

# 1 **Online tourism destination image: components, information sources, and** 2 **incongruence**

## 3 **Abstract**

4 This article considers the three modes of signification of images (i.e., designative, appraisive,  
5 and prescriptive) to understand incongruences between different image formation agents.  
6 Quantitative and qualitative techniques were used to compare texts (208,348 words) and  
7 pictures (4,990) from four sources (DMO, agencies, guides, and blogs) of images about  
8 Barcelona. The results explained incongruences between sources. Blogs and agencies tend to  
9 offer more images with appraisive meaning than other sources. Guides and blogs tend to offer  
10 more prescriptive images of the destination. This study emphasizes that the designative,  
11 appraisive, and prescriptive components are valuable conceptualizations to study tourism  
12 destination image.

## 13 **Keywords**

- 14 1. Online destination image
- 15 2. Modes of signification
- 16 3. Designative, appraisive, and prescriptive meaning
- 17 4. Image incongruence
- 18 5. Image components
- 19 6. Information sources
- 20 7. Text and pictures
- 21 8. Chinese outbound tourism
- 22 9. Barcelona
- 23 10. Europe

24 **Word count:** 8683

## 25 **1. Introduction**

26 Destination image has been widely recognized as an important construct influencing tourism-  
27 related decision making, destination marketing, and tourist behavior (Picazo & Moreno-Gil,  
28 2019; H. J. Song, Wang, & Han, 2019). Scholars generally agree that destination image  
29 includes several components, such as cognitive, affective, and conative elements (Gartner,  
30 1994). Designative, appraisive, and prescriptive semantic aspects have also been identified  
31 (Marine-Roig, 2019). With the rise of the internet, it is common for travelers to refer to  
32 numerous online information sources (Camprubí & Coromina, 2017). However, notable  
33 image gaps and incongruence may exist between different sources, platforms or agents (Choi,  
34 Lehto, & Morrison, 2007; Tang, Choi, Morrison, & Lehto, 2009).

35 Currently, various agents are creating and disseminating online images about destinations  
36 without destination promoters' input. Understanding image incongruence has thus been  
37 deemed crucial in evaluating promotional marketing efforts (Pavesi, Denizci Guillet, & Law,  
38 2016). Even so, studies focusing on one type of information source have received most  
39 academic attention (Picazo & Moreno-Gil, 2019; Standing, Tang-Taye, & Boyer, 2014).  
40 Comparatively few studies have considered incongruence among induced, autonomous, and  
41 organic information sources (Marine-Roig & Ferrer-Rosell, 2018). Moreover, no research  
42 appears to have analyzed image incongruence by examining the three modes of signification  
43 (i.e., designative, appraisive, and prescriptive).

44 Barcelona, situated on the Eastern Mediterranean coast of the Iberian Peninsula, is a historic  
45 city that was founded by the ancient Romans and evolved via various processes. Tourism  
46 largely developed during the 1950s through Fordist tourism trends, and the city entered its  
47 current post-Fordism stage after the 1992 Olympic Games (Garay & Cànoves, 2011). The  
48 works of modernist architect Antoni Gaudí (1852–1926), such as Las Ramblas boulevard and  
49 the sea promenade, are major physical representations of this city. However, problems have  
50 recently arisen due to over-tourism and residents' discontent.

51 Barcelona currently faces the challenge of diversifying its tourism market and understanding  
52 its city image in international contexts. In this case, Chinese and other East Asian markets  
53 provide opportunities for destination development (Barcelona Turisme, 2018; Lojo & Li,  
54 2018). However, researchers have yet to evaluate the image incongruence of a European city  
55 based on local and Chinese information sources (Lojo, Li, & Cànoves, 2019). It is therefore  
56 salient to explore the Chinese destination image of Barcelona, particularly because is

57 conducive to establishing a more effective marketing development agenda for Barcelona (and  
58 other European cities) targeting the Chinese market.

59 Against this backdrop, this study takes the three modes of signification of signs (Holbrook &  
60 Hirschman, 2012; Morris, 1971) as a theoretical framework to analyze Barcelona's  
61 destination image as presented by different local and Chinese information sources. The  
62 specific objectives of this study are as follows: 1) to advance understanding of the  
63 conceptualization of destination image components, namely by analyzing three modes of  
64 image meaning (i.e., designative, appraisive, and prescriptive); 2) to establish relationships  
65 between and insights into tourism information sources to explain image incongruence and  
66 information gaps; and 3) to determine Barcelona's tourism image among chosen local and  
67 Chinese sources, thus presenting a case study of destination image in cross-cultural contexts.

## 68 2. Literature review

### 69 2.1. Tourism destination image

70 In line with Crompton (1979), tourism destination image is defined in this article as the sum  
71 of beliefs, ideas, and impressions a person possesses about a specific place. The image of a  
72 destination is especially important because it conveys the destination's offerings, affects the  
73 destination's competitive positioning, and plays a pivotal role in tourism marketing (Al-Ansi  
74 & Han, 2019). Destination image also shapes tourists' expectations, visit intentions,  
75 satisfaction, behavior in the destination, and overall destination experience (Moon & Han,  
76 2019). An overall image is also tied to the attributes of a tourist destination, is influenced by  
77 cultural differences, and includes a range of destination qualities (e.g., atmosphere, shapes,  
78 materials, social environment, services, and attitudes) (Al-Ansi & Han, 2019).

79 Destination image falls along the tourist experience continuum, which includes pre-, during,  
80 and post-trip considerations. Before a trip, an attractive destination image increases travelers'  
81 emotional and behavioral involvement, enhances their purchase intentions, and influences  
82 their decision-making process (Kim, Kim, & Han, 2019). During a trip, destination image is  
83 linked to different levels of involvement, selection of activities, and fulfillment of  
84 expectations. At this stage (*in situ*), as destination-related images are subject to change,  
85 travelers can modify earlier tourism images based on their actual experiences in the  
86 destination (Gartner, 1994). After a trip, a positive destination image affects visitor loyalty,  
87 repeat purchase behavior, satisfaction, love, trust, and positive word of mouth (Bronner & de  
88 Hoog, 2011; Han, Shim, Lee, & Kim, 2019; Han, Yu, & Kim, 2019).

### 89 2.2. Components of destination image

90 In the article "Image Formation Process," Gartner (1994) proposed that three components—  
91 cognitive, affective, and conative—compose a hierarchical causal model of destination  
92 image. The cognitive component refers to what one knows about the destination (i.e., beliefs,  
93 ideas, and impressions); the affective component is related to one's sense of the destination  
94 (i.e., emotional reactions, responses, and feelings); and the conative aspect refers to one's  
95 destination-related behavior (e.g., actions, visit/revisit intention, and intention to spread  
96 positive word of mouth) (Agapito, Valle, & Mendes, 2013). This trichotomous model is  
97 consistent with Boulding's (1956) concept of image, explained in the book *The Image:  
98 Knowledge in Life and Society*; in this context, images function as conveyors of different  
99 types of knowledge to clarify individual behavior.

100 Marine-Roig (2019) presented a secondary model to understand the components of tourism  
101 image in which a composite destination image is shaped by designative, appraisive, and  
102 prescriptive modes of meaning that, in turn, are associated with cognitive, affective, and  
103 conative components. This model was adapted from Pocock and Hudson's (1978) concept of  
104 environmental images and is grounded in Morris's (1971) semiotic analysis of signs as  
105 published in his *Writings on the General Theory of Signs* (1971). The three modes relate to  
106 three levels of meaning derived from images. Here, images are understood as signs or  
107 "objects" from external sources (Holbrook & Hirschman, 2012; Nerlich & Clarke, 1996).  
108 This analytical approach thus appears well suited to evaluating tourism images shared online.

109 In the current paper, online images are understood as "sign-vehicles," while the three image  
110 components are taken as signifying modes (i.e., designative-appraisive-prescriptive). This  
111 semiological approach fits within the neopositivistic perspective on consumer behavior  
112 (Holbrook & Hirschman, 2012). Synthesizing earlier work (Holbrook & Hirschman, 2012;  
113 Marine-Roig, 2019; Nerlich & Clarke, 1996), the three modes of meaning are defined as  
114 follows. Designative meaning refers to physical characteristics (e.g., structural, form-based,  
115 spatial, and temporal dimensions) of the destination that can be read from images; this mode  
116 is related to factual knowledge, such as description and identification. The appraisive  
117 component refers to tourists' destination evaluations, preferences, emotional responses, and  
118 values and is related to the communication of expectations. Third, the prescriptive component  
119 is based on tourists' predictions, inferences, and attitudinal responses; in particular, this mode  
120 conveys procedural knowledge and behavior (**Figure 1**).

121 [Insert **Figure 1** around here]

### 122 **2.3. Tourism online information sources**

123 Today, the internet is the primary image communication channel (as a secondary or external  
124 source) for private and public tourism organizations (Akehurst, 2009). Online sources and  
125 social media, in addition to facilitating information access and immediacy, are essential to the  
126 multilayered formation and transmission of destination image. One model used to categorize  
127 the multiple agents of image formation first appeared in Gartner's (1994) article entitled  
128 "Image Formation Process" and has been extensively applied in research on online sources  
129 (Camprubí et al., 2013; Mak, 2017). In brief, Gartner (1994) identified three main types of  
130 secondary sources: (1) induced sources (from destination promoters); (2) autonomous sources  
131 (from stakeholders who do not need to promote the destination); and (3) organic sources  
132 (from individuals).

133 In addition, destination image (as a social construct) can be divided into projected and  
134 perceived images (Mak, 2017). These dimensions can be further related to supply agents  
135 (projected) and demand agents (perceived) (Marine-Roig & Ferrer-Rosell, 2018). Projected  
136 images are generated by diverse stakeholders with specific purposes, whereas perceived  
137 images constitute travelers' perceptions of a particular destination. However, in recent years,  
138 tourists have become consumers and emitters of images; travelers' personal photographs,  
139 perceptions, comments, reviews, and experiences are posted on social media, blogs, online  
140 travel reviews, and other platforms (Garay & Cànoves, 2015; Mak, 2017; Marine-Roig &  
141 Clave, 2016). Tourists can now share perceived images, which further contribute to the  
142 projected images available for consultation—the “hermeneutic circle of representation”  
143 (Mak, 2017).

144 From an organizational viewpoint, Lojo and Timothy (2020) classified secondary sources of  
145 image formation based on origin and purpose. First, sources can be either “tourism-focused”  
146 (where their main aim is to convey images related to tourism products and experiences, such  
147 as in publicity campaigns by destination marketing organizations [DMOs]) or “non-tourism-  
148 focused” (e.g., in news coverage, general literature, or film). Tourism-focused agents can be  
149 further divided into (a) official organizations or DMOs interested in promoting tourism to the  
150 destination; (b) agencies or other intermediaries (i.e., public or private organizations) trying  
151 to sell travel packages or other tourism-related products (without a main goal of selling  
152 information *per se*); (c) information brokers (i.e., public or private organizations) that sell  
153 information products, such as guides or travel magazines; and (d) travelers seeking to share  
154 their experiences (e.g., through user-generated content [UGC]) (**Figure 2**).

155 [Insert **Figure 2** around here]

#### 156 **2.4. (In)congruence in destination image**

157 Due to the growing number of information channels and information agents, the actual image  
158 of a tourism destination is a multilayered structure consisting of a relational network of agent  
159 types. Accordingly, multiple representations of a particular destination are often incongruent  
160 (Camprubí & Coromina, 2017; Camprubí, Guia, & Comas, 2014; Mak, 2017; Marine-Roig &  
161 Ferrer-Rosell, 2018). Such incongruence can manifest between (a) different platforms from  
162 the same provider, such as DMOs' online webpages and printed brochures (Singh & Formica,  
163 2008); (b) different media formats (e.g., text vs. picture) (Hsu & H. Song, 2013); and (c)  
164 different information sources (H. Song & Hsu, 2013).

165 In this context, most congruence studies have been bidimensional and assessed discrepancies  
166 between projected and perceived images (Bui, 2011; Mak, 2017; Marine-Roig & Clave,  
167 2016). Few researchers have considered induced, organic, and autonomous agents of image  
168 formation (Choi et al., 2007; Marine-Roig & Ferrer-Rosell, 2018; Michaelidou, Siamagka,  
169 Moraes, & Micevski, 2013; Tang et al., 2009). Choi et al. (2007) and Tang et al. (2009)  
170 analyzed Macau's image on its official tourism website, tour operators' websites, online  
171 travel magazines and guide websites, and online travel blogs. Similarly, Michaelidou et al.  
172 (2013) examined 1,626 photographs from a DMO website, guides, travel agencies, and UGC  
173 related to Taiwan. Marine-Roig and Ferrer-Rosell (2018) recently proposed using composite  
174 analysis to evaluate Catalonia's image and related information gaps between content from  
175 induced (regional tourism board), autonomous (travel guides), and organic (online reviews)  
176 agents.

177 Understanding such (in)congruence has been acknowledged as invaluable in evaluating  
178 promotional efforts in marketing settings (Pavesi et al., 2016). The congruence between  
179 media-projected and traveler-perceived destination image could also enhance visitors' trip  
180 satisfaction and expectancy fulfillment (H. Song & Hsu, 2013). Among consumers,  
181 congruent information is more frequently recalled, easily understood, and deemed more  
182 relevant (Singh and Formica, 2008). Incongruent information may be perceived as more  
183 humorous, surprising, or shocking and can thus elicit stronger affective responses (Singh &  
184 Hu, 2012). Overall, it is necessary to examine source congruence to better understand various  
185 aspects of destination promotion (e.g., marketing efforts; brand recognition; and tourists'  
186 demands, expectations, and needs) and to develop effective destination marketing agendas  
187 (Bui, 2011; Marine-Roig & Ferrer-Rosell, 2018).

## 188 **2.5. Research gap, setting, and theoretical stance**

189 In summary, studies on destination image have sought to discover how people feel about,  
190 think about, and visualize places. Research has also focused on which destination images are  
191 emitted, consumed, and created. In terms of incongruence in destination image, tourists'  
192 perceived images have been found to be misaligned with those supplied by marketers,  
193 magazines, guides, or other sources (Camprubí & Coromina, 2017). Despite congruence-  
194 related issues, literature reviews (Picazo & Moreno-Gil, 2019; Standing et al., 2014) have  
195 indicated that most tourism image research has considered a single destination image source.  
196 Even in cases where different sources are sampled, limited articles have examined different  
197 source types (e.g., induced, autonomous, and organic) and different components of tourism  
198 image (Marine-Roig & Ferrer-Rosell, 2018).

199 By taking a new perspective, the aforementioned three modes of signification of images (i.e.,  
200 designative, appraisive, and prescriptive) (cf. Marine-Roig, 2019; Morris, 1971) were  
201 considered to assess inter-source congruence. This analytical approach appears well suited to  
202 evaluating tourism images shared online, because it allows to consider images as “objects”  
203 from external sources. Based on the preceding considerations and to achieve a fuller  
204 representation of organizations that serve as image sources (Lojo & Timothy, 2010), four  
205 image formation agents were sampled in this study: a local DMO (induced), travel agencies  
206 (induced), travel guides (autonomous), and UGC (organic).

207 In addition, tourism academia has called for more cross-cultural studies to explore image-  
208 related effects, differences, and gaps (Al-Ansi & Han, 2019; Bandyopadhyay & Morais,  
209 2005). Consequently, to investigate a contemporary phenomenon with timely marketing  
210 relevance, this article presents an empirical study on the congruence of Barcelona’s  
211 destination image between Chinese and local sources. European destinations are  
212 geographically and culturally distinct from those in East Asia, hence the need for secondary  
213 agents of image formation.

214 The theoretical stance and the research setting of this research are unique and reveal new  
215 findings and conceptual development. A quasi-positivist philosophical position was  
216 employed along with an inductive method; that is, this study was not guided by research  
217 hypotheses but rather by the objectives stated in the introduction. Therefore, results offer  
218 novel insight into (a) the three modes of signifying applied to tourism destination image, (b)  
219 destination image congruence, (c) and East Asian tourists’ needs when visiting Western  
220 destinations.



## 221 **3. Methodology**

### 222 **3.1. Sample and data extraction**

223 This article compares four image sources related to Barcelona: (1) the city’s local DMO website; (2)  
224 all Barcelona-related travel products offered by the three leading Chinese online travel agencies (i.e.,  
225 Ctrip, Tuniu, and Ly); (3) Chinese online travel guides; and (4) Chinese travel blogs. First, the  
226 website of Barcelona’s DMO (Barcelona Turisme) is the most complete source to obtain a current  
227 and official representation of the city; the DMO oversees Barcelona’s strategic planning, promotion,  
228 and development. Second, the focal online travel agencies and travel guide websites were chosen  
229 based on popularity using the web ranking tool [www.alexa.com](http://www.alexa.com). Three travel agencies were  
230 sampled, which offered 108 products across 37 suppliers including Barcelona as a destination. Nine  
231 guidebooks were obtained from a total of eight sources. Fourth, the [qyer.com](http://qyer.com) platform is the most  
232 popular and interactive online Chinese forum for discussing tourism and posting travel-related blogs  
233 (Chen, Guevara, & Alarcón, 2017; Lojo & Cànoves, 2015; Wu & Pearce, 2014). Seventeen blogs  
234 containing information about Barcelona, all of which received a high number of views and  
235 comments, were selected from the platform.

236 Altogether, texts and pictures were retrieved from 13 source websites (**Table 1**) through a web-  
237 scraping procedure using Web Scraper software, a Mozilla add-on. Downloaded data were saved as  
238 text-only archives and .jpeg pictures. The target content from websites was gathered via web  
239 scraping during April and May 2017.

240 [Insert **Table 1** around here]

### 241 **3.2. Sample characteristics and processes**

242 First, the textual data were homogenized. Local DMO information was downloaded in English, and  
243 Chinese-language information was translated into English by a bilingual translator with the help of  
244 computer tools. To facilitate further analysis, linguistic units were created on an analogous basis:  
245 synonyms and similar words were changed into the same form, and local names were simplified and  
246 standardized in all documents. In addition, stop-words such as “a,” “the,” and “at,” which contain  
247 limited lexical meaning, were deleted from the original text.

248 Second, the collected pictures were ordered by file size in kilobytes (unit of digital information).  
249 Pictures of less than 3 kilobytes were deleted because these files included only thumbnails, buttons,  
250 icons, banners and navigation menus. Additionally, pictures that contained design elements (related  
251 to the websites) and not to the image of Barcelona were also deleted (without regard to their size).” It

252 should be noted that “pictures” are defined in this article as artifacts that depict visual perceptions  
253 (e.g., photographs, maps, illustrations, screenshots). The final dataset consisted of 60,908 words and  
254 671 pictures from Barcelona’s DMO website; 46,667 words and 1,114 pictures from travel agencies’  
255 websites; 50,167 words and 1,475 pictures from travel guides; and 50,606 words and 1,730 pictures  
256 from blogs (**Table 2**).

257 [Insert **Table 2** around here]

### 258 **3.3. Data analysis methods**

259 This paper relies on content analysis, an observational research method that examines a body of  
260 material to capture themes and meaning from selected information sources. Quantitative and  
261 qualitative approaches are the two main epistemological positions employed in this article. The  
262 chosen quantitative approach involved inductive reasoning and has been found useful for classifying  
263 large sets of collected data into fewer categories of meaning (Stepchenkova, 2012). The qualitative  
264 approach requires assessment and interpretation of results while focusing on the complexity and  
265 nuances of meaning (Wu & Pearce, 2014).

266 First, a quantitative analysis of the most common words and phrases was performed to determine  
267 differences in semantic representations of Barcelona. The most frequent words and concepts were  
268 identified and then compared, namely to reveal the highest frequencies in the datasets. The text  
269 analysis software AntConc was used to extract keyword rankings (Anthony, 2016), which enabled  
270 the authors to compare the primary topics in each information source and the rankings of the most  
271 often mentioned attractions. This process has been deemed appropriate for obtaining the manifest  
272 content of themes and the most important keywords that explain destination images.

273 Second, the sample dataset included 4,990 pictures that were examined. Tourism research on  
274 destination image generally lacks standard criteria for measuring and evaluating the visual content of  
275 pictures (Picazo & Moreno-Gil, 2019). Thus, a mixed approach combining qualitative coding and  
276 hierarchical frequency analysis was used to ascertain the frequency of picture-related themes. A  
277 distribution based on themes and categories (see **Table 4**) is reasonable for inductive categorization  
278 (Wu & Pearce, 2014). All pictures were manually examined and coded according to their  
279 representations. In addition, the texts were carefully reviewed to perform manual categorization and  
280 coding to identify relationships and patterns; the conceptualization of themes behind pictures can be  
281 found in **Supplemental material 1**.

282 Third, to interpret the results of quantitative and qualitative analyses, a comparative approach was  
283 adopted, and findings were conceptualized to understand image (in)congruence. Following the

284 literature review, designative, appraisive, and prescriptive modes of signification were taken as the  
285 main conceptual variables. Findings from the frequency analysis (texts) and hierarchies of themes  
286 (pictures) were used to compare the designative aspect (**Table 3, Table 4, Figure 3**). For the  
287 appraisive component, the traditional approach to categorizing estimation processes as two general  
288 types of representations (i.e., either negative or positive) was used (An, Ji, Marks, & Zhang, 2017;  
289 Lomas & Ivztan, 2016); that is, emotions and evaluations can be either negative (e.g., unpleasant,  
290 sad, distressing) or positive (e.g., pleasant, happy, relaxing). Similar to prior work (Lin, Chen, &  
291 Park, 2012; Sun, Ryan, & Pan, 2015), this study incorporated qualitative content to obtain  
292 positive/negative estimations (**Figure 4**). Quantitative and qualitative analyses were both applied to  
293 interpret the prescriptive meaning behind texts and pictures (**Figure 5**).

294 Fourth, to ensure the validity and consistency of the data analysis and results, the study sample  
295 included a large amount of textual content and visual representations (i.e., pictures). To accurately  
296 assess subgroup differences, sampled contents were balanced among information sources, and a  
297 comparative perspective was assumed. To operationalize the applied concepts, the authors cross-  
298 checked major variables and themes. To enhance the reliability of qualitative procedures, the authors  
299 cross-checked the coding process and identified categories until all interpretations resulted in  
300 agreement. Specifically, the following analytical qualitative approach was employed (Wu & Pearce,  
301 2014): (a) themes and codes generated from pictures and texts were inductively identified; (b) codes  
302 were examined and transformed into categories of meaningful and representative designation  
303 images, patterns, and phrases; and (c) to interpret research findings, the analytical relationships  
304 between sampled information sources were considered in light of the previous steps. In terms of  
305 ethical considerations, the authors sought blog authors' permission to use personal photographs as  
306 needed.

307

## 308 4. Findings: Incongruence in Barcelona's destination image

### 309 4.1. Designative meaning

310 **Table 3** shows the most frequent words in rank order for the four information sources and  
311 indicates the designative foci of these sources. Findings revealed the *what*, *where*, and *when*  
312 about Barcelona. The city's DMO website depicted Barcelona as an urban destination ("city")  
313 that is rich in material heritage ("building") and has different points of interest ("area"). This  
314 source also highlighted Barcelona's position within the northeasternmost autonomous region of  
315 Spain (i.e., "Catalonia"). Overall, the DMO emphasized city attractions by focusing on  
316 Barcelona's urban character and open spaces (e.g., the general area, streets, parks, and  
317 markets) as well as its material and artistic heritage (e.g., buildings, architecture, houses, and  
318 sculptures).

319 [Insert **Table 3** around here]

320 Second, Chinese travel agencies' top 20 most frequently used words describing Barcelona  
321 indicated that these image formation agents placed greater designative focus on the city's  
322 iconic cultural attractions, such as architecture and famous urban areas (e.g., Sagrada Familia,  
323 Park Güell, Las Ramblas, and Casa Milà). They highlighted the renowned architect Gaudí and  
324 used many descriptive nouns (e.g., "world," "Spain," "design," "color") and adjectives (e.g.,  
325 "famous," "large," "Olympic"). Third, Chinese guides tended to mention descriptive geo-  
326 contextual elements (e.g., "Spain," "Catalonia") and infrastructure features (e.g., "bus,"  
327 "ticket," "airport," "train," "metro," "walk," "car") as well as major city attractions (e.g.,  
328 Gaudí, museums, art, Las Ramblas). Fourth, Chinese blogs provided much more varied  
329 depictions of Barcelona, including terms such as "tickets," infrastructure elements (e.g.,  
330 "metro," "airport"), and the concept of leisure shopping ("shop"). Blogs also portrayed the  
331 heritage elements (e.g., "Sagrada Familia," "Gaudí," "church," "Casa Batlló") and artistic  
332 elements (e.g., "design," "color") of the city.

333 Analysis of the contents of pictures unveiled the following image themes: (1) public space, (2)  
334 monumental heritage, (3) paintings and museums, (4) intangible culture, (5) other places and  
335 experiences, (6) infrastructure, (7) and tourist realities (**Table 4**). The first six themes correspond to  
336 photographs, while the seventh theme also includes maps, screenshots, and annotated photographs.  
337 In this study, the largest number of DMO images involved intangible cultural elements such as live  
338 performances, artistic events, shows, and gastronomy. Overall, Barcelona's DMO demonstrated a  
339 balanced distribution of the first six themes (**Figure 3**).

340

[Insert **Table 4** around here]

341 Among analyzed travel agencies, most pictures included representations of Barcelona’s traditional  
342 tourist attractions; photographs of the city’s architectural and monumental heritage accounted for  
343 more than 40% of all pictures. Specifically, nearly one-fifth of all images were related to Sagrada  
344 Familia. With respect to image incongruence, travel agencies rarely offered representations of  
345 museums, artistic events, and festivities. By comparison, tourist guides focused on images involving  
346 public space (27.25%) and infrastructure (26.58%), such as accommodations or transportation  
347 options.

348 Travel blogs reflected Chinese bloggers’ affinity for Barcelona’s monumental and architectural  
349 heritage (35% of pictures), with Gaudí’s buildings constituting the largest proportion of photographic  
350 expression. Elements indicative of immaterial culture, such as gastronomy and urban markets, also  
351 defined Chinese tourists’ perceived image of Barcelona. Travel blogs were also unique in their total  
352 absence of pictures of Barcelona-related sports and mountainous landscapes (e.g., Montserrat, a  
353 UNESCO Natural World Heritage Site). Museums, artistic shows, and amusement parks, such as the  
354 aquarium or Tibidabo, also received little attention. Regarding the theme of “tourist realities,”  
355 bloggers added new image categories: selfies and photographs of family and friends, explanatory  
356 screenshots, and pictures related to ticket purchases and specific locations.

357

[Insert **Figure 3** around here]

## 358 **4.2. Appraisive meaning**

359 In addition to the designative function of images, incongruence also characterized the  
360 appraisive dimension. For Barcelona’s DMO, positive aspects revolved around friendly public  
361 spaces and urban landscapes, modernist buildings and architecture, the city’s arts scene, and  
362 the vast array of urban, sea, and mountain sports to be enjoyed. Chinese travel agencies noted  
363 the city’s overall positive vibe as a famous, colorful, beautiful, and relaxing destination. These  
364 agencies also highlighted the importance of Gaudí as the “greatest exponent of modernism”;  
365 the context of “novelty” and “discovery” associated with this geographic area (i.e., Barcelona,  
366 Spain, and Europe); and the convenience and usefulness of the group tour itineraries,  
367 restaurants, and cozy hotels. Travel guides also connoted Barcelona’s architecture with  
368 positive evaluations and focused on the pleasure associated with enjoying the local culture,  
369 gastronomy, and festivities. Blogs’ positive representations were linked to Gaudí, shopping,  
370 and photographs (especially selfies and pictures of family members and friends visiting  
371 renowned landmarks). Moreover, blogs added another dimension to the positive assessment of

372 Barcelona in terms of its lively nightlife compared to other European destinations, the presence  
373 of the sea within the city, and the friendly locals.

374 Among negative images, it was unsurprising to find that induced agents of image formation in  
375 the study sample (i.e., Barcelona’s DMO and travel agencies) presented no negative  
376 evaluations; after all, their objective is to draw visitors to the destination. Conversely, travel  
377 guides (autonomous agent) and blogs (organic agent) contained negative comments that shared  
378 some similarities. Congruence was observed in poor evaluations regarding experiences with  
379 theft and queues (e.g., sources noted that Barcelona is considered the “pickpocket capital of the  
380 world” with “endless queues”). Travel guides also remarked on the inconvenience of different  
381 currencies and credit cards (e.g., China’s UnionPay is not accepted at most businesses in  
382 Barcelona). Blogs referred to language challenges and problems accessing relevant  
383 information, booking services, and trip arrangements.

384 Overall, in this sample, Barcelona’s DMO website and travel guides were more restrained and  
385 less emphatic in their positive appraisals. More emphatic appraisive content was found among  
386 travel agencies (with positive evaluations) and travel blogs (with positive and negative  
387 evaluations). Collectively, the greatest incongruence in positive images occurred between the  
388 local source (Barcelona’s DMO) and the Chinese blogs (**Figure 4**). Barcelona’s DMO was  
389 found to project a complex city image in which public space was the main attraction, including  
390 sports and activity-based tourism images. DMO-related tourist ventures included visits to  
391 museums, artistic spectacles, theme parks (e.g., the Aquarium and Tibidabo), and a variety of  
392 activities including urban biking, sea sports and sailing, running, trekking, and visiting nearby  
393 vineyards or the Montserrat mountain. Comparatively, the blogs referred to the tourist  
394 experience as a traditional sightseeing trip: the most entertaining aspects of traveling to  
395 Barcelona included sightseeing (e.g., architectural sites, markets, and the FCB stadium),  
396 spending time with family and friends (in a friendly and cultural destination), and enjoying  
397 shopping and local food. Despite this dissonance in positive tourist experiences, both sources  
398 were relatively congruent in their praised destination attributes.

399 [Insert **Figure 4** around here]

### 400 **4.3. Prescriptive meaning**

401 Source incongruence also manifested in the prescriptive dimension of Barcelona’s destination image.  
402 Blogs and guides tended to provide more images with a prescriptive function compared to the DMO  
403 website and travel agencies. On one hand, blogs and guides presented more information linked to  
404 procedural and practical knowledge to showcase the accessibility and availability of basic tourism

405 services. On the other hand, travel agencies and Barcelona’s DMO offered more descriptive images  
406 of the destination, linked to imagery of traditional tourist attractions and sightseeing to convey  
407 images of “what” the destination is (i.e., description). Blogs and guides presented more images about  
408 transportation, mobility, hotels, tax refunds, and shopping along with insight into “how to be a  
409 tourist” in Barcelona.

410 Images with prescriptive meaning also included advice about accommodations, tickets, schedules,  
411 routes, queueing, maps and locations, and travel-related obstacles when visitors lacked knowledge of  
412 Spanish or had limited English proficiency. These types of information often generated active  
413 discussion in blogs’ comment sections, where users expressed appreciation for the tips or requested  
414 additional details: “This post helped me a lot, especially the airport introduction, including how to  
415 buy a ticket and how to rent a car. Thank you so much!”. On blogs, the prescriptive function of  
416 images was framed within the textual and visual imagery of tourists’ shared maps, screenshots, and  
417 annotated maps and by posters’ recommended apps to use while traveling. Therefore, blogs indicated  
418 Asian tourists’ information needs, whereas the DMO’s online webpage did not. The most notable  
419 image gap involved information related to cell phone usage, transportation (i.e., getting to, from, and  
420 around the city), shopping, tourist bookings, and tickets for attractions. **Figure 5** presents six pictures  
421 drawn from blogs explaining this dimension of tourists’ destination image.

422 [Insert **Figure 5** around here]

## 423 5. Discussion

### 424 5.1. Descriptive synthesis

425 The results of this study suggest that different information sources convey different images of  
426 Barcelona as a tourist destination based on a three-level analysis. At the designative level, the city's  
427 DMO website images were centered around urban landscapes, Barcelona's diverse buildings and  
428 architectural sights, the local arts scene, tourism activities, and the regional context of Catalonia  
429 (**Table 4**). Travel agencies' images were more focused on famous landmarks, such as Las Ramblas  
430 boulevard and Gaudí's works. Thus, specific public spaces and monumental heritage constructed the  
431 image for this source, practically disregarding other designative themes (**Figure 3**). Travel guides'  
432 images of Barcelona included a larger number of famed attractions with less focus on architectural  
433 heritage and a greater focus on the city's infrastructure. Lastly, travel blogs' images depicted the  
434 city's monumental heritage along with representations of its infrastructure, gastronomy, and tourist  
435 realities (e.g., selfies, maps, or personal photographs). Overall, the Chinese image was more closely  
436 tied to the geographical context of Spain and Europe.

437 At the appraisive level, findings show that all sources conveyed a positive image of the destination  
438 overall. These positive assessments outweighed the negative, leading Barcelona's image to be  
439 markedly positive. Only travel guides and travel blogs presented negative images. Most  
440 incongruence in Barcelona's appraisive image was related to enjoyable city activities: the DMO  
441 projected images of sports, appreciation of nature, mountainous landscapes, forests, and live  
442 performances and events, whereas Barcelona's image in the Chinese sample illustrated a more  
443 traditional sightseeing experience (e.g., enjoying famed landmarks, gastronomy, and shopping)  
444 (**Figure 4**). Travel agencies and blogs tended to showcase more appraisive images (i.e., images that  
445 expressed greater subjectivity, emotion, and evaluation).

446 At the prescriptive level, sampled sources referred to itineraries, schedules, routes, and  
447 infrastructure-related information. Travel guides and blogs also provided instructions on avoiding  
448 aforementioned negative elements of Barcelona; such tips are relevant to the prescriptive function of  
449 blogs, which also offered advice to prospective travelers and provided space for questions and  
450 answers. Information about tickets, tax refunds, map usage, using foreign cellphone apps (e.g.,  
451 Google Maps), and language issues were also discussed to transmit/obtain procedural knowledge  
452 about the destination. Travel agencies and the DMO website contained less prescriptive content. In  
453 the study sample, these sources focused on "what is Barcelona" (e.g., attractions, places, locations,  
454 and history). By contrast, Barcelona-related blogs and guides offered more information and images  
455 regarding "how to be a tourist" in Barcelona (i.e., serving a prescriptive function).



## 456 5.2. Conceptual development

457 An integrative interpretation of these results is related to the study objectives and relevant  
458 literature. This section is structured around three research areas: (1) components of the  
459 destination image and its meaning; (2) relationships between information sources and image  
460 incongruence; and (3) Barcelona's tourism image as demonstrated by local and Chinese  
461 sources.

462 First, this study sought to analyze Barcelona's destination image by examining three modes of  
463 signification (i.e., designative, appraisive, and prescriptive). This framework and corresponding  
464 findings align with the proposition that all images must designate something, but not all images (nor  
465 all image formation agents) must communicate appraisals or prescriptions. Research has shown that  
466 the cognitive elements associated with destination attributes often dominate destination image  
467 (Baloglu & McCleary, 1999; Mak, 2017; Michaelidou et al., 2013); however, little is known about  
468 *why* this is the case. By relating a destination's cognitive, affective, and conative components to  
469 three modes of signification (Holbrook & Hirschman, 2012; Marine-Roig, 2019), it is possible to  
470 determine why fewer affective and conative images were identified in prior studies: all images have  
471 a *designatum*, but not all *designata* have appraisive or prescriptive meaning. As indicated throughout  
472 this article, designative, appraisive, and prescriptive functions each belong to the continuum of  
473 summative image meaning (**Figure 6**).

474 [Insert **Figure 6** around here]

475 The findings of this study and accompanying interpretations imply that the chosen framework (i.e.,  
476 modes of signification) is useful for delineating the components of tourism destination image (e.g.,  
477 Marine-Roig, 2019). This article further shows that this theoretical framework is suitable for (a)  
478 textual and pictorial (e.g., photographs, illustrations, and maps) content and (b) several agents of  
479 image formation. **Figure 7** provides an example of the same picture (an annotated transportation  
480 ticket from a Chinese blog) and the three noted levels of meaning. In this case, key concepts emerge  
481 from both the textual (i.e., accompanying sentences, caption, and titles) and pictorial (i.e., the actual  
482 visual representation) content.

483 [Insert **Figure 7** around here]

484 Second, these findings enrich the literature on tourism destination image incongruence based  
485 on various information sources. The results unveil noticeable levels of incongruence in online  
486 images between the four examined sources, similar to earlier analysis (Choi et al., 2007;  
487 Marine-Roig & Ferrer-Rosell, 2018; Michaelidou et al., 2013; Tang et al., 2009). Expanding

488 upon previous research, the findings of this study explain gaps (or incongruence) using two  
489 well-defined dimensions, namely appraisive and prescriptive. According to the appraisive  
490 dimension, blogs and agencies were more emphatic in their positive appraisals and more  
491 congruent. Blogs appear more distinct (i.e., more incongruent) from Barcelona's DMO. Based  
492 on the prescriptive dimension, blogs and travel guides are more similar to each other (i.e., more  
493 congruent), whereas agencies and the DMO are on the other side of the axis. As displayed in  
494 **Figure 8**, the organic (i.e., blogs) and locally induced (i.e., the DMO) sources tend to share a  
495 more incongruent image, consistent with Marine-Roig and Ferrer-Rosell (2018). Travel  
496 agencies and guides also exhibit greater incongruence.

497 [Insert **Figure 8** around here]

498 Third, these findings facilitate interpretation of Barcelona's current multimodal tourism image  
499 in a cross-cultural context. In this case study, differences in the city's tourism image may be  
500 explained by the social origins of information sources, which are rooted in distinct cultures  
501 (i.e., East and West; Spain and China). This observation echoes prior studies demonstrating  
502 that cultural differences and geographical distance influence (a) destination image (Tang et al.,  
503 2009), (b) information needs (Lojo & Timothy, 2020), and (c) use of information sources (Tan  
504 & Chen, 2012). The results of this study also show that neither Barcelona's local DMO nor its  
505 tourism industry anticipated these elements; the DMO website did not supply the images and  
506 information Chinese tourists needed. Consequently, although the Chinese market is highly  
507 valued by the local DMO (Barcelona Turisme, 2018), the main destination image projected by  
508 this DMO as evidenced by the Barcelona website does not align with Chinese sources'  
509 projected and perceived images.

### 510 **5.3. Managerial implications**

511 These findings demonstrate that various online representations of Barcelona exist, all of which  
512 complement, contradict, and supplement each other. Since the 1990s, Barcelona's traditional tourism  
513 image, as marketed by its local DMO, has been firmly linked to Gaudí, architecture, and culture.  
514 More elements have been added recently (**Table 3**), and the city's induced image from this source is  
515 now constructed of art, museums, intangible culture, festivities, festivals, sports, tourist activities,  
516 and services. This diversity corresponds to the DMO's current efforts to diversify Barcelona's  
517 tourism products with the aim of avoiding overcrowding (Ajuntament de Barcelona, 2020).

518 Even so, this study indicates that Chinese bloggers' and travel agencies' images of Barcelona  
519 represent highly traditional city representations (i.e., Gaudí and the city's architectural heritage).  
520 **Tables 3** and **4** show that both sources largely lack imagery related to art, museums, and other

521 tangible elements of local culture, sports, and events. The absence of these elements suggests that  
522 Barcelona's image in the Chinese tourism market does not align with the DMO's objectives.  
523 Therefore, the DMO should consider the findings of congruence studies to determine the success of  
524 marketing efforts geared toward distinct travel markets.

525 These findings further reveal that Chinese travel agencies and blogs mediate Barcelona's image  
526 through its national representations; for example, within these two sources, "Spain" was respectively  
527 the 4<sup>th</sup> and 6<sup>th</sup> most frequently mentioned word. In the case of the sampled travel guides, "Spain" was  
528 the most common word. This trend might be explained by the fact that Chinese tourists in Spain  
529 often prefer to visit different cities across the country (Lojo, 2016). Accordingly, if Barcelona's  
530 DMO wishes to promote relevant messages to Chinese tourists, then this organization should offer  
531 contextual information on different scales: in addition to the scale of Catalonia, Chinese and other  
532 long-haul tourists will likely be interested in European and Spanish culture as well as in itineraries  
533 through Spain or Europe that include Barcelona.

534 The appraisive level of analysis in this study pinpointed notable incongruence in the attractions that  
535 Chinese tourists consider enjoyable according to blogs and the DMO's images. If the DMO would  
536 like to enhance the city's image and increase the number of potential tourism activities, efforts  
537 should be undertaken to market activities, sports, festivities, festivals, and other tourist activities that  
538 are not linked to Gaudí or Barcelona's heritage. Further efforts should be devoted to promoting  
539 relationships between experiential tourism consumption, interactive experiences, shopping, and  
540 sightseeing at well-known landmarks.

541 This study also revealed that a large number of bloggers and online communities are seeking  
542 procedural information about the city. Surprisingly, the word "ticket" was found most frequently in  
543 blogs (**Table 3**), and many threads and images were related to ticketing, understanding city maps,  
544 location distribution, schedules, and route options (**Figure 5**). Chinese travelers tend to be concerned  
545 about practical information, which may be partially due to their uncertainty avoidance in new  
546 destinations. Before deciding to travel, independent Chinese tourists (i.e., those traveling outside  
547 organized group package tours) generally seek procedural knowledge on "how to be a tourist" to  
548 minimize perceived obstacles (Lojo, 2020).

549 These results suggest that research into image congruence can be useful for identifying marketing  
550 strategies for specific tourist markets. It is thus recommended that destinations pursue segmentation  
551 strategies that meet consumers' demands and provide systematic, comprehensive information in  
552 multiple languages. For example, to facilitate tourist segmentation and information acquisition,  
553 international DMO websites can offer information in several languages: London's official tourism

554 website is available in 6 languages, including Chinese ([www.visitlondon.com](http://www.visitlondon.com)); Paris's tourism office  
555 website is presented in 10 languages, including Chinese, Japanese, and Korean  
556 (<http://parisinfo.com>). Yet Barcelona's official website only appears in two languages (English and  
557 French). If the DMO website posts information in other languages, then more tourists will be able to  
558 refer to the site and be positively influenced by Barcelona's induced image.

## 559 **6. Conclusion**

560 This work adopted a quasi-positivistic approach involving quantitative and qualitative  
561 analytical methods. This mixed methodology enabled specific development of (a) factual  
562 results based on sample data and (b) interpretive results focused on enhancing conceptual  
563 understanding. Altogether, the theoretical framework, techniques, and insights resulting from  
564 this research have important scientific and practical significance:

565 First, this research extends Gartner's (1994) classic work on destination image formation by  
566 applying the theoretical framework of designative-appraisive-prescriptive modes of  
567 signification. The literature review introduced the conceptual basis of this framework, and the  
568 study findings demonstrate the effectiveness of this framework in providing new insight into  
569 destination image (e.g., Marine-Roig, 2019). This paper thus refines the components of  
570 destination image and the online image domain.

571 Second, the abovementioned achievement facilitates interpretation of image incongruence  
572 between different sources using a novel approach. Findings enrich the literature on  
573 destination image incongruence (e.g., Mak, 2017; Michaleliou et al., 2013) by explaining  
574 dissonance among images communicated by Barcelona's DMO and selected travel agencies,  
575 travel guides, and travel blogs. These results also indicate that agencies and blogs are similar  
576 in terms of the appraisive dimension (while showing greater incongruence to guides and the  
577 DMO). Guides and blogs appear more congruent within the prescriptive dimension.

578 Third, the study reveals travel pictures' ability to function simultaneously in the three modes  
579 of signification. While the prescriptive function of destination images has been established  
580 (e.g., Marine-Roig, 2019; Pocock & Hudson, 1978), scarce studies have sought to explain  
581 and exemplify the prescriptive meaning of tourism pictorial images. This domain may be  
582 especially valuable in fostering a clearer understanding of the pictorial representations of  
583 tourism destinations.

584 Fourth, this study was centered on assessing Barcelona's destination image based on local  
585 and Chinese sources via textual and pictorial analyses. Within the vast tourism image  
586 literature, this research is the first to examine a European city image congruence in the  
587 Chinese tourism market (Lojo et al., 2019). Resultant evidence reveals how cultural and  
588 geographical distance can affect destination image. The findings and discussion in this paper  
589 identified specific types of image incongruence, gaps, and information needs. Results also  
590 showed that long-haul tourists from different cultures are exposed to specific images and  
591 need procedural knowledge in particular, a notion consistent with the prescriptive mode.

592 Fifth, this work has presented several practical implications for Barcelona's DMO and the  
593 local tourism industry regarding the Chinese market. In addition, the article highlights the  
594 value of studying image incongruence to (a) direct, modify, or improve a destination's  
595 induced image and (b) identify the information needs of specific tourist segments.

### 596 **6.1. Research limitations and future studies**

597 Given the uniqueness of this research setting, several limitations should be acknowledged.  
598 The employed theoretical and methodological framework is useful for conceptualizing a  
599 specific phenomenon within a particular cultural context (i.e., Barcelona and Chinese  
600 information sources in this case). However, scholars should exercise caution when  
601 extrapolating these findings to other populations. This study referred to a sample of four  
602 online information sources; it may be necessary to replicate the experiment with other  
603 sources or methods to identify more predictable outcomes. Additional work is also  
604 recommended to examine destination image and the modes of image signification in greater  
605 depth. For example, researchers could explore the prescriptive dimension of destination  
606 image among long-haul tourists in more detail.

607 Regarding the nuances of this research and the case of Chinese tourists in European  
608 destinations, future studies could follow several directions. First, it would be interesting to  
609 identify the challenges local DMOs and tourism marketers may face in penetrating Chinese  
610 tourists' preferred information sources. Second, DMOs' marketing strategies can be  
611 communicated via numerous channels (e.g., websites, social media, TV, and other  
612 promotional avenues). Thus, future research into the Chinese tourism image of European  
613 destinations could investigate other DMO messages and platforms to gain a fuller  
614 understanding of induced images. Finally, further clarification is needed regarding how  
615 previous tourism experiences in Europe may influence tourists' perceived destination image  
616 and information source usage.

### 617 **Declaration of Conflicting Interests**

618 The author(s) declared no potential conflicts of interest.

619 **6. References**

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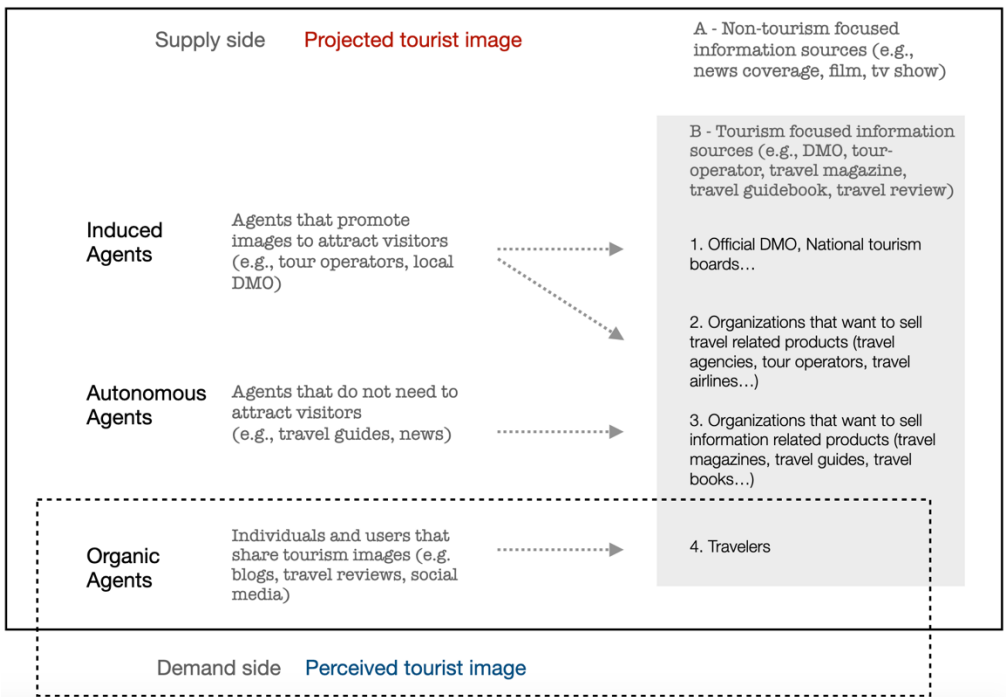
748 **Figure 1**  
 749 Components of the destination image: three different modes of signification  
 750

Components	Trichotomy	Modes	Use	Questions
1	Cognitive	Designative	Identification-descriptive	What? Where? When?
2	Affective	Appraisive	Valuative-emotional	Why?
3	Conative	Prescriptive	Incitative-procedural	How?

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 753 **Note 1:** Three components of images. Images as external objects that communicate knowledge.

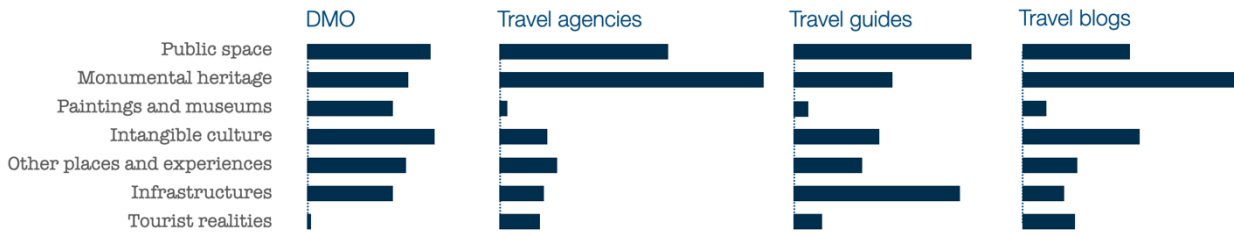
754 **Note 2:** Modified and extended from Holbrook and Hirschman (1993), Marine-Roig (2019), Morris, (1971),  
 755 Nerlich and Clarke (1996).

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 762 **Figure 2**  
 763 Online agents of image formation  
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775 **Figure 3**  
 776 A comparison of themes in pictorial representations of Barcelona  
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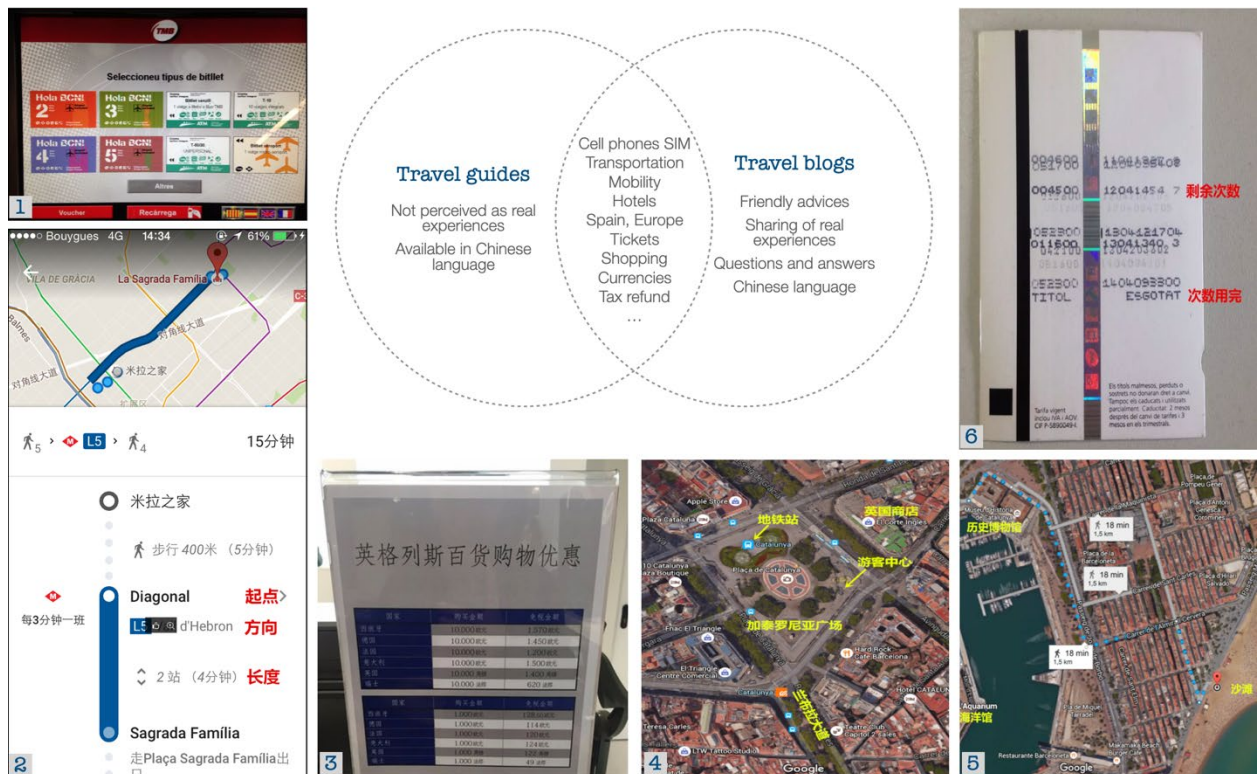
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**Figure 4**  
 Links between appraisive elements in DMO's induced image and blogs' organic image



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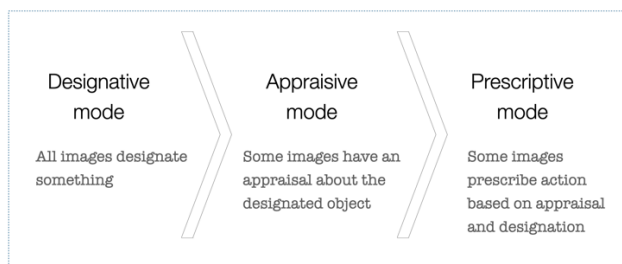
795 **Figure 5**  
 796 Prescriptive function of pictures  
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 800 **Note 1:** (1) a photograph of public transport ticket vending machines, (2) an annotated screenshot, (3) a photograph of a  
 801 tax refund information panel, (4 and 5) annotated maps, and (6) an annotated photograph of a transportation ticket.:  
 802 **Note 2:** Pictures are used with the permission of bloggers.

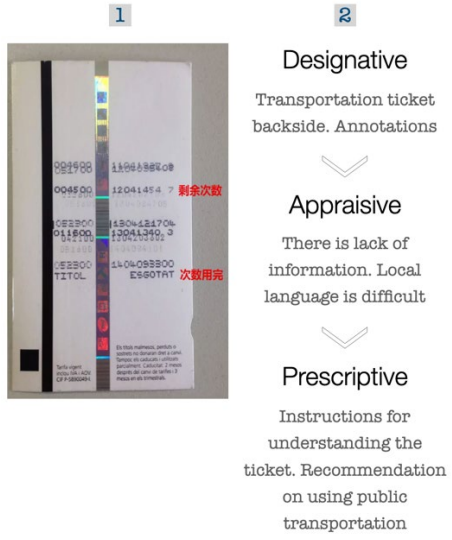
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**Figure 6**  
 Modes of signification of the destination image



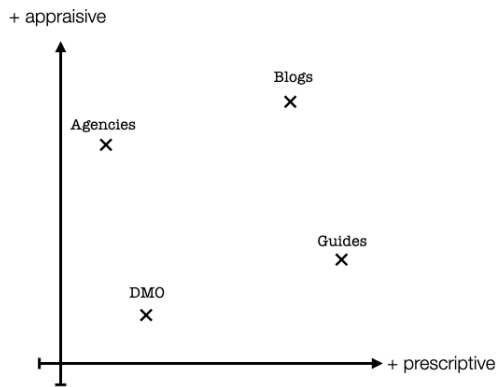
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817 **Figure 7**  
 818 Three levels of meaning and key concepts extracted from pictorial and textual content  
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 822 **Note:** 1 = Image; 2 = Modes of signification and key concepts  
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 827 **Figure 8**  
 828 Two dimensions to explain image incongruences in information sources  
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843 Table 1 Sampled sources

Type	Sources	Agents	Platform	Address
1. Induced	Local DMO	Barcelona tourism office	1 website	<a href="https://www.barcelonaturisme.com/wv3/en/">https://www.barcelonaturisme.com/wv3/en/</a>
2. Induced	Chinese travel agencies	3 travel agencies (Ctrip, Tuniu, LY)	3 websites. 108 travel products (from 37 suppliers)	<a href="http://www.ctrip.com">www.ctrip.com</a> <a href="http://bj.tuniu.com/">http://bj.tuniu.com/</a> <a href="http://www.ly.com">www.ly.com</a>
3. Autonomous	Chinese online travel guides	Autonomous authors from 9 travel guidebooks (Qyer, Ctrip, Tripadvisor, Yododo, Elong, Qunar, Mafengwo, Barcelona tourist guide)	8 websites	<a href="http://www.qyer.com">www.qyer.com</a> <a href="http://www.Ctrip.com">www.Ctrip.com</a> <a href="http://www.tripadvisor.cn">www.tripadvisor.cn</a> <a href="http://www.yododo.com">www.yododo.com</a> <a href="http://www.elong.com">www.elong.com</a> <a href="http://www.qunar.com">www.qunar.com</a> <a href="http://www.mafengwo.cn">www.mafengwo.cn</a> <a href="http://www.barcelonaTouristGuide.com">www.barcelonaTouristGuide.com</a>
4. Organic	Chinese travel blogs	Travelers (17 travel blogs)	1 website	<a href="http://bbs.qyer.com">http://bbs.qyer.com</a>

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846 Table 2. Sample distribution.

	DMO	Agencies	Guides	Blogs	Total
No. of websites	1	3	8	1	13
No. of tour products		108			108
No. of guides			9		9
No. of blogs				17	17
No. of words	60,908	46,667	50,167	50,606	208,348
No. of pictures	671	1114	1475	1730	4990

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849 Table 3. A comparison of the top 20 most frequent words or phrases, in rank order.

Rank	BTO	Chinese agencies	Chinese guides	Chinese blogs
1	City	Building	Spain	Ticket
2	Building	Gaudí	City	Gaudí
3	Art	City	Bus	People
4	Area	Spain	Ticket	Sagrada Familia
5	Catalonia	Famous	Airport	Metro
6	Architecture	Sagrada Familia	Gaudí	Spain
7	Century	Hotel	Street	Street
8	House	World	Hotel	Building
9	Street	Architecture	Catalonia	City
10	Museum	Park Güell	Museum	Square
11	Design	Design	Area	Church
12	Park	Street	Train	Shops
13	Market	Las Ramblas	Metro	Casa Batlló
14	Square	Color	Building	Design

15	Old	Church	Square	Airport
16	Sea	Olympic	Art	Europe
17	Sculpture	Large	Walk	Hotel
18	Gaudí	Park	Las Ramblas	Old
19	New	Stone	People	Sea
20	Modernist	Casa Milà	Car	Night
21			Europe	
22		Art	Shops	Color
23	Church	People	Famous	Large
24	People			Walk
25	Spain	Casa Batlló	Large	Car
26			Sea	
27				
28		Night	World	World
29				Casa Milà
30	World			Area
31				House
32		Square		Park Güell
33	Large	Europe		Architecture
34			Century	Train
35	Olympic			
36			Architecture	
...				
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850 1: the table shows the 20 most frequent words and phrases for each source and compares the position of other  
851 words that appear in other sources.

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854 Table 4. Distribution of pictorial themes and categories, by each source.

Themes of pictures	DMO (%)	Agencies (%)	Guides (%)	Blogs (%)
<b>1. Public space</b>	<b>19.76</b>	<b>26.21</b>	<b>27.25</b>	<b>17.63</b>
1.1. Streets	3.77	3.62	10.51	4.22
1.2. Squares	3.32	0.34	3.53	1.85
1.3. Sea and harbor	4.37	3.28	5.56	5.20
1.4. Park Güell	1.06	12.76	3.25	3.06
1.5. Other parks and open spaces	3.62	2.07	2.85	1.33
1.6. Other urban landscapes	1.96	3.10	0.75	1.97
1.7. Mountain landscapes	1.66	1.03	0.81	0
<b>2. Monumental heritage</b>	<b>16.14</b>	<b>42.76</b>	<b>15.19</b>	<b>35.38</b>
2.1. Sagrada Familia	0.75	19.14	3.86	10.92
2.2. Other religious buildings	2.56	4.66	2.44	3.70
2.3. Secular buildings	9.80	16.55	7.86	19.77
2.4. Arc de Triomf	0.15	0	0.14	0.35
2.5. Street sculptures	2.87	2.41	0.88	0.64
<b>3. Paintings and museums</b>	<b>12.97</b>	<b>1.72</b>	<b>2.85</b>	<b>3.99</b>



3.1. Paintings	1.66	0.17	0.14	0.75
3.2. Interior of museum	6.79	1.03	0.54	2.77
3.3. Exterior of museum	4.52	0.52	2.17	0.46
<b>4. Intangible culture</b>	<b>21.27</b>	<b>7.07</b>	<b>13.02</b>	<b>19.02</b>
4.1. Live performances	7.85	0	2.64	1.10
4.2. Festival/festivities	1.36	0.52	4.34	1.27
4.3. Castellers	0.30	0	0	0.40
4.4. Gastronomy	7.99	3.10	4.47	7.80
4.5. Markets life	1.96	2.41	1.29	6.65
4.6. Local people & life	1.81	1.03	0.27	1.79
<b>5. Other places and experiences</b>	<b>15.84</b>	<b>9.31</b>	<b>10.31</b>	<b>8.79</b>
5.1. Football Club Barcelona	0.75	7.24	5.29	3.47
5.2. Theme parks	2.87	0	0.95	0.12
5.3. Shopping	2.26	2.07	3.19	5.20
5.4. Sea sports	6.79	0	0.14	0
5.5. Other sports	3.17	0	0.75	0
<b>6. Infrastructure</b>	<b>13.12</b>	<b>6.72</b>	<b>26.58</b>	<b>7.11</b>
6.1. Accommodation	0.15	1.03	12.27	0.92
6.2. Restaurants	2.11	1.03	3.73	2.49
6.3. Transportation	6.79	2.59	4.20	1.27
6.4. Tourism information offices	0	0	0	0.29
6.5. Other infrastructure	4.07	2.07	6.37	2.14
<b>7. Tourist realities</b>	<b>0.90</b>	<b>6.21</b>	<b>4.81</b>	<b>8.10</b>
7.1. Maps	0.90	1.38	4.27	1.39
7.2. Selfies	0	0	0	0.23
7.3. Other photographs of tourists	0	4.83	0.54	2.54
7.4. Screenshots	0	0	0	1.97
7.5. Tickets	0	0	0	1.97
Total	100	100	100	100

855 See supplemental material 1 for conceptualization and definition of the seven themes.

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