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A comparative study of the perceived visual attractiveness level of hotel websites using the eye-tracking technique

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Abstract

The structure of a website and the location of its main image attributes, presence of scarce text, search function and celebrity images, directly influence the user's perception of the visual appeal of websites, as well as their evaluation. In this study, a study and subsequent analysis of the booking websites (www.booking.com) and hotels (www.hoteles.com) are carried out, using the eye tracking technique analysis of these attributes, except for celebrity images, since it is not the case of this type of communication between company and user. A questionnaire and a cluster analysis are also carried out. The target audience chosen is the millennial population. In the results, it is noted that the presence of a single main image (Hoteles) obtains a greater number of fixations than when two (Booking) are used, that the simple design of the Booking website obtains a significant preference than that of Hoteles, which has more text and communicative elements, and the importance of the presence of the search engine, with greater user preference for the location of the Booking website.

Keywords: Attention, visual appeal, neuromarketing, eye tracking, consumer behaviour.

Introduction

In the online hotel search engines sector, there is extreme competitiveness, in which communicative elements are essential. Within them, the online communication and sales channel that the website implements, could be determined as the most important. Companies seek to make their design attractive to the client, and more specifically to get their attention, and thus perceive the messages and communications that they consider to be priority, and also visualize a large number of elements, remaining there for a relatively long period of time. For this reason, the study of the elements that produce visual appeal on hotel search engines websites is decisive in the battle for customer attraction, retention and satisfaction.

In this paper, an analysis and comparison of the main elements is made, with basis on the related literature, of the Booking.com and Hoteles.com websites.

Literature/theoretical framework review

The studies carried out through the eye-tracking technique have their background and origin in concepts prior to the existence of this technique, and in which the relevance of its application lies foe this study. Thus, for the present research paper, it has been necessary to investigate in the fields of perceived visual attention and visual attractiveness when viewing a website.

Visual Attention

Visual attention is that to which attention is paid (both voluntarily or involuntarily) through the eyes when visualizing a stimulus. Attention is used to focus mental abilities on sensory input selections (in this case, sight) so that the mind can successfully process the stimulus of interest (Duchowski, 2007). Several theories about visual attention have been contributed throughout the history of the investigation. For example, in the case of Gibson (1941), it was he who proposed a visual attention factor focused on intention. That is, the subject's early preparation on whether to react to the stimulus and if so, how and with what kind of responses. Later, Broadbent (1958) explained that the information entered in parallel in our system, then filtered selectively to the sensory channels.

In contrast to the above, other researchers proposed the theory that there were central structures with pre-established weights of importance that would determine the aforementioned selection: that is, what had a causal role in attention were these important weightings and not attention as such (Deutsch y Deutsch, 1963). That is, the attentional effects are the result of the importance, or relevance, that interact with information (Duchowski, 2007).

But how could a fairly coherent scene of the entire visual field be united in the mind? Hence the importance of being able to observe and record the eye movements of a subject when visualizing a stimulus, that is, the design of the patterns called *scanpaths* (Notony Stark, 1971). The analysis of this metric is even relevant to the study, if appropriate, the differences between the sequential patterns of different groups of subjects when viewing a stimulus or a website. For example, men and women (Eraslanet al., 2015). In fact, a *scanpath* analysis is likely to be more valuable for exploratory tasks, compared to goal-directed tasks, since researchers can then understand how users explore websites involuntarily (Eraslan et al., 2015). Another objective with which you can make an *scanpath* interpretation is to use them as a guide to redesign the websites so they are more accessible on small screen devices, since it allows users to directly access the visual elements visited by the first time without much displacement and zoom (Akpinar & Yesilada, 2015).

The fixations pattern and the choice of where to send the eye is not random, but it seems guided (Rayner & Pollatsek, 1989). The fixations in a reading movement are influenced, for example, by the text properties, such as word length (Rayner, 1975). In general, and as explained by Akpinarand and Yesilada (2013), a website is segmented into its visual elements such as headings, search boxes and menu items.

This is why it is not a secret that eye-tracking studies are increasingly used in the investigation of how to improve website usability. In particular, the probabilities of transition between website elements can be a guide to evaluate the efficiency of the disposition of website elements (Ehmke & Wilson, 2007), and following these studies, reorganize and restructure the website according to the results and the profile of the target audience for each website. For example, according to Eraslanet al. (2015), visual elements can be rearranged to give direct access to first and commonly fixed visual elements, and therefore users can focus directly on the desired content.

However, the eye movement system is but one of many perceptual and response systems that benefit from attentional selection (Hoffman & Subramaniam, 1995). Attention movements depend on the activation of brain structures that are intimately involved in eye movement (Rizzolatti et al. 1987, 1994). This is why attention is important in the execution of eye movements (Klein et al., 1992), but does not play any role in their planning.

In the burden of attention, there are two selective attention mechanisms. The first is the one referring to perceptual selection, which means that an individual can ignore irrelevant

distracting stimuli, when he is under high perceptual load situations. The second refers to a more active attention control mechanism, which is necessary to reject irrelevant distractors, even when they are perceived (that is, even in situations of low perceptual load). (Lavie et al., 1995).

Eye-tracking

The information provided by the users' look when they track companies' websites and/or the like, has become a highly useful resource for companies. The interest that has been generated in discovering and extracting all possible information has created a high demand for tools that capture users' intentions by companies (Oyekoyaand & Stentiford, 2006). Today, there are many companies that use a primary channel network, in order to expand their reach and market share (Djamasbi et al., 2010) given the fundamental role that the Internet plays in commercial activity.

Eye tracking is a technique by which an individual's eye movements are measured, so that the researcher knows where a person is looking at a given time, and the sequence in which the person's eyes are changing from one place to another (Poole & Ball, 2006). This technique provides information on the processing and effectiveness of communications that cannot be obtained through traditional measures due to the speed and lack of conscious access to the rapid attention processes that take place during the communication exposure. In addition, it complements the information extracted with conventional measures with details on the spatio-temporal dynamics of attention and, therefore, allows the creation and implementation of models in which the processing and effectiveness of visual communication are viewed in an integrated way (Wedel & Pieters, 2008). Likewise, it allows to eliminate the subjectivity of data self-information (Schmutz et al., 2010). In the case of disabled or manually limited users, eye tracking can be achieved through this technique and is used in real time as the only possible input to the dialogue between individual and computer (Jacob & Karn, 2003).

Eye-tracking studies

Regarding the history of studies using this tool, the use of eye-tracking must be traced back to more than 100 years ago (Rayner & Pollatsek 1989). For this reason, the evolution that has undergone its development is of vital importance, since, in comparison to the present, the first studies that sought to track the gaze of the subjects were invasive. Examples are electro-oculographic techniques (which required electrodes connected to the skin around the eye to receive the signal of the different eye movements), or the use of contact lenses that were accompanied by a metal coil embedded around the edge of the eye so that eye movements were measured through fluctuations in a magnetic field, when this coil moved (Poole & Ball, 2006). However, thanks to technological advances related to sensors, eye tracking has also become a more affordable and less intrusive technique when using it (Pernice & Nielsen, 2009). However, to benefit from the information provided by the *eye-tracking* technique, you must perfectly understand the specific eye movement metrics and what they represent (Wang et al., 2019).

Another important parameter of measurement by *eye-tracking* is eye fixings. They are a span of at least eighty milliseconds during which the eye fixes its gaze on a point (Buscher et al., 2009). It is considered a very useful and common measure for studies, in which you want to determine which parts or areas of a website are relevant, and then capture user attention in a small initial time interval.

The information extracted during the fixations eventually contributes to the effects of the commercialization of interests such as learning (memory), preference formation, choice and sales. (Wedel & Pieters, 2008). Fixations are considered a reliable indicator of an individual's attention (Vertegaaland & Ding, 2002; Djamasbi, 2010). However, some of

these fixations may not be significant and, because the *scanpath* analysis is correlated, these fixations should be removed to reduce variance (Eraslanet al., 2015).

Another eye tracking metric is the *saccades*. These are rapid and ballistic movements of the eyes from one fixation to the next that usually last 20-40 milliseconds (Buscher et al., 2009). The *saccades* are the fastest movement of the human body, and humans make approximately 170,000 of them daily (Wedel & Pieters, 2008). An important fact is that visual information is generally perceived only during fixations, not *saccades*.

Using the data obtained from the fixations, you can create *heatmaps*, evaluation criteria to confirm which components or content attract the most user attention. Heatmaps show the combined fixations of many users on one page (Nielsen & Pernice, 2010). In these maps "the color red indicates a high fixation level, while yellow and green indicate decreasing fixation levels" (Djamasbi et al., 2010). As for the areas without color, it follows that they have been areas not set by users during their viewing.

In the present investigation, we begin from the results obtained on the application of *eye-tracking* technique applied in the study of Djamasbi et al. (2010). In their experiment, they divided the research into two different but complementary studies: on one hand, they carried out a self-report on the subjects, wanting to extract relevant information regarding their evaluation of the visual appeal of a certain number of websites. After having carried out this first analysis, they aimed to corroborate the information provided in this study, with the eye monitoring of the subjects, visualizing the three best rated websites and the three worst rated. The purpose of the question was to verify if the users' opinion really coincided with the perception they experienced when browsing these websites.

The relevance of this research with regards to this is the profile of the sample chosen to carry it out, and in this sense, the generation Y and/or millennials (people born between 1980 and 1993) is of great interest in the research field, as well as commercial, given the technological circumstances with which their lives have developed. For generation Y, usability is a fact and aesthetics is not a bonus, but an expectation (Djamasbi et al., 2010).

The visual appeal of a website is a concept of great relevance, (Lavie & Tractinsky 2004; Lindgaard et al. 2006, Djamasbi et al. 2007), since a website that is highly attractive can attract new users, and contribute to generate loyalty to those that already use it services. Aesthetics can have a direct influence on the evaluation and enjoyment of a website (Lingaard et al., 2006) and can also be a good predictor of a user's intention to buy an item or revisit the website (Loiacono et al., 2002). Users overlook important usability failures, provided they have a very positive impression of the website design and structure (Djamasbi et al., 2010).

The four main characteristics that users set when tracking a website and have a significant impact on their perception are the following: main image, celebrity images, little text and search function (Djamasbi et al., 2010). The size of a content object on a website is directly proportional to its importance and, therefore, of higher level in the visual hierarchy.

Therefore, it is important to have a visual hierarchy through which users can be guided in page visualization, through the prior timely placement of these important elements. Users usually look initially at images rather than text (Faraday 2000). This is something that is done unconsciously at different times of their routine. For example, when reading the newspaper, it is a fact that readers first scan the images on the page, and then read the text (Brandt, 1954).

Research Objectives

The main objective of this research is to test the hypothesis that the structure of a website and location of certain previously considered attributes directly influence the user's perception of the visual attractiveness of websites, as well as their evaluation (Lindgaard et al., 2006 and Djamasbi et al., 2010), in the case of hotel search engines booking.com and hotels.com, in the millennial target audience.

Certain previously considered attributes positively influenced the perception of the attractiveness of an *e-commerce* website by users belonging to generation Y. These attributes are four: main image, little text, search function and celebrity images (Djamasbi et al. 2010) For this study, this last attribute will not be considered, since it is not the case of this type of communication between company and user.

Therefore, the objective of this analysis is to verify whether those attributes previously studied, which are considered relevant for subjects belonging to the millennial population, have the same relevance in this perception of visual attractiveness in the websites of the hotel booking.com and hotels.com.

Research Methodology

As mentioned above, the main objective of this study was to analyze the influence and/or effect that certain previously defined attributes may have on the structure and web design of two pioneer hotel search engines in the sector. To carry out this research and achieve its main objective, an experiment has been designed that is divided into two blocks: an *eye-tracking* study through which data on the visual behavior of the subjects and post-test survey will be obtained, through which they are asked for the evaluation of various aspects of different websites, in order to analyze in which aspects each search engine stands out from the user's perspective. The reason for combining these two study techniques lies in being as exempt as possible from measurement analysis biases or from answers to the questions asked.

Experimental Design

Study I: Eye - tracking

The purpose of this work was to analyze how users look on the websites of Booking and Hoteles.com when viewing an image of their homepage. This way, information will be obtained about which attributes are those that mostly capture their visual attention, what is their visual tour through the same website and in which attributes they are given more importance during that visualization involuntarily. Therefore, these data obtained helped us to make a comparison or analysis of similarities between both observed cases and draw conclusions about it.

- Participants

The sample comprised 30 subjects aged between 20 and 29 years. Since the study was based on eye tracking, it was conducted in a space that was conveniently prepared to avoid data measurement bias. Due to the economic limitation of the study, the participants collaborated selflessly with the purpose of the research given the link with the researcher itself.

- Design and Proceeding

Before proceeding to the explanation and execution of the experiment, the participants signed a consent document through which they were informed about the activity. Next, the device was calibrated for the subject's gaze. This process takes approximately 15-20 seconds. Once the system recognizes the subject's gaze and is declared calibrated,

the eye tracking software calculates the coordinates of the subject's gaze, with an average accuracy of about 0.5 to 1º of visual angle.

Based on the hypothesis that the user is approximately 60 cm away from the screen, this accuracy corresponds to an average error on the screen of 0.5 to 1 cm (www.theeyetribe.com). Finally, the subjects were proposed to visualize two different images for 10 seconds each.

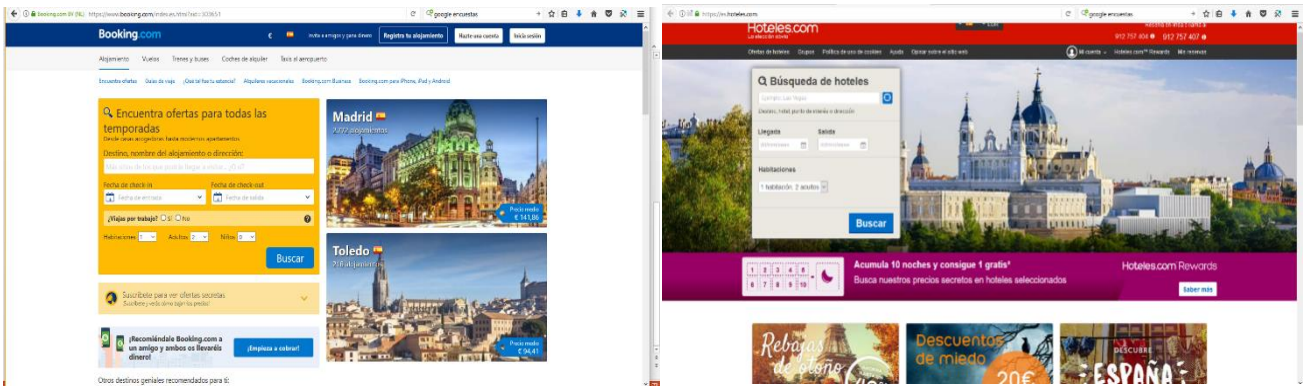

Figure1. Visualization samples used in the experiment. Source: www.booking.comandwww.hoteles.com

- Device

The hide tracking device used for this experiment is *TheEyeTribeTracker*. *EyeTribe* technology allows the control of the eyes of consumer devices through a simplified and improved user experience (www.theeyetribe.com).

The Ogama (Open Gaze and Mouse Analyzer) software was used to collect information, through which you can carry out the appropriate studies of the participants' eyes and obtain the different heat maps, areas of interest, fixation data, *scanpaths*, etc. (www.ogama.net)

- Measurements

Data from fixations, heatmaps and *scanpaths* were collected. This way, it has been possible to analyze in depth the visual path of the subjects when viewing the image of each search engine.

- Results

We have proceeded to study in detail the results of the different measurements, both individually and in general, in order to get a global view of the conclusions that can be drawn from the study.

Study II: post-test survey

As a second block of this investigation, a post-test survey was carried out on the experiment participants, in order to obtain additional information regarding their experience, after the intentional observation of websites. The 5-point Likert scale measurements were used (strongly agree - strongly disagree). As well as information related to age, gender, employment status and contact information (in this case, email).

This survey was carried out on the subjects after their visual monitoring was carried out for both images. The results, purely descriptive, will serve to complete and reinforce the information previously obtained and observed.

Data collection and analysis

The experiment was carried out in Madrid, between October 3 and November 11, 2017. The number of participants was 30 subjects (21 women and 9 men). The approximate duration per person was 10 minutes.

After designing the experiment in the software, and having tested it through various pilot tests to avoid possible errors in data collection, the steps to follow for each subject of the sample were the following:

1. Introduction and explanation of how the subject will proceed.
2. Signature of the consent document by the subject.
3. Calibration of the view of the subject with the eye-tracker and through the software of the same device *EyeTribe* next to the Ogama software.
4. Carrying out the experiment using Ogama: visualization of two visual samples for X seconds each.
5. Completion of the post-test survey on the general and individual evaluation of each of the aspects to be evaluated, on each viewed website.

After conducting the experiment and after collecting the results for each subject, it was proceeded to analyze, both globally and individually, the data related to the visual fixations on the different points of these images, the replay of each of the looks in the X seconds of visualization, *scanpaths* and heatmap for each exposed image. Subsequently, the data provided by the survey participants were analyzed from a quantitative statistical perspective.

Analysis of results, discussion and conclusions

In this chapter, the information obtained during the experiment will be analyzed and the pertinent conclusions will be drawn. Likewise, it will be analyzed if the practical application of the work previously carried out by Djamasbi et al. (2010) raised here is reaffirmed in the online accommodation search engine sector. This way, future lines of research in the field will also be raised, as well as the limitations of this research.

Analysis of obtained results

To contextualize and understand the results even better, a clear description of what the profile of the individuals who participated in the experiment and on which certain conclusions are going to be extrapolated to a larger population is required. They all have one aspect in common: they belong to generation Y or millennials. That is, the generation of those who were born between 1980 and 1993 and, therefore, are characterized by having developed and grown in the new digital era. This makes us face a group with some experience in online browsing and consumption that have proliferated this last decade.

This last observation is of great interest for this research, since it has been demonstrated in different web usability studies that differences have been found between beginner and more experienced individuals (Yarbus, 1967; Card, 1984; Andrews & Coppola, 1999). The sample of this study is formed of 21 women (70%) and 9 men (30%). Most of them are between 22 and 24 years old (83.3%), followed by approximately 17% of participants with ages ranging from 23 to 29 years old. Of all of them, only 26.6% are working.

This research will have a mixed approach to the analysis of results and conclusions. In summary, this study welcomes a qualitative approach in regards to the data extracted from the *eye-tracker* device, along with a quantitative approach based on the results obtained from the post-test survey. This way, we seek to strengthen the qualitative basis of the work. with numbers that are consistent for such research. That is why the results will be explained first based on the data collected by the *eye-tracker*.

In the first place, the global and individual replay for each image displayed has been analyzed, in order to observe the visual path of each subject. and at what points and/or attributes the subjects fixed their gaze first, in addition to observing the order of their fixations throughout said display for 10 seconds. This way, conclusions can be drawn from whether they follow a similar path, or if they have large differences between them, using a greater period of time in the attributes to be studied in this work or not. In this case, in general, it can be affirmed that there is clearly a “F” pattern display (Nielsen 2006).

In the following figures, you can see the *scanpath* of the sample for each image, which helps us understand how each individual's gaze behaves during the visualization of these images. In this manner, we obtain a tracking map of the gaze with two reflected data: the size of the circle (how long the gaze remained at that point) and the number of the circle (the script or the story that the gaze followed during the visualization). This graph is best analyzed individually, due to saturation and overlap of data in the same image.

Figure 2. Scanpaths. Booking.com example. Source: Ogama Software

Figure3. Scanpaths. Hoteles.com example. Source: Ogama Software

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On the other hand, the Ogama software has the functionality to analyze heatmaps, both

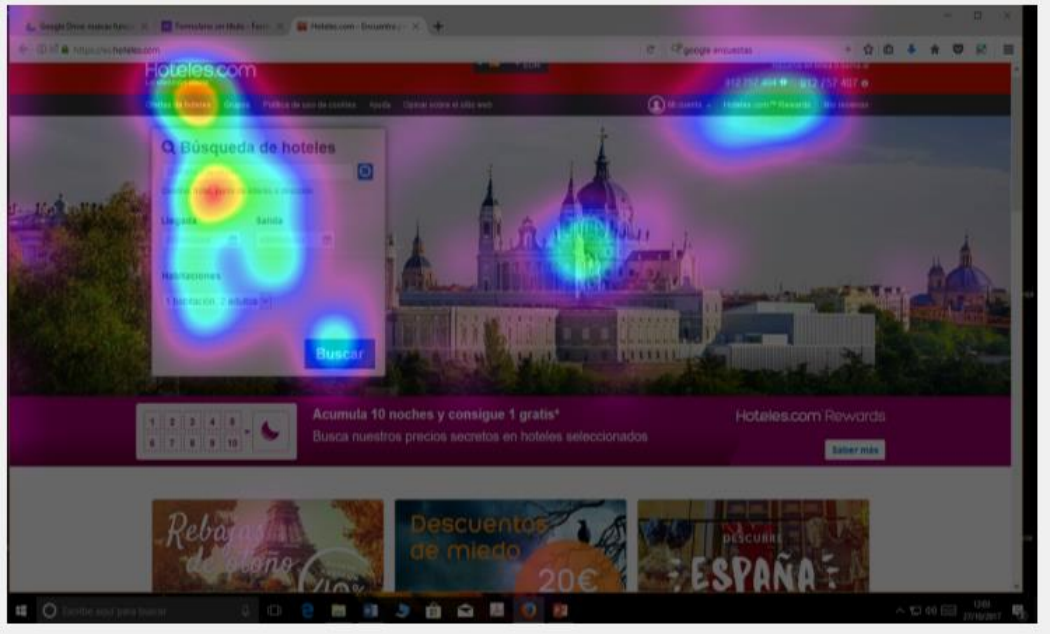
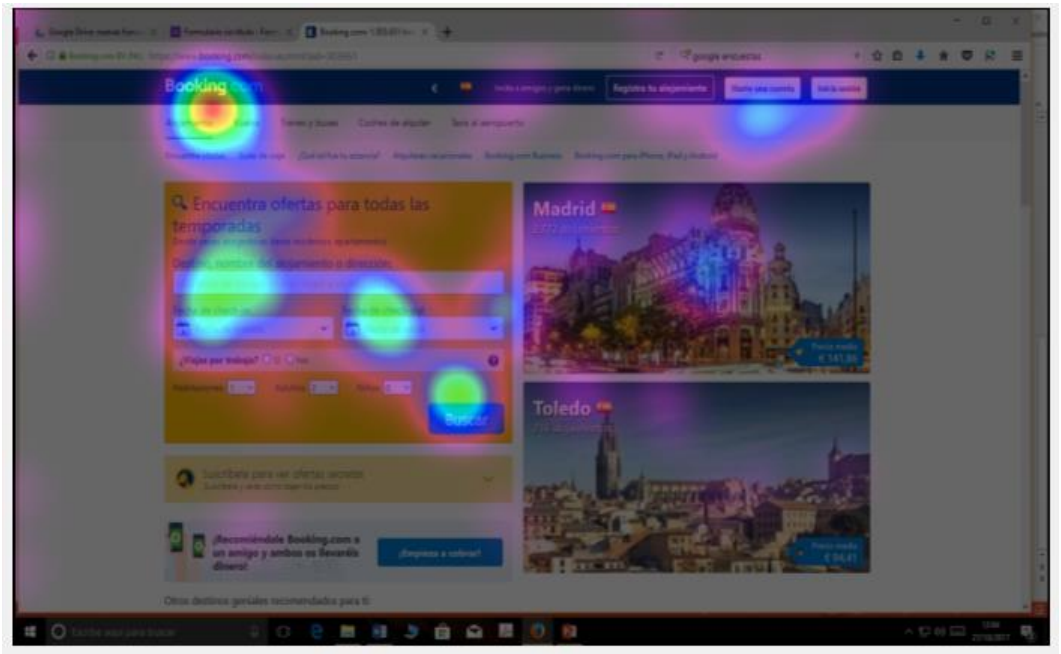


Figure 4. Heatmaps. Booking.com example. Source: Ogama Software

individually and globally, for a sample previously defined in the program. That's how it makes the researcher easier to deduce which areas of the images have attracted the most visual attention of the subjects. As it can be seen in Figures 4 and 5, the results obtained for both cases are quite homogeneous, but have small significant differences



that justify the present study.

Figure 5. Heatmaps. Hoteles.com example. Source: OgamaSoftware

Both websites have a homepage uniformity and structure that are very very similar, placing the accommodation searchbox on the left side. Even so, differences such as images location (in the case of Booking.com on the right margin and divided into two different images and that of Hoteles.com,at the center of the screen) don't affect the time of being one of the attributes mostly visualized in both cases. Subsequently, the implications of these small differences will be seen.

Regarding the results obtained from the survey, when comparing the statements made by Booking and Hoteles.com, using the Wilcoxon test:

Contrast Statistics[a]

	(hoteles.com), [The website has is attractive and encourages browsing through it] - (booking.com), [The website has attractive features and encourages browsing through it]	(hoteles.com), [The website design seems striking] - (booking.com), [The website design seems striking]	(hoteles.com), [The website images encourage you to use their services] - (booking.com), [The website images encourage you to use their services]	(hoteles.com), [The website images encourage you to use their services]	(hoteles.com), [What interests me most about the website is the search engine] - (booking.com), [What interests me most about the web is your search engine]
Z	-2,273[b]	-,146[c]	-,938[b]	-,828[b]	-,890[c]
Asymptotic Symbol (bilateral)	,023	,884	,348	,408	,373

a. Wilcoxon sign rank test
b. Based on negative ranks.
C. Based on positive ranks

Table 1. Wilcoxon Test

The only statement that has a significant difference is “the website is attractive and encourages browsing through it”, which would mean that, on a conscious level, users would statistically rate the Booking website as significantly more attractive than the one of Hoteles.com, and also consider that it encourages more to navigate through it.

Cluster

On the other hand, a cluster analysis has also been carried out by linking Ward with a measurement interval of Euclidean squared distance, without performing values standardization, as it is not necessary. Next, a solution based on the 5 cluster dendrogram is proposed.

Membership Conglomerate

Case	5 Conglomerates
1	1
2	1
3	2
4	3
5	4
6	4
7	2
8	1
9	3
10	5
11	1
12	3
13	2
14	1
15	5
16	1
17	4
18	1
19	5
20	2
21	4
22	4
23	1
24	4
25	1
26	2
27	4
28	4
29	1
30	2

Table 2. Membership Conglomerate

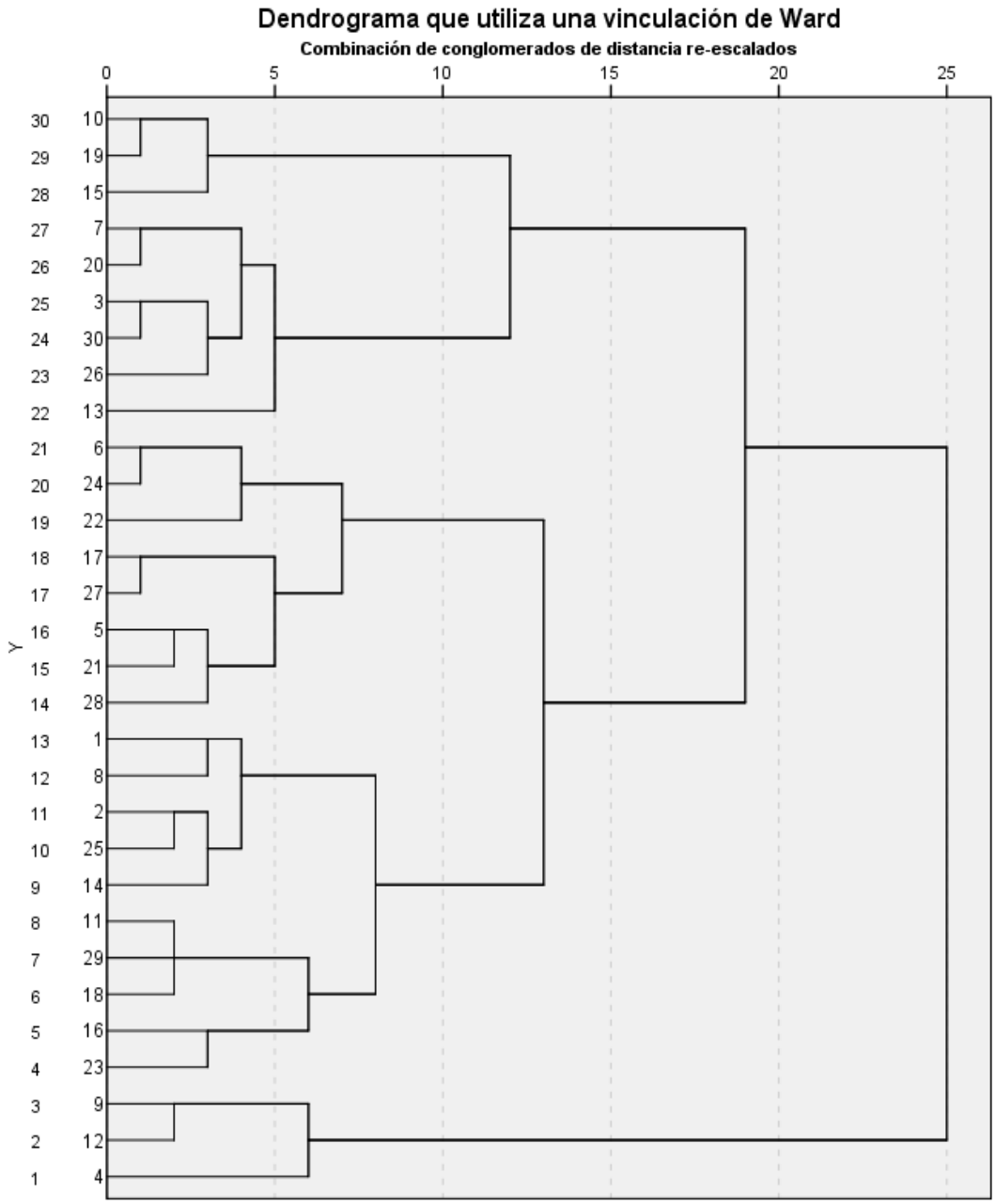


Table 3. Dendrogram

Observing the behavior of the 5 resulting segments, and by linking with the Ward method, the following graph can be obtained:

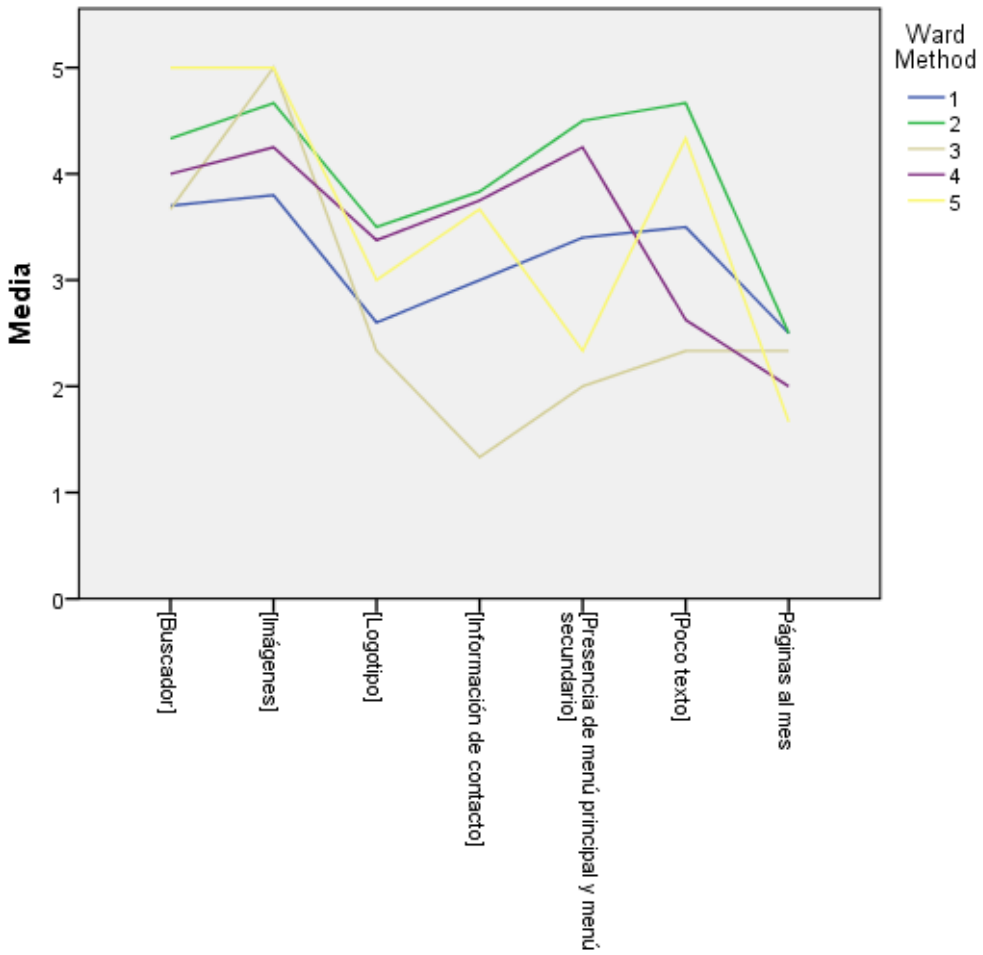


Table 4. Ward Method

On the other hand, when performing the Kruskal-Wallis test. it can be observed that the search attributes and pages per month don't have sufficient significance in their participation for the determination of each cluster to be able to affirm that the results are different.

Contrast Statistics[a,b]

	[Browser]	[Images]	[Logos]	[ContactInformation]	[Presence of main menu and secondary menu]	[Few Text]	Pages per Month
Chi-square	7,217	11,867	8,843	16,188	15,942	20,510	7,846
gl	4	4	4	4	4	4	4
Asymptotic Symbol (bilateral)	,125	,018	,065	,003	,003	,000	,097

a. Kruskal-Wallis Test
b. Grouping variable: Ward Method

Table 5. Kruskal–Wallis Test

Discussion of Results

Although apparently it seems that there are two very similar search engines, the analysis carried out suggests that there are small differences between them. In the first place, and as it can be seen in the heatmaps (Figures X and Y), users have generally visualized the same attributes in both cases. These are the following ordered from highest to lowest display:

- Brand logo in upper left corner

- Accommodation search engine and/or dates
- Log-in box in upper right corner
- Search engine button
- Center of the main image

These attributes coincide, in general, with those proposed by the study conducted by Djamasbi et al. (2010). Moreover, the overall structure of its visualization reconstructs the shape of an "F", which was observed and affirmed in another previous study conducted by Wang et al. (2014). This last observation also aligns with that of Djamasbi et al. (2010) in that they defend that the generation of millennials tends not to fix their gaze at the bottom of the screen when viewing it, unless it is strictly necessary, or when they're performing a very specific search. Another explanation for this could also be the predisposition that the gaze has to avoid areas like the right due, to the advertising saturation that such area of the screen has suffered in recent years.

In regards to the *scanpath* analysis that the gaze sample has followed for two images, it can be observed that in the case of Booking, the subjects' gaze has more frequently wandered or visualized the elements listed above, though with very little difference, in comparison with Hoteles.com. However, in the case of Hoteles.com, it could be said that the number of fixations is lower than that of Booking. One of the reasons may be that users didn't need to observe more, since they have found what they needed quickly or that the main layout elements of the website is clearer and cleaner, in visual terms. In the case of Booking, the first fixations focus on the accommodation search engine area, while on Hoteles.com they concentrate on the two upper corners, in which the corporate company information is displayed, in addition to the menus available to users.

This suggests that, even unconsciously, the gaze tends to focus on attributes that attract visual attention, according to their disposition on said website (Djamasbi et al., 2008). Another difference that stands out between the two search engines is that Hoteles.com also includes a *call to action* typology element for visitors, in the form of a promotion that attracts even more visual attention, either due to its design, format, or arrangement in the website layout. This banner is located just below the accommodation search engine so, for this company, the visualization in this type of elements is also of great importance, since it would mean that they are carrying out a good communication strategy for their products and/or services. Also, in the case of Hoteles.com, it is worth mentioning the attention given to the "offers" tab, which can be understood as a competitive advantage over Booking, which may not be achieving that efficiency by communicating the discounts and/or offers or promotions that are available to customers.

In regards to the observation and attention given to the logo, Hoteles.com takes advantage of both upper corners to place it, though on the right side there is a communicative call on action on disguise, under the section name "Hoteles.com Rewards". Meanwhile, Booking only shows this brand identity in the upper left corner. However, both websites dedicate the upper right corner to everything related to customer access/log-in. An interesting fact of this is that these accesses have received equal or more visual attention from the subjects, than the brand logo itself. This confirms that there is a positive, significant and robust relationship between the visual complexity of the page and the upper left corner or "top left corner" (Michailidou et al., 2008). In this case, Hoteles.com would win. as it takes advantage of both the upper left and right corner to include communication elements below these essential elements in the navigation of any commercial website (logos and log-in boxes).

As for the main image, though they are located in different areas on the website (in the case of Booking, it is in the right margin at medium height in the fold, and in the case of Hotels.com it is located in the center of the screen), The center of the same image is the one that attracts the most visual attention of the subjects for both cases. Therefore, the display of the center of said main image is independent of the situation of this element.

This can be explained in that the users, as members of a more visual than reader subpopulation as millennials are characterized, feel the need (voluntary or involuntary) to permanently visualize the main image of the web or at least one image in front of any text.

Finally, considering the evaluation carried out by the participants in the post-test survey, the preferred website in general terms is that of Booking. This lies in the positive rating it has been given, in terms of the three attributes previously considered in this study: search function, logo and scarce text. It should be noted that in terms of the main image, the Hoteles.com website is proclaimed as the favorite. Secondly, given the importance that users give to the search function when browsing a website, companies should not lose the approach of loyalty for existing customers and work to attract those users who still "doubt" or "wander" through their websites. This is why a good option would be to continue betting on a minimalist design, in which this element (search engine) stands out even more over the rest of the attributes.

This way, browsing will be facilitated even more for those users who visit the websites to "wander" without a defined purchase objective, or who only intend to carry out a specific information query, and thus win this market segment that is still predominant in the online community. In line with this ideal extension of this navigation, other authors also maintain that there is a close relationship between the presence of images, with a longer time to evaluate the options, as it happens, for example, in the case of Hoteles.com (Pang et al., 2016).

Aside this, with regards to the cluster analysis carried out, the following statistical and frequency analysis of the different segments has been carried out:

Ward Method = 1

Statistics[a]

		Ward Method	gender	age	employed?
N	Valid	10	10	10	10
	Missed	0	0	0	0

a. Ward Method = 1

Table 6. Ward Method=1

Frequency Table

Gender[a]

		Frequency	Percentage	Valid Percentage	Accumulated Percentage
Valid	Female	6	60,0	60,0	60,0
	Male	4	40,0	40,0	100,0
	Total	10	100,0	100,0	

a. Ward Method = 1

Age[a]

		Frequency	Percentage	Valid Percentage	Accumulated Percentage
Valid	+29	1	10,0	10,0	10,0
	20-22	8	80,0	80,0	90,0
	26-28	1	10,0	10,0	100,0
	Total	10	100,0	100,0	

a. Ward Method = 1

Employment[a]

		Frequency	Percentage	Valid Percentage	Accumulated Percentage
Valid	NO	7	70,0	70,0	70,0
	YES	3	30,0	30,0	100,0
	Total	10	100,0	100,0	

a. Ward Method = 1

Table 7. Frequency

Ward Method = 2

Statistics[a]

		Ward Method	Gender	Age	Employed?
N	Valid	6	6	6	6
	Missed	0	0	0	0

a. Ward Method = 2

Table 8. Ward Method=2

Frequency
gender[a]

		Frequency	Percentage	Valid Percentage	Accumulated Percentage
Valid	Female	5	83,3	83,3	83,3
	Male	1	16,7	16,7	100,0
	Total	6	100,0	100,0	

a. Ward Method = 2

age[a]

		Frequency	Percentage	Valid Percentage	Accumulated Percentage
Valid	20-22	6	100,0	100,0	100,0

a. Ward Method = 2

Employment[a]

		Frequency	Percentage	Valid Percentage	Accumulated Percentage
Valid	NO	5	83,3	83,3	83,3
	YES	1	16,7	16,7	100,0
	Total	6	100,0	100,0	

a. Ward Method = 2

Table 9. Frequency

Ward Method = 3
Statistics[a]

		Ward Method	Gender	Age	Employed?
N	Valid	3	3	3	3
	Missed	0	0	0	0

a. Ward Method = 3

Table 10. Ward Method= 3

Frequency
gender[a]

		Frequency	Percentage	Valid Percentage	Accumulated Percentage
Valid	Female	2	66,7	66,7	66,7
	Male	1	33,3	33,3	100,0
	Total	3	100,0	100,0	

a. Ward Method = 3

edad[a]

		Frequency	Percentage	Valid Percentage	Accumulated Percentage
Valid	20-22	2	66,7	66,7	66,7
	23-25	1	33,3	33,3	100,0
	Total	3	100,0	100,0	

a. Ward Method = 3

Employment[a]

		Frequency	Percentage	Valid Percentage	Accumulated Percentage
Valid	NO	3	100,0	100,0	100,0

a. Ward Method = 3

Table 11. Frequency

Ward Method = 4

Statistics[a]

		Ward Method	Gender	Age	Employed?
N	Valid	8	8	8	8
	Missed	0	0	0	0

a. Ward Method = 4

Table 12. Ward Method= 4

Frequency
gender[a]

		Frequency	Percentage	Valid Percentage	Accumulated Percentage
Valid	Female	7	87,5	87,5	87,5
	Male	1	12,5	12,5	100,0
	Total	8	100,0	100,0	

a. Ward Method = 4

edad[a]

		Frequency	Percentage	Valid Percentage	Accumulated Percentage
Valid	20-22	7	87,5	87,5	87,5
	26-28	1	12,5	12,5	100,0
	Total	8	100,0	100,0	

a. Ward Method = 4

Employment[a]

		Frequency	Percentage	Valid Percentage	Accumulated Percentage
Valid	NO	5	62,5	62,5	62,5
	YES	3	37,5	37,5	100,0
	Total	8	100,0	100,0	

a. Ward Method = 4

Table 13. Frequency

Ward Method = 5

Statistics[a]

		Ward Method	Gender	Age	Employed?
N	Valid	3	3	3	3
	Missed	0	0	0	0

a. Ward Method = 5

Table 14. WardMethod = 5

Frequency

Gender[a]

		Frequency	Percentage	Valid Percentage	Accumulated Percentage
Valid	Female	1	33,3	33,3	33,3
	Male	2	66,7	66,7	100,0
	Total	3	100,0	100,0	

a. Ward Method = 5

Age[a]

		Frequency	Percentage	Valid Percentage	Accumulated Percentage
Valid	20-22	2	66,7	66,7	66,7
	23-25	1	33,3	33,3	100,0
	Total	3	100,0	100,0	

a. Ward Method = 5

Employment[a]

		Frequency	Percentage	Valid Percentage	Accumulated Percentage
Valid	NO	2	66,7	66,7	66,7
	YES	1	33,3	33,3	100,0
	Total	3	100,0	100,0	

a. Ward Method = 5

Table 15. Frequency

Five different segments have been obtained, whose denomination and definition would be the following:

- Segment 1.- Young worker. It corresponds to both men and women who are between 20 and 22 years old, and with a large percentage who work.
- Segment 2.- Young women, students. This segment is comprised of women between 20 and 22 years old, who mostly don't work.
- Segment 3.- Students. Corresponds to people of both genders, regardless of a certain age (between 20 and 25 years old) but who don't work, and who are mainly dedicated to study.
- Segment 4.- Young women workers. This segment is formed of women who are between 20 and 22 years old, but with a high percentage of female workers.
- Segment 5.- Working men. It corresponds to mostly males who work. As for age, a specific range would not be determined, but it would be from 20 to 25 years old.

Therefore, with all the previously explained analysis, it can be said that with regards to the hypothesis established in the research carried out by Djamasbi et al. (2010), and of which the present study is a practical application to the hotel sector, in terms of accommodation search engines, the following conclusions could be reached:

- The inclusion of a main image in the design of a main page and its possible positive influence on the perception of visual attractiveness of said website is of vital importance to users, being the element that attracts their attention unconsciously the most. Evidence of this are the visualizations made by the entire sample in the case of Hoteles.com, which is characterized by having a single main image in the center of the website. Meanwhile, Booking.com has two different images located one above the other. This way, it has been possible to see how the context changes when talking about a single main image (greater number of fixations received). In fact, for practical purposes, it could be said that thanks to the fact that Hoteles.com has only one main image, it takes advantage of the opportunity and the remaining space for the inclusion of other elements of an advertising and/or informative nature. This advantage can be a double-edged sword, considering the risk factor of the possible advertising saturation that users can perceive if such space and/or content in it is not well managed. In addition, millennials are characterized by being a demanding public on a visual level, giving more importance to images that convey more information than the text itself (Djamasbi et al. 2008), so it can be said that the relationship is corroborated between main image and perception of positive visual appeal.

- In reference to the inclusion of “scarce text” in a web page and its positive influence on the perception of visual appeal, millennials are characterized as a “lazy” generation, who doesn’t like to “waste” time reading text, when there is an image that can summarize the main thing. In this case, Booking is undoubtedly the favorite (73% of the subjects support it) since it has a simple and clean design, in terms of text inclusion and menu arrangement, when compared to Hoteles.com. In fact, an evident proof of this is the need that the participants have had to look more to assimilate this information in the case of Hoteles.com, given the abundance of communicative elements to digest once their website has been visited. Therefore, the existence of a positive relationship between little text on the website and visual appeal is corroborated.

- Finally, it has also been possible to verify the importance of the inclusion of a search engine in a web page. For generation Y, a utilitarian and fundamental characteristic, such as the search function, is considered as a basic necessity in Maslow's hierarchy. In fact, given the technological level of which they have witnessed throughout their growth as people, they expect and demand an adequate level of minimum functionality from a web page to subsequently pursue and be able to assess greater desires, such as visual attractiveness (Djamasbi et al., 2008). For these cases in particular, it is therefore demonstrated the qualitative data from the eye-tracker that is highly valued by the subjects. 77% of them declare Booking.com as their favorite. This is why the relationship between the search function and the positive visual appeal is also contrasted.

Conclusion

Based on the previously established and corroborated here, it can be said that the practical application to the study carried out by authors Djamasbi et al. (2008), in which this research has been based, also contrasts the main basic hypothesis of this study: The structure of a website and location of the main image attributes, scarce text and search function, directly influence the user's perception of the visual appeal of web pages, as well as their evaluation of the millennial generation.

In short, and for more practical purposes at the commercial level, it could be said that in terms of preference for the three attributes to be analyzed, Booking.com company stands

out given the simplicity and usability of its home page. However, Hoteles.com works beyond the navigability of its website and is committed to a more aggressive communication strategy, including various elements to capture such visual attention ("call to action" type elements in banner format, offers section and/or promotions, "Hoteles.com Rewards" section...). Therefore, Booking would qualify as that company that bets on practicality, whereas Hoteles.com invests more resources in getting their corporate identity known to their users, through various communication messages. What is the most competent strategy? It would be necessary to study various sectors and conduct experiments in greater depth to gather more information about which is more efficient.

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