Website Quality Assessment : A Case Study of Chinese Airlines

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Abstract

The importance of Chinese tourism is growing and so is the level of competition of the companies related to it. The websites of these companies is a key element. It is very important that websites – visited by clients for information search, decision making, and subsequent booking – respond to the expectations of users. The web pages must be designed according to criteria such as web quality. The aim of this paper was the construction of a model for the analysis of the quality of the websites. We took as a reference the Index Web Evaluation (IEW). Four blocks were identified: accessibility, speed, navigability/usability, and content quality. The model was used to analyze the websites of 25 Chinese airlines. For this, we attended to the items contained in this index, modified and expanded it, and adapted it to fulfill the objective of the study. According to the scores, the weights of each aspect and dimension, a ranking of the websites of the Chinese airlines was presented. The results indicated that international airlines had a better website. Accessibility was a weak point on the web. Within the category of navigability, the languages that the websites were translated into was another weak point for most companies. On the other hand, one of the strong points was the quality of the content of the web pages. In addition, points of improvement were provided for each of the airlines analyzed.

Keywords : **web page quality, Chinese airlines, web evaluation index, digital marketing**

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The data published by the National Bureau of Statistics of China (2016) suggested that the tourism sector in China is of a paramount importance for China's economy. As can be seen in Figure 1, inland travel in China has been continuously growing. For example, between 2010 and 2014, the number of inland tourists in China increased by 71.1%, from 2,130 million tourists in 2010 to 3,611 million tourists in 2014. With regard to the number of tourists from outside China, approximately 130 million tourists visited China annually from 2010 – 2014 (National Bureau of Statistics of China, 2016).

In line with this, the income generated by internal tourism in China also increased, from 17,971 billion Euros in 2010 to 27,579 billion Euros in 2011, and then to 32,437 billion Euros in 2014 (National Bureau of Statistics of China, 2016). Therefore, between 2010 and 2014, the growth rate of income generated by internal tourism in

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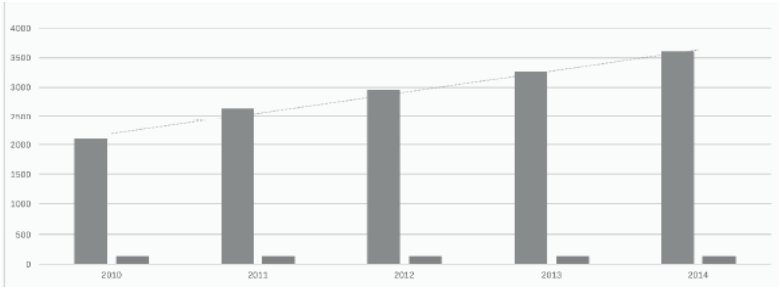
Figure 1. Growth of the Number of Tourists in China (in million)

(left bars = Chinese tourists ; right bars = foreign tourists)



Source : National Bureau of Statistics of China (2016)

China reached 140.9%. This clearly demonstrates that tourism plays a very important role in the Chinese economy.

Even when talking about Chinese tourism, it has become increasingly important to consider the role of information and communication technologies (ICT). ICT is used to help companies manage their expansion through the most advanced information and communication technologies, helping them improve their connection to the Internet so as to improve their "virtuality"(Charne, 2014).

Information technology (IT) has contributed to massive growth in tourism and has resulted in an exponential growth of both offer and demand. This makes IT one of the key elements of the tourism sector. In fact, IT tools are essential instruments for the commercialization, distribution, and adjustment of the tourism company functions, while allowing consumers to optimize the value of their money and time when travelling (Charne, 2014 ; Saura, Palos - Sanchez, & Correia, 2019).

Similar to citizens of other countries, more and more users in present-day China search websites in order to discover new products and services that will enhance their experience of travel destinations of their choice. Accordingly, these changes in behavior have a strong impact on the tourist companies' policies, above all through assigning a more pronounced role to their online presence (Reyes-Menendez, Saura, Palos-Sanchez, & Alvarez - Garcia, 2018).

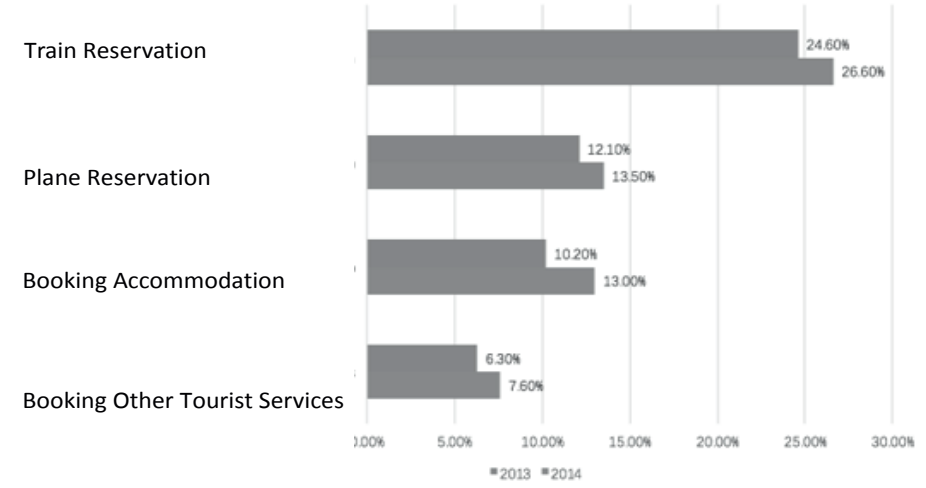
According to the National Bureau of Statistics of China (2016) on the general Internet use in 2010, 34.3% of the Chinese population used the web, and in 2014, this number increased to 47.9%, that is, almost half of the population. Changes in the geographic distribution of the Chinese population was the important reason for that. In 2014, the total number of habitants in China was 136,782 million, of which 74,916 million were urban population and 61,866 million were rural population (National Bureau of Statistics of China, 2016). Figure 2 shows the Internet use in China throughout the years 2010 – 2014.

Furthermore, as noted in the annual report on the tourism market by the China Internet Network Information Center, in 2014, a total of 222 million Chinese tourists reported that they used the Internet to book their journeys. Of these, 26.6% used the Internet to book trains, 13.5% to book planes, 13% to book accommodation, and 7.6% to reserve other touristic services (China Internet Network Information Center, 2015b). The increment in the Internet used to book train tickets was 2%, inflight bookings 1.4%, and accommodation search 2.8%. Finally, the share of other related services grew to 1.3%.

Economically and culturally, China is still a developing country. Given that the government has dedicated more time and resources to develop the country's railway lines, its population tends to book more train tickets. However, due to the speed and efficiency of plane travel, travelling by plane has turned into one of the main ways of transportation as well.

The data also showed that Internet use is greater for transportation booking than for the search for

Figure 2. Percentage of Internet Use for Travel Planning



Source : China Internet Network Information Center (2015a).

accommodation. Accordingly, the present study focuses on the airline sector, as airline companies' websites are apparently visited more frequently than accommodation companies' websites.

Due to the access to abundant information, tourists are now becoming more and more aware of any price discrimination they may suffer. Nowadays, tourists can easily compare prices offered by different websites and even carry out searches filtered by price. On the other hand, being able to compare prices for one product can lead to unjust perceptions (Sinha & Smith, 2000).

In this context, it is important that websites correspond to the users' expectations (Nijhawan, 2016 ; Ríos - Martín, Palos - Sanchez, & Cáceres-Genao, 2017 ; Srivastav & Mittal, 2016) and are designed according to such criteria as web quality. However, despite the abundance of research on evaluation of websites (Conesa Fuentes & Paños Álvarez, 2006 ; Gómez Gorja, Mondéjar Jiménez, & Andrés Martínez, 2010 ; González López, Bañegil Palacios, & Buenadicha Mateos, 2013 ; Schmidt, 2006 ; Torre Barbero, Estepa Luna, López-Pardo Martíneza, León Márquez, Sánchez Laguna, & Toledano Redondo, 2014), studies focusing specifically on airlines in the tourism sector are scarce. At the same time, airlines play an important role in tourism, and this sector is important for the socioeconomic growth of nations. This is particularly relevant for China, both due to the country's role as an emerging power and due to its share in the market.

In the present study, based on an extensive review of the literature, our objective is to develop and create a model to evaluate websites specifically adapted for the tourism sector, specifically airlines. Furthermore, we test the proposed model in a case analysis of Chinese airlines. Based on the results of the analysis, the dimensions and remarkable features related to Chinese airline websites are described. Furthermore, we identify the strengths and weaknesses of the analyzed airline websites and suggest areas for further improvement. Finally, we obtain a ranking of Chinese airline websites in accordance with the points awarded to each of them through the proposed model.

Theoretical Background

Studies on website evaluation and analysis, focusing on different aspects and domains, are many and varied. In the present study, aiming to elaborate the methodology fit for our purpose of evaluating Chinese airline websites as

Table 1. Some Studies on Web Page Analysis

Study	Object of Research
Buenadicha Mateos, Chamorro Mera, Miranda González, & González López (2001)	Spanish universities' web analysis
Acosta-Vargas, Luján-Mora, & Salvador-Ullauri (2017)	Government websites
Moustakis, Tsironis, & Litos (2006)	The quality evaluation model of websites
Miranda González & Bañegil Palacios (2004) ; Gonzalez López et al. (2013)	Evaluation of company websites
Miranda, Barriuso, & Cortés (2005)	Web analysis of financial organizations
Conesa Fuentes & Paños Álvarez (2006)	Evaluation of medical and private hospital
Torres Barbero et al. (2014)	webpages
Rubio Lacoba, Miranda González, & Chamorro Mera (2006)	Web presence of logistics operators
Schmidt (2006) ; Ríos-Martín et al. (2017)	Evaluation of hotel websites
Miranda, Chamorro, Valero, & Maestre (2010)	Evaluation of websites of football clubs

well as to propose a model to reach this goal, an extensive literature search was undertaken. The literature used to construct the model proposed in the present study is shown in Table 1 in chronological order.

The studies in Table 1 were found through a web search for different tags or keywords, such as website quality, website evaluation, website analysis, etc. The methodology most frequently used in previous studies for web analysis was through the Index Web Evaluation (IEW). We carried out a meticulous study of these studies to establish different dimensions and aspects included in this index, analyzing its possible inclusion in the selected template.

Overall, the most frequently mentioned aspects can be classified in four essential categories, which are used to evaluate the quality of a website: accessibility, speed, usability, and content quality. The authors of those studies, apart from mentioning one or more of these categories, usually added a secondary classification where some additional items complemented the proposed model.

The first IEW category is *accessibility*. Accessibility is a measure that reflects the degree to which a website can be visited and used by the largest number of people possible, independently of any personal or environmental limitations. Accessibility is also related to a design which allows for a good perception, understanding, navigation, interaction, and overall satisfactory use of a website for all groups of population, including the disabled (Torre Barbero et al., 2014).

According to Miranda et al. (2005),website quality is higher if the website is easily identified and accessed by users. In our study, we use two measuring factors belonging to this category: (a) search engine presence and (b) website popularity.

Search engine presence entails that a higher position of a website in the search engine implies a greater amount of traffic and, consequently, an improvement in the website's accessibility. On the other hand, the concept 'popularity' of the website is a measurement that shows the number of impacts generated (Miranda et al.,2005).

Following Miranda González and Bañegil Palacios (2004), the advantages of a greater number of links leading to a certain website is a crucial factor. In the first place, the higher the number of websites linked with the object of study, the greater the probability of the traffic arriving to it. Secondly, search engines will locate the sites with higher positions using more links referencing them (Saura, Palos-Sanchez, & Grilo, 2019).

The second IEW category is *access speed and response time*. Previous research demonstrated that the time factor is crucial for users (Rubio Lacoba et al.,2006).While access speed can be measured with a chronometer, this criterion can be influenced by a great number of factors, such as the equipment used, the time of connection, page traffic, and so on (Miranda et al.,2005). To minimize the effects of such factors, in the study carried out by Rubio Lacoba et al. (2006), three measurements were used to measure the loading speed of each website using the same

computer equipment with a 56 kbs modem linked through an ordinary line. The Internet access was provided by an independent provider using the Internet Explorer 6.0. search engine. The measurements were performed over three consecutive days of the same month and always within the same time interval (between 16:30 and 17:30 hours). However, due to Internet access development, we consider this type of speed measurement not to be completely adequate. How this variable is measured in the present study and will be discussed in the Methodology section.

The third category is *usability*. This measure refers to the ease with which the user can navigate through a website. An inadequate design can generate unwanted consequences, such as the potential loss of sales because users cannot find what they are searching, or a potential loss in the number of repeated visits due to the initial negative user experience. Users should never feel lost. A well-designed website is that one where the index is always shown on the screen, making it easier and faster for anyone to access their desired location (Miranda et al., 2005). Therefore, according to Miranda González and Bañegil Palacios (2004), the factors used to evaluate usability include the following :

- Permanent menu that allows fast access to the different sections of each webpage.
- Site map schematically indicating the different sections to access a specific point and allowing to constantly know where it is located.
- Keyword search function which allows the user to find information available within the company's website.

Furthermore, the International Organization for Standardization ISO 9126 defined software usability as the effort required by the users to satisfactorily use the product (ISO, 2001). According to the definition, usability also includes intelligibility, learning difficulty, operability, attractiveness, and the fulfillment of the required usability.

In addition, Nielsen (1999) defined a number of usability norms applicable to website design. Specifically, among the reasons for users to repeat a visit to a website, the more important reasons are: high content quality, actualization quality, minimum download time, low difficulty use, content relevance in relation to the needs of the users, exploitation of the online environment characteristics, and that the web reflects a web-centered organization.

Finally, the third and last IEW category is *content quality*. A website must contain information which satisfies the user's needs and must be updated with a monthly periodicity at most (Miranda et al., 2005). Similarly, Nielsen (2003) indicated that including dates in articles and press releases, as well as the type of information, is crucial in terms of avoiding confusion among users.

In their review of the literature (e.g., Buenadicha Mateos et al. , 2001 ; Huizingh, 2000 ; Miranda González & Bañegil Palacios, 2004 ; Rubio Lacoba et al., 2006 ; Young & Benamati, 2000), researchers proposed the following three factors to evaluate content quality :

- **Informative Factors :** Factors of this type provide a great commercial and non - commercial quantity of information on a specific company. They may include information related to the company's organization, partners, important clients, and social policies. Another important factor here is the product/service description including prices, specifications, photos, and so on.
- **Transactional Factors :** Factors of this type refer to the possibility of completing the recruitment or product/service purchases through the Internet. Information on booking processes and payment methods can also be included.
- **Communication Factors :** Factors of this type are related to the communication between the user and the

company. Websites are entry channels for companies and that users generally want to access relevant information about companies. For this reason, this information should be presented on the main page to make such information easily accessible for the users.

The IEW Model Applied to Airlines

As specified above, the method selected in the present study for our website analysis is the Web Evaluation Index. However, for the purposes of the present study, the WEI is modified so as to better adapt it for its application to the airline sector. In this section, we discuss the modified version of the Web Evaluation Index in further detail.

Specifically, two modifications are introduced into the model. Firstly, we include into it several new items to evaluate Chinese airline websites. Secondly, we also introduce modifications to the measurement of the items in the original version of the index.

(1) Accessibility : We begin with accessibility in order to perform the measurements in this category. Following Miranda et al. (2005), we used two measuring factors: presence in search engines and page popularity.

↳ **Presence in Search Engines :** We opted for introducing the name of the company in Google to find out whether the name appears within the first 10 results of the search. If this was the case, the position was specified.

↳ **Popularity :** Generally, popularity can be measured with Page Rank, introducing the website link in the tools created by Google. This is used as a visibility and impact measurement of the famous algorithm: *Page Rank* by Google (www.calcularpagerank.com).

Despite the wide use of Page Rank in previous research, in our case, when analyzing Chinese websites, access to this site was not possible due to Google censorship by the Chinese government that considers Google to provide access to sensitive information. Other reasons of the Chinese government's boycotting Google include data storage in servers outside of China as well as the country's determination to favor the local industry. Therefore, in China, Google was one of the first technological packing companies which encountered dramatic censure. A prohibition extends to all services offered by Google, such as Gmail, YouTube, etc. For this reason, we decided to use an alternative way of measuring popularity. Specifically, we used the approach proposed by Rubio Lacoba et al. (2006) on Internet presence of the main logistic operators in Spain. These authors used "link" (e.g. www.iberia.com) followed by the analyzed website. The results showed the number of pages which, according to Google, link to the website in question.

(2) Speed : The second category referred to speed, which included two new items that were evaluated : speed of the total load of the page on the computer and on the mobile phone. We analyzed the speed of page load of the Chinese airlines using PageSpeed Insights from Google Developers. This program was designed to evaluate and optimize web pages (available at: https://developers.google.com/speed/pagespeed/insights/). In our case, we noted the obtained values. The website speed values were within the range from 0–199 points : the higher the score, the higher the efficiency rate of the website.

(3) Usability : The third category is usability. Good usability is a key to a good user experience. Furthermore, the experience of users is influenced by different elements. Accordingly, we evaluated several aspects of the websites. Specifically, the following traditional aspects were measured :

↳ Existing links that did not work : Whether during a visit to the website, any broken link was found.

↳ Web dynamism : We indicated if the website contained animations and whether those animations were regularly updated.

↳ Page adapted to mobile devices : Whether the website was adapted to this type of device. To achieve this, we selected the button "minimize size" located in the top right corner.

↳ Page adapted for disabled people : Whether the website offered information on its accessibility for people with disabilities. At this point, there was no need for checking anything else ; it was enough if such information was provided.

↳ Map or Web Page Index : Whether the website had a map or if the website schematically showed the different sections contained in order to give access to the specific site required and to know where the user is at all times.

↳ Keyword search function : Whether the keyword search function was included in the web, allowing users to locate the available information inside the company's website.

↳ Permanent menu : Whether there was a permanent menu that allows fast access to different sections of the website.

↳ Languages : Whether the website was available in different languages.

We also measured the following new aspects :

↳ Clear and simple language : Whether the website used simple and clear language.

↳ Pages whose usability is not high : Whether the design and structure of the page helped the users to prevent their being disoriented while searching the web.

↳ Friendly interphase : Whether the web page had a pleasant design.

↳ Online help : Whether, during the web visit, there was access to virtual assistance aid, direct phone, etc.

(4) Content Quality : The fourth category analyzed was the content quality. In this section, following Rubio Lacoba et al.'s (2006) proposal, we evaluated the content using three types of factors : informative, transactional, and communication. In addition, in order to develop our model, we also decided to integrate new items within these important factors.

First, the informative content included the following items :

↳ The company's history : Whether the website provided information on the origins of the company, its founders, the group it belongs to, etc.

↳ Description of the services offered : Whether the website included a detailed description of the services offered, even if prices are not included.

↳ Virtual visit : Whether it was possible to carry out a virtual visit of the company through the company's website.

↳ Check the prices of the offered services : Whether the website allowed users to check the prices of the goods or services of interest.

↳ Information about security in transactions carried out on the website : Whether the website made it easy for users to understand data safety policies when purchasing online.

↳ Information about quality and environment policies : Whether the web page included information related to the aspects of quality and environment policies in the given company.

- Fidelity programs : Whether the web page informed users about loyalty programs and advantages offered to their clients.
- Type of user identification : Whether it was possible to access the page and a user could identify itself as a company, travelling agency, tour operator, etc.
- Current news publication : Whether there was any news related to the tourism sector or access to other relevant pages.
- Job offer publication : Whether the website posted the job offers in the company.
- Access to other websites and interesting related information : Whether the web page included interesting information for users or at least provided links to such information, e.g., meteorology, information about the destination, nearby tourist attractions, vaccinations needed, etc.
- Additional software : Whether it was necessary to use any special software to see the web content, e.g. Adobe Acrobat for PDF, Flash, and other programs.

On top of the aspects listed above, we also included the following new aspects to measure content quality:

- Latest offers : Whether the website included last-minute offers.
- Booking cancellation policy information : Whether information about conditions and booking cancellation policies appeared on the website.
- Information about Data Protection Law : Whether the page offered information on data protection laws to protect information shared by the clients.
- Frequently asked questions (FAQs) : Whether the page included a space for questions frequently asked by clients.

Regarding the transactional content, the following items were included :

- Ways in which the reservations are booked: Through their own bookings search engine ; through a link from a third party (booking.com, tripadvisor.com,etc.) ; sending an application form or an email by the user.
- Search engine : Whether the tool to perform the searches and bookings was accessible from every web page.
- Payment methods (credit cards, PayPal, others) : Which payment methods were accepted for bookings ordered on the web page.
- Check Online was included as a new aspect : Whether the client could check-in on the same web page, so as to obtain the boarding pass online.

Finally, regarding the communicative content, the items we used are as follows :

- Contact email : Whether a contact email appeared on the website.
- Address or phone number : Whether the address or company phone number appeared on the website.
- Electronic Bulletin or Newsletter : Whether the page offered users the possibility to subscribe to a mailing list to receive the latest information about the company (offers, novelties, news, interesting information, etc.).

↳ Acknowledge opinions : Whether there was a possibility to get the other clients' opinions (not in the social media, but directly on the webpage).

In addition to the points above, the following new items were added to this section :

↳ Client attention for resolution of incidents : Whether the page showed an email address or phone number for client services which users could contact to report any inconvenience or to simply ask for more information.

↳ Leave feedback: Whether on the client's web page, a client could fill in a service satisfaction survey.

↳ Chinese and Spanish social media : Whether the web in Chinese and Spanish could be identified through the logos of different social networks or could be directly accessed through a link (Weibo, Wechat, RenRen, QQ, Facebook, Twitter, YouTube, Pinterest, Vimeo, Flickr, LinkedIn, Instagram, and Google+).

Research Methodology

Out of a total of 34 airlines, 25 major companies were included in the sample. They were classified in five groups ; among these, Groups 1–3 included Chinese capital companies, while Groups 4–5 included private airlines (see Table 2). The remaining airlines did not have their own website for various reasons, such as their websites had a low degree of user-functionality and thus did not yield themselves well to the analysis.

Table 2. Groups, Airlines, and Websites

GROUP 1	China Southern Airlines	www.csair.com
	Xiamen Airlines	www.xiamenair.com
	Chongqing Airlines	www.chongqingairlines.cn
	Air China	www.airchina.com
	Shandong Airlines	www.shandongair.com
GROUP 2	Shenzhen Airlines	www.shenzhenair.com
	Air Macau	www.airmacau.com.mo
	Dalian Airlines	www.dalianair-china.com
	China Eastern Airlines	www.ceair.com
	China United Airlines	www.flycua.com
GROUP 3	Joy Air	www.joy-air.com
	Yunnan Airlines	www.ynair.cn
	Jiangsu Airlines	www.cejs-air.com
	Hainan Airlines	www.hnair.com
	Hong Kong Airlines	www.hongkongairlines.com
	Tianjin Airlines	www.tianjin-air.com
GROUP 4	Lucky Air	www.luckyair.net
	Urumqi Air	www.urumqi-air.com
	Fuzhou Airlines	www.fuzhou-air.cn
	West Air	www.westair.cn
	OK Air	www.okair.net
	Spring Airlines	www.ch.com
GROUP 5	Donghai Airlines	www.donghaiair.cn
	Ruili Airlines	www.rlair.net
	Loong Air	www.loongair.cn

The methodology that was used included a detailed revision of the airline websites. This revision was undertaken over several days, between April and the beginning of May 2017. The data extracted from the analysis of the web pages were introduced in a Google Forms Survey, with one survey per airline. Each section of the IEW model and each variable had a different weight or adjustment, allowing for setting a final score for each dimension and each webpage.

The block adjustments were as follows (see Appendix) :

- Accessibility : 20%
- Speed : 10%
- Usability : 20%
- Content Quality : 50%

Empirical Analysis and Results

After analyzing the results of applying the evaluation model to 25 Chinese airline websites, we obtained global results of the IEW for each of the airline companies. The final scores for each category are shown in Table 3. Later, we created several graphs, which allow us to clearly see what websites in each category reached the highest scores, as well enable comparison across the companies.

(1) Punctuation Index IEW : The applied model determined the quality of the airline websites from a global

Table 3. Results Obtained by the Airlines in the IEW and in Different Categories

Airlines	Index IEW	Accessibility	Speed	Navigability/Usability	Content
Air China	90.40	65.00	94.00	95.00	98.00
Spring Airlines	85.00	65.00	85.00	80.00	95.00
OK Air	82.50	65.00	100.00	65.00	93.00
China Eastern Airlines	82.20	47.50	77.00	95.00	92.00
Xiamen Airlines	81.20	47.50	70.00	95.00	91.40
Hainan Airlines	80.40	47.50	70.00	95.00	96.00
China Southern Airlines	77.50	47.50	45.00	90.00	91.00
Lucky Air	77.40	82.50	34.00	70.00	87.00
West Air	75.90	100.00	14.00	70.00	81.00
Shandong Airlines	74.20	30.00	67.00	85.00	89.00
Ruili Airlines	73.90	65.00	64.00	60.00	85.00
Urumqi Air	73.80	82.50	76.00	60.00	75.40
Shenzhen Airlines	72.60	47.50	86.00	70.00	81.00
Hong Kong Airlines	72.20	47.50	62.00	85.00	79.00
Fuzhou Airlines	71.90	82.50	59.00	60.00	75.00
Air Macau	71.00	65.00	55.00	75.00	75.00
Jiangsu Airlines	68.00	65.00	45.00	60.00	77.00
Loong Air	66.65	47.50	44.00	60.00	81.50

Donghai Airlines	64.80	30.00	43.00	55.00	87.00
Joy Air	64.70	30.00	72.00	60.00	79.00
Tianjin Airlines	63.80	30.00	53.00	65.00	79.00
Yunnan Airlines	61.50	30.00	83.00	60.00	70.40
China United Airlines	60.70	30.00	67.00	60.00	72.00
Dalian Airlines	58.80	21.00	46.00	60.00	76.00
Chongqing Airlines	56.35	30.00	64.00	40.00	71.90

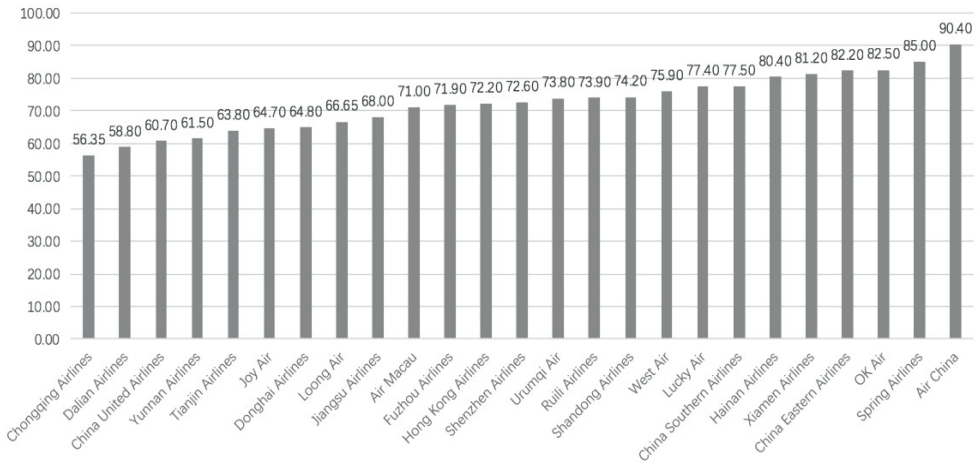
perspective. As shown in Figure 3, the airline with the highest score is Air China (Chinese public capital) with the score of 90.4 out of 100, closely followed by Spring Airlines (private capital) with 85 points. On the other pole of the spectrum, the lowest score (56.35) is assigned to the company : Chongqing Airlines.

(i) "Accessibility" Score : The intention of using a website is influenced by the accessibility and quality of the website (Nagdev & Rajesh, 2018). In this category, West Air is the company with the highest scores, since along with its website being located first in the search engines, in the popularity index link, this company received the highest score (100), surpassing every other company. The second-best score accessibility corresponds to the airline websites that appear first in the search engines, but with the score of 75 in the popularity link index. In this position, there are three websites: Fuzhou Airlines, Urumqi Air, and Lucky Air. By contrast, the company Dalian Airlines has the lowest score, occupying the fourth place, because it did not score in the popularity link. The remaining companies received low accessibility scores.

(ii) "Speed" Score : The results show that the best valued page according to page speed load is that of OK Air, which obtained 100 points, followed by Air China with 94 points. The lowest score, with 14 points, is assigned to West Air, because, as mentioned above, it obtained the highest accessibility score.

(iii) "Usability" Score : A higher score in this section means a better user experience. The highest score is 95

Figure 3. Global IEW Scores of the 25 Chinese Airline Websites



points, and this threshold is reached by four companies: Hainan Airlines, Xiamen Airlines, China Eastern Airlines, and Air China. The lowest score, with 40 points, is assigned to Chongqing Airlines.

(iv) "Content Quality" Score : The quality of the content is one the most important sections of the website as it is one of the main reasons for users to visit the page when searching quality information about the company's services and products as well as to get involved in user feedback communication. The highest score in this category (98) is obtained by Air China followed by Hainan Airlines and Spring Airlines, both with 95 points. The lowest score of 70.4 points is assigned to Yunnan Airlines.

(2) Detailed Results by Variables

(i) Airline Characteristics

- **Type :** According to our results, 88 % of the analyzed Chinese airline companies are flag carriers, while the remaining 12 % (namely, Joy Air, West Air, and Spring Airlines) are low-cost carriers.

- **Ownership :** In relation to the type of ownership, 12% of the analyzed airlines are public, such as China Southern Airlines, Air China,and China Eastern Airlines. The remaining 88% are divided into two parts: 64% are companies of the mixed type and 24 % are private.

- **Destinations :** Out of the 25 analyzed airlines, only 28% have international presence, such as China Southern Airlines, Xiamen Airlines, Air China, China Eastern Airlines, Hainan Airlines, Hong Kong Airlines, and Spring Airlines. The remaining 72 % airlines are operated only within China.

(ii) "Accessibility" Category : In relation to the accessibility category, all analyzed airlines have a presence in search engines**,** meaning that, if the name of an airline company was typed in the Google search bar, all links to that airline appeared within the first 10 results. Figure 4 shows the position occupied by each of the companies. In fact, 24 of them were shown as the first result when the search was performed specifically by the airline name. Only Dalian Airlines appeared in the fourth position.

To measure the popularity of the websites, we used the link followed by the website analyzed. Google also indicated the number of linked pages. The score was codified on the scale from 0 – 100, with 0 being the worst possible score and 100 the highest (see below) :

- 0 – 10,000 (0 points)
- 10,001 – 100,000 (25 points)
- 100,001 – 500,000 (50 points)
- 500,001– 4,500,000 (75 points)
- Over 4,500,000 (100 points)

As to the popularity score, Figure 5 shows the results organized from the lowest to the highest popularity. Overall, popularity levels were low, as only 4 out of 25 airlines obtained a score over 50 points. These companies are Fuzhou Airlines, Urumqi Air, Lucky Air, and West Air. Only West Air acquired the highest possible popularity (100 points).

Figure 4. Position of 25 Airline Companies in Search Engines

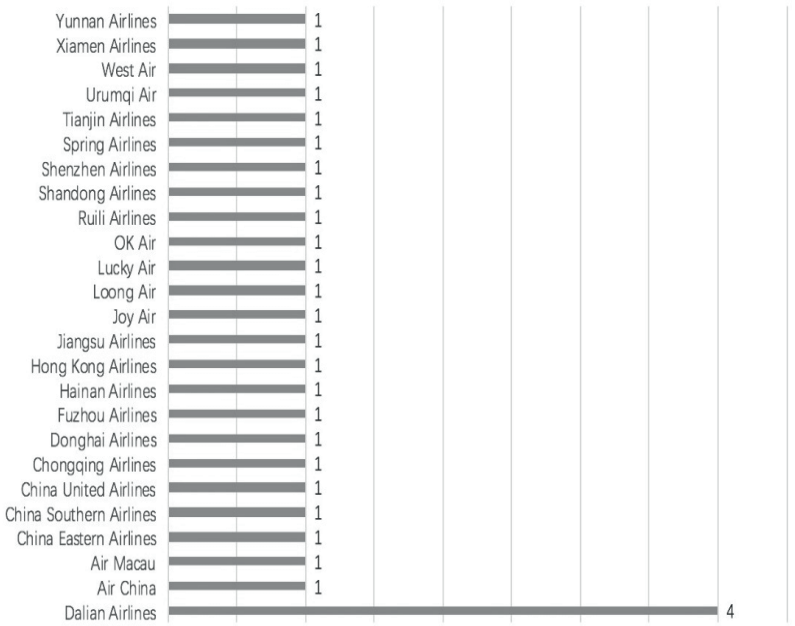
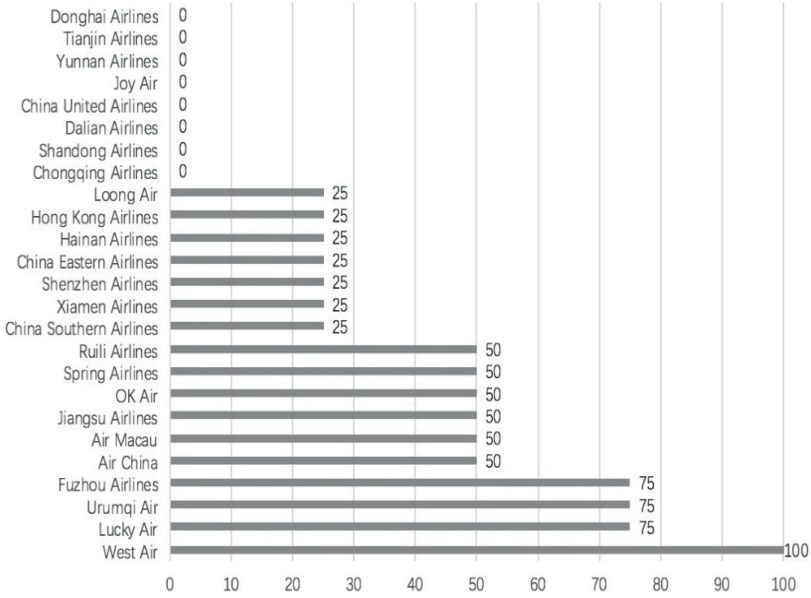
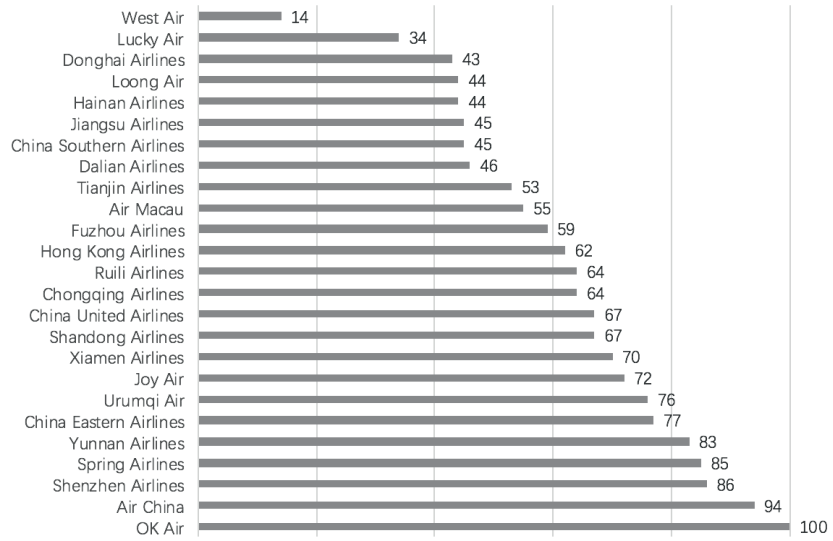


Figure 5. Popularity of the 25 Chinese Airlines by Link



(iii) "Speed" Section : To analyze speed, we used Page Speed Insights, a tool created by Google. When the website was added to the program to be analyzed, it returned a number between 1 and 100, which indicated its speed (where, 1 was the slowest possible loading speed and 100 was the best possible loading speed). The results are

Figure 6. Loading Speed by PageSpeed Insights



shown in Figure 6. However, we must note the similarities between the scores obtained from this variable and the Speed category, since this section only included this variable.

The speed score that positively stands out (100) was that of OK Air. The lowest score (14) was obtained by the airline West Air. Most webpages had the speed surrounding 53–77 intervals, the average speed being 62 out of 100.

(iv) "Usability"Category : Based on the obtained results, meaningful conclusions can be drawn about the most relevant factors for most airlines as well as the factors companies pay the least attention to.

It is important to emphasize that the advertising used on the web must be careful with the privacy of users and not affect accessibility (Palos-Sanchez, Saura, & Martin - Velicia, 2019).In all analyzed websites, the language was simple and clear, and unequivocal and concise lexis was used. Moreover, the use of menu titles and links to redirect users towards the desired information did not disorient the visitors. Furthermore, all websites showed a friendly and visually pleasant interface. None of the analyzed websites had broken links. Finally, all websites included animated elements and they were continuously updated.

With regard to online help, be it through an available email address or phone number, our results showed that only 9 out of 25 evaluated websites (i.e. 36%) offered this possibility. Next, 36% of the surveyed airlines had webpages adapted to being browsed using mobile devices. Keeping in mind the wide spread use of mobile devices with Internet connection, it is a crucial feature that airline companies need to adopt to enhance their customers' experience. Concerning accessibility adapted to people with disabilities, only two of the airlines (8% of the total ; Chongqing Airlines and Donghai Airlines) did not include any information about how they adapted their content to this category of users.

With respect to the elements constituting usability, 96% of the airlines provided a map or web index that familiarized users before navigation and showed more clearly the information. However, only 28% of the websites offered the possibility to search by keywords. On the other hand, all websites included a permanent menu, making it easier for users to navigate in the simplest fashion possible throughout the different sections of the web pages.

Finally, a very salient issue nowadays is language. Two dominant languages were used in the analyzed websites : Chinese (all websites) and English (40% of all websites). All airlines offered an option to translate to

Chinese (because their origin is Chinese) and to English (the third most widely used language in the world, after Chinese and Spanish). Other languages mentioned by the companies that were added to the language options were: Japanese (28%), Russian and Korean (20%), French and German (16%), Spanish and Italian (8%), and Portuguese (4%). This distribution could be attributed to the fact that several of the analyzed airline companies operate in Asia and Europe.

(v) "Content Quality" Category

↳ **Informative Content :** Informative content is the factor that included most items and variables out of the three which made up the content quality category. With respect to the company history (its origins, founders, groups they belong to, etc.) of the analyzed airlines, only two (Chongqing Airlines and Tianjin Airlines) provided some content about the company's history. Therefore, the vast majority of airlines (92%) did not include this type of content.

Regarding service description, this is an aspect present in 100% of the analyzed web pages. Furthermore, 36% of the websites included contained information related to plane characteristics. A quite innovative element that brings clients closer to the company is the online visit. In spite of this, only few pages offered this possibility, with a total of six companies implementing this option. The possibility to check the prices of the offered services is available on all airline websites included in the present analysis. Finally, information about last-minute offers for Chinese air transport is very common. We checked whether all airline websites offered this opportunity on their websites.

As concerns booking cancellation, this content is also universally present in our sample, just like the information about payment security as well as quality and environmental policies. Similarly, information on the data protection law was omnipresent, as this content is stipulated by the law. Therefore, all the websites had a section notifying the clients about the responsibility they acquired and the corresponding measures. Next, client loyalty programs were also referred to on all airline websites. There are studies that confirm that the website environment has a significant impact on electronic loyalty (Kurup & Jain, 2018).

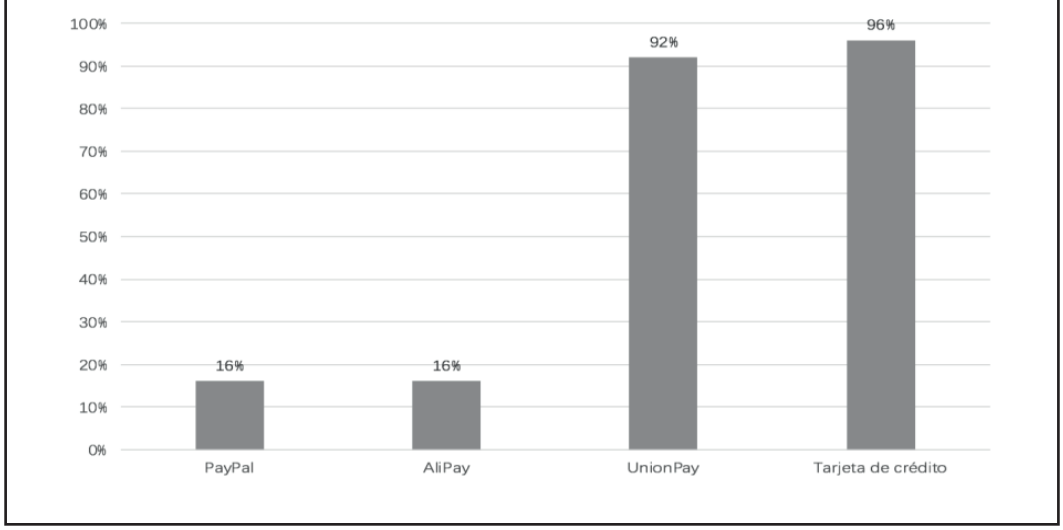
The most frequently asked questions (FAQs) section was found to appear on 92% of the analyzed websites. In relation to user types, 76% of these allowed access to the profile, be it as a particular user, agency, or company. In addition, while 100% of the websites included the "current news" section on information related to the tourism sector, 68% offered information on job offers, even though most airlines didn´t publish vacancies, but offered the possibility to fill in an online curricula application.

Regarding the inclusion of interesting general information (e.g. weather forecasts, information about the destination, tourist attractions in the vicinity, vaccination needed, etc.), 100% of the airline websites had this valuable information.

Finally, it should be noted that no information about additional software necessary to correctly visualize the web content was provided. However, this should not be considered as a negative aspect, as, in the case of the analyzed websites, it was not necessary to download any element in an additional format.

↳ **Transactional Content :** The 25 airlines studied in the present study ensured that it was easy for clients to book their company's services through their search engine (it was also possible to book through other companies' websites that allow users to compare prices and opinions). All analyzed companies offered the possibility of booking through the web. To book, a customer should first find the flight of interest, which is why the search bar is one of the main components of the analyzed airline websites. Apart from these two different ways, we also analyzed if booking could also be done by filling in an online application or sending an email. Only three companies (equivalent to 12%) included one of the latter two options. Online check-in is widely accepted both by companies and users, which is why all airlines included this option.

Figure 7. Payment Methods Acceptable on 25 Airline Websites

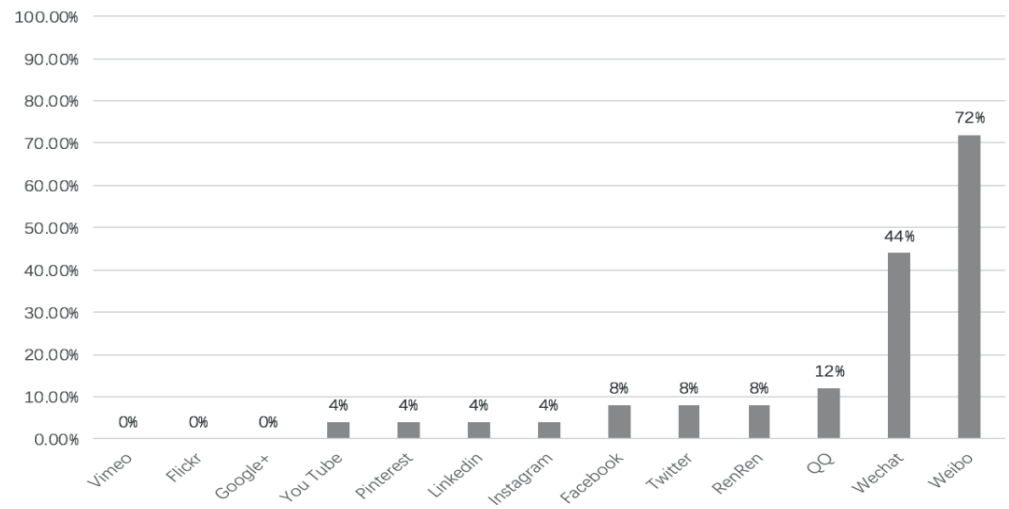


The most used payment method was a credit card (96%) followed by UnionPay (92%). UnionPay is an association for the industry of Chinese bank cards. This payment method is similar to a bank transfer. PayPal and Alipay were also acceptable forms of payment on 16% of the websites. Alipay is a subsidiary of the Alibaba Group and it functions similarly to PayPal (see Figure 7).

↳ **Communicative Content :** The contact email appeared in 28% of the studied cases, which was quite low. This scarcity can be attributed to the fact that, in China, many people do not use email to communicate. On the other hand, information about the company address or phone number was provided on 92% of the analyzed websites.

All studied airlines offered the option to subscribe to their online bulletin or newsletter, and the incident aid section also appeared on all airline websites. On the other hand, 84% of the companies allowed their clients to

Figure 8. Social Media Used by Chinese Airlines



leave their feedback on the company's webpage, and the same percentage allowed other users to see the comments and feedback left by other clients.

Finally, Figure 8 shows the presence of analyzed airline companies in social media. This trend is becoming more common because companies can greatly benefit from their presence in this new communication system, and the influence of social media is essential for achieving leads (Palos-Sanchez, Saura, & Debasa, 2018). The most widely used (72%) social media site that redirects to Chinese airlines is Weibo, a social media site similar to Twitter. Closely following is Wechat (44%), which is a mobile text-messaging service and a voice-messaging channel like WhatsApp. Among other social media platforms with fewer links redirecting from the Chinese airline websites are QQ (12%), RenRen (8%), Twitter (8%), Facebook (8%), Instagram (4%), LinkedIn (4%), Pinterest (4%), and YouTube (4%). Vimeo, Flickr, and Google+ did not appear to be particularly relevant among Chinese airlines. These international social media sites are subject to many restrictions in China, so local social media are used most frequently.

Discussion and Conclusion

As demonstrated by the results of the present study, the IEW is a very useful tool to evaluate the online presence of Chinese airlines. Its application offers valuable and relevant information that allows for a comparison between the analyzed websites. According to this model, the airline with the highest score is Air China. As discussed above, it has the most complete website ; its strongest points are speed, usability, and content quality, while accessibility is its weakest aspect.

Furthermore, Spring Airlines, OK Air, China Eastern Airlines, Xiamen Airlines, and Hainan Airlines closely follow Air China. These airline companies are generally strong in relation to usability and content quality, but are still weak on accessibility and speed. In sum, it can be concluded that the companies with an international presence have the best websites. This finding can be due to the larger number of resources available to these companies, which enhances their websites. Another reason can be that these companies are competing at an international level with other airlines. For this reason, they need their websites to be as attractive as possible as well as to offer a great number of functionalities. In relation to accessibility, only 16% of the analyzed airline websites reached an accessibility score over 70, and 60% of the websites received a score below 50. Therefore, it can be concluded that the analyzed websites had a weakness in this area. In addition, this is because only 16% of the analyzed airline websites reached the final score in accessibility, since, even though we obtained really good results when evaluating positioning in search engines, this result amounted to 30% of the score. On the other hand, the evaluation of this section was negatively affected by the low link popularity indexes of the analyzed websites, with the popularity link score of 70%.

In relation to speed, 36% of the airline companies exceed the 70-point score, while 32% of the companies did not reach 50 points, suggesting that speed was a weak aspect of these websites. Therefore, speed scores of Chinese airline companies should be improved to enhance client experience.

Concerning usability, 50% of the analyzed airlines achieved a score over 70, while only 4% got a score below 50. This suggests that airline companies assign more importance to usability as compared to accessibility and speed.

Furthermore, within the category of usability, available languages offered by the airlines websites could be considered a weak point for most of them, because only few companies had international presence and only those companies offered translations to other languages. We would propose that airlines should work to improve this point, even in the event when they do not have international presence, as there are many potential clients in other countries willing to fly internal Chinese airlines.

Finally, considering that all airline companies got a score over 70 points on content quality, we can conclude

that this section of the websites is one of their strong points. It can be confidently assumed that content quality is one of the main aspects which conditions the user's perception of an airline company's website. In this model, content quality has a very important value, amounting to 50% of the total score. In this respect, we must also reinstate the need for a continuous enhancement and adaptation to e-consumer trends, which must be constant in any digital marketing plan (Saura, Palos-Sánchez, & Cerdá Suárez, 2017).

Managerial Implications

This research work has important managerial implications. On the one hand, through this research, the airline website developers will be able to find important recommendations that can help them establish the conditions of the website design and other aspects that are detailed here in the sections of this manuscript. For those responsible for marketing of airlines and websites that sell travel on airlines, it can be a work of great interest in the sense that the conclusions will help to give the necessary importance to the different factors that this work presents.

Limitations of the Study and Scope for Further Research

The present study has several limitations. On the one hand, the evaluating model itself might show subjective factors when elaborating an evaluation index. Therefore, in order to construct it, objective factors, which can provide more reliable results should be used. Overall, any model is susceptible to being incomplete and thus lack an important key variable in their analysis. This happens particularly frequently with the models applied to any sector or geographic area. Consequently, in the present study, we adapted and modified the IEW for a case study of airlines — specifically, Chinese airlines. Future studies could extend this research by investigating the objective factors or alternate these factors with other subjective factors. Similarly, airlines from other continents could be studied.

Authors' Contribution

Cristina Ceballos Hernandez, Pedro Palos-Sánchez, and Miguel A. Rios contributed to the design and implementation of the research, to the analysis of the results, and to the writing of the manuscript.

Conflict of Interest

The authors declare no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

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Appendix

Block's Adjustment

Table A1. Accessibility Section

30%	A2. Presence in search engines (POSITION)
70%	A3. Link popularity

Table A2. Speed Section

100%	Speed in page speed insight (over100)

Table A3. Usability Section

5%	N1. Simple and clear language
5%	N2. Page navigation is simple
5%	N3. Friendly interface
5%	N4. Existence of broken links
5%	N5. Dynamic Web
5%	N6. Online help
5%	N7. Page adapted to mobile devices
5%	N8. Page adapted for disabled people
50%	N9. Usability [Map or index of the website] N9. Usability [Keyword search function] N9. Usability [Permanent menu] N10. Languages [Spanish]
10%	N10. Languages [English] N10. Languages [French] N10. Languages [German] N10. Languages [Italian] N10. Languages [Portuguese] N11. Languages. Others (indicate)

Table A4. Usability Section - Content Quality Section

Informative Content : 50%	
4%	CI1. History of the company
10%	CI2. Description of offered services
10%	CI3. Characteristics of the room
6%	CI4. Virtual visit
10%	CI5. Check prices of the offered services
6%	CI6. Latest offers
6%	CI7. Information on booking cancellation policies

6%	CI8. Information on security in online transactions
6%	CI9. Information on environmental and quality policies
6%	CI10. Information on data protection laws
4%	CI11. Loyalty programs
6%	CI12. Frequently asked questions (FAQs)
4%	CI13. Identification by type of user
4%	CI14. Current news posts
4%	CI15. Job offer posts
4%	CI16. Access to other pages and relevant information
4%	CI17. Indicate if additional software is needed to view the web content.
Transactional Content : 20%	
50%	CT1. Through their own booking engine CT1. Through a third party link (booking.com, tripadvisor.com,etc) CT1. Through a form or email filled in by the users.
20%	CT2. Search engines
10%	CT3. Online Check-in
20%	CT4. Payment methods [Credit card] CT4. Payment methods [PayPal] CT5. Other Payment methods
Communicative Content : 30%	
10%	CC1. Contact e-mail
15%	CC2. Address or Phone
5%	CC3. Newsletter
10%	CC4. Customer service for incidents
10%	CC5. Leave opinions
10%	CC6. Know opinions
40%	CC7. Social networks [Weibo] CC7. Social networks [Wechat] CC7. Social networks [QQ] CC7. Social networks [RenRen]

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