

# DETERMINING KEY FACTORS IN A WEB SITE: THE CASE OF ACEROS DE HISPANIA

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## ABSTRACT

The design of a quality web site, as part of e-business strategy, has become a key element for success in the virtual market. This article analyses the main factors which must be taken into account when designing a commercial web site, concentrating on the Aceros de Hispania company. We have calculated the Web Assessment Index (WAI), proposed by Miranda and Bañegil (2004), by studying the features which determine web site quality: accessibility, navigability, content and speed. The results obtained provide several lessons which should be borne in mind when designing a commercial e-strategy.

**KEYWORDS:** Web Assessment Index (WAI), accessibility, navigability, speed.

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# **DETERMINING KEY FACTORS IN A WEB SITE: THE CASE OF ACEROS DE HISPANIA**

## **1.- INTRODUCTION**

In recent years, Internet has become a new channel for the commercialization of products conventionally sold through traditional outlets; according to the Forrester Report, the volume of online retailing will reach nearly \$12,837.30 billion by 2006. Electronic commerce (e-commerce) requires little additional investment by companies (a web site is sufficient) and facilitates access to markets previously considered as out of reach (Whinston, Choi, & Stahl, 1997; Solé, 2000). Many companies have been built upon an exclusively electronic system of sales and, in distinction to the offline market, have employed a weak e-business strategy. This has led to serious tactical errors which have caused many firms to fail (Phan, Chen, & Ahmad, 2005).

Numerous authors consider that a key aspect of e-business strategy is the design of a quality web site (Nour & Fadlalla, 2000; Turban, McLean, & Wetherbe, 2002, Frost & Strauss, 2002), since this is the principal medium of communication to interact with current and potential customers. Thus, success in the virtual market requires firms to correctly manage technology and the information provided on its web site.

The purpose of this article is to identify the key aspects which must be taken into account in the design of a commercial web site and which contribute to a successful e-strategy. To this end, we undertake a case study of a specific company, Aceros de Hispania, S.L. (<http://www.aceros-de-hispania.com>), dedicated to the sale (exclusively online) of decorative, handmade weaponry: swords, knives, daggers, amour, shields, etc. Located in an area which has been economically both deprived and depressed in recent years, it has nevertheless managed to overcome obstacles such as the lack of an adequate communications network, continual depopulation, the absence of economic opportunities and a poor entrepreneurial environment. This has been due to a strategy based on the strength of specific aspects of its web site, and it has become the biggest worldwide shop in its field, with regard to the number of products, and the company *par excellence* for lovers and collectors of this type of handicraft.

This article begins with a review of the key factors which must form part of any business strategy directed towards electronic commerce and which define a quality web site. Secondly, the e-business strategy of Aceros de Hispania is analyzed. Finally, the principal lessons learned are discussed, with a view to aiding those businesses which wish to move from the traditional bricks and mortar structure to a clicks and mortar one.

## **2.- DESIGN OF A COMMERCIAL WEB SITE**

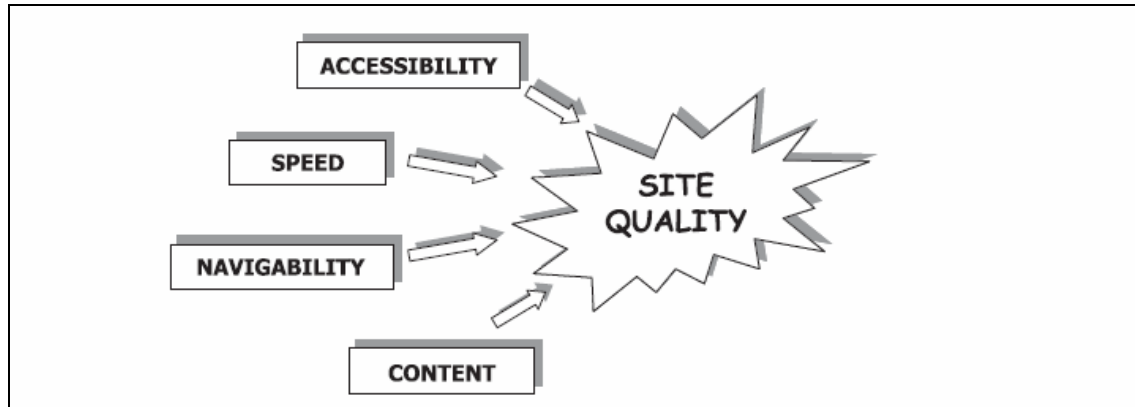
An adequate e-business strategy necessarily includes the design and construction of a commercial web site that visitors find comfortable when interacting with the company. Web site quality depends upon both its content and its operationality for users (Rabin, 2001); the better a company web site is, the greater are the probabilities of success in the virtual market.

Many studies have analyzed the importance of adequate web site design, concentrating on aspects such as content, use and objectives (Angehrn & Meyer, 1997; Liu, Arnett, Capella, & Beatty, 1997; Takacs & Freiden, 1998; Griffith & Krampf, 1998; Ju-Pak, 1999). However, as Nour and Fadlalla (2000) warn, such research provides a general description of the importance of the web site but does not identify those factors which must

always be present and which improve company e-strategy (Kirsner, 1998; Nielsen, 1999a and b; Robbins & Stylianou, 2003).

We therefore believe it interesting to specify the essential elements of commercial web site design: accessibility, speed of access, navigability and content quality (Figure 1). On the basis of these four categories, obtained from Bauer & Scharl (2000) and Miranda & Bañegil (2004), the Web Assessment Index (WAI) can be calculated, to provide an objective evaluation of company web site quality and permit comparison with those of other organizations and sectors.

Figure 1: Web site quality assessment model



Source: Miranda and Bañegil (2004)

**1. Accessibility** refers to the quality of a web site in terms of its ease of identification and access for current and potential users. This may be measured by at least two indicators: its search engine position and the site popularity. On occasions, and in order to increase precision, this measurement may be supplemented by the number of external links which direct users to the web page. The greater the number of linked sites, the more traffic is received and the higher is search engine positioning (Miranda and Bañegil, 2004).

**2. Access speed** is a very important factor in e-commerce. Various studies, such as that by Hoffman and Novak (1996), demonstrate the positive correlation between web site loading time and user satisfaction and show that fast loading is essential for online transactions to be finalized. When loading time is excessive, users will either redirect the search engine to another site and not return to the web site (Weinberg, 2000; Cao, Zhang, & Seydel, 2005).

**3. Navigability** refers to the usability which company web sites must offer. Poor design may prevent users from finding the product they want to buy, and consequently they will not revisit the site. Thus, ease of search reflects web sites' capacity to help users to find the information they require (Huizingh, 2000). Companies must facilitate searches by providing site maps, internal search engines using keywords or a permanent site menu which permits visitors to know where they are at any given moment (Clyde, 2000; Hudson Keasey, & Litter, 2000; Robbins & Stylianou, 2003). Such navigation tools help users to keep a mental map of their position and understand how different pages or sections are interrelated (Cao et al., 2005). In summary, the less clicks necessary to find the object required, the greater is user satisfaction and the higher is the probability of producing loyal customers.

**4. Content quality** evaluates the relevance of the information provided by companies on their web sites, since information supply is the basic goal of a web site (Bhatti, Bouch, & Kuchinsky, 2000). Thus, this factor offers a broad field for study and comprises three basic functions: informative, transactional and communicative. The first of these concerns the data the company supplies regarding its background, activity, product or service description, etc. (Robbins and Stilianou call this "corporate information"). The second regards the ease with which Internet transactions may be completed and the third, also termed "communication/customer support", is related to the facilities and communication channels companies offer for users to establish direct contact (contact e-mail, telephone number, contact address, etc.).

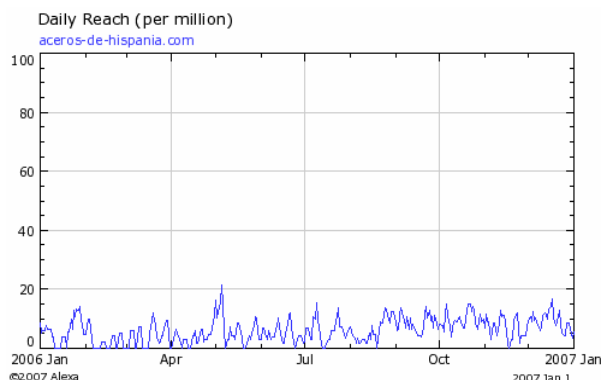
These four aspects refer to the quality of the site from the point of view of the system utilized (accessibility, navigability and speed) and of information (web site content). As in analogous studies (Olsina Godoy, Lafuente, & Rossi, 1999; Bauer & Scharl, 2000; Buenadicha, Chamorro, Miranda, & González, 2001; Miranda & Bañegil, 2004; Miranda, Barriuso, & Cortés, 2005), in order to obtain an overall score for an e-business, and furthermore to be able to compare it with other companies active in the electronic market, these categories must be weighted using a scale from 0 to 100 points (the greater the number of points, the more important the factor). The Web Assessment Index (WAI), proposed by Miranda and Bañegil (2004), is constructed on the basis of this weighting.

The following section presents a description of the company studied here, Aceros de Hispania (ADH), and a detailed analysis of its web site quality.

### 3.- ACEROS DE HISPANIA, S.L. (ADH)

Aceros de Hispania, S.L. began trading in the electronic market in April 1999, in the small village of Castelserás in the province of Teruel in Spain. Despite having a staff of only 7 and a family structure (its founders and owners are two brothers), it sells its merchandise in over 81 countries worldwide (see Annex) and its web site receives a daily average of 8.5 visits per million internauts, with peaks of up to 20 (Figure 2) and an annual rate of growth of 26% (Alexa, 2007).

Figure 2: Visits to the web site in 2006



Source: Alexa (2007), [www.alexa.com](http://www.alexa.com)

According to ADH's founders, company strategy is simple. If a sword with special characteristics is required, users have only to enter these into a search engine, and the name of the company will appear among the

first results. Thus, Aceros de Hispania has become the principal supplier of the official sword of the “Lord of the Rings” trilogy, or the sword of William Wallace, the principal character in “Braveheart”.

The story begins when one of the brothers who founded the company attended a free course organized by the Teruel Entrepreneurs' Association, aimed at teaching small and medium-sized businesses to use e-mail and browse web pages. Despite their lack of experience in the electronic market, the two founding brothers decided to start their own e-business. Taking advantage of the opportunities presented by Internet, they succeeded in creating a venture which, given its product characteristics and its geographical location, would have had difficulty in surviving using exclusively offline sales channels.

ADH has managed to successfully develop its business exclusively via its web site; its strategy is based on a wide product range (more than 7,000 items), on prominent search engine positioning and on navigability and quality of information. It has consequently overcome obstacles such as barriers to entry, reduced many of the costs incurred by bricks-and-mortar competitors and taken advantage of the resulting savings to offer lower prices.

### ***Quality analysis of the ADH web site***

To study the quality of the ADH web site, we have analyzed each of the key factors defined earlier and calculated the WAI.

**1. Accessibility:** As explained above, success in the virtual market requires companies 1) to appear in the top results provided by the principal search engines, and 2) enjoy great popularity on Internet, which can be measured by the number of links and by PageRank, obtained by Google.

In the first case, owing to the international expansion of ADH, our study has analyzed four different search engines: Google, Yahoo, MSN and Ask. For the period 2004-2007, in all the observations performed in the four search engines, ADH is among the top results provided when the generic name of their products (e.g. swords, knives, armor and “knives and swords”) is entered (Table 1); sponsored links are excluded from the list. Furthermore, there exist over 700 different search terms linked to the company web site. The company is thus easily accessible for all potential customers searching for information on a subject linked to its product range.

Table 1: Company position/total results obtained by search engines using keywords\*

	<b>GOOGLE</b>	<b>YAHOO</b>	<b>MSN</b>	<b>ASK</b>	<b>Mean of the term</b>
<b>Knives</b>	7°/ 29,200,000	1°/ 28,700,000	1°/ 14,130,951	+ than 50°/ 7,538,000	<b>2.25</b>
<b>Swords</b>	10°/ 19,500,000	7°/ 17,900,000	1°/ 6,975,567	46°/ 4,843,000	<b>16</b>
<b>Armors</b>	1°/ 255,000	6°/ 230,000	14°/ 42,203	7°/ 52,700	<b>7</b>
<b>"Knives and swords"</b>	3°/ 140,000	1°/ 216,000	1°/ 36,176	8°/ 49,700	<b>3.25</b>
<b>Mean of the search engine</b>	<b>5.25</b>	<b>3.75</b>	<b>4.25</b>	<b>15.25</b>	<b>7.125</b>

\* Stability tested at different moments in time.

The second aspect of accessibility analyzed has been *site popularity*, measured by the number of external links directed to the ADH web site. We excluded from the total number of impacts those generated by artificial increases (those created by the company itself) and measured exclusively independent external links. The greater this figure, the greater will be the traffic directed to the company web site; in addition, search engines will award

it a higher position (Miranda and Bañegil, 2004). This quantification was performed using *Link Popularity* (<http://www.linkpopularity.com>) and *Link vendor* (<http://www.linkvendor.com>).

Table 2 shows, according to the search engine employed, the number of links to the ADH web site; the figures are relatively high, bearing in mind that company policy excludes payment being made to achieve a greater number of links or to undertake exchanges of this type. All the links have been created voluntarily by the web sites which host them, without any prior agreements having been reached. The PageRank result obtained by Google is 5/10, a very high value if we take into account that its growth is exponential, and also if we compare it to other PageRanks, such as that for Ryanair (5/10) or eBay (8/10).

Table 2 also presents the results obtained by search engines when the name of the company is entered. In all cases, the ADH web site appears in first place.

Table 2: Links and web pages indexed to Aceros de Hispania\*

	Google	MSN	Yahoo	Ask
Links	153	981	3081	385
Pages	3620	363	2603	397

\* Stability tested at different moments in time.

**2. Speed:** To study speed, the information provided by Alexa ([www.alexa.com](http://www.alexa.com)) was analyzed. The information supplied by this web site with regard to popularity must be interpreted with caution, due to the bias generated by its analyzing only those users who have this toolbar. However, this bias disappears for information concerning speed. The average loading time is 2.7 seconds, which may be defined as slow, since 60% of sites are faster.

This is due to the need for the products offered by Aceros de Hispania to be attractively presented; although diagrams, images and photographs reduce the speed reached by its web site, they are very important and facilitate the final sale.

One weakness of the ADH web site is its speed; companies must do everything possible to achieve maximum download speed for their sites, by adding servers and links, updating Java, utilizing the latest versions of Real Placer and Shockwave, etc.

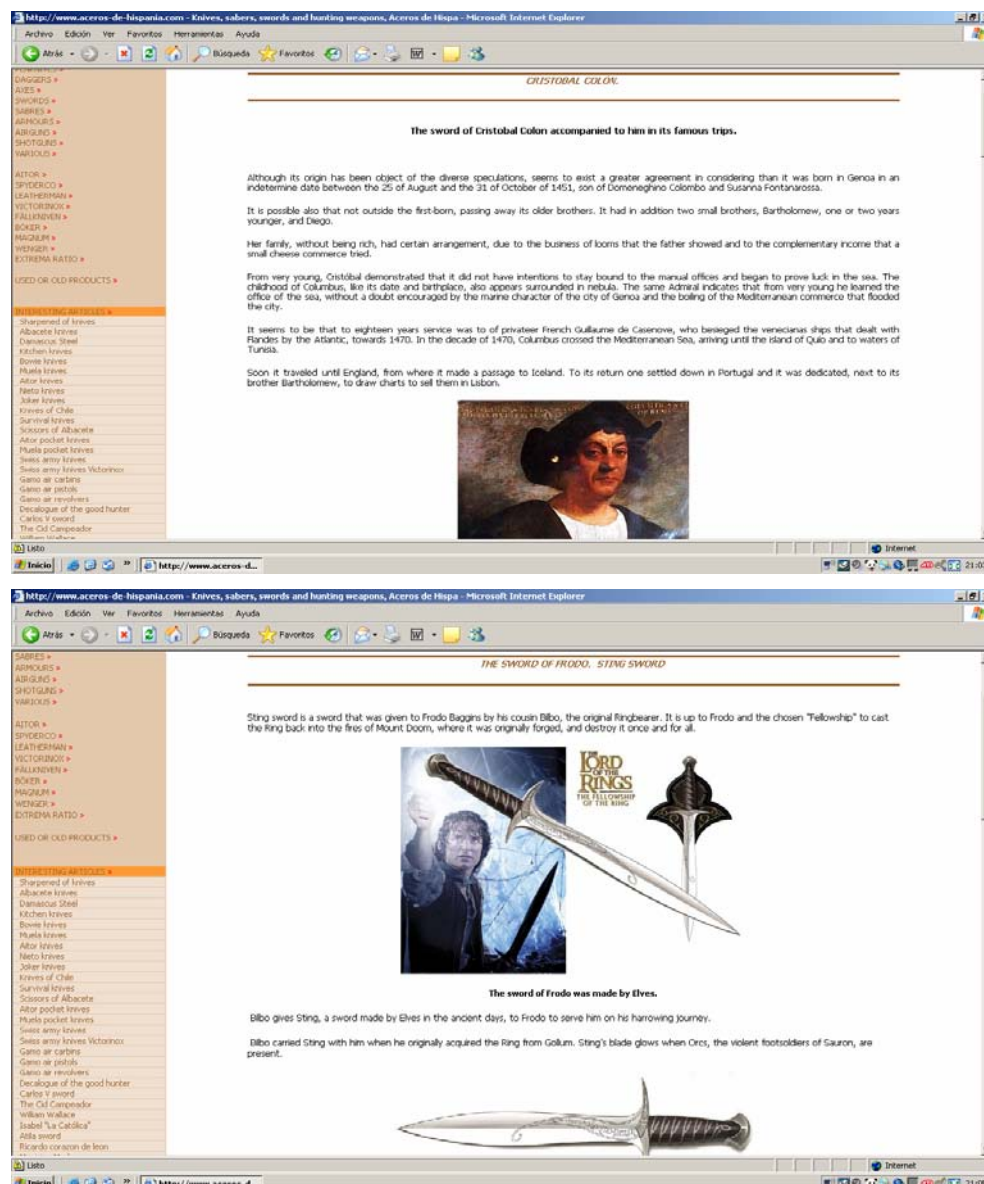
**3. Navigability:** As described earlier, navigability is the usability of the web site and the ease with which users can find relevant information, can access the homepage and can avoid getting lost when searching for products (Evans and King, 1999). ADH facilitates navigability by (1) its *own keyword search* functions, which allow users to find the information required; (2) a *permanent site menu*, which provides rapid access to the various sections of the site and prevents users from perceiving uncertainty or a lack of control while navigating; (3) a *site map*, allowing familiarity with the site prior to navigation, and (4) a *help page*, which supplies users with information about ADH, its products and e-commerce in general.

**4. Content quality:** With regard to informational content, ADH provides information about all its products, permits its prices to be consulted, facilitates access to other web sites of interest to its users and indicates how to obtain interesting information related to the origin and history of its products (Figure 3). It provides an exhaustive description of its product range, concerning size, weight, color and materials, as well as

photos of all the items it offers; such information is necessary for users to trust the e-business. Furthermore, its web site emphasizes the aims of the company: “Our objectives are clear, good service and a wide range of products of all type, to cater for the tastes and requirements of collectors and hobbyists all over the world”, and the craftsmanship of all its products: “The product line of Aceros de Hispania is almost totally manufactured in Spain, following the tradition of craftsmanship which has made our country famous since time immemorial”.

Nevertheless, it is necessary to highlight certain limitations of the informational content of the web site, such as the lack of financial information which would permit users to appreciate the economic progress of the firm in recent years.

Figure 3: Product description and origins



Transaction information refers to the facilities offered by the company for undertaking online purchases. ADH provides general information concerning e-commerce (Figure 4), as well as an order form which informs users, prior to purchase, of transport costs or the cost of the product in different currencies (euros and dollars)

(Figure 5). Clearly, the company places great importance upon this type of information, related to electronic transactions, since Internet is its only distribution channel. The site offers information regarding the company's privacy policy, banking data security and other information of interest to potential buyers, termed "general conditions" (price lists, payment systems, shipping methods, delivery times, guarantees, refunds and exchanges, personal data protection, exclusion clauses, etc.).

Figure 4: E-commerce information

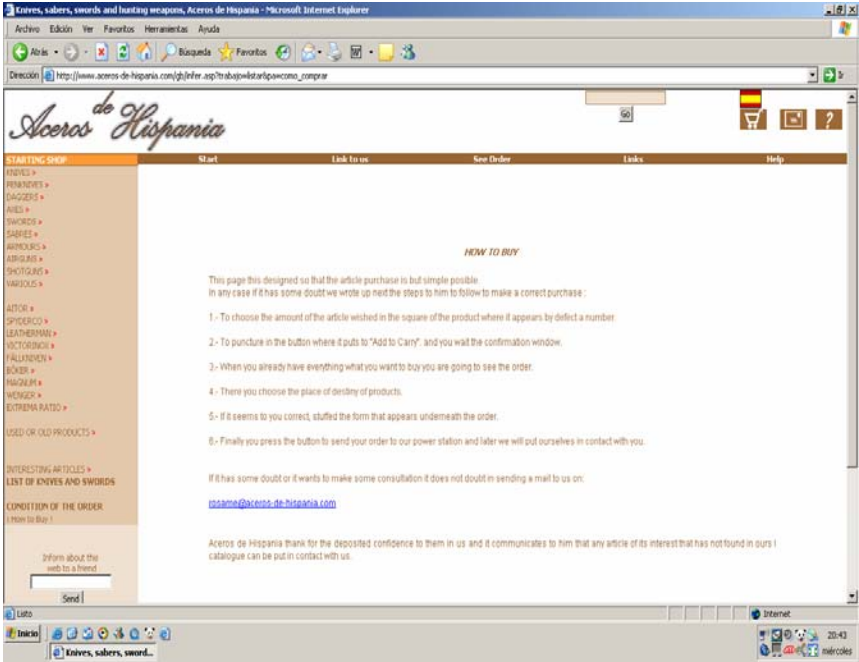
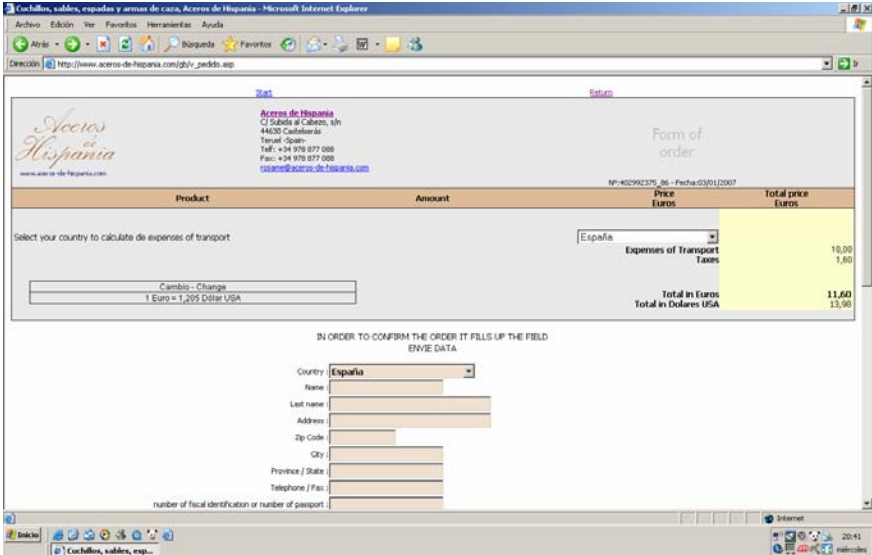


Figure 5: Order information



Finally, the contact information allows users to communicate with ADH through various channels: e-mail, postal mail, telephone and fax, all provided in two languages (English and Spanish). This information is easily accessible on the company homepage, with a single click. Interactivity with consumers is thus strengthened,



transmitting confidence and transparency with regard to the company's activity. Contact information is an accurate predictor of web site quality.

### ***Web site evaluation using WAI and comparison with other sites***

Following the analysis of each of the aspects which define quality web sites, we calculated the Web Assessment Index (WAI). To this end, we used as a basis the weightings assigned in other studies and approved by independent experts (as did Buenadicha et al., 2001; Miranda and Bañegil, 2004), thereby facilitating the homogenization of this index and its comparison with other companies and industries. As content quality is essential to enter the target market and perform electronic transactions, 50 points were assigned to this factor. 20 points were assigned to both navigability and accessibility and 10 points to speed. The assignation of these weightings would constitute one of the principal limitations of our study were it not for their having being commonly used and accepted in the most recent literature (Olsina et al., 1999; Bauer and Scharl, 2000; Buenadicha et al., 2001; Miranda & Bañegil, 2004). The results obtained from the evaluation of these four features and from the weightings employed were used to construct the Web Assessment Index (WAI) presented in Table 3.

To analyze the quality of the ADH web site, its evaluation has been compared with: (1) the WAI obtained for the iron and steel industry, to which ADH is closely linked by the nature of its products; (2) the WAI for the retail trade industry, since ADH's activity is distribution-based and (3) the WAI obtained by the top 200 Spanish firms' web sites (Table 3 and Figure 6). These three indexes have already been calculated by Miranda and Bañegil (2004), and their independence and reliability is therefore guaranteed.

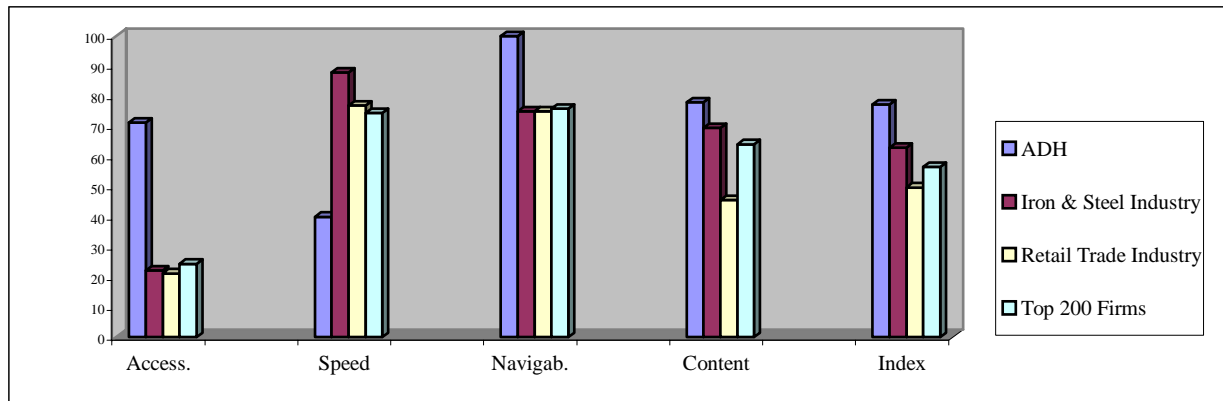
Table 3: Web site quality indexes

	<b>Weighting</b>	<b>ADH</b>	<b>Iron and steel industry</b>	<b>Retail trade industry</b>	<b>Top 200 Spanish firms</b>
<b>ACCESSIBILITY</b>	<b>20</b>	71.25	22.18	21.21	24.4
<b>SPEED</b>	<b>10</b>	40	87.9	76.88	74.47
<b>NAVIGABILITY</b>	<b>20</b>	100	75	75	75.81
<b>CONTENT</b>	<b>50</b>	78	69.5	45.62	64.1
<b>INDEX</b>	<b>100</b>	<b>77.25</b>	<b>62.98</b>	<b>49.74</b>	<b>56.62</b>

The four factors were evaluated on the basis of the analysis described in the previous section. The results in Table 3 show that ADH scores highest in the most important categories: accessibility, navigability and content, while speed obtains a significantly lower score. It must be remembered that 60% of company web sites are faster than that of ADH, and it therefore scores 40/100. Compared with the iron and steel industry, the retail trade industry or the top 200 Spanish companies, its download speed is considerably lower.

With regard to navigability, the ADH web site possesses the four features most relevant for measurement (permanent menu, own search functions, site map and help page); it therefore receives the maximum score (100), as against the 75 points awarded by other WAIs, which do not include one of these four features. These tools promote user confidence and increase the probability of completing a purchase, augment usability and users' perceptions of self efficacy and thereby increase both user satisfaction and the number of loyal customers.

Figure 6: Evaluation of web site quality



The competitive advantage of ADH, in comparison to the iron and steel industry, retail trade industry and the top 200 Spanish companies, is strongest with regard to **accessibility**. If keywords linked to the company's activity (sword, knife, amour, etc.) are entered, the ADH web site is among the top results returned by the principal national and international search engines, attaining an average value of 7.125. Furthermore the PageRank calculated by Google (5/10) is identical to that of many internationally prestigious companies. The explanation of the high score for accessibility, with respect to other WAIs, is that one of the pillars of ADH's online business development strategy is precisely its search engine presence and positioning. Because its web site appears among the top results obtained when the keywords of its business are entered, ADH receives thousands of visits every day. ADH invests considerable resources in improving its web site position, thereby distinguishing itself from its main competitors.

Finally, **web site content** is also one of ADH's strongest points (see Figures 2-4); it scores higher than the iron and steel industry, the retail trade industry or the top 200 Spanish firms. The ADH web site is the only medium of communication the company possesses to interact with its portfolio of clients scattered all over the world, and thus its informational and communication content is especially important. Consequently, descriptions in two languages of its products and explanations of the company's privacy and security policies are crucial information for users to feel confident and make a purchase. The lower WAI score of the companies and industries used for comparison is probably due to their business not being exclusively Internet-based. Since the offline market provides supplementary support, the quality of web site content is not as essential as in the case of ADH. Similarly, order information (orders, payment methods, etc.) is more important for ADH than for other companies in the same sector, as its profits come exclusively from electronic commerce.

#### 4.- WEB SITE SUCCESS: THE LESSONS LEARNED

Internet has permitted the creation of many businesses which would not have been viable with a bricks-and-mortar structure. Our case study of Aceros de Hispania provides several valuable lessons which should be applied to e-strategy design. The following key factors should be considered not only as management tools but also as important sources of competitive advantage:

- *Exploitation of Internet to gain access to niche markets at a worldwide level.* In this way, ADH has reached a large number of clients who otherwise would not have been aware of the company's activity.

- *Design of a quality web site.* For the majority of firms, their web site is their only available window to the world. They must therefore attempt to take maximum advantage of the information they provide and obtain via this medium, interacting with their clients and exploiting the feedback Internet permits. The quality of company web sites may be divided into four aspects, related either to the system (navigability, speed and accessibility) or to information (content).
- *A company web site must appear among the top results provided by search engines.* This will increase company popularity among all those potential clients who use Internet to search for information related to the company's products.
- *Companies must increase their popularity via links to the best sites related to their products.* Such links will increase traffic to their site, will associate them to the image of the linked web site and will place them on users' lists of favorites.
- *Improvement of web site download speed.* A slow web site may impede both the decision to purchase and the decision to complete the transaction online. However, this drawback is overridden by the type of product sold (planned and/or impulse purchase) and the market at which it is aimed (collectors or amateur).

Moreover, if feedback regarding download speed is provided, (for example, if an icon indicates what percentage of information has been downloaded) users are more likely to tolerate delay in downloading. Companies must therefore improve their systems to streamline communication with their current and potential customers. Clyde (2000) suggests that web sites should be simple, with limited use of complex animations, and that the speed and memory of the site host are important.

- *Improvement of the perception of self-efficacy and control during user interaction on the web site.* Companies must provide tools which increase the usability of their web site and facilitate rapid information searches: main menus, internal search engines using keywords, help pages and site maps. The fewer the number of clicks, the greater is the probability of a transaction being completed.
- *Optimization of web site information quality.* For those companies which only operate in the electronic market, their web site is their only means of publicity. Thus, any information they wish to communicate must be adequately situated and explained on their site. Such companies must therefore pay special attention to related aspects, such as their web site design and features and the provision of accurate and updated information (Lin and Lu, 2000). If a company web site offers incorrect, inappropriate or insufficient information, this may detract from its business image and cause the loss of valuable clients.
- *Provision of all the information necessary for transactions.* This recommendation is especially important for companies focused exclusively on e-commerce. A lack of information regarding security, privacy or payment methods may prevent a transaction being completed, and thus a potential customer to be lost.
- *Ease of communication between users and the company, using various media.* Information as to how the company may be contacted for any doubt or problem must appear on the web site homepage; this will produce greater confidence in the company. Alternatively, it must be easy to find and accessed with a single click.

## 5.- CONCLUSIONS

The purpose of this article is to determine the key aspects which must be taken into account when designing a commercial web site and which contribute to a successful e-strategy. To this end, we have analyzed the case of Aceros de Hispania, S.L., a company which has overcome the considerable obstacles resulting from its geographical location and developed a successful e-business which would have been unviable in the offline market.

The Web Assessment Index has been employed to determine web site quality on the basis of four criteria: accessibility, navigability, content and speed. These categories have been evaluated for the case of ADH, emphasizing those aspects which constitute strong points in its e-strategy.

Firstly, it can be observed that Internet popularity, obtained via links and good search engine positioning, facilitates entry to practically inaccessible markets, since any Internet user searching for information related to the company's activity will find its web site address among the top results returned. Commercial web sites should have a search facility to help users to maintain a mental map of the site.

Secondly, the navigability and usability of a web site make users feel comfortable and secure when browsing it, which increases the probability of a transaction being completed. Companies must make the information desired by online purchasers easily available, through internal search engines, general menus, site maps, etc.

The third aspect to take into account is web site content, since the information provided on the web site must be accurate, informative, updated and relevant to customers' requirements. This will fulfill the informational, communication and ordering functions, which are decisive for individuals to trust the company activity. Finally, attention must be paid to more technical factors, such as download speed.

The results obtained by this study demonstrate that for an e-business to be successful it must follow a web site strategy which takes into account the variables analyzed in the Web Assessment Index. It will consequently be able to develop a quality web site, in terms of simplicity, efficiency, speed and popularity; as in the case of ADH, any company will be able to overcome the barriers which would have impeded its successful worldwide positioning in the offline market.

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Annex: Alexa Traffic Rank by Countries for Aceros de Hispania

Country Code	Traffic Rank	Page Views	User
Mexico	11863	21.4%	13.8%
Argentina	12489	11.4%	12.3%
USA	283192	3.6%	10.8%
Spain	27876	8.9%	7.7%
Venezuela	9912	6.4%	6.2%
Costa Rica	10507	1.8%	4.6%
Canada	124940	1.1%	4.6%
Chile	24784	4.6%	3.1%
Peru	20774	1.8%	3.1%
Colombia	22717	1.4%	3.1%
Australia	74694	1.1%	3.1%
Brazil	92588	1.1%	3.1%
Israel	26884	27.8%	1.5%
Ecuador	10733	1.4%	1.5%
El Salvador	11349	1.4%	1.5%
Azerbaijan	4625	0.4%	1.5%
Dominican Republic	22016	0.4%	1.5%
France	154424	0.4%	1.5%
Hungary	52203	0.4%	1.5%
Indonesia	35983	0.4%	1.5%
India	197050	0.4%	1.5%
Iran	42551	0.4%	1.5%
Italy	118538	0.4%	1.5%
Malaysia	88532	0.4%	1.5%

Source: Alexa (2007), [www.alexa.com](http://www.alexa.com)