

# USABILITY AND FUNCTIONALITY EVALUATION OF THE MOST PROFITABLE CROATIAN COMPANIES' WEB SITES

UDK 658(497.5):004.7 / JEL M15, M21 / PRELIMINARY COMMUNICATION

**ANTUN BILOŠ**  
PHD, ASSISTANT  
UNIVERSITY OF J.J STROSSMAYER  
FACULTY OF ECONOMICS IN OSIJEK  
GAJEV TRG 7, 31000 OSIJEK, CROATIA  
abilos@efos.hr

**IVAN RUŽIĆ**  
PHD, AGROKOR WINES  
ZAGREB, CROATIA  
ivan.ruzic@agrokorvina.hr

**IVAN KELIĆ**  
UNIV.SPEC.OEC., ASSISTANT  
UNIVERSITY OF J.J STROSSMAYER  
FACULTY OF ECONOMICS IN OSIJEK  
GAJEV TRG 7, 31000 OSIJEK, CROATIA  
ikelic@efos.hr

## ABSTRACT

The most commonly used form of Internet presence for a company is its official web site. Business web sites have been used since the beginning of Internet development in its early stages. As the Web space has been changing over time in quality, quantity and capabilities, so have its business web sites as well. It is a known fact that web site quality varies as well as its usability and functionality. Having that in mind, there is an obvious need to systematically analyze and evaluate business oriented web sites. Both theoreticians and practitioners agree on the basic evaluation components of web site analysis in general. However, there is no single widely accepted performance evaluation model of business web sites. The aim of the paper is to analyze and evaluate web sites of 190 most profitable Croatian companies in different economic sections (sectors). The paper is focused on web site usability and functionality from the user perspective. Usability and functionality is measured in order to compare business web sites and assess their performance.

**KEYWORDS:** web site evaluation, usability, functionality, Croatian business web sites.

## 1. INTRODUCTION

The most common means of Internet presence for companies is the official web site. Official business web sites are an area which has been developed the most in business Internet presence. It is an undeniable fact that the quality of an official web site significantly varies and that special attention should be given to its analysis. Theoreticians and practical experts in this area generally agree about the most significant components of the analysis, but there is no generally accepted model of official web site success evaluation. Sporadic research of foreign web site analysis practice has shown that there are no simple and all-encompassing solutions, but that analysis models were almost always adjusted to the peculiarities of individual research situations. However, it is important to point out that every analysis model has a certain number of generally accepted standards.

## 2. WEB SITE USABILITY AND FUNCTIONALITY EVALUATION

Although a large number of significant e-marketing research does exist, the biggest number of existing

empirical research papers connected with official web site success are only preliminary. Although, a large number of older and more recent models exist which suggest a certain aspect of official web site success (less frequently of a more complete success of e-marketing efforts), until today a standard frame or systematic benchmark which defines official web site efficiency has not been established.<sup>1</sup> Most research on this topic is facing a limited number of quality factors or is aimed at a specific web service. Although, there should be a significant number of factors connected with official web site success, there is a fairly small number of research papers that analyze the combination of all factors and services. In the last twenty years, research and studies have generated different approaches and models for the assessment of official web site quality and efficiency. We should mention that the specific characteristics of a business field from which the subject comes are a frequent influential factor on the choice of evaluation parameters. According to the already mentioned data, we can suggest a rough categorization of official web site types which come from specific business characteristics (e.g. business or commercial official pages, educational, banking, government or government organization web sites).<sup>2</sup> Business and commercial official web sites were studied from different perspectives. Some researchers studied official web site

<sup>1</sup> Hasan, L., Abuelrub, E. (2008) Assessing the Quality of Web Sites, INFOCOMP Journal of Computer Science. 7,4, pp. 11-20.

<sup>2</sup> Hasan, L., Abuelrub, E. (2008) Assessing the Quality of Web Sites, INFOCOMP Journal of Computer Science. 7,4, pp. 11-20.

factors which are crucial to e-business success and called them critical success factors.<sup>3 4 5 6</sup> Other researchers point to key problems, ideas and strategies which are necessary to take into account from a user satisfaction perspective when managing online businesses and evaluating the focus on user goals during the official web site set up process.<sup>7 8 9</sup> <sup>10</sup> A separate group of researchers has studied the abilities of web designers to pinpoint factors that they consider important during design and development of official web sites.<sup>11 12</sup> Other researchers have developed generic tools or specific frames which grade the quality of official web sites.<sup>13 14 15 16 17 18 19</sup> Certain researchers have focused their attention to important characteristics or have suggested frames for measuring important characteristics of official web sites. Very often, they have used previous models in order to disclose to which extent official web sites, which implement e-business solutions, contain those important characteristics. Other researchers have focused on web site usability.<sup>20 21 22</sup> Heimlich and Wang<sup>23</sup> have proposed key web site structure problems, while Cao and Zhang<sup>24</sup> have studied factors which affect web site design with implemented e-shops. Heimlich<sup>25</sup> has studied the evaluation of business web site content, Husin et.al.<sup>26</sup> have studied the extent in which companies include ethical and credible elements in their pages. Fogg et.al.<sup>27</sup> have researched how different web site elements affect its credibility according to the perception of the user.<sup>28</sup>

The aim of this paper is to study to which extent users are satisfied with the functionality of business web sites, i.e. to which extent will the official web site fulfill user's expectations according to functionality and usability.

## 2.1 Sample

The used sample and the primary data in this paper is part of the research for the doctoral thesis *Electronic marketing of business subjects in the Republic of Croatia* which was conducted during the period between May and November 2012. The focus of this research are the most profitable companies in the Republic of Croatia, while taking into account the business field they belong to. Using the National classification of businesses (NKD2007) and the 21 business fields it recognizes, the first 10 subjects from each business field for the year 2010<sup>29</sup> were taken as the basic sample. Two fields were omitted from the sample as they did not contain a significant number of subjects. The final sample contained 190 subjects arranged according to business field. The existence and availability of their official web sites was tested in the next step. The classification of official web site existence was determined primarily according to size and number of pages it contains, as is shown in Table 1.

<sup>3</sup> Delone, W., Mclean, E. (2003) The DeLone and McLean of information systems success: a ten-year update, *Journal of Management Information Systems*, pp. 9-30.

<sup>4</sup> Liu, C., Arnett, K. (2000) Exploring the factors associated with web site success in the context of electronic commerce, *Information and Management*. 38, pp. 23-33.

<sup>5</sup> Madeja, N., Schoder, D. (2003) Designed for success: empirical evidence on features of corporate web sites, 36th Hawaii International Conference on System Sciences.

<sup>6</sup> Molla, A. Licker S.P. (2001) e-commerce systems success: an attempt to extend and respecify the Delone and Maclean of IS success, *Journal of Electronic Commerce Research*. 2,4, pp. 131-141.

<sup>7</sup> Chanaron, J. (2005) Evaluating e-learning: the case of automotive small-medium suppliers, 1st International Conference on e-Business and Elearning (EBEL), Amman, Jordan, pp. 13-25.

<sup>8</sup> Heimlich, J., Wang, K. (1999) Evaluating the structure of web sites, Environmental Education and Training Partnership Resource Library, Ohio State University Extension, USA.

<sup>9</sup> Srivihok, A. (2000) An assessment tool for electronic commerce: end user evaluation of web commerce sites, Technical Report, Faculty of Science, Kasetsart University, Bangkok, Thailand, 2000.

<sup>10</sup> Zhang, P., Dran, G. (2001) Expectations and ranking of web site quality features: results of two studies on user perceptions, 34th Hawaii International Conference on System Sciences.

<sup>11</sup> Chanaron, J. (2005) Evaluating e-learning: the case of automotive small-medium suppliers, 1st International Conference on e-Business and Elearning (EBEL), Amman, Jordan, pp. 13-25.

<sup>12</sup> Tan, F., Tung, L. (2003) Exploring web site evaluation criteria using the repertory grid technique: a web designers' perspective, 2nd Annual Workshop on HCI Research in MIS, WA.

<sup>13</sup> Barnes, S., Vidgen, R. (2001) Assessing the quality of auction web sites, 34th International Conference on System Sciences, Proceedings.

<sup>14</sup> Barnes, S., Vidgen, R. (2002) An integrative approach to the assessment of e-commerce quality, *Journal of Electronic Commerce Research*. 3,3, pp.114-127.

<sup>15</sup> Fitzpatrick, R. (2000) Additional quality factors for the World Wide Web, 2nd World Congress for Software Quality, Japan.

<sup>16</sup> Gledec, G. (2005) Evaluating web site quality, 7th Internet Users Conference (CUC2005), Croatia

<sup>17</sup> Lin, F., Huang, K., Chen, Y., Lin S. (2004) Quality evaluation of web services, IEEE International Conference on e-Commerce Technology for Dynamic e-Business.

<sup>18</sup> Mich, L., Franch, M., Gaio, L. (2003) Evaluating and designing web site quality, *IEEE Multimedia*, IEEE Computer Society.

<sup>19</sup> Signore, O. (2005) A comprehensive model for web sites quality, 7th IEEE International Symposium on Web Site Evolution (WSE'05).

<sup>20</sup> Basu, A. (2002) Context-driven assessment of commercial web sites, 35th Hawaii International Conference on System Sciences.

<sup>21</sup> Lim, K. (2002) Security and motivational factors of e shopping web site usage, Decision Sciences Institute 2002 Annual Meeting, pp. 611-616.

<sup>22</sup> Singh, M., Fisher, J. (1999) Electronic commerce issues: a discussion of two exploratory studies, Electronic 3rd Annual Conference on Electronic Commerce, Victoria University, New Zealand.

<sup>23</sup> Heimlich, J., Wang, K. (1999) Evaluating the structure of web sites, Environmental Education and Training Partnership Resource Library, Ohio State University Extension, USA.

<sup>24</sup> Cao, M., Zhang, Q. (2002) Evaluating e-commerce web site design: a customer's perspective, Decision Sciences Institute 2002 Annual Meeting, pp. 1186-1191.

<sup>25</sup> Heimlich, J. (1999) Evaluating the content of web sites, Environmental Education and Training Partnership Resource Library, Ohio State University Extension, SAD.

<sup>26</sup> Hussin, H., Suhaimi, M., Mustafa M. (2005) ecommerce and ethical web design: applying the BBBOnline guidelines on Malaysian web sites, *The International Arab Journal of Information Technology*. 2,3, 218-226.

<sup>27</sup> Fogg, B.J., Marshall, J., Laraki O., Osipovich A., Varma C., Fang N., Paul J., Rangnekar A., Shon J., Swani P., Treinen M. (2001) What makes web sites credible? a report on a large quantitative study, *Computer Human Interaction*. 3,1, pp. 61-68.

<sup>28</sup> A detailed overview of the official web site success analysis is available as part of the doctoral thesis by the author, Biloš A. (2012) *Elektronički marketing poslovnih subjekata u Republici Hrvatskoj*, Ekonomski fakultet u Osijeku, Sveučilište J.J.Strossmayera

<sup>29</sup> Poslovna.hr business database was used. Mayring, 1990

**Table 1.** Classification of official web sites according to size and availability

GROUP	DESCRIPTION	Nr OF PAGES
A	Web site	More than 5
B	Microsite	2 – 5 pages
C	Part of a corporate portal	2 and more pages
D	Homepage	1 page
E	Listing within the corporate portal/web site	1 page
F	None	0 pages

Source: authors' research

In the group A we have every functional<sup>30</sup> official business web site which has at least 5 pages. Group B contains so called microsities i.e. very small official web sites that, apart from the home page, have very few other pages (2 - 5 pages). If the official web site has only a home page, it is placed in group D. Cases where the company has bought a domain (domain name), but has not set up a page or there is only an information page from the hosting company, were not included in the group D. Group C contains companies which don't have official web sites, but exist within a corporate portal with more than one page (subportal). If the company is only mentioned or listed within one page of the corporate portal, it is placed in group E. In case the company does not have an official web site or does not belong in any of the mentioned groups, it is placed in group F. All companies i.e. their web sites are classified into one of these categories. An additional limitation was noticed in several cases where different subjects have the same official web site. Although, legally these are different subjects, they are mostly connected at a certain level (owner structure etc.).

It is important to point out that almost 3/4 (75%) of companies from the sample have a group A official web site. However, a significant number of companies (32 or almost 17%) do not have any form of official web site and belong in group F. All the groups were incorporated in further functionality analysis, except groups E and F. Group E (listed on a corporate web portal) was not used in the research since such a form of Internet presence can't be treated as significant enough in the sense of managing Internet marketing activities. All possible analytic procedures would apply to the official group web site which is not the subject of this analysis. Official web sites of companies from group F were not analyzed for logical reasons (because they, of course, do not exist). The research was conducted on 143 official web sites.

Since the primary research goal was not to study the online population in Croatia, but the official web sites of business subjects, it was not necessary to ensure a representative sample of Internet users in Croatia. Instead, we needed educated users who can adequately stand in for typical target group representatives of the business web sites users. Having all of this in mind, it was agreed that the functionality

analysis of the sample is conducted on the available student population of the Faculty of Economics Osijek. A group was created from the available student population with the goal of objectively analyzing 143 business web sites. The student population consisted predominantly (98%) of 3rd year undergraduate and 1st year graduate students of the Faculty of Economics, Osijek. It was assumed that the mentioned student population can give a valid evaluation of usability and functionality levels of official web sites from a user's perspective. However, before the testing took place, brief instructions were given to the participants, with the goal of avoiding possible flaws and ensuring a standardized approach to each test. 158 students took part in this stage of the research and they tested 143 official web sites.

## 2.2 Data collection

Data collection was conducted in 4 iterations i.e. with 4 student groups during a period of 15 days in June 2012. Four lecture halls with computers were used for testing purposes. All computers had roughly the same characteristics and had broadband Internet connections. Each computer was tested beforehand and different browsers of similar or almost the same characteristics were made available. The questionnaire had 4 parts. The most significant was the second part in which the functionality and usability level of the observed official web site was tested in 20 questions. The questions were mostly conceived using the Likert scales with one open ended question asking about flaws in the web site. The used seven degree Likert scales was transformed into numerical scales and mean values were calculated (with all the limitations that occur during this transformation) in order to enable easier comparison.

The questionnaire focuses on the following official web site characteristics that the users have tested:

- homepage and inner page design,
- web site purpose and purpose oriented web site design,
- web site visibility,
- web site navigation,

<sup>30</sup> Functionality in this context describes an official web site that can be accessed regardless of content quality. It is only important to establish that the web site represents the studied business entity (company).



- web site search engine,
- web site speed,
- influence on user distraction,
- data timeliness,
- language quality,
- web site content scope,
- web site content usability,
- ease of use,
- total satisfaction.

Each respondent has tested 10 official web sites during testing. The page was observed for 5 minutes after which the questionnaire was completed. The testing pace was adapted to the more complex web sites. 158 respondents have completed 1448 questionnaires. Some of the questionnaires were discarded because of incomplete or formulaic answers which gave reasonable doubt about the accuracy and truthfulness of the answers. 1430 questionnaires were taken for analysis, 10 questionnaires per individual official web site from the sample.

### 2.3 Survey analysis

Further on, we analyzed the average for all 143 official web sites which represent web locations of the most profitable companies according to business field. Figure 1 gives a complete graphic representation of the research results. The results obtained through individual questions are discussed below.

It made sense to first test the user satisfaction degree of the home page, since it is the first thing users see when they access an official web site. We can see that most users (more than 60 %) are satisfied with the home page, among which dominate those who are very satisfied (25%). The number of those who are not satisfied at all is very small (5%). Overall, the average home page satisfaction value is 4.79 (on a scale between 1 and 7 where 1 is completely dissatisfied and 7 is completely satisfied). After the home page testing, the respondents tested several content pages on the observed official web sites. User satisfaction is similar to home page satisfaction, even a little higher. Again, the highest number is of those who are very satisfied (27%) and the lowest of those who are not satisfied at all (5%). The average value for this criterion is 4.81. We can conclude that the purpose of most of the tested web sites can be established based on the home page. This can be done fairly easily on 70% of the web sites. The average value is 5.24. A similar average attitude is apparent when testing design in establishing the purpose of the web site. It has a value of 4.99. Based on the home page and related graphic elements, we can conclude that the official site purpose can be fairly easily established. Graphic elements which are relevant to the purpose and goal of the web site help greatly.

If we include all those who are satisfied to a certain extent with the web site visibility (those who are partially satis-

fied and very satisfied) we can conclude that they, with 68%, are the dominant group. The average value for web site visibility satisfaction i.e. the ease of content reading is 4.98. The web site navigation satisfaction degree is similarly evaluated and a generally positive attitude prevails with an average value of 5.00. Most respondents are satisfied (30%). The smallest group are the respondents who are not satisfied at all (4%). The web site search engine satisfaction degree is also positively rated with an average value of 4.93. The obtained results show that more than 75% of the respondents are to a certain extent satisfied regarding web site search engines (30% are satisfied and 16% completely satisfied). The web site speed satisfaction degree is the best rated factor with an average value of 5.46. 25% of the respondents are completely satisfied, 37% satisfied and 18% partially satisfied, which makes almost 80% of those who are satisfied to a certain extent with the web site speed. The fact that all used computers had a broadband Internet connection certainly contributes to the results.

In order to interpret the influence on the user distraction factor, it is necessary to explain the significance and testing approach. The goal was to identify if the observed official web site has specific elements which, for some reason, divert the user's attention. Since a negative effect was tested with this criterion, when transposing the scales, the maximum score was placed with the complete lack of the effect, and the minimal with the highest degree of the effect, although the opposite orientation was used in the questionnaire. Using this method it was calculated that the average mean score for this factor is 5.33, which indicates a very small presence of irritating elements which divert the user's attention from the purpose of the web site i.e. the content. The research results show that most of the respondents graded the effect as very low (37%) and non-existent (24%).

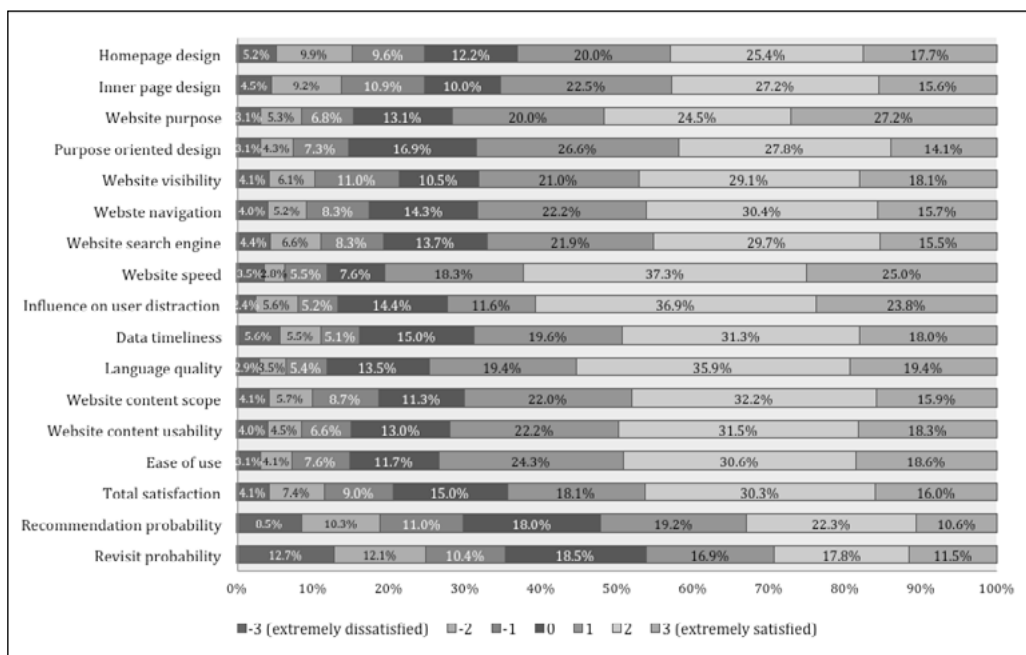
The respondents are generally satisfied with the data timeliness i.e. the official web site content. The average value is 5.03. The web site testing has confirmed that the quality of the used language on business web sites mainly fits users' expectations: 19% are partially satisfied, 36% are satisfied and 19% are very satisfied: The average score is 5.29. The satisfaction degree of the web site content scope was also tested in this research. As with the previous criteria, an overall positive user satisfaction is present here. Almost half of the respondents were satisfied or completely satisfied with the content scope of tested official web sites. The average value is 5.01. Apart from the content scope, the content usability satisfaction was also tested and a generally positive attitude towards this criterion was noticed. The average value is 5.13. 19% of the respondents are very satisfied with the ease of use of official web sites in the sense of web site user orientation, 31% are satisfied. We can also add 24% of those who are partially satisfied to this group. The average ease of use score of 5.16 is a little higher than the content scope value.

The final question connected with the observed web site

components was concerned with total satisfaction. Like with the other tested criteria, most respondents react generally positive to the total satisfaction question. The average value is 4.91. We should point out that 64% of the respondents were to a certain extent satisfied with official web sites, although a fairly significant percentage (15%) gave a neutral answer. A more even distribution of answers was noticed with questions concerning recommending web sites to other users and revisiting the tested web site. 22% of users think that there is a high probability that they would recommend the tested web sites to others, 11% are

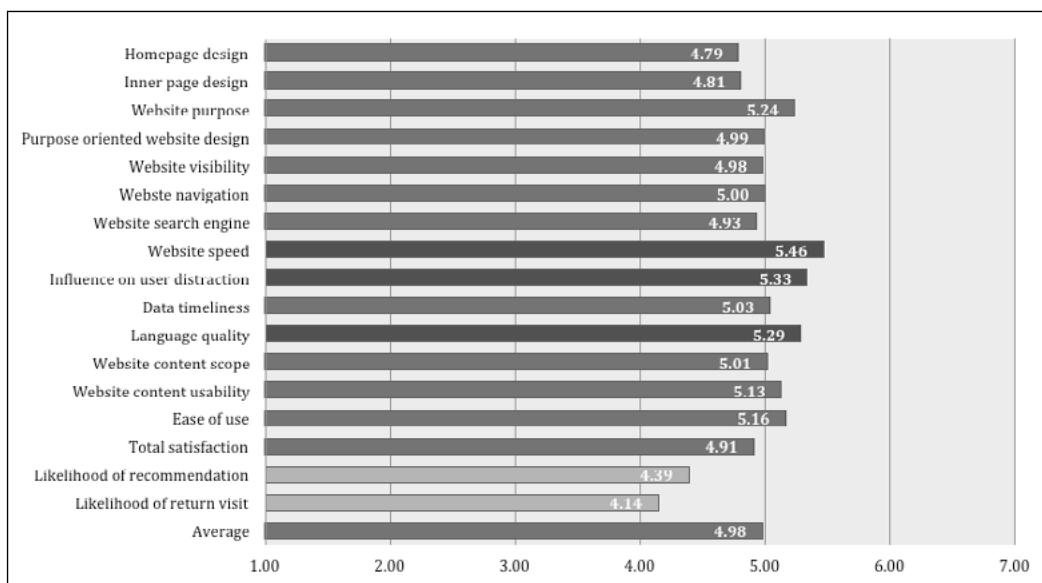
certain they would recommend the sites. The average recommendation probability value is 4.39. The revisit probability score of tested official web sites is the lowest rated of all, with an average value of 4.14. Although we are still discussing a generally positive attitude, this indicator is the closest to a neutral value (the closest to the value 4). We can now conclude that the respondents are IT literate individuals, competent for testing the quality components of functional items and the usability of official web sites, who don't significantly visit some of the tested web sites.

Figure 1. Summary results of web site functionality and usability testing



Source: authors' research

Figure 2. Mean score of survey factors



Source: authors' research

According to the mean scores the highest rated factors are web site speed, influence on user distraction (inverted scale) and language quality. The lowest rated factors are re-visit probability and recommendation probability. An overall mean score of 4.98 was calculated based on all factors. It indicates that the official web sites from the sample mainly satisfy the observed criteria according to user perception. It will be possible to establish more significant finds for individual official web sites/business subjects.

### 2.3.2 Demographic profile of web site users

The respondents where 74% female and 26% male which is consistent with the overall male/female ratio at the Faculty of Economics, Osijek. The age structure corresponds with the sample creation method. Since the largest number of respondents are 3rd year undergraduate students and 1st year graduate students, the dominant age group among them is 21-24 (87%), 11% of the respondents belong to the age group 25-30, 60% of the respondents were 1st year graduate student and 38% were 3rd year undergraduates.

### 2.3.3 Sample profile by company

Table 2 shows the list of all 143 companies with their average mean scores based on the complete test. The mean score is the quantified representation of the official web site success and enables comparison between companies. It can generally be concluded that a large number of tested companies has a satisfactory average mean score. In other words, all the mean scores which are above 4 are positively evaluated official web sites i.e. there is a general positive attitude towards the web site by the users. 124 business subjects have this score, which makes 87% of tested official web sites and it represents a significant majority. Furthermore, it is apparent that as many as 76 companies (53%) have the average mean score above 5. These are the subjects which have a higher criteria satisfaction level. We should point out those companies whose web sites have achieved an average mean score of 6 or higher. These scores represent excellent web sites which have the highest testing criteria satisfaction level. This group is made of 10 companies and is, interestingly, led by three joint-stock companies: Dukat d.d., Privredna banka Zagreb d.d. i Turisthotel d.d.

**Table 2.** Mean scores of individual official web sites

Nr	COMPANY	WEBSITE	SCORE
1	Dukat d.d.	www.dukat.hr	6.5
2	PBZ d.d.	www.pbz.hr	6.3
3	TURISTHOTEL d.d.	www.zaton.hr	6.2
4	Globalna hrana d.o.o.	www.mcdonalds.hr	6.2
5	Zagrebačka pivovara d.o.o.	www.ozujsko.com	6.2
6	METIS d.d.	www.metis.hr	6.2
7	STOMATOLOŠKA POLIKLINIKA ZA ORALNU KIRURGIJU, ORTODONCIJU, RADIOLOŠKU DJELATNOST - ORTOPAN I ZUBOTEHNIČKI LABORATORIJ RIDENT	www.rident.hr	6.1
8	Specijalna bolnica Svjetlost	www.svjetlost.hr	6.0
9	ERSTE & STEIERMÄRKISCHE BANK d.d.	www.erstebank.hr	6.0
10	KLEMM SIGURNOST d.o.o.	www.klemmsecurity.hr	6.0
11	PZ Osatina	www.osatina.hr	5.9
12	UNILINE d.o.o.	www.uniline.hr	5.9
13	HRT	www.hrt.hr	5.9
14	BLITZ - CINESTAR d.o.o.	www.blitz-cinestar.hr	5.9
15	KAMGRAD d.o.o.	www.kamgrad.hr	5.9
16	ILIRIJA d.d.	www.ilirijabiograd.com	5.9
17	HOTEL DUBROVNIK d.d.	www.hotel-dubrovnik.hr	5.9
18	Poliklinika Šljaj-Anić	www.slaj-anic.com	5.8
19	MEDICINSKO BIOKEMIJSKI LABORATORIJ DR. SC. DARIJA BREYER	www.lab-breyer.hr	5.8
20	Pag 91 d.o.o.	www.pag91.hr	5.8
21	PLAVA LAGUNA d.d.	www.plavalaguna.hr	5.8
22	MARINE KAŠTELA d.o.o.	www.marina-kastela.com	5.8
23	Pliva Hrvatska d.o.o.	www.pliva.hr	5.8
24	CENTAR ŠKOJO d.o.o.	www.kruna.hr	5.8
25	GRADSKA PLINARA ZAGREB d.o.o.	www.plinara-zagreb.hr	5.7
26	PLINACRO d.o.o.	www.plinacro.hr	5.7
27	HP d.d.	www.posta.hr	5.7

28	AGRAM YACHTING d.o.o.	www.agramservis.hr	5,7
29	ZAGREBAČKE OTPADNE VODE d.o.o.	www.zov-zagreb.hr	5,7
30	ZRAČNA LUKA DUBROVNIK d.o.o.	www.airport-dubrovnik.hr	5,7
31	Hrvatska Lutrija d.o.o	www.lutrija.hr	5,6
32	VALALTA d.o.o.	www.valalta.hr	5,6
33	ACI d.d.	www.aci-club.hr	5,6
34	AGROKOR d.d.	www.agrokor.hr	5,6
35	MASLINICA d.o.o.	www.maslinica-rabac.com	5,6
36	ZAGREBAČKA BANKA d.d	www.zaba.hr	5,6
37	POLIKLINIKA ZA STOMATOLOŠKU PROTETIKU, PARODONTOLOGIJU I ORTODONCIJU SA ZUBOTEHNIČKIM LABORATORIJEM DR. JELUŠIĆ	www.jelusic.com	5,6
38	VIPnet d.o.o.	www.vipnet.hr	5,6
39	Business.hr d.o.o.	www.business.hr/hr/	5,6
40	ZAGREBAČKA ŠKOLA EKONOMIJE I MANAGEMENTA	www.zsem.hr	5,6
41	SLOBODNA DALMACIJA d.d.	www.slobodnadalmacija.hr	5,5
42	NP Plitvička jezera	www.np-plitvicka-jezera.hr	5,5
43	PBZ CARD d.o.o.	www.pbzcard.hr	5,5
44	TANKERSKA PLOVIDBA d.d.	www.t-com.hr	5,5
45	HBOR	www.hbor.hr	5,5
46	SPEKTAR-PUTOVANJA d.o.o.	www.spektar-putovanja.hr	5,5
47	Končar-energetski transformatori d.o.o.	www.koncar.hr	5,5
48	TDR d.o.o.	www.tdr.hr	5,5
49	KATARINA LINE d.o.o.	www.katarina-line.hr	5,4
50	HYPO ALPE-ADRIA BANK d.d.	www.hypo-alpe-adria.hr	5,4
51	KONZUM d.d.	www.konzum.hr	5,4
52	MUCIĆ & Co d.o.o.	www.mucic.hr	5,4
53	ALGEBRA d.o.o.	www.algebra.hr	5,4
54	PBZ CROATIA OSIGURANJE dioničko društvo za upravljanje obveznim mirovinskim fondom	www.pbzco-fond.hr	5,4
55	SOKOL MARIĆ d.o.o.	www.sokol-maric.hr	5,4
56	SUPER SPORT d.o.o.	www.supersport.hr	5,4
57	Hep proizvodnja d.o.o.	www.hep.hr/proizvodnja/	5,4
58	NEW YORKER CROATIA d.o.o.	www.newyorker.de/hr/	5,4
59	Hep d.d.	www.hep.hr	5,3
60	MBM-COMMERCE d.o.o.	www.mbm-commerce.hr	5,3
61	TRINOM d.o.o.	www.trinom.hr	5,3
62	dm-drogerie markt d.o.o.	www.dm-drogeriemarkt.hr	5,3
63	ELDRA d.o.o.	www.eldra.hr	5,3
64	AUTO HRVATSKA d.d.	www.autohrvatska.hr	5,3
65	Visoko učilište Algebra	www.racunarstvo.hr	5,2
66	MICROSOFT HRVATSKA d.o.o.	www.microsoft.hr	5,2
67	ATLANTSKA PLOVIDBA d.d.	www.atlant.hr	5,2
68	HEP-Operator distribucijskog sustava d.o.o.	www.hep.hr/ods	5,2
69	Hrvatske šume d.o.o.	www.hrsume.hr	5,1
70	ULJANIK d.d.	www.uljanik.hr	5,1
71	ALLIANZ ZB d.o.o.	www.azfond.hr	5,1
72	POLIKLINIKA PRO VITA	www.poliklinika-provita.hr	5,1
73	ZRAČNA LUKA SPLIT d.o.o.	www.split-airport.hr	5,1
74	IVORA - ŠKOLA INFORMATIKE	www.ivora.hr	5,1
75	LUXOR SERVIS d.o.o.	www.luxor-grupa.hr	5,1
76	Leopold Jordan GmbH	www.jordan.hr	5,1



77	BIOMAX d.o.o.	www.biomax.hr	5,0
78	Ina d.d.	www.ina.hr	5,0
79	Ledo d.d.	www.ledo.hr	5,0
80	CENTAR ZA VOZILA HRVATSKE d.d.	www.cvh.hr	5,0
81	Ribnjačarstvo Poljana d.d.	www.ribnjacarstvo-poljana.hr	4,9
82	TROMONT d.o.o.	www.tromont.hr	4,9
83	ING-GRAD d.o.o.	www.ing-grad.com	4,9
84	SOCIETE GENERALE-SPLITSKA BANKA d.d.	www.splitskabanka.hr	4,9
85	TERMOPLIN d.d.	www.termoplin.com	4,9
86	VISOKA POSLOVNA ŠKOLA LIBERTAS	www.vps-libertas.hr	4,9
87	ULJANIK PLOVIDBA d.d.	www.uljaniksm.com	4,9
88	ATLANTIC GRUPA d.d.	www.atlantic.hr	4,8
89	Karlovačka pivovara d.o.o.	www.karlovacko.hr	4,8
90	JANAF d.d.	www.janaf.hr	4,8
91	IBM HRVATSKA d.o.o.	www.ibm.com/hr/hr/	4,8
92	PORSCHE LEASING d.o.o.	www.porscheleasing.com.hr	4,8
93	CE-ZA-R d.o.o.	www.cezar-zg.hr	4,7
94	PODZEMNO SKLADIŠTE PLINA d.o.o.	www.psp.hr	4,7
95	HUP-ZAGREB d.d.	www.hup-zagreb.hr	4,7
96	HT d.d.	www.tankerska.hr	4,7
97	Veleučilište Velika Gorica	www.vvg.hr	4,7
98	Raiffeisen mirovinsko društvo za upravljanje obveznim mirovinskim fondom d.d.	www.rm.f.hr	4,6
99	APIS IT d.o.o.	www.apis-it.hr	4,6
100	METRO Cash & Carry d.o.o.	www.metro-cc.hr	4,6
101	Visoka škola za sigurnost s pravom javnosti	www.vss.hr	4,6
102	RAIFFEISENBANK AUSTRIA d.d.	www.rba.hr	4,6
103	STUDENAC d.o.o.	www.studenac.hr	4,6
104	AGENCIJA ZA LIJEKOVE I MEDICINSKE PROIZVODE	www.almp.hr	4,6
105	GEORAD d.o.o.	www.georad.hr	4,6
106	ERSTE d.o.o., društvo za upravljanje obveznim mirovinskim fondom	www.ersteplavi.hr	4,5
107	TEHNOINVEST ZAGREB d.o.o.	www.winterhalter.hr	4,5
108	Kaming d.d.	www.kaming.hr	4,5
109	Hrvatska kontrola zračne plovidbe d.o.o.	www.crocontrol.hr	4,5
110	C.I.O.S. d.o.o.	www.cios.hr	4,4
111	Sarađen d.o.o.	www.saradjen.hr	4,4
112	Hrvatski operator tržišta energije d.o.o.	www.hrote.hr	4,4
113	ALD Automotive d.o.o.	www.aldautomotive.com	4,4
114	MARINA PUNAT d.o.o.	www.marina-punat.hr	4,4
115	OMV Hrvatska d.o.o.	www.omv.hr	4,3
116	MA. CO. T. d.o.o.	www.macot.hr	4,3
117	Pioneer-sjeme d.o.o.	www.croatia.pioneer.com	4,3
118	Jamnica d.d.	www.jamnica.hr	4,3
119	Đuro Đaković Montaža - Centar za zavarivanje d.o.o.	www.argonac.hr	4,2
120	TEHNO-ZAGREB d.o.o.	www.tehno-zagreb.hr	4,2
121	HEP-Operator prijenosnog sustava d.o.o.	ops.hep.hr	4,2
122	HATRICK d.o.o.	www.hatrick.hr	4,2
123	Solana Pag d.d.	www.solana-pag.hr	4,1
124	UNIJA NOVA d.o.o.	www.unija-nova.hr	4,1
125	IMPORTANNE d.o.o.	www.importanne.hr	4,0
126	ELEKTROMODUL-PROMET d.o.o.	www.elektromodul.hr	4,0



127	SPECTRA - MEDIA d.o.o.	www.spectra-media.hr	4,0
128	ZAGORJE-TEHNOBETON d.d.	www.gpzagorje.hr	3,9
129	SN HOLDING d.d.	www.snholding.hr	3,9
130	ADRIS GRUPA d.d.	www.adris.hr	3,9
131	HERZ d.d.	www.herz.hr	3,8
132	Baker Tilly Discordia d.o.o.	www.discordia.hr	3,8
133	Poliklinika Prim. dr. PETAR NOLA	www.ordinacija-nola.hr	3,7
134	Galapagos istraživački centar d.o.o.	www.glaxosmithkline.hr	3,6
135	TRIOUS d.o.o.	www.trius.hr	3,6
136	Antenal d.o.o.	www.antenal.hr	3,6
137	Poliklinika OXY	www.oxy.hr	3,5
138	MMM Agramservis d.o.o.	www.agram-yachting.hr	3,5
139	EMPORION d.o.o.	www.emporion.hr	3,2
140	Koka d.d.	www.vindija.hr	3,1
141	Vupik d.d.	www.vupik.hr	2,5
142	ANTONIO TRADE d.o.o.	www.antonio-trade.hr	2,0
143	KERUM	www.kerum.hr	1,8

Source: authors' research

On the other hand, the bottom of the list make mostly sites which were in construction during testing, microsites or only have a homepage. Because of that, the respondents could not react positively, as all available information was placed on the home page with only brief contact information. We should point out that out of the 3 web sites in category D (those which only had a home page at the time of testing in

May 2012), all 3 showed no improvement by October and they still exist in that form.

The above discussed average mean scores are based on all tested factors. It is also interesting to observe the situation according to individual criteria and the mean scores for each of them. This is shown in Table 3.

**Table 3.** The best mean scores according to individual tested official web site factors

TESTING CRITERIA	COMPANY	WEBSITE	AVG MEAN SCORE
Home page design	Zagrebačka pivovara d.o.o.	www.ozujsko.com	6.7
Inner page design	PBZ d.d.	www.pbz.hr	6.6
Web site purpose	Globalna hrana d.o.o. Zagrebačka pivovara d.o.o.	www.mcdonalds.hr www.ozujsko.com	6.8 6.8
Purpose oriented web site design	BLITZ - CINESTAR d.o.o. NEW YORKER CROATIA d.o.o.	www.blitz-cinestar.hr www.newyorker.de/hr/	6.5 6.5
Web site visibility	Dukat d.d.	www.dukat.hr	6.6
Web site navigation	METIS d.d.	www.metis.hr	6.5
Web site search engine	Dukat d.d.	www.dukat.hr	6.6
Web site speed	Dukat d.d. PLINACRO d.o.o.	www.dukat.hr www.plinacro.hr	6.7 6.7
Influence on user distraction	KERUM	www.kerum.hr	7.0
Data timeline	BLITZ - CINESTAR d.o.o.	www.blitz-cinestar.hr	6.7
Language quality	Dukat d.d.	www.dukat.hr	6.7
Web site content scope	Dukat d.d.	www.dukat.hr	6.9
Web site content usability	TURISTHOTEL d.d.	www.zaton.hr	6.5
Ease of use	Dukat d.d.	www.dukat.hr	6.5
Total satisfaction	TURISTHOTEL d.d.	www.zaton.hr	6.7
Total satisfaction	Dukat d.d.	www.dukat.hr	6.3
Revisit probability	PBZ d.d.	www.pbz.hr	6.4

Source: authors' research

The best average value of 6.7 for home page design has Zagrebačka pivovara and the best inner page design has Privredna banka with a mean score of 6.6. The first place for web site purpose share Globalna hrana and Zagrebačka pivovara with the same mean score of 6.6. Blitz-Cinestar and New Yorker Croatia also share the first place for purpose oriented web site design with an average mean score of 6.5. The latter site is interesting because it is a corporate official web site within which there is a subportal of the Croatian subsidiary. This confirms the thesis that a web site can do a good job in this form. The Dukat web site has the highest scores in most factors (7). In 6 factors it sits alone at the top. It shares the first place with Plinacro (mean score 6.7) in the web site speed factor. The official web site of the company Metis is first according to web site navigation criteria with an average score of 6.5. The Kerum company has the maximum score 7 in the influence on user distraction criteria. This company sits at the bottom of the overall list with its average mean score, but is at the top according to this criteria because it's home page has no irritating elements which distract the user (it is a mostly empty home page with very little information). Blitz-Cinestar has the best web site according to the data timelines factor (mean score 6.7). The official web site of the company Turisthotel has the best position in 2 criteria: web site content usability (6.5) and total

satisfaction (6.7). The Privredna banka Zagreb web site has the best score in the revisit probability factor (6.4).

### 2.3.4. Sample profile by business section (sector)

As it was explained earlier, the whole sample was created and segmented according to the business field of the companies. Out of 10 companies in each of the 19 business fields, only those were tested which had functional web sites or subportals within corporate sites. However, in order to analyze the situation in individual fields, it was necessary to take into account those which don't have an official web site or it isn't functional. The average mean score of such examples had to be 0 as they were not analyzed. The fact that they could not be analyzed because of objective reasons should be taken into account. The other specific visible influence was with 2 business subjects within one field that had the identical web site (they were legally connected). The average mean score for these cases was taken separately for both subjects. In this way, all 10 web sites in individual business fields had an impact on the average mean score which is shown in Table 4.

Table 4. Mean scores of tested official web sites according to business fields

**Table 4.** Mean scores of tested official web sites according to business fields

	BUSINESS FIELD (SECTION)	AVG MEAN SCORE
A	AGRICULTURE, FORESTRY AND FISHING	2,6
B	MINING AND QUARRYING	3,1
C	MANUFACTURING	5,3
D	ELECTRICITY, GAS, STEAM AND AIR CONDITIONING SUPPLY	3,5
E	WATER SUPPLY; SEWERAGE, WASTE MANAGEMENT AND REMEDIATION ACTIVITIES	2,9
F	CONSTRUCTION	3,5
G	WHOLESALE AND RETAIL TRADE; REPAIR OF MOTOR VEHICLES AND MOTORCYCLES	4,3
H	TRANSPORTATION AND STORAGE	5,2
I	ACCOMMODATION AND FOOD SERVICE ACTIVITIES	5,2
J	INFORMATION AND COMMUNICATION	4,3
K	FINANCIAL AND INSURANCE ACTIVITIES	5,5
L	REAL ESTATE ACTIVITIES	1,3
M	PROFESSIONAL, SCIENTIFIC AND TECHNICAL ACTIVITIES	2,9
N	ADMINISTRATIVE AND SUPPORT SERVICE ACTIVITIES	4,8
O	PUBLIC ADMINISTRATION AND DEFENCE; COMPULSORY SOCIAL SECURITY	2,0
P	EDUCATION	4,9
Q	HUMAN HEALTH AND SOCIAL WORK ACTIVITIES	4,6
R	ARTS, ENTERTAINMENT AND RECREATION	3,7
S	OTHER SERVICE ACTIVITIES	3,7

Source: authors' research

It can be concluded that the best mean scores according to fields has field K - Financial and insurance activities with a score of 5.5 which is a reflection of their official web site quality according to business field i.e. the testing criteria satisfaction, but also of the fact that all representatives from

this field have a web site. Field C - Manufacturing is very close with the mean score 5.3. The same effect is present in field L - Real estate activities with the score 1.3, but with an apparent counter-effect (6 of the subjects do not have a web site, more than half that represent this field). A clear

conclusion imposes itself. When it comes to functionality and usability of web sites, there are significant differences between business fields because of the lack of official web sites, but also because of a lack of quality functionality components and usability by those companies which have sites.

## CONCLUSION

Out of 190 official web sites of the most profitable companies in the Republic of Croatia distributed according to business field, the research could be conducted on 143 of them. Based on the testing of 143 web sites of companies, it can be concluded that they mainly satisfy the testing criteria with an average score of 4.98 (on a scale from 1 to 7). It should be pointed out that there are differences between the individual factors in the achieved average mean scores. According to the average mean scores the highest rated factors are web site speed, influence on user distraction (inverted scale) and language quality. The lowest rated tested factors

are revisit probability and recommendation probability. The situation can be more precisely depicted in the individual web site analysis. It can generally be concluded that a large number of tested business subjects have a satisfactory average mean score. All mean scores which are above 4 are in a way considered positive, since there is an overall positive attitude of the users. 124 companies i.e. 87% of the tested web sites which belong to this group represent a significant majority. Having in mind the achieved mean scores, companies whose score is 6 or above should be distinguished from the others. This score indicates outstanding official web sites which have the highest criteria satisfaction level. The group consists of 10 companies. Significant differences between average mean scores were noticed during analysis of individual business fields. There are two main reasons for this: certain companies have no official web site which has affected the average mean score in some fields, but the quality functionality components and usability, which were the focus of the testing, also had a significant impact. The best mean score according to business field has field K - Financial and insurance activities.

## REFERENCES

- Barnes, S. Vidgen, R. (2002) An integrative approach to the assessment of e-commerce quality, *Journal of Electronic Commerce Research*, 3,3, pp.114-127. (References from Journals)
- Basu, A. (2002) Context-driven assessment of commercial web sites, 35th Hawaii International Conference on System Sciences. (References from Proceedings and Books)
- Biloš A. (2012) Elektronički marketing poslovnih subjekata u Republici Hrvatskoj, doctoral thesis, Faculty of Economics in Osijek, J.J.Strossmayer University of Osijek (References from Other Literature)
- Cao, M., Zhang. Q. (2002) Evaluating e-commerce web site design: a customer's perspective, *Decision Sciences Institute 2002 Annual Meeting*, pp. 1186-1191. (References from Proceedings and Books)
- Chanaron, J. (2005) Evaluating e-learning: the case of automative small-medium suppliers, 1st International Conference on e-Business and Elearning (EBEL), Amman, Jordan, pp. 13-25. (References from Proceedings and Books)
- Delone, W., Mclean, E. (2003) The DeLone and McLean of information systems success: a ten-year update, *Journal of Management Information Systems*, pp. 9-30. (References from Journals)
- Fitzpatrick, R. (2000) Additional quality factors for the World Wide Web, 2nd World Congress for Software Quality, Japan. (References from Proceedings and Books)
- Fogg, B.J., Marshall, J., Laraki O., Osipovich A., Varma C., Fang N., Paul J., Rangnekar A., Shon J., Swani P., Treinen M. (2001) What makes web sites credible? a report on a large quantitative study, *Computer Human Interaction*, 3,1, pp. 61-68. (References from Other Literature)
- Gledec, G. (2005) Evaluating web site quality, 7th Internet Users Conference (CUC2005), Croatia. (References from Proceedings and Books)
- Hasan, L., Abuelrub, E. (2008) Assessing the Quality of Web Sites, *IN-FOCOMP Journal of Computer Science*, 7,4, pp. 11-20. (References from Journals)
- Heimlich, J., Wang, K. (1999) Evaluating the structure of web sites, *Environmental Education and Training Partnership Resource Library*, Ohio State University Extension, USA. (References from Other Literature)
- Hussin, H., Suhaimi, M., Mustafa M. (2005) ecommerce and ethical web design: applying the BBBOnline guidelines on Malaysian web sites, *The International Arab Journal of Information Technology*, 2,3, 218-226. (References from Journals)
- Lim, K. (2002) Security and motivational factors of e shopping web site usage, *Decision Sciences Institute 2002 Annual Meeting*, pp. 611-616. (References from Proceedings and Books)
- Lin, F., Huarng, K., Chen, Y., Lin S. (2004) Quality evaluation of web services, *IEEE International Conference on e-Commerce Technology for Dynamic e-Business*. (References from Proceedings and Books)
- Liu, C., Arnett, K. (2000) Exploring the factors associated with web site success in the context of electronic commerce, *Information and Management*, 38, pp. 23-33. (References from Journals)
- Madeja, N., Schoder, D. (2003) Designed for success: empirical evidence on features of corporate web sites, 36th Hawaii International Conference on System Sciences. (References from Proceedings and Books)
- Mich, L., Franch, M., Gaio, L. (2003) Evaluating and designing web site success in the context of electronic commerce, *Information and Management*, 38, pp. 23-33. (References from Journals)
- Molla, A. Licker S.P. (2001) e-commerce systems success: an attempt to extend and respecify the DeLone and Maclean of IS success, *Journal of Electronic Commerce Research*, 2,4, pp. 131-141. (References from Journals)
- Signore, O. (2005) A comprehensive model for web sites quality, 7th IEEE International Symposium on Web Site Evolution (WSE'05). (References from Proceedings and Books)
- Singh, M., Fisher, J. (1999) Electronic commerce issues: a discussion of two exploratory studies, *Electronic 3rd Annual Conference on Electronic Commerce*, Victoria University, New Zealand. (References from Proceedings and Books)
- Srivihok, A. (2000) An assessment tool for electronic commerce: end user evaluation of web commerce sites, Technical Report, Faculty of Science, Kasetsart University, Bangkok, Thailand, 2000. (References from Journals)
- Tan, F., Tung, L. (2003) Exploring web site evaluation criteria using the repertory grid technique: a web designers' perspective, 2nd Annual Workshop on HCI Research in MIS, WA. (References from Proceedings and Books)
- Zhang, P., Dran, G. (2001) Expectations and ranking of web site quality features: results of two studies on user perceptions, 34th Hawaii International Conference on System Sciences. (References from Proceedings and Books)