

Quantitative Website Analysis: Case Study of the Serbian Banks

Rezime: U kratkoj istoriji domaćeg Interneta. Banke su među prvim organizacijama koje su obezbedile pristup Internetu i pokrenule web-sajtove. U međuvremenu, web-sajtovi su postali značajni resurs za informisanje korisnika, a za banke značajno mesto za reklamiranje proizvoda i uspostavljanje odnosa sa korisnicima. Naravno, svaka od banaka je pristupila kreiranu web-sajta veoma pažljivo, jer svako razume potencijal ovog medija, i uložili su maksimalne napore da dizajniraju web-sajt na najbolji mogući način. Poređenje web-sajtova je težak posao, ukoliko ne postoji standardizovana i jasno definisana metodologija evaluacije. U ovom radu primenjena je WAI (Web Assessment Index) metodologija, sa ciljem poređenja i evaluacije sajtova. Cilj rada nije da se otkrije koji je sajt bolji, već da se uoče greške i da se poveća efikasnost operacije koje se sprovedu posredstvom Interneta. Ovaj rad takođe prikazuje matematički model WAI Indexa.

Ključne reči: kvantitativna evaluacija, web-sajtovi banaka, WAI index

Abstract: In the short history of the domestic Internet, banks were among the first business organizations to access the Internet and launch their websites. In the meantime, websites became significant places for the hosts of customers to be informed, and for the banks to advertise their products and establish a business relation with the customers. Naturally, each bank approached the creation of its website very carefully, because everybody understood the potential and invested maximum efforts to design their websites in the best possible way. Comparing websites is a tedious job unless one has a standardized and clearly defined methodology of evaluation. In this paper we have applied the WAI (Web Assessment Index) methodology in order to make a website comparison. The idea is not to find out which site is better rather than the other, but to identify the mistakes made with a view to correcting them, thus improving the operations conducted through the Internet. Within this paper mathematical model for applied WAI Index has been presented.

Key words: Quantitative evaluation, banks' websites, WAI Index

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1. INTRODUCTION

In the short history of the domestic Internet, banks were among the first business organizations to access the Internet and launch their websites. In the meantime, websites became significant places for the hosts of customers to be informed, and for the banks to advertise their products and establish a business relation with the customers. Naturally, each bank approached the creation of its website very carefully, because everybody understood the potential and invested maximum efforts to design their websites in the best possible way. Comparing websites is a tedious job unless one has a standardized methodology of evaluation. In this paper we have applied the WAT (Web Assessment Index) methodology in order to make a website comparison. The idea is not to find out which site is better than the other, but to identify the mistakes made with a view to correcting them, thus improving the operations conducted through the Internet. In order to give scholars and practitioners a better understanding about previous endeavors and to enable them to build on existing research, this paper also presents mathematical model for applied WAI Index.

The beginning of Web site evaluation can be traced back to the work of Boyd Collins, who founded the Infofilter project in 1995, which was the same year associated with the "World Wide Web gold rush." The Infofilter initiative strived to "provide librarians and others with timely and accurate reviews of Internet resources." In order to do so, they "tried to identify objective criteria for Internet resource reviews, created and revised reviews themselves and participated in the editorial process for Internet resource reviews." The project, which was dependent on the work of volunteers, ceased its operation in July 1997 due to the emergence of competing initiatives which had better funding and superior resources. The criteria they originally used included authority, content, organization, currency, search engine, graphic design and the innovative use of the medium. The same year, in which the Infofilter project began its operation, Alertbox has started and some authors (see /6/) proposed a structural framework for examining the commercial activity on the Web. They introduced a categorization framework for commercial Web sites which differentiated between six distinct functional categories, including (1) Internet storefront, (2) Internet presence, (3) content, (4) mall, (5) incentive site and (6) search agent. Most notably, 50 out of the 70 references they cited stem from the same year the paper was written, which indicates that 1995 was the year in which systematic ways and concepts of analyzing Web sites emerged.

2. BANKING SYSTEM OF REPUBLIC OF SERBIA

Banking system of Republic of Serbia is composed by the following components: Central Bank of Serbia, commercial banks and other financial institutions. Banks in Serbia are conducting their activity independently, in order to make profit on principles of solvency, profitability and securing liquidity.

New infrastructure of national payment system development, based on market competition principles, was one of the key reforms implemented by Republic of Serbia since January 6th 2003. Domestic payment market migration from Department for calculation and payments to the commercial banks has significantly improved the banking sector. Industry, individuals and financial institutions now have more efficient payment system, with diversified and quality spectrum of services. Also, this led to the costs reduction.

Banking system is one of the leading transitional areas of the Serbian market. Transition of commercial banking has resulted in mergers, acquisitions and capitalization of the banks. This further improved offer and quality of banking services, including electronic banking.

Table 1. Basic indicators of the banking sector

	2001	2002	2003	2004	2005	2006	2007	2008	2009
Number of Banks	49	50	47	43	40	37	35	33	32
Overall balance sheet (bilions of RSD)	291,5	316,6	367,5	510,1	775,0	1.169,3	1.561,8	1.643,9	1687,6
Banks' capital banaka (bilions of RSD)	46,2	63,6	86,3	99,5	125,7	216,3	328,4	456,8	550,9
Owner's structure , number of banks									
- Share of foreign banks	15	12	11	11	17	22	21	21	23
- Share of domestic banks	23	27	19	18	12	7	6	5	4
- Share of banks owned by Republic of Serbia	11	11	17	14	11	8	8	7	5

Starting from 2000, Serbian banking sector has gone through significant restructuring. This restructuring was strategically focused on healthy and strong

institutional prerequisites, as well as on implementation international standards and best practices. Key results of the reforms are increased trust in banking sector and financial institutions and reintegration with global economic trends.

Number of banks in Serbia in 2001 was 84. Onwards it has trend of decreasing. In 2003 there were 47 banks, in 2004 there were 43 banks and in 2007 there were 35 banks in the market. 21 banks are owned by foreign stakeholders, 8 of them were owned by the Republic of Serbia. In 2008 there were 33 banks and all Internet sites were analyzed.

Banking sites have been analyzed in September-October 2008 timeframe. Paper related to the banking site analysis has been published in the journal Banking, published by Serbian Bank Society, in June 2009.

3. WEBSITE ASSESSMENT METHODOLOGIES - OVERVIEW

Since the beginning of Internet, the evaluation of business websites' performance has been a constant concern of experts in various fields. Thus authors (see /7/, pages 335-345) deal with the content analysis of websites of different successful companies, leaders in the use of information technology. In order to examine the profile of commercial use of the web one author (see /5/) conducts a study in which he suggests an evaluation matrix. The matrix comprises the business purpose of websites classified into categories and according to value types, created at the website from the consumers' point of view.

Some authors (see /3/, pages 343-358) write about the role marketing plays in the development and management of B2B websites. In their website evaluation they focus on five categories: site home page, overall design and performance, textual content, audio-visual elements/interactions. For his comparison of the Internet strategies employed by the Japanese and American companies, one of the authors (see /15/, pages 298-308) uses an approach measuring the influence exerted by factors such as web design, positioning, information presentation, and delivery services.

By applying the combination of factors, one can influence the website's strategic potential and provide a development platform. Other authors (see /4/, pages 123-134) investigate the websites' comparison based on the source (Yahoo and Dutch Yellow Pages), branch of industry and size. He covers the characteristics of the content and design, as well as measures, on the basis of features, i.e. objectively (content - informational, transactional, entertaining, design navigation, search option) and observations, i.e. subjectively.

Within the methodology of automated websites' classification, some of the authors (see /1/, pages 31-43) developed a set of operational criteria, and analyze the content and the structure. An investigation with a view to identifying the key metrics for defining the website's usability, design and performance, is

conducted by one of researchers (see /13/, pages 151-167). The collected data indicate that the website's success depends on the access speed, navigation, contents, interactivity, and feedback for the user.

The improvement of sites is the major objective of Web analysis research. In order to make a Web site more effective, one of the pioneer authors in this area (see /8/) proposes to match design characteristics, including e.g. media richness, promotional activities and online sales with information intensity aspects of the firm. Although being a conceptual piece of research, their framework represents one of the early approaches to search for antecedents of Web design. By using (a) functional and navigational issues, (b) content and style, and (c) contact.

The Website assessment methodologies are presented in the Table 2.

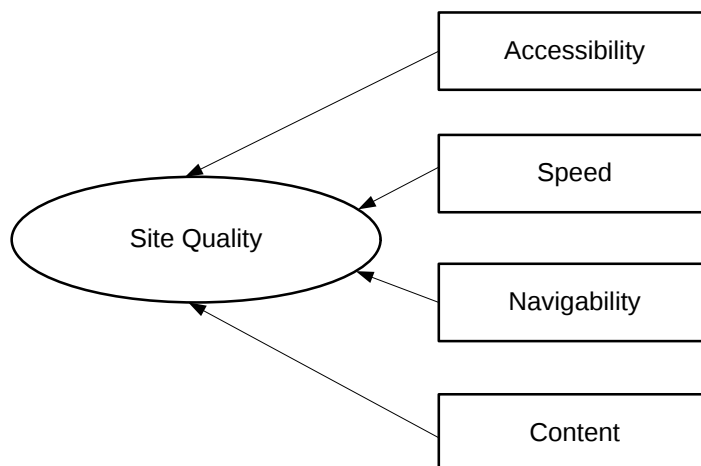
Table 2. Website Assessment Methodologies

Methodology focus	Website Dimensions
Usability of Web sites	Content, Ease of Use, Promotion, Made-for-the-Medium, Emotion
Constituents of Successful Sites	Ten selected characteristics (e.g. proper use of fonts, number of images, proper use of colors)
B2B Web Site Assessment Tool	- Home Page, - Overall Site Design and Performance, - Text Content, - Audio-Visual Elements - Interaction and Involvement
Web Assessment Index (WAI)	- Accessibility, - Speed, - Navigability, - Site Content
Web Evaluation Instrument from a First-Time Buyer's Viewpoint	Variety of Web functions
Development of a Benchmark for Web sites	Functional/Navigational issues, Content and Style, Contact Information
Web site Quality Evaluation Method (QEM)	Usability, Functionality, Site Reliability, Efficiency
Extended Web Assessment Method (EWAM)	Usefulness, Ease of Use, Trust
Matrix of Business Functions and Customer Values	Information, Friendliness, Responsiveness, Reliability
Functionality Grid for Web site Evaluation	Information, Communication, Downloading, Transaction

4. CHOICE OF CRITERIA FOR THE BANKS' WEBSITES ANALYSIS

Most of the mentioned approaches focused either on the basic content management, or on the specific set of website's ultimate results. The desired evaluation may often be achieved by using just a few highly relevant characteristics of the specimen being analyzed. Some evaluation models include subjective factors such as easy access, clear text, presentation quality, pleasant colors, sounds, etc. In order to minimize this subjectivity, the site evaluators need to be given precise guidelines so that they could evaluate each factor, and a large group of factors is needed indeed.

In an attempt to avoid the main weaknesses of the previous model, previous researchers (see /2/) have developed a new Web Assessment Index (WAI), which may be used for comparing the current use of the Internet by the various organizations. Using this model, given in Picture 1, they analyzed the Spanish Universities' websites. The WAI index was used by most important authors in this field (see /9/, pages 313-318) in their study of the 200 biggest Spanish companies, and by researchers (see /10/, pages 73-82) in the comparison of quality of the Spanish banks' websites.



Picture 1. Model of website quality assessment

The WAI index uses four broad categories as a base for determining the website's quality: access, speed, navigation and website content. The key factors within each category are chosen according to the references and experience of the researcher, and they have to reflect what users generally consider to be important website components and characteristics.

The first WAI index category is website's accessibility. Clearly, the more easily users identify and access the website, the higher its quality. Still, measuring just hits per page is not a valid indicator of website's quality or success. In order to truly assess the website's accessibility there need to define some objectively measurable features. Therefore, two indicators were used for measuring this category: presence in search-engines and link's popularity. Higher-ranked presence in search-engines leads to the larger number of website's accesses, thus increasing the level of accessibility. In this paper we chose Google as an indicator of presence in the search-engines, because it is most often used by our Internet users. The second indicator used for measuring the website's accessibility is site's popularity.

The most frequent measure for website's performance evaluation is the number of hits that the site generates. Still, there is a problem of accuracy related to this type of measuring, because if the page contains charts, each chart counts as another hit, and also because there are certain methods to artificially increase the number of these hits. Therefore, the total number of hits does not necessarily have to represent the number of visits to the site. Taking this into account, we have decided to use another type of evaluation: we have defined the link's popularity as the rank of the concerned site on the Alexa website list (www.alexa.com).

Table 3. Search Engine popularity in Serbia according to Alexa.com

Search Engine	Website	Traffic Rank (domestic)	Traffic Rank (global)	Number of connected websites	Speed	Online from
Google	Google.com	1	2	310.213	Very Fast (1 second)	15.Sept.97
Yahoo!	Yahoo.com	3	1	62.651	Average (2.2 seconds)	18.Jan.95
Krstarica	Krstarica.com	10	5922	760	Very Slow (7.9 seconds)	20.Dec.99
Google.rs	Google.rs	12	19643	N/A	N/A	N/A
Microsoft Network (MSN)	msn.com	13	6	17019	Average (2.5 seconds)	10.Nov.94
Mozilla Corporation	Mozilla.com	40	63	18570	Slow (3.2 seconds)	18.Oct.94

Access speed and response time are obviously of great importance, the time always being a critical factor. Certain studies discovered that there is a significant correlation between the page load time and the satisfaction of website's users. The access speed was measured by chronometer, although this measurement may be influenced by a large number of factors such as the used hardware, connection time, web traffic, etc. In order to minimize the sources of these mistakes, the measurements were conducted at the same time

from the same computer, using the most popular web search-engine - Internet Explorer. The Internet access was enabled through the cable connection. The sites were accessed several times successively, with a view to obtaining the more representative average measurements, through the following address: <http://www.nbs.rs/export/intemet/drilica/50/50.2.html> , where all banks' websites can be found.

The third category of our index is what we have named navigation. The poor website design will result in the loss of potential clients, because the users will not be able to find what they need, and in the loss of potentially repeated visits due to the initial negative experience. Taking into account that the users must never feel lost, each page has to be sufficient on its own, and to provide the links to the main menu. An indicator of a good website is an always visible website index, which enables the users to swiftly reach the desired location. Factors used for the evaluation of this category are the following:

- Permanent website's menu, enabling quick access to various parts of each page.
- Search by key word option, so that the visitors could locate the interesting features on the bank's website.

The website contents' quality will be evaluated by assessing the presence of information relevant for the users. The website must have the content which satisfies the users' needs, and it should be regularly updated. The banks' websites can contain various characteristics, including information on products, contact information enabling feedback from the user, general information on a bank, etc. The important information should be directly accessible. If 80% of the users search for 20% of information, then such information should be the most visible and the easiest to access. Basic contact information of an organization should be found on the home page menu, and related information should be grouped together, not scattered around different parts of the site. Factors chosen to quantify the contents' quality were based on the websites' contents identified in the previous studies and on the experiences of the researchers. Banks use the web in order to achieve three main goals: to inform the market, to deliver bank products and services, and, finally, as a tool to improve their relationship with clients. Based on the extent to which banks used these three functional possibilities on their websites, they can be described as information, transaction, and post-transaction factors. So, we have considered three sets of factors in order to evaluate the website's content by using a binary yes/no scale.

Information factors: Websites are informational to a great extent, providing commercial and non-commercial information on banks. They can provide insight into the basic data on the company, its partners, important clients and social policies. Another important content is the product/service description, including the price, specifications, photographs, etc. In addition, the companies have lately started to use their websites in order to provide information useful for their shareholders, especially the financial information. Therefore, we have considered the following five information factors:

- General information on a company

- Information on products/services
- Information on prices
- Information on ATMs and branch-offices
- Financial information

Transaction factors: With the extensive and widespread use of the Internet, the possibility for the financial institutions to offer their services and products over the Internet has become reality. The first differentiation we have made within this category is between those institutions offering their products over the Internet, and those using the Internet as an information channel only. The transaction contents that can be found on each of the researched websites may be included in the following four categories: online communications, general inquiries (statements of account), specific inquiries, transfers of funds, brokers' activities, investment and savings advice, accounts and payment cards, credit applications, tax payment, and cell phone prepayments.

Communication factors: Taking into account that websites often serve as starting points for gaining insight into a company, and that the visitors usually want to access the information on a bank, the contact information of an organization should be on the home page menu, and thus, easily accessible. With a view to evaluating the communication capacity of each website, we have identified whether the site contains the following items:

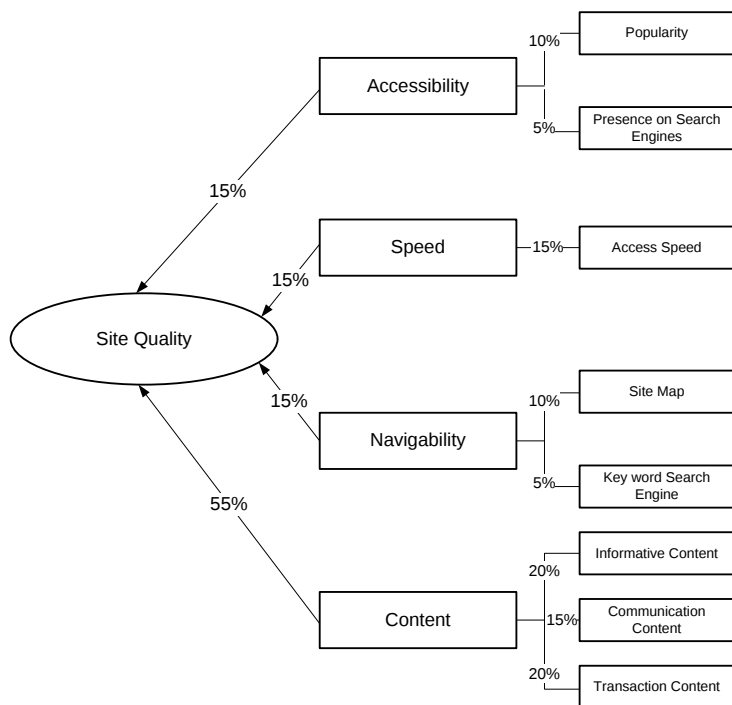
- Contact e-mail;
- Contact phone number;
- Contact address;
- Tools for feedback from the user.

After we defined them, all categories and factors were measured (on the basis of the 100 points total). Given that the site's content is the most critical aspect/ since it represents the very reason why the website is designed in the first place - to enable access to certain information and services - we assigned 55 points to this category, and 15 points to each of the remaining three categories. These measurements were defined by the analyses from the previous studies, and took into account the opinions of various experts in the field of e-banking. Moreover, in order to ensure the credibility of this task, we invited three websites' users to be our evaluators. Each website's user grades the relative importance of different categories within the instrument. First, the users distribute 100 points within the 4 large categories, and then they assign them to various sub-categories. The Delphi analysis enabled us to establish the final list of items and their respective importance. The use of these subjective factors of importance may be considered as the major limitation of our study. The values of weights of the different categories and sub-categories are given in Table 4.

Table 4. Website assessment criteria

CATEGORIES	Weights	CATEGORIES	Weights
ACCESSIBILITY	15	NAVIGABILITY	15
Presence in search engines	5	Site map	10
Popularity	10	Keyword search function	5
SPEED	15		
Access speed (in seconds)	15		
CONTENTS QUALITY	55		
Informational content	20	Transactional content	20
General company information.	4	Online banking	10
Product/services information.	4	Online communications.	1
Price information.	4	General inquiries.	1
ATM and branches information.	4	Specific inquiries.	1
Financial information.	4	Funds transfers.	1
Communicational content	15	Brokerage.	1
Users feedback	6	Investments and saving services.	1
Contact telephone	3	Accounts and pay cards.	1
Contact address	3	Credit applications.	1
Contact e-mail	3	Tax payment.	1
		Cell phone recharging.	1
		TOTAL	100

The distribution of the different variables in the WAI index building, is given on the Picture 2. The most important factor is the site quality, followed by the accessibility, speed and navigability.



Picture 2. Categories and sub-categories used for Website assessment

5. EVALUATION OF THE WEBSITES OF BANKS IN SERBIA

Analysis and Results

Site availability D_i has been measured by two sub-categories: website link popularity PL_i and presence in search engines PP_i .

$$D_i = PL_i + PP_i$$

Site popularity value for bank i can be calculated by using equation below:

$$PL_i = M \left[1 - \frac{(R_i - R_{\min})}{(R_i - R_{\min})} \right]$$

Where:

PL_i – number of points for bank i for sub-category link popularity,
 $i=1, \dots, n$,

n – overall number of banks (i.e. banks' websites),

$M=10$ i.e. maximal number of points for sub-category link popularity,

R_i – website rank for bank i according to Alexa.com,

$R_{\max}$ – highest recorder website rank, according to Alexa.com,

$R_{\min}$ – lowest recorder website rank, according to Alexa.com.

Search engine presence can be calculated by using equation below:

$$PP_i = M \left[1 - \frac{(AP_i - AP_{\min})}{(AP_{\max} - AP_{\min})} \right]$$

gde je:

$M=5$ i.e. maximal number of points for sub-category presence on search engines,

PP_i – number of points for bank i for sub-category presence on search engines,

AP_i – average value of search engine presence index for bank i for key word search feature,

$$AP_i = \sum_{j=1}^k \frac{KR_j}{k}$$

k – number of key words,

KR_j – sequential number of bank i website for j key word,

$AP_{\min}$ – lowest average value of search engine presence index,

$AP_{\max}$ – highest average value of search engine presence index.

Accessibility: The accessibility of the banks' websites bearing the index from 90 to 100 is of the highest rank in this category, too/ and the analysis shows that Societe Generate banka and Komercijalna banka are the most accessible according to the both criteria, presence in search-engines and link's popularity

(picture 4). More than a half of all banks, 51.51% have index between 12 and 14, 8 banks (24.24%) with index between 10 and 12 and 6 banks (18.19%) have index below 10, with Kosovsko-metohijska banka trailing, with index value 1,25.

The link popularity criteria, rank of our bank on global level (according to Alexa.com) is as following: the highest rank has Banka Poštanska štedionica and is placed on 132.728. position (on local level at 207. position), Komercijalna banka placed on 165.533. position (on local level at 260. position), and Banca Intesa placed on 168.156. position (on local level at 249. position), which is significantly below rank of the best ranked Spanish banks (La Caixa 1.325. and Banco Español de Crédito 11.959.).

According to presence on search engines criteria, using Google as best ranked search engine in Serbia (and key words related to banking industry: account, payment card, loan, interest and payment system), highest rank has Société Générale Bank with average index value of 4.6, KBC Bank with 5.4 and OTP Bank with 25.

Website loading speed for bank i has been calculated by measuring loading speed of each bank.

$$V_i = M \left[1 - \frac{(T_i - T_{\min})}{T_{\max} - T_{\min}} \right]$$

Where:

$i=1, \dots, n$,

n – number of banks,

V_i - number of points for category website speed loading,

$M=15$ - maximal number of points for category website loading speed,

T_i – bank' i website loading speed ,

$T_{\min}$ – minimal website loading time,

$T_{\max}$ – maximal website loading time.

Website loading speed for 6 banks (18.18%) is up to the 1 second. Sixteen banks, 48.49% have loading speed between 1 and 2 seconds. Six banks (18.18%) have loading speed between 2 and 3 seconds Vreme otvaranja sajtova 6 banaka (18,18%). Three banks (9.09%) have website loading speed between 3 and 4 seconds and only two banks (6.06%) have loading time over 5 seconds.

Typically, those sites whose whole pages could be loaded quickly were also easy to navigate. The quickest to load was the website of Piraeus Bank, with 0.66 seconds on average and the slowest was the website of OTP Bank with 6.24 seconds. Given that in all cases the access was a matter of seconds, the Internet users with cable connection, as in this case, quickly access the banks' websites.

Navigability of website N_i has been pondered depending on service component presence or not-present, sub-categories which were considered are site map and

key word search engine. Value of this category is calculated as per equation below:

$$N_i = MS_i + KR_i$$

Where:

N_i – number of points for category navigability of website of bank i ,

MS_i – number of points for site map sub-category,

KR_i – number of points for key word search engine sub-category,

$i=1,...,n$, n – number of banks,

$$1. MS_i = \tau \vee \neg \tau$$

$$\tau = 10$$

$$\neg \tau = 0$$

τ - variable used for map site feature exist/not exist checking and valuation

Where MS_i equal to τ or $\neg \tau$, value of τ depending on map site feature presence, with possible values $\tau=10$, a $\neg \tau=0$.

$$2. KR_i = \lambda \vee \neg \lambda$$

$$\lambda = 5$$

$$\neg \lambda = 0$$

λ - variable used for key word search engine feature exist/not exist checking and valuation

Where KR_i equal to λ or $\neg \lambda$, value of λ depending on key word search engine feature presence, with possible values $\lambda=5$, a $\neg \lambda=0$.

The marketing sectors in banks understood the importance of quick access to the desired location, since 51.51% of all websites had implemented both the website map and the search by key word option. There are 5 banks with either the former or the latter, and 18.18%, i.e. 6 banks need to implement this criterion in the future.

Content: The website's content VS_i was evaluated by taking into account the relevant information that must be found on the bank's website according to the needs of the potential clients. Equation used for content quality index calculation is as following:

$$VS_i = IS_i + KS_i + TS_i$$

Where:

IS_i – number of points for sub-category informational content of bank' website,

$$S_i = \sum_{l=1}^p IF_l$$

IF_l – number of points for each factor within sub-category informational content,

$l=1, \dots, p$,

p – number of factors within sub-category informational content,

KS_i – number of points for sub-category communication content of bank' website,

$$KS_i = \sum_{m=1}^q KF_m$$

KF_m – number of points for each factor within sub-category communication content,

$m=1, \dots, q$,

q – number of factors within sub-category communication content,

TS_i – number of points for each factor within sub-category transactional content,

$$TS_i = \sum_{x=1}^y TF_x$$

KF_x – number of points for each factor within sub-category transactional content,

$x=1, \dots, y$,

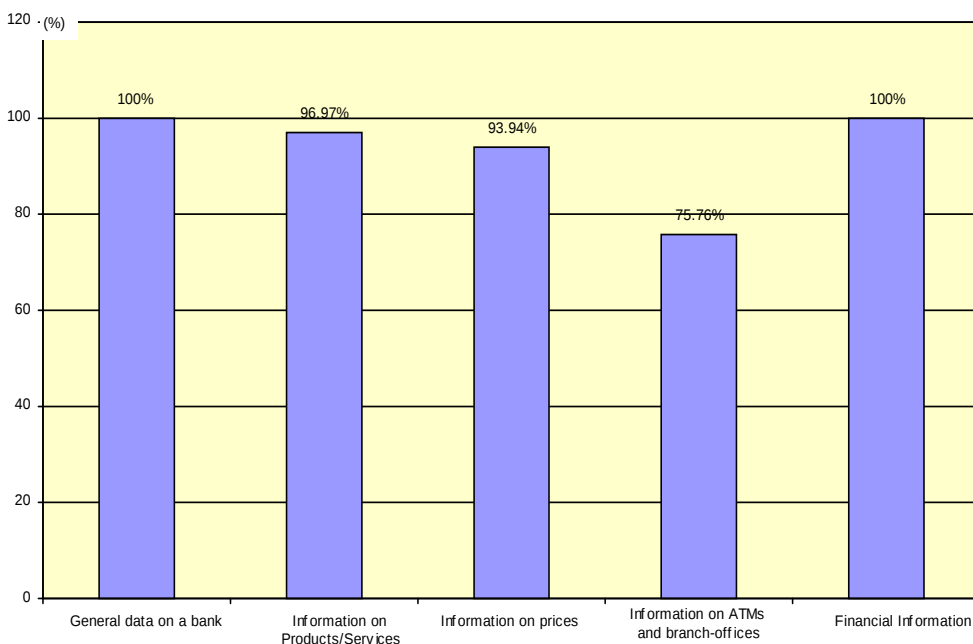
y – number of factors within sub-category transactional content, and based on equation below:

$$VS_i = IS_i + KS_i + TS_i = \sum_{l=1}^p IF_l + \sum_{m=1}^q KF_m + \sum_{x=1}^y TF_x$$

When a bank's website evaluation index is calculated according to all three content categories, the result is as given in the picture. Eurobank EFG, Vojvodjanska banka, Raiffeisen banka, Societe generale banka, Hypo-Alpe-Adria banka, and Komercijalna banka have all criteria implemented, so that the users have at their disposal everything considered to be important content in respect of bank services. The content quality was, in case of 51.51% of banks, evaluated as bearing the index from 50 to 55, 42.42% of banks have the ratio above 40, and only in case of Kosovsko-metohijska banka this ratio is below 30. These results are in the rank of the European banks' results.

Complete information on a bank can be found on the websites of 24 banks, which is equivalent to 72.73%. The websites of all banks contain general information on a bank, and information on financial services. A bit lower percentage of websites contain information on types of products and services

(96.97%), and information on prices of services (93.94%), while the information on ATMs and branch- offices can be found on 75.76% of websites.

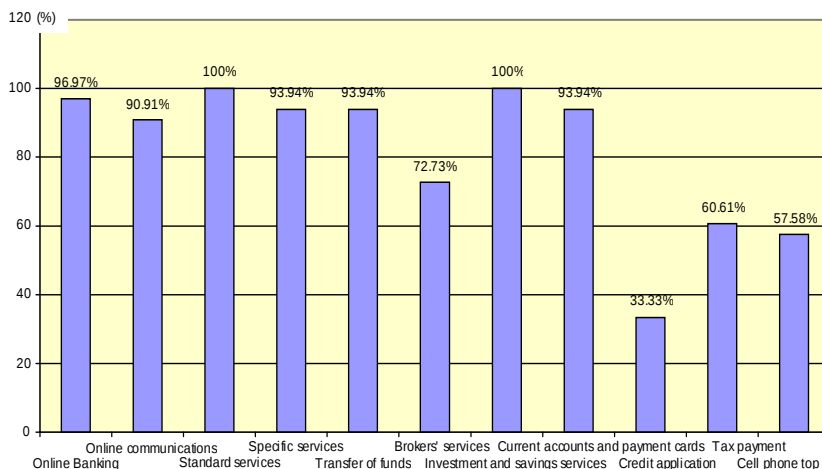


Picture 3. Informational content

Only 24.24% of the analyzed websites were transactional, i.e. only 8 banks had all items from the evaluation category placed on their websites. These results show that the electronic trade era has just begun in Serbia, and that the activities are to be undertaken by the relevant factors in the country in order to develop this kind of operations.

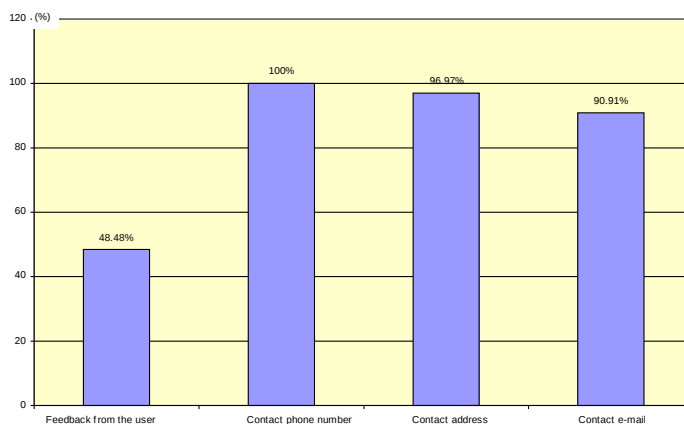
All banks offered standard services and investment and savings services. Most banks offered online banking services (96.97%), specific services, transfer of funds, opening of the account and payment by cards (93.94%). Online communications with the clients are also very usual, appearing in 90.91% cases. Other available services include: brokers' services (72.73%), tax payment (60.61%), cell phones credit update (57.58%), and the credit applications are the least present (33.33%) (picture 4.).

The level of Internet bank services is again in correlation with the bank's size. Larger banks offer larger number of services, because they have more available sources for investment in their websites.



Picture 4. Transactional content

Only 16 banks (48.48%) enabled their clients to communicate with the bank in the way they choose to, by providing all categories of interest. According to the results of the research, the banks considered contact by telephone to be the most important (100%), contact e-mail was found in case of 90.91% of evaluated websites, and contact address in 96.97% of websites. The smallest number of evaluated websites (48.48%) offered the tools for feedback from the users (picture 5.).

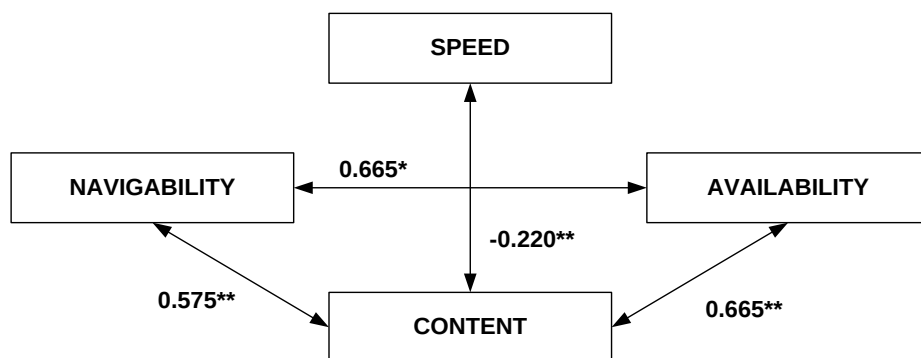


Picture 5. Communication content

Finally, we analyzed the number of language versions available at each website. All websites are translated into English, and only the website of OTP banka into Hungarian too, which is significant for our Diaspora, the English language being the official language of the Internet. Although the official alphabet of the Republic of Serbia is Cyrillic, none of the websites, except the website of the National Bank of Serbia, used the Cyrillic alphabet.

With a view to concluding the analysis, we made a correlation between the different constitutive index factors and measured the rate of relation between the four used categories: speed, accessibility, navigation and content. Website content is significantly related to accessibility and navigation. Both correlations show that the best-designed websites are also the richest in content, easily accessible and easy to navigate. It is interesting to mention that navigation is also related to accessibility; hence the easily accessible sites are easy to navigate.

Negative correlation between speed and content was expected, too. The more complex websites, containing more information, communication and transaction elements, are usually slower. However, this situation can easily be avoided by distributing the content to different pages, and keeping the home page as simple as possible. One way of managing this exchange (speed vs. content) is to plan the links within the website so that the certain characteristics remain separate. This way, the visitor interested in the virtual visit to a bank may click on a separate link, see how long the loading lasts, while not being slowed down if he/she is not interested in this characteristic. On the other hand, there are no significant relations between speed and accessibility, or between speed and navigation ($\alpha = 0.05$).



Picture 6. Bivariate correlation between factors
(*Significant at 95% and ** Significant at 99%)

6. CONCLUSION

This paper dealt with the bank websites in Serbia, with the model "Index WAI" being suggested and tested for the evaluation of their potential. This

methodology enables the researchers and managers to compare the attributes and components of the Internet websites, in order to identify the weaknesses and possibilities of their websites. The major challenge in the index composition was how to avoid the subjective factors, which were dominant in the previous evaluation tools. This index is based on the four broad categories: website content, speed, accessibility and navigation, which were all quantified in an objective and logical manner. The results of the application of this index in the Serbian banks' websites analysis have shown the high flexibility of the WAI index, and pointed to the main weaknesses of the evaluated web pages. The WAI index values show that the Serbian banks' websites are not short of the European banks' websites in respect of functionality.

All banks in Serbia, along with other financial institutions, have their own website. Overall number of points, i.e. value of **WAI index** for website quality level, for each bank can be calculated based on the equation below:

$$WAI_i = D_i + V_i + N_i + VS_i$$

where

WAI_i index for bank i

D_i – number of points for category site availability for bank i,

V_i – number of points for category site opening speed for bank i

N_i – number of points for category navigability for bank i

VS_i – number of points for category site for the site content quality for bank i.

According to the WAI index, the best websites belong to Piraeus Bank, Eurobank EPG, and Vojvodjanska banka, although 12 out of 32 banks have an index ranging from 90 to 100, which is the maximum. Then there are 10 banks with an index ranging from 80 to 90, 7 banks with an index ranging from 70 to 80, and only 4 banks with an index below 70, which evidences the high quality of our banks' websites. Still, the most valuable output of this study is not to identify the best websites, but to show the website of each company compare with the similar websites, and to observe the ideas and practices that may improve the company's website (Table 5).

Finally, the statistical correlations between the qualitative factors of web pages were identified, with a view to providing assistance to banks in deciding which characteristic they want to invest in.

It is worthwhile mentioning that there are several limitations to this analysis. First, all data used in the research are collected on the basis of a limited number of accesses to each site in a specific time, despite the fact that the Web is a highly dynamic and changeable media. Similar studies in different periods of time may yield different results. Such evaluation will in time also shed some light on the fact whether there is a divergence or convergence of web activities. The second problem was the subjective nature of the factors' evaluation, which, although based on the results from the previous studies, introduces subjectivity

into this analysis. Still, after the identification of the critical categories and factors within the WAI, the next phase would be testing these tools in different countries, and measuring the relation between the value index and the success of online banking. The evaluators may use this instrument with ease, without any specific training or knowledge, and, apart from this, the evaluation time is shorter than in other evaluation models. As further information on web design and usability become available, the evaluation index presented in this paper may be perfected into an empirically verified design tool.

Table 5. WAI Index values for banks websites in Serbia

Bank	WAI Index
Piraeus Bank	97.31
Eurobank EFG	96.52
Vojvodjanska banka	96.46
SCG Srbija	96.16
Hypo Alpe Adria Banka	95.02
Komercijalna banka	94.93
NLB banka	94.34
Raiffeisen banka	93.97
Privredna banka Beograd	93.01
Banca Intesa	91.15
Poštanska štedionica	90.83
Alpha banka	90.50
Erste banka	86.51
ProCredit banka	85.62
UniCredit banka	85.00
Metals banka	84.64
Srpska banka	84.21
AIK banka	84.11
Credy banka	83.84
Privredna banka Pančevo	83.59
OTP banka	81.37
JUBMES banka	80.27
Volksbanka Srbija	79.08
Credit Agricole banka	78.52
Findomestic banka	75.69
Agrobanka	71.39
Čačanska banka	71.24
Marfin banka	70.29
Opportunity banka	70.00
Univerzal banka Beograd	69.86
KBC banka	61.92
Kosovsko-Metohijska banka	44.62

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