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FIKUSZ

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Proceedings



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SZÉCHENYI PLAN

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Welcome at FIKUSZ 2012!

The FIKUSZ (Symposium for Young Researchers) Conference was organized as part of the Hungarian Science Festival 2012 for the seventh time this year. One of the important objectives of the organizer Keleti Faculty of Business and Management, Óbuda University was to create a Central and Eastern-European Scientific Research Centre and to provide an opportunity for the PhD students and young PhDs of the region, dealing with the business and management sciences, to publish their work. After strict evaluation processes, the studies can be downloaded from the RePec database as well. Simultaneously, getting acquainted with each others' research fields and results can provide solid basis for mutual research work to be started.

The 15 conference presentations discuss interesting topics from Marketing to Information Technology, through Human Resource management and Organizational Behaviour to Financial questions and Business Ethics.

The majority of the studies are optimistic. The problems of economic life can be solved. There are papers, however, that are pessimist which has to do with the prolonged economic crisis. These are not able to report promising research results or simply formulate questions.

According to tradition, a competition was announced at the Conference. Based on the decision of the evaluators and session chairmen, the following people have won the prizes of the 3 best papers and presentations:

1. Justyna Lewandowska (Poznan School of Logistics, Poland)
2. Diana Sadoveanu (Alexandru Ion Cuza University, Iasi, Romania)
3. András Keszthelyi (Óbuda University, Hungary)

I would like to thank my colleagues for the preparation and organization of the conference, and the plenary lecturers – Prof. László Józsa CSC. (Széchenyi István University) <http://www.kegk.uni-obuda.hu/sites/default/files/9%C3%B3B3zsa%20FIKUSZ%202012.pdf> and Prof. Péter Dobay CSC. (University of Pécs) <http://www.kegk.uni-obuda.hu/sites/default/files/Dobay%20FIKUSZ%202012.pdf> – for their help in maintaining and strengthening this tradition!

I would like to give special thanks to the Dean, András Medve CSC. for supporting the organization of our conference. We are grateful to all our lecturers who honoured our University and Conference with their participation!

Last and not least, see you in November 2013 in Budapest at our next FIKUSZ conference!

I am happy to recommend this volume of studies to everybody who might be interested in the above topics.

Pál Michelberger
Conference Chair

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Competitive Website Evaluation in Higher Education

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Abstract: *This study addresses the issue of the competitive websites of the universities. Why is it important for the institutions to have competitive website? Because websites are the most important form of their online appearance, as a reflection of the style, the activity and the reputation of the particular institution. The study evaluate the differences of three reference group's websites: International, European and Hungarian.*

Keywords: *website, higher education, competitiveness, evaluation, marketing*

1 Introduction

"Every business is an information business" P. Evans and T. Wurster leaders of the Boston Consulting Group, said. [1] According to György Bögel information has always been an important competitiveness factor in the modern business world [2], I daresay the most important one. It is to say the whole world refers to the information revolution. The websites carry information which means specific messages for the target groups. This study addresses the issue of the competitive websites of the universities. Why is it important for the institutions to have competitive websites? Because websites are the most important form of their online appearance, as a reflection of the style, the activity and the reputation of the particular institution. [3] In my study I am evaluating the competitive website from not only one aspect. Considering the concept of the competitiveness my examinations have been completed by different methods of other disciplines (e.g. marketing) as well. My aim is to find out the criteria of the competitive institutional website and to compare the Hungarian university websites to other ones in a competitive, international environment includes the steps as follows:

Step 1: Defining the competitiveness factors and a set of evaluation criteria: developing a check list of categories and criteria, developing the website's competitiveness index.

Step 2: Selecting the domestic and the higher education institutions in foreign countries (Reference Groups) for measuring competitiveness.

Step 3: Testing and refining the model of evaluation criteria.

Step 4: Applying the model: comparing the Hungarian university websites to other websites of universities in foreign countries.

2 Model of the Evaluation

2.1 Overview of Website Evaluation

Many models, templates, checklists or other schemas for evaluating web sites were developed for measuring the effectiveness of websites. The models around 1997 (Leland, Beck, Kapoun) used the criteria from print media, mostly rely to the authority and reliability of websites. [4] [5] [6] Smith created 7 categories of criteria: scope, content, graphic and multimedia design, purpose and audience, reviews, workability and cost. [7] Gorski's 7 criteria categories are: relevance, appropriateness, credibility, bias, accuracy, accessibility, navigability and multiculturality. [8] The study of Áts et al. was based on the criteria of design, content, interactivity, security and technical solutions to evaluate the websites of Hungarian secondary schools in 2000. [9] Few years later Spencer and Ruwoldt focusing on certain relevant aspects of marketing evaluated 60 university websites. They also analysed the content and link structure of these websites. [3] Website Evaluation Questionnaire (WEQ) was developed by Elling, Lent and Menno. WEQ focused on usability and user-satisfaction with the following aspects: layout, content and navigation. [10] In 2008 Edit Bányai and her research group developed a set of criteria for evaluating the websites of Hungarian Business Schools. [11] Matt Soace et al. in 2010 analysed 10 universities focusing on landing page navigation links. [12]

The conclusion of the short overview of the evaluation models or criteria lists is that all of them are focusing on one main aspects such as usability, technics, marketing or website development. There is no model that measures the competitiveness of the website especially for higher institution at the moment as it needs more aspects and complexity. Therefore my aim is to develop an evaluation model that measures the competitiveness of the websites. Firstly I have to define the main aspects.

2.2 Evaluation Aspects

The analization of websites considering their competitiveness means a complex task as it requires both economical and technical knowledge. Probably that is the reason why there are only very few of such literature with that kind of complex approach. The most

literatures only use one attitude, therefore I based my recent research beside my own experiences on the literature, trade journals, online sources of both the economical and the technical fields. The research is firstly based on secunder informations, and from the field of primary research it is based on scientific achievements of analysis and questionnaire method. According to one hypothesis of my research an analysing system can be developed that enables to measure and analyse the institutional websites.

The components of the model of evaluation criteria have been determined from the following aspects:

- business strategy
- marketing
- the functional utility of the website
- applied web technology
- quality

The first two aspects are economical approaches (strategy, marketing), the purpose of which is to determine the adequate scope of information and to forward them to the target groups. The other two aspects (functionality of the website, applied web technology) are technical approaches that indicate the operative method of realization.

Which are the attributions that a website needs to have regarding its competitiveness? In the first place the intent of the institutional website must be determined. The intent is to transmit messages to specific target groups and to the "world". This means that the website is a very important marketing communication tool that takes place in the marketing strategy of the organization. Therefore the competitiveness of the website has been examined firstly from the aspect of the strategy:

- determining the vision
- concrete orientation: whom? what? how?
- measurability. [13]

The strategy determines the marketing strategy where the target groups (whom?), the higher education product (what?) and the website (how?) are examined as communicational tools. In the marketing section of my research I rely on the results of researches conducted by the PTE Közgazdaságtudományi Kar Gazdálkodástudományi Intézet, which examined for marketing purposes the websites of the Hungarian higher education economics institutions. [11]

After the economical view the research of the competitive website was followed by the technical approach. The functionality and the applied web technology are determinative factors, studied by numerous literary works, which I took into consideration during my research.

Quality takes an important part in the competitiveness of websites. According to Tenner and DeToro quality is primal business strategy. [14] Defining strategy and competitive

advantage play determinative factors in the competitiveness of the organisation. Garvin [15] has mentioned five approaches while Berry, Zeithaml and Parasuraman [16] have determined ten traits relating to quality.

Studying the relevant literature and taking the above mentioned facts and approaches into consideration 196 criteria have been defined for analysing the competitiveness of websites.

2.3 Model of the Evaluation Criteria

The framework is made up many criteria based on relevant literature. The criteria are arranged in groups, which enables the system to be extended and weighed subsequently, thus making it flexible. The model of evaluation criteria as a "gauge" measures the competitiveness of the site, the result of measuring will create the competitiveness index of the website.

The elements of the model of the evaluation criteria are the following:

- *Criteria*: except of a few of the criteria most of them work as binary variables : 1 point (true) for the existence, attainability, application of the criteria and reasonably 0 point (false) when finding the contrary.
- Application of *external and internal value systems*: e.g. Google Page Rank
- *Groups* (aspects): support the systematization and weighting.

The model of the evaluation criteria has a strong hierarchical structure. The criteria have been classified into two main categories with the title **CONTENT** and **DEVELOPMENT**. The system also reflects very well the already well known questions of strategy: whom, what and how? To the question **WHOM** the answer is to be found in the "Target Groups" category while the answer to the question **WHAT** appears in the category "General Informations". Both categories are to be found in the main category group "CONTENT". The question **HOW** is represented by the category "DEVELOPMENT", which consist of three groups:

1. functionality → "General Development" group,
2. existence, attainability, visibility → "Visibility of the Website" group,
3. innovation → "The Application of the Web 2.0 Technology" group.

The five sub-groups - which are summarized by the two main groups - are sorted in further categories. (Figure 1)

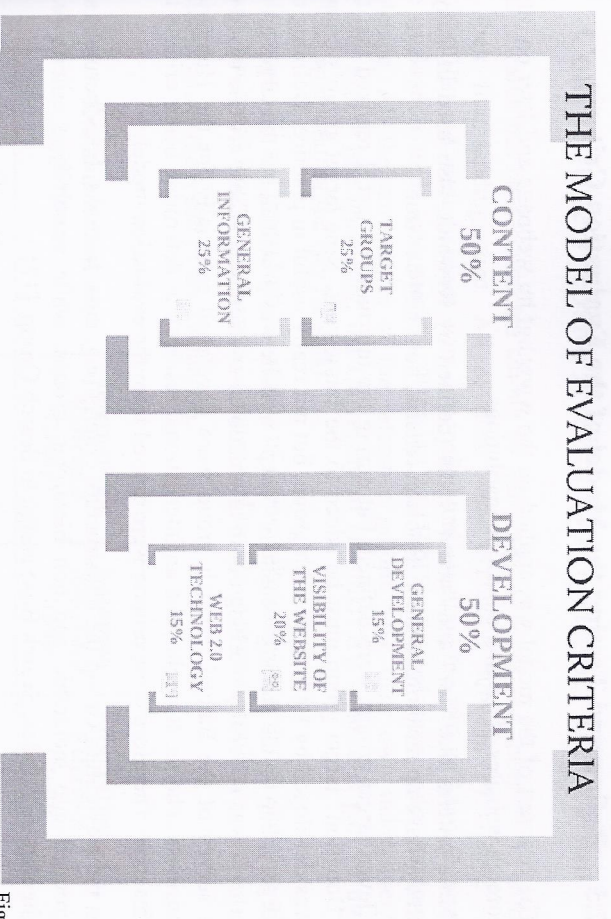


Figure 1
The model of the evaluation criteria
(Created by the author)

2.4 Competitive Website Index (CW-Index)

The competitiveness index is calculated as follows:

1. The evaluation process of the websites uses the group's criteria. The criteria are mostly binary variables, which means if the criteria can be found on the institution's webpage then 1 point is calculated.

2. After all of the criteria values have been determined the values of the certain group will be summed up and this result will be compared to the potential maximum points of the group. Thus a relative percentage can be calculated. For example if the summed up amount of the criteria that can be found in the group is 10, and the potential maximal points are 20, then the relative percentage will be $10 / 20 = 0,5 = 50\%$. The received percentage will be multiplied by the group's weight.

3. The Step 2 will be done with the other criteria groups as well. Subgroups percentages in the same parent group will be summed and weighted. We do this process until all groups are summed and weighted in each hierarchical level (group) and we reach the main two groups, the "Content" and "Development" groups. Adding and weighting their percentage we get the CW-Index.

2.5 Refine and Testing the Model of the Evaluation Criteria

The first test of the model was applied on the www.bgf.hu webpage and later on other foreign websites of higher education institutions.

Some criteria like “for” and “about” links (defined by Ruwoldt, also used in Bányai study) have no meaning to use as Boolean criteria, both will be “true”.

Eleven target groups were defined, but during the international test, I realized that the “Donation” target group must be added to the framework. Nine target group’s criteria was developed by Bányai research group, but not really useful in practice. Defining the target group on the landing website or “deep” website was practical, but the target group criteria was not really working out in international environment. These criteria based on a survey of the Bányai research group were developed especially for the Hungarian business schools. It might need an international research to determine better criteria for this case. Therefore these criteria were dropped from the evaluation model.

In the Navigation Group the linkstructure criteria (e.g. tags, fastlinks, breadcrumb) are grouped into hierarchic and non hierarchic groups, while search type criteria (e.g. sitemap, A-Z Index, Search Box) assign to Search Group. [17]

After testing and refining the evaluation framework (87 criteria), it became more easier to use it and more simple like it was in the beginning.

3 Reference Groups

The first 22 institution of International Reference Group and 20 institution of the European Reference Group are selected as intersections of the following well known ranking lists:

- QS World University Rankings 2011-12 [18]
- Times Higher Education World University Rankings 2011-12 [19]
- Academic Ranking of World Universities (ARWU) 2012. [20]

Within the International Group there is high rate of USA institutions, therefore another 8 universities have been selected from other continents such as Africa, Asia, South America and Australia. For more information see Appendix.

As the most Hungarian Institutions are rarely found in the above mentioned rankings, I used the the following criteria to choose for the Hungarian Reference Group:

- 5 “Research-Elit University (“Kutató-elit egyetem”) quality status
- 5 “Excellent University” (“Kiváló egyetem”) quality status
- 5 Random selected.

4 Competitive Website Evaluation in Higher Education

The research has been conducted among 60 university websites and specially focused on their first landing page. All of them were evaluated between 28.05.2012 – 01.09.2012. and most websites were downloaded and saved on the 28th of May. During the evaluation three universities (TUM, LUM, HKU) changed their main landing webpage. All the universities of the reference groups have their own independent website except one university, the University of Helsinki. It’s website is part of the official webportal of the city Helsinki.

This paper will not present all the results of the website evaluation due to shortage of space but it will focus on some part of the model to demonstrate it’s utility.

Table 1 shows the result of the evaluation.

Evaluation Criteria Groups	International Reference Group	European Reference Group	Hungarian Reference Group
• General Information	36,5%	39,0%	37,3%
• Target Groups	32,0%	28,0%	19,5%
Content Group	68,5%	67,0%	56,8%
CONTENT (50% overall weight)	34,25%	33,5%	28,4%
• General Development	11,9%	11,3%	13,3%
• Website Visibility	32,5%	31,2%	30,1%
• Web 2.0 Technology	11,8%	11,4%	7,5%
DEVELOPMENT	56,2%	53,9%	50,9%
DEVELOPMENT (50% overall weight)	28,1%	26,95%	25,45%
CW-INDEX (Content + Development)	62,35%	60,45%	53,85%

Table 1
CW-Index
Source: authors research

4.1 Content

4.1.1 General Content

In the General Content Group the Hungarian Reference Group provides less news blocks and event blocks on the landing page. Inside the News category the Hungarian universities publish more news as the other reference groups while in the category Calendar/Events the contrary is to be found. Beside the news block many sites use the "Picture Shuttle" technique appearing on the most dominate place of website to provide interesting information, news, events of the university. The Hungarian Reference Group 67% has organogram, European 70% and the International only 47%. All three reference groups has history of the institution information on their sites. Declaring the mission of the institution is an important brand building issue beside the history information. 33% of Hungarian Reference Group has mission or vision declaration, 75% has it in European and 67% in the International Group. Strategic plan overview for public are mostly provided by the Hungarian reference Group (47%). I found very interesting as the Mission statement is part of the strategic plan and I find it very interesting why the institutions do not provide it on an independent webpage as well?

4.1.2 Target Groups

The model of the evaluation criteria determines 12 general target groups: Prospective Student, Current Student, Foreign Student, Alumni, Parents, Staff, Prospective Staff, Business & Partners, Neighbour Environment, Media, Visitors. The "Donation / to Give" and the "Parents" groups are typically used by the USA and British universities (Table 2). The International Reference Group uses more general target groups on their websites than the other two reference groups.

Target Groups	International Reference Group	European Reference Group	Hungarian Reference Group
Target Group (Over all average)	64%	56%	39%
Prospective Student	93%	50%	80%
Current Student	90%	95%	93%
Alumni	90%	90%	60%
Prospective Staff	80%	85%	53%
Donation	70%	30%	7%
Media	60%	60%	53%
Visitors	57%	35%	27%
Staff	80%	80%	40%
Foreign Student	43%	55%	0%
Business, Partners	37%	75%	33%
Parents	43%	5%	13%
Neighbour environment	23%	10%	7%

Table 2

Target groups

Source: authors research

The Hungarian Reference Group do not have have special menu link for "Foreign Students", but they have special foreign language (93%) site for this target group.

4.2 Development

4.2.1 General Development

The USA and the British universities do not use foreign language on their websites beside their official language, except the University of Michigan as it has Spanish version as well. The website of Hungarian Central European University uses the english language as primary language and Hungarian as second language. Except one Hungarian University of the Hungarian Reference Group is not using english language. The second most used language of the reference groups was German (20%) followed by Chinese (13%). All the universities of International and European Group have english websites.

Site management (e.g. Last modified date information) is also a weak point of the Hungarian Reference Group. The "404" also known the "Page not found" (Site Management Subgroup) webpage unique content and design adaption is not dominant for the Hungarian Reference Group.

Technical Support Subgroup evaluate the mobil device optimization and accessibility of the website. No mobile optimized site is to be found in the Hungarian Reference Group, but it has more accessibility sites as the other two reference group.

The Hungarian overall rating result is better as the result of the International groups. (Table 3)

Criteria	International References Group	European References Group	Hungarian References Group
General Development Group (100%)	39,6%	37,7%	44,2%
Site Management Subgroup (100%)	19,5%	29,0%	14,7%
Technical Support Subgroup (100%)	54,4%	45,0%	44,4%

Table 3

General Development Group and two Subgroup out of 11

Source: authors research

4.2.2 Website Visibility

The Hungarian Reference Group is less visible on Internet as the other two reference groups. The Visibility Ranks Subgroup criteria are the Google PageRank and the Webometrics as external value systems to measure Internet visibility. SEO (Search Engine Optimization) Techniques subgroup percentage is also lower as the Hungarian Reference Group does not use metatags well (HU: 33.%, EU: 56%, INT: 46%) Metatags are hidden informations in the website source code, used by spider robots. For example Google is using such spider robots in the ranking index. This means that the hungarian universities websites are ranked lower, therefore less visible in the Internet (Table 4)

Criteria	International References Group	European References Group	Hungarian References Group
Visibility (100%) Group	81,3%	77,9%	64,6%
Visibility Ranks Subgroup	41,2%	36,6%	27,5%
SEO Techniques Subgroup	40,1%	41,3%	37,1%

Table 4

Visibility Group and Subgroups

Source: authors research

4.2.3 Web 2.0 Technology

The Hungarian Reference Group does not use the Social Media as often as the others, only 13% use Twitter comparing to the European (60%) or International (73%). The iTunes U is a free service of the Apple company especially for universities. Almost every second university uses it in the International Group, 20% in the European Group and no one use it in the Hungarian Group.

The RSS feeds are used quite well by the Hungarian institution (criteria in 1:N Connection Subgroup). (Table 5)

Criteria	International References Group	European References Group	Hungarian References Group
WEB 2.0 Technology (100%)	39,2%	37,9%	24,5%
1:N Subgroup	24,4%	17,5%	9,0%
1:N Connection Subgroup	14,8%	20,4%	15,5%

Table 5

Visibility Group and Subgroups

Source: authors research

Conclusion

The model of evaluation criteria is a tool to find differences in competitiveness between websites of universities. There is no other model that measures the competitiveness of the website especially for higher institution at the moment as it needs more aspects and complexity.

During the evaluation, I found differences between the reference groups. The International Reference Group uses more general target groups, iTunes U and other Social Media such as Facebook, Twitter and Youtube. News and Events are important communication channels to reach the website users, therefore on the website's landing page the International Reference Group uses news and events blocks or "Picture Shuttle" more often than the other reference groups. Also this group provides more optimized websites for mobil devices.

The visibility of the International Reference Group is much better as it uses better contents (e.g. history, mission, brand elements) and develop techniques (e.g. metatags, RSS, Web 2.0). Using english language is an important communication tool that also determines the websites visibility in the Internet.

The Hungarian Reference Group's websites are less competitive compared to the European or the International Reference Group in many aspects such as content structures, target group content, usability and visibility.

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Appendix

International Reference Group

International Reference Group	
California Institute of Technology	US: 15
Cambridge University	GB: 4
Columbia University	HK: 2
Cornell University	BR: 2
Eidgenössische Technische Hochschule Zürich	AU: 1
Harvard University	ZA: 1
Hong Kong University of Science and Technology	CH: 1
Imperial College of Science, Technology and Medicine	CA: 1
Johns Hopkins University	JP: 1
Massachusetts Institute of Technology	CL: 1
National University of Singapore	SG: 1
Northwestern University	
Oxford University	
Pontificia Universidad Católica de Chile	
Princeton University	
Stanford University	
University of Tokyo	
Universidade de Sao Paulo	
Universidade Estadual de Campinas	
University College London	
University of California, Berkeley	
University of California, Los Angeles	
University of Cape Town	
University of Chicago	
University of Hong Kong	
University of Melbourne	
University of Michigan	
University of Pennsylvania	
University of Toronto	
Yale University	

European Reference Group

Cambridge University	GB: 8
École Normale Supérieure, Paris	DE: 4
Eidgenössische Technische Hochschule Zürich	SE: 2
Georg-August-Universität Göttingen	CH: 2
King's College London (University of London)	FR: 2
Ludwig-Maximilians-Universität München	NL: 1
Oxford University	FI: 1
Pierre and Marie Curie University - Paris 6	
Ruprecht-Karls-Universität Heidelberg	
Technische Universität München	
Imperial College of Science, Technology and Medicine	
University of Edinburgh	
University of Manchester	
University College London	
University of Bristol	
University of Helsinki	
University of Zürich	
Uppsala University	

Hungarian Reference Group

Budapesti Corvinus Egyetem
Budapesti Gazdasági Főiskola
Budapesti Műszaki és Gazdaságtudományi Egyetem
Debreceni Egyetem
Eötvös Loránd Tudományegyetem
Közép-európai Egyetem
Miskolci Egyetem
Nyugat-magyarországi Egyetem
Óbudai Egyetem
Pannon Egyetem
Pázmány Péter Katolikus Egyetem
Pécsi Tudományegyetem
Semmelweis Egyetem
Szegedi Tudományegyetem
Szent István Egyetem

Table 6

The three reference group
Source: authors research



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How Kournikova can help to steal data?

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Abstract: As not only the amount of data stored digitally in computers but our dependency of these data, too, increases day by day it is of critical importance to prevent unauthorized data accesses. To gain access to other parties' data and, on the other hand, make it as hard as possible is (and has always been) a heavy fight between the data owners and the spies, only the tools have changed since ancient times. Https has become part of our everyday life as an excellent arm to protect the sensitive data of confidential communications from accessing our gmail mailbox to netbanking. Https is based on a two-key encryption standard which, according to the publicly known results of mathematics, cannot be attacked directly. In theory. In practice there exist roundabouts. In this paper I show a possible and low cost technical-organisational solution of such an attack which could be performed because of some malpractice of IT-managers: manipulation of top level certificates.

Keywords: data security, certificates, manipulating top level certificates

JEL code: L-86 Information and Internet Services; Computer Software

1 Introduction

At the very beginning of computer networking there were only 'real programmers!' around there, they planned the basic protocols and programs for themselves. Security in today's meaning was not a point of view at those times, for nobody thought that after a few decades everybody would be allowed to access the network. In other words: all the traditional network protocols are plain text ones, which means that all the communication data travel via the network as plain text, including user names and

¹ "The real programmer" is part of computer programmers' folklore to describe the archetypical "hardcore" programmer. See e.g. <http://www.ee.tyerson.edu/~elf/hack/realmen.html>