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## ARE NATIONS SO DIFFERENT WHEN THEY ACCESS THE INTERNET?

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**Abstract:** This study analysed the existence of a common notoriety in the audience of websites in different groups of countries aiming at discovering whether there is some kind of preferential access pattern, regardless of the variety of endogenous and exogenous influences that might interfere in the audience of these websites. To appraise the overall popularity of websites, the study developed a Virtual Popularity Index – VPI and applied it with data that were obtained on the website Alexa ([www.alexa.com](http://www.alexa.com)) which provides information about the access to different electronic portals. This information includes traffic, origin and access duration. Thus, through the development and use of this Index as applied to a sample of 2500 observations covering the 20 most visited websites in 125 countries, it was possible to identify that the first eight most accessed websites are the same in the African, American, Asian and European continents. The study also revealed that certain websites, which were analysed in different continents, were able to reach an audience hegemony overcoming any barriers adopted by the users via the possibility of individual content customisation.

**Keywords:** Information Technology; Internet; Websites; Google; Facebook

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## INTRODUCTION

Seen as one of the most revolutionary tools of information dissemination and communication of the last decades, the Internet can be considered as the main network for data exchange between various users or organisations (RAMOS, 1998).

The access to websites stands out as one of the preferred activities of users in different countries. An evidence of the quick and significant adoption of the Internet can be seen via the number of its users. In just five years the Internet reached the same number of radio users in 38 years (ZEFF; ARONSON, 2000; FERREIRA; OLIVEIRA; FEIX, 2004; CURI; DIAS; GONÇALVES FILHO, 2006). The Internet had 48 million users in 1997 (GERTNER; DIAZ, 1999).

Thus, one of the challenges of the organisations, which are interested in obtaining benefits from this information technology, is to attract a larger audience to their websites (DANN; HADDOW, 2008; BHATNAGAR; GHOSE; VIKAS, 2009; DELOITTE, 2009; OLIVEIRA; HUERTAS, 2010). As a result of this, studies dealing with the websites, such as their design, performance and functional characteristics, emerged as important research topics in the area of information systems (BENBUNAN-FICH, 2001; LIU; ARNETT, 2000; MCKINNEY; YOON; ZAHEDI, 2002; PALMER, 2002; OLIVEIRA; HUERTAS, 2010).

Some researches affirm that cultural aspects and social influences may reflect the preference of users when they access websites (STRAUB; LOCH; HILL, 2001; SOYOUNG; YURI, 2006; SINGH; BAACK, Daniel; PEREIRA; BAACK, Donald, 2008; LIAO; PROCTOR; SALVENDY, 2009; WONSUN; JISU, 2009; SHEN; KHALIFA, 2010). Hofstede (2001) argues that cultural differences exert an influence on the audience of the websites and therefore some characteristics of the population and of the country can interfere in the popularity of content portals.

Moreover, it is known that the challenge of retaining the netizens to the websites may not relate exclusively to individual preferences, but also to aspects which are associated with the quality of the information and of the systems, to characteristics of the platforms and to creation and content of the websites (TAO; YAOBIN; BIN, 2009; COSTA FILHO; PIRES, 2010).

However, the analysis of audience patterns of websites in various groups of countries is a relatively unexplored topic in scientific periodicals. This study aims at analysing an access preference pattern in different countries, regardless of the variety of individual influences on web navigation.

For this analysis, we developed a Virtual Popularity Index (VPI), which takes into account the distribution of the access volume to websites in several countries. The indicator allows the analysis of the access surfing preferences in a global dimension and weighs the access into groups of countries; it does not restrict itself to the access volume from specific locations, thus it fills in a gap in the studies on this topic.

The study also researched some groups of the most popular websites in the world according to the VPI by means of a cluster analysis, which revealed a category of websites that are grouped on the basis of the similarity of some specific features.

## THEORETICAL FRAME OF REFERENCE

### Characteristics inherent in audience success on websites

According to Iyer, Gupta and Foroughi (2000), “a good web site not only attracts, informs and sells to consumers during the first visit, but also increases the potential for return visits and sales.” In this sense, websites have become the main tools to expose the corporate presence on the Internet. Such technological resources provided new ways of communicating with customers and suppliers, for publicity and marketing of products and services, among other possibilities (SICILIA; RUIZ; REYNOLDS, 2006; PLEBANI; GUERINI; TONTINI, 2009).

According to Wells, Valacich and Hess (2011), the quality of a website affects the consumer's perception of product quality. In this sense, the ease of use, that is the usability of the website and its efficiency are aspects to be considered in the evaluation of its quality. The usability of a website is a broad concept associated with the visual presentation, navigation resources and with its functionality or usefulness for the user (CAPPEL; ZHENYU, 2007; ROSSI, 2008; TAO; YAOBIN; BIN, 2009; WELLS; VALACICH; HESS, 2011).

Some studies describe the use of an instrument that uses scales for the measurement of websites quality called WebQual, that assess them in relation to 12 dimensions, namely: 1 – Fitness to the task: it is the website ability which helps the user to fulfil a desired task. 2 – Interactivity: its ability to allow communication between the interested people, regardless of distance or time. 3 – Trust. 4 – Response time. 5 – Intuitiveness: the navigation of the website can be learned or understood easily by the user. 6 – Visual appeal. 7 – Innovativeness. 8 – Emotional appeal or flow: the website intrinsically provides a pleasant and intense user experience while he or she navigates. 9 – Integrated communication. 10 – Business processes: the website promotes the achievement of the businesses which are intended by its owner, if this is his or her goal in creating it. 11 – Design appeal: the graphic resources and content of the website promote the impression that the user can use it comfortably. 12 – Viable substitute: the website operates as an alternative channel to perform the intended tasks that could be implemented by other means (LOIACONO, 2000; SOYOUNG; YURI, 2006; RAPOSO; PEREIRA; SANTOS, 2008; PRADO; TAKAOKA, 2009).

Scope, richness and affiliation are also considered three important features of a website (EVANS; WURSTER, 1999). *Scope* refers to the number of users who visit this website, or audience and to the volume of information that the website provides its visitors with. *Richness* is defined as the relevance and details of the information which is contained in the website. Finally, *affiliation* refers to the ability of the website to provide some kind of relationship with its visitors, for example, customers of an ecommerce portal (EVANS; WURSTER, 1999; TSE; CHI-FAI, 2004).

Other researches which are connected to the Internet and to the websites list other characteristics that can influence users' preference for websites. *Organisation of the information*: allows the user to navigate easily through the content which is provided by the developers; *customisation*: the website allows the user to arrange the visualisation in such a way that it will be easier for him or her to search for it and obtain the desired information besides broadening his or her interactivity with the system; *technical aspects*: technical properties are

also considered important to the operation of the website, such as its ability to authenticate users, fraud protection, encryption and other security aspects plus the speed and availability of access to information (TSE; CHI-FAI, 2004; TARAFDAR; JIE, 2005; ALHUDAITHY; KITCHEN, 2009).

### **Endogenous influences in the use of websites**

Besides the characteristics of websites and other aspects, cultural factors and social influences may also influence the preference of users when they access websites (STRAUB; LOCH; HILL, 2001; SOYOUNG; YURI, 2006; SINGH; BAACK, Daniel; PEREIRA; BAACK, Donald, 2008; LIAO; PROCTOR; SALVENDY, 2009; WONSUN; JISU, 2009; SHEN; KHALIFA, 2010).

In a study of websites perception between North-Americans and Koreans, the cultural dimensions according to Hofstede (2001) were validated as distinct between these two populations (SOYOUNG; YURI, 2006). The five cultural dimensions they analysed were: 1 - *Power distance*: the degree of perception that individuals with less power in organisations or institutions have when they accept that power is distributed unevenly; 2a - *Individualism*: social structure that governs the way in which people care for themselves and their families; 2b - *Collectivism*: the expectation that third parties will take care of others, even if these are unknown; 3 - *Uncertainty avoidance*: it is the individual sense of threat when facing ambiguous or risky situations; 4a - *Masculinity*: cultures of a high masculinity have a tendency to consume and they aim at displaying themselves; 4b- *Femininity*: cultures with high femininity tend to consume for their own use; 5 - *Long-term orientation*: long-term oriented cultures value long-term thrift or savings of individual economies, whereas short-term oriented cultures value immediate consumption at the expense of saving for the future.

When it is applicable, acculturation is also another possible factor which influences behaviour in the use of websites. In this case, immigrants who live in a country usually undergo a process when they learn that country's culture. This influences their behaviour patterns, purchase intentions and usage of the media, among other things (BERRY, 1980; SINGH; BAACK, Daniel; PEREIRA; BAACK, Donald, 2008). For example, Singh, Baack (Daniel), Pereira, and Baack (Donald) (2008) identified that the Hispanic population in the U.S. has: 1 - greater identification with websites that advocate Hispanic causes; 2 - greater intent to purchase on websites associated with their community; 3 - a preference for websites which insert pictures of Hispanic celebrities; 4 - a preference for websites which offer support in Spanish.

Studies also indicate that cultural effects coupled with social norms may influence the use of the Internet. For example, Shen and Khalifa (2010) described some characteristics of the use of the social network Facebook permeated by aspects of traditional Arabic and Islamic culture. The authors found that the masculine use of this website is consistent with the goal of networking for socialisation, which ought to be understood as the basic function of this website. On the other hand, its feminine use aims at finding possible important complements for limitations in their social lives.

The government censorship of the websites' traffic can also force users to change their behaviour in accessing them by migrating to other websites that provide a particular service or content (HAMILTON; KNOUSE; HILL, 2009). One example of corporate actions to dodge the censorship regulations of the internet is the launch of the Google.cn

website. It allowed the Chinese to access the content filtered by the Chinese government according to its internet access rules.

When "Tiananmen Square" is typed on the Google.cn website it shows suggestions of tourism companies and pictures of people enjoying this place during the holidays. There are no pictures of the 1989 events of resistance to the government. On the other hand, the Google.com website brings pictures of the Chinese citizen who stood in front of an army tank and became a symbol of resistance to the Communist government (DANN; HADDOW, 2008).

Studies show that Google accounts for approximately 85% of the world market for information search on the Internet ahead of its competitors (NETMARKETSHARE, 2010; RIPBERGER, 2011). Because of this significant access audience among users, there are developers who try to improve techniques to position their websites in the top positions of the Google search engine. Some of these techniques are considered illegal by Google and other search engines such as the "black hat" technique. It consists in the hiding of texts in the website code lines in order to promote a better positioning on the search websites and to suggest relevance and popularity to users who are looking for the terms which are associated with the electronic address of the site (VOGL; BARRETT, 2010).

### **Evaluation of websites popularity**

The analysis of the popularity of a website among users and groups is a relevant information for governmental or private organisations, which intend to provide their users with electronic applications, such as distribution of their information, advertising actions, implementation of electronic transactions (DANN; HADDOW, 2008; BHATNAGAR; GHOSE; VIKAS, 2009; DELOITTE, 2009; OLIVEIRA; HUERTAS, 2010) as well as the identification of the interests of these users according to the popularity of the content that the websites possess.

One of the mechanisms for the evaluation of their popularity is the number of times they are accessed. Some websites inform the total number of these hits such as the Alexa ([www.alexa.com](http://www.alexa.com)) (SADAN; SCHWARTZ, 2011, SCHMUCK, 2013).

However, no studies were found which attempted to globally rank the websites' popularity by weighting the access volume proportionality between groups of countries. Here a gap in the research of information systems was identified.

Therefore, this study intends to develop an indicator that will allow analyses of access preferences to websites on a world scale, which is titled Virtual Popularity Index – VPI, weighted by groups of countries and not solely restricted by the total volume of hits.

### **METHODOLOGY**

The methodology involved techniques of the quantitative method with the evaluation of secondary data.

In the following part we will present the process of development of the Virtual Popularity Index, VPI, which permits to point out the access preference to websites by groups of countries, regardless of the variety of individual influences upon the navigation.

Then we apply the index in order to identify the global audience hegemony of the websites with an analysis of data similarity among the sites which are classified according to it.

### ***Development of the Virtual Popularity Index - VPI***

Currently, one of the ways of measuring popularity is hit counts in an electronic address over a given period of time. However, some electronic portals have a significant volume of requests in a given country, but do not have the same popularity in other countries. The small number of inhabitants who are connected to the Internet in poor countries could justify such disparities in access volume between different nations.

One way to eliminate such disparities in the popularity measure among groups of nations is the weight given to the percentage of countries which present identical popularity ratings for a given website for a specified number of hits.

The values of these percentages of countries with the popularity ranking via the volume of hits will be grouped into one variable labelled NPC. The popularity ranking in a specific country via the volume of hits will be grouped into a variable labelled RA.

For example, LinkedIn is the ninth most accessed website in 5% of the African countries and therefore its NPC is equal to 0.05 for a 9.0 RA.

Thus, the relativity which is embedded in the NPC variable prevents countries, which have extreme numbers of hits, from influencing, too much, the popularity measure of a website in relation to a group of countries, which transmits parsimony to the values that are calculated by the VPI.

The delimitation of the classification which is obtained via the VPI is defined by the total number of ranking positions – TP. For example, this study will analyse the 20 most visited websites in various groups of nations, and, in this case, the TP variable is equal to 20.

Considering the variables, which are described in this topic, the authors developed the Virtual Popularity Index – VPI by following the equation below, where RA → Popularity ranking in a country; NPC → Percentage of a group of countries with a given rank; TP → Total number of positions of the rank:

$$VPI = \sum_{i=1}^{TP} (NPC_i * (TP - RA_i + 1))$$

**Figure 1: Equation of Virtual Popularity Index - VPI**  
**Source:** Developed by the authors.

From the equation of the VPI, we can observe that the subtraction of the variable RA from the variable TP plus one (+1) results in a numerical weight that increases the value of the VPI index for websites which have better positioning in the access volume when compared to other websites.

On the other hand, the addition of one unit in the third term of the VPI equation prevents it from assuming zero value in the analysis of the RA upper limit for a particular website.

It is possible to note that the formulation of the VPI provides some independence from the number of visits to each website because the NPC variable determines the classification in the context of the amount of countries which are being analysed.

Thus the popularity of a website can be compared in any group of countries, regardless of the number of times it was visited or the number of countries that make up this group.

In this way, countries with a lower penetration rate of the Internet can contribute to the popularity index of a website in the same way as the countries where the population enjoys a greater availability of Internet access.

Finally, we understand that the use of VPI index requires the selection of countries as groups to enable the sum of the values as we specified before.

### **Information from the sampling**

To apply the VPI and collect the number of hits on websites, the authors relied on worldwide access information which is available on specialised electronic portals that deal with this subject (BHATNAGAR; GHOSE; VIKAS, 2009).

The data we used to develop this study were obtained on the website Alexa - [www.alexa.com](http://www.alexa.com) (ALEXA, 2012), which provides information on access, such as traffic information, origin and duration of visits.

The choice of Alexa as a source of information for the sample composition is justified because, besides providing access to various information websites, this channel was also used by other studies as a data source (HACKETT; PARMANTO; XIAOMING, 2005; BHATNAGAR; GHOSE; VIKAS, 2009; MCCAFFERTY, 2011). Some studies indicate the Alexa as the most comprehensive tool worldwide in gathering data from websites (SADAN; SCHWARTZ, 2011; SCHMUCK, 2013).

Among other information, the classification given by Alexa is a measurement of the hits in the last three months and, on the basis of these statistics, the portal provides a list of sites which are organised according to the total number of hits.

The data sample, which contains the electronic addresses of the 20 most visited websites in 125 countries in September 2011, resulted in a data collection that includes 2500 observations which provide information about the sites per country and electronic address.

In the Appendix section of this study the names of the countries that make up the sample are listed. We emphasise that the access data found for Oceania were below 15% of the countries of that continent (there was accessible information solely for Australia and New Zealand) and therefore we decided to discard the hits' analysis for this part of the world.

## **PRESENTATION AND ANALYSIS OF RESULTS**

### **Application of the Virtual Popularity Index**

We calculated the popularity of websites of continental groups corresponding to Africa, Europe, Asia and America. However, since the United States have the highest adoption rate of internet use among others countries (HERNANDEZ, 2002; CURI; DIAS; GONÇALVES FILHO, 2006), in an exploratory way, we decided to create two groups of countries in the American continent.

Thus, a group is formed of countries of Latin America and the other of countries of North America. We calculated the VPI by considering all the countries which belong to the sample and which form the group called World. Table 1 shows the 20 most popular websites, according to the VPI, in the country groups which are organised in this study.

RANK	AFRICA		LATIN AMERICA		NORTH AMERICA		ASIA		EUROPE		WORLD	
	Website	VPI	Website	VPI	Website	VPI	Website	VPI	Website	VPI	Website	VPI
1	Facebook	19.7	Facebook	19.57	Google (LD)	20.00	Google.com	18.33	Facebook	18.41	Facebook	18.73
2	Google.com	17.75	Google (LD)	17.91	Facebook	19.00	Facebook	17.97	Google.com	18.33	Google.com	17.96
3	Youtube	17.30	Google.com	17.74	Youtube	17.67	Youtube	16.83	Google (LD)	18.33	Youtube	17.28
4	Yahoo	16.30	Youtube	17.70	Yahoo	16.00	Google (LD)	16.11	Youtube	17.44	Google (LD)	16.95
5	Google (LD)	14.20	Windows Live	15.65	Windows Live	13.33	Yahoo	13.56	Wikipedia	13.51	Yahoo	13.28
6	Windows Live	10.75	Yahoo	14.13	Wikipedia	13.33	Blogspot	10.33	Yahoo	10.64	Wikipedia	11.72
7	Blogspot	10.7	Blogspot	19.70	Blogspot	12.67	Wikipedia	10.33	Blogspot	9.85	Blogspot	10.74
8	Wikipedia	10.20	Wikipedia	11.87	Twitter	12.67	Windows Live	8.61	Windows Live	7.82	Windows Live	10.20
9	Google (OD)	7.10	MSN	10.35	Google.com	11.67	Twitter	6.44	Twitter	5.44	Twitter	6.54
10	Babylon	5.20	Twitter	9.09	MSN	10.00	MSN	3.67	Linkedin	3.72	MSN	4.32
11	Twitter	4.75	Amazon	7.04	Amazon	9.67	Maktoob	2.86	Google (OD)	2.92	Google (OD)	3.07
12	MSN	4.10	Taringa	5.22	Linkedin	7.33	Linkedin	2.50	Ebay	2.59	Amazon	3.07
13	Maktoob	2.95	Ebay	3.09	Ebay	5.33	Wordpress	2.47	Mail.ru	2.38	Linkedin	2.80
14	Linkedin	2.20	Mercadolivre	3.09	Craigslist	4.00	Google (OD)	2.33	Amazon	2.36	Wordpress	1.85
15	MediaFire	1.90	Wordpress	2.00	Wordpress	3.67	Mail.ru	2.08	Yandex	1.97	Ebay	1.75
16	Amazon	1.50	Google (OD)	1.52	Mercadolivre	3.33	MediaFire	1.89	V Kontakte	1.56	Mail.ru	1.37
17	Koora	1.45	Enterfactory	1.22	Eluniversal	3.00	Yandex	1.86	Wordpress	1.38	Maktoob	1.32
18	XNXX	1.35	Orange	1.17	Kijiji	3.00	4shared	1.44	MSN	1.26	Babylon	1.27
19	BBC	1.25	Linkedin	1.09	Bing	3.00	Amazon	1.39	IMDB	1.05	Yandex	1.17
20	Wordpress	1.15	t.co	0.96	Taringa!	2.67	Baidu	1.31	Index	1.03	Taringa!	1.04

**Table 1: Most popular websites according to the VPI**

Source: The authors

According to Table 1, we can observe that the Google<sup>3</sup>, Facebook, and Youtube websites remain present in the first four positions in any of the groups which are displayed, including the world.

Among the observations in the sample, only China, Russia and Iran do not have the Facebook website among the top 20 most visited websites in their territories.

Thus the presence of access restriction policies or censorship of this website in these countries is conformed, in accordance with other studies on the subject (DANN; HADDOW, 2008; HAMILTON; KNOUSE; HILL, 2009).

According to the VPI, it is clear that Google, with its search websites of several domains, whether local or the *.com*, reigns in a sovereign way over the internet audience, since this organisation is able to capture the electronic searches of users all over the world.

<sup>3</sup> The Google (LD) website is the local domain Google. For example: in Brazil it is [www.google.com.br](http://www.google.com.br). The Google (OD) website is the Google website domain in other countries.

We also note also that the Youtube, Picasa and Blogger websites also belong to Google. Therefore the diversity of activities provided by Google, such as searches for maps, images, and scholarly articles can also help this website to attract users (CLEMONS; MADHANI, 2010).

Regarding e-commerce websites, Table 1 indicates that in North America, Latin America and Europe the websites for online retail have a greater popularity than anywhere else, due to the existence of two websites which are dedicated to this activity and are positioned in the 15 positions of the VPI ranking (Amazon and Ebay).

Despite the many advances in e-commerce tools, Table 1 indicates the preference of the users of the World Wide Web for the distribution of information and digital content over electronic transaction websites. However, this does not mean that the volume of electronic transactions is less important, given the disclosure of significant movements of financial values through electronic channels (DINIZ, 2000).

The risk perception associated with electronic transactions can be an influence that explains the users' preference for websites which provide content over those which provide electronic transactions, given the fraud potential in accessing these ones (SOYOUNG; YURI, 2006; SANCHEZ; ALBERTIN, 2007; LIAO; PROCTOR; SALVENDY, 2009).

It is also important to consider that many electronic transactions are done via virtual private networks and their hits are not monitored by websites for traffic measurement such as the Alexa. This is a first limitation of the VPI which is ranked on the basis of this data source.

### ***Comparison of methodologies for virtual popularity ratings***

Table 2, below, was organised to compare the indication of virtual popularity of websites by means of two different methods: via the volume of hits reported by the Alexa portal and by the VPI:

RANK	VPI	ALEXA
	<i>Website</i>	<i>Website</i>
1	Facebook	Google.com
2	Google.com	Facebook
3	Youtube	Youtube
4	Yahoo	Yahoo
5	Wikipedia	Baidu
6	Blogger	Wikipedia
7	Windows Live	Blogger
8	Twitter	Windows Live
9	MSN	Twitter
10	Amazon	QQ
11	Linkedin	Amazon
12	Wordpress	Taobao
13	Ebay	Msn
14	Mail.ru	Yahoo JP
15	Maktoob	Linkedin
16	Babylon	Google India
17	Yandex	Sina
18	Taringa	Wordpress
19	Media Fire	Google.de
20	V Kontakte	Ebay

**Table 2: Most popular websites according to the VPI and to the Alexa portal**

**Source:** The authors

From the results presented in Table 2 we can see that the popularity ranking and the respective positioning of the websites by means of the methods we mentioned differ in most cases, especially after the fourth position of the presented rankings.

When we compare the results in Tables 1 and 2, we note that the popularity, which is measured solely via the amount of hits, as furnished by the website Alexa, indicates websites that are popular in certain countries only. An example is the Taobao website which is placed in the 12th position in the Alexa ranking while its VPI is zero in the American and European continents.

In particular, studies claim that one of the reasons that contribute to the meaningful participation of Google in the market is the integration of technology tools in its systems and the massive purchase of digital content (CONWAY, 2010).

Facebook can have its world ranking explained because it attracted more than one billion users, 70% of which outside the United States, its country of origin (RIENZO; BERNARD, 2009; BRYSON; GOMEZ; WILLMAN, 2010; ANG, 2011; STEFANONE; LACKAFF; ROSEN, 2011).

According to previous studies, Facebook can include the following individual motivations to use it: the use of specific content, such as games, apps and polls; practices of social research, associated with seeking information from others; viewing and sharing photos and videos and maintaining social relationships, among other purposes (JOINSON, 2008; WISE; ALHABASH; PARK, 2010), which may explain its significant global popularity.

### ***Identification of global audience hegemony of websites***

For the investigation of the most popular websites worldwide ranked by VPI this study resorted to the cluster analysis technique. Among other possibilities, this technique permits weighting the homogeneity between groups (PUNJ; STEWART, 1983; KETCHEN; SHOOK, 1996).

According to Hair *et al.* (2005), the main objective of the cluster analysis is to define the data structure by placing the most similar observations in groups via the measurement of the similarity between the objects which are being analysed, in this case, the values of virtual popularity for websites.

The measure of similarity among objects is an empirical measurement of correspondence or similarity between the objects to be clustered. In other words, it is possible to divide a group of websites into a number of groups on the basis of the similarity of characteristics the research determines. There are three ways of measuring similarity for cluster analysis: distance measures, correlation and association. As cluster analysis is carried out by means of calculations with metric variables, we considered distance measure as appropriate for the continuation of the analysis (HAIR *et al.*, 2005).

To obtain the clusters we selected the simple connection algorithm. This algorithm is suitable due to versatility and because it allows the use of the original distance matrix of its observations (HAIR *et al.*, 2005).

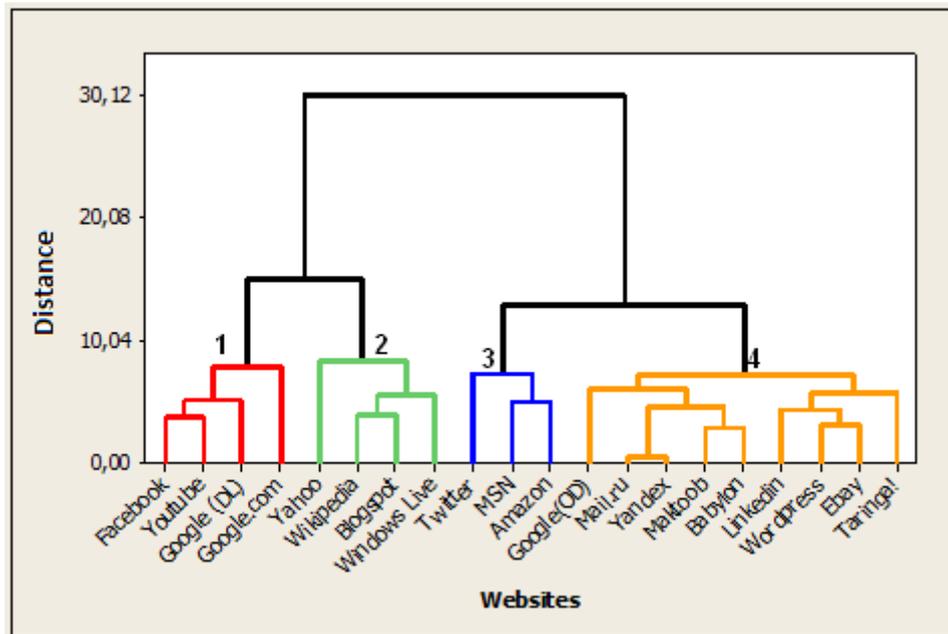
In an exploratory way, we compared the results we achieved by using simple connection algorithms and those achieved with the Ward's method. This method considers other similarity measures for all variables (MILLIGAN, 1980; JAIN; DUBES, 1988). No differences were found in the results of the components of the clusters when the algorithm for their formation was changed.

We used the cross-validation approach in order to evaluate the results we obtained (HAIR *et al.*, 2005). The sample observations were divided into two sub-samples composed of 1250 observations. The results showed the same components of the clusters and validated the previous results.

In Figure 3, the four clusters formed<sup>4</sup> of the groups of the 20 most popular websites in the world according to the VPI are shown.

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<sup>4</sup> Clusters organised according to similarity level, using mean Euclidean distances between pairs, using the Minitab software, version 15.



**Figure 3: Dendrogram of websites according to the VPI**

Source: Prepared by the authors

In Figure 3, we observe that clusters 1 and 2 represent the first eight positions of the VPI ranking and contain the same websites in any of the groups of countries we analysed.

Four of these eight websites allow the dissemination of individual content, which confirms the global adoption of digital second generation media or 2.0. It is clear that this is an era of production and personalisation of digital content, which is maintained by the interest in the dissemination of knowledge and information among World Wide Web users (LEE, 2010; MCCAFFERTY, 2011).

This great popularity of the search websites and the ability to manipulate the positioning of the links – either by developers or by their own search websites for their marketing interests – generates debate among researchers. They consider that Google’s monopoly can negatively affect competition among organisations that use this medium of communication (CLEMONS; MADHANI, 2010; VOGL; BARRETT, 2010).

By means of the dendrogram and the results presented in Table 1, it is possible to note that cluster 3 is formed of websites which are located in the central positions between the groups of countries we analysed and are present in the rankings of all groups of countries we analysed. There is heterogeneity of functionalities of the websites in this cluster because it is made up of communication and electronic retail websites. This indicates a possible global dispersion or fragmentation of popularity from the positions occupied between the websites in the cluster.

On the other hand cluster 4 is made up of some websites, which have greater audience in determined groups of countries and are not present in the first 20 positions of the world ranking based on the VPI.

Thus, one can infer that the global audience of these websites must be reduced because they present contents which only involve some world regions and attract fewer

users from other places. In this sense, cultural effects or aspects associated with the geographical origin of the hits may influence these navigation preferences (SINGH; BAACK, Daniel; PEREIRA; BAACK, Donald, 2008; BHATNAGAR; GHOSE; VIKAS, 2009).

Another possible influence on the individual access to traffic on websites are government regulations for web access (DANN; HADDOW, 2008; HAMILTON; KNOUSE; HILL, 2009; LIAO; PROCTOR; SALVENDY, 2009).

## CONCLUSION

Currently the organisations consider the Internet as a communication channel which offers more opportunities than threats in the diverse application segments. Among these opportunities we can mention a better targeted marketing communication directed at potential customers, the channelling of financial operations and the faster and cheaper delivery of information than in traditional media (LIMEIRA, 2003; KOETZ, 2004; CRISPIM; DULTRA, 2005; PLEBANI; GUERINI; TONTINI, 2009).

It is considered that the development of studies which contribute to the understanding of the audience of content portals can facilitate the management and strategies of organisations that use the Internet to reap benefits.

No studies were found which investigate whether there is a common global notoriety about the audience of the websites that, regardless of the variety of endogenous and exogenous influences, may affect the users' preferences.

Given this information gap, this study presented and applied a Virtual Popularity Index – VPI – on global access data from different websites. This allowed an analysis of the access preferences on a global scale.

The consideration of the popularity about the number of countries we examined transfers the interpretation of the dissemination of the popularity of a website to the VIP, which results not only from the amount of total hits, but which also includes the allocation of this virtual popularity in the countries we studied.

Thus, through the application of the Virtual Popularity Index – VPI – to a sample of 2500 observations covering the 20 most visited websites in 125 countries, it was possible to identify that in the African, American, Asian, and European continents the first eight most popular websites are common to all of them.

Although several studies discuss the different particularities about preferences in the access to websites, this research shows the hegemony of global popularity of these preferences by grouping the sites with the results of VPI. The outcome of this is that the same websites with higher audience were grouped into a single cluster, just in different groups of countries.

According to the results, it is clear that Google and Facebook emerge as examples of globally recognised virtual audiences. Thus, this study shows that these two websites attract a significant overall volume of hits and lead the audience in several continents.

Previous studies (BERRY, 1980; SINGH; BAACK, Daniel; PEREIRA; BAACK, Donald, 2008) have shown that aspects, which involve the culture of a country, can influence the perception of websites' users. In this sense, given the homogeneity of the popularity of websites which obtained the first positions in the ranking between culturally distinct groups of countries (e.g. groups of Western and Eastern countries), it seems that the content personalisation and the adaptation to different languages can overcome possible adoption barriers the user faces (TSE; CHI-FAI, 2004; TARAFDAR; JIE, 2005; ALHUDAITHY; KITCHEN, 2009). This may reduce perceptions of aversion to any uncertainty about the use of these electronic portals (SOYOUNG; YURI, 2006; LIAO; PROCTOR; SALVENDY, 2009; WONSUN; JISU, 2009).

Taking into consideration that the Internet is an information technology which is used in multiple market segments and applications that can be used by companies as an advertising channel or as a business environment, we believe that this study may be useful to researchers in the areas of Marketing and Management of Information Technology, who want to investigate phenomena associated with this electronic channel.

As a managerial application, the study of aspects that involve the adoption of the websites can help the organisations to enhance their ability to attract and retain the users who visit their portals.

Moreover, the development of a popularity ranking of websites by groups of countries can assist organisations in their fortuitous standardisation of international advertising campaigns on portals with higher global popularity and help to guide their investments in this segment.

Among other limitations, we recognise that changes in the results of this study may arise due to variations in the volume of access to the websites we cited. The absence of data for some countries is another limitation of this study. In future studies, we suggest the inclusion of other variables which allow to cross-check the results of this index with other aspects that are related to management of information technology.

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## Appendix

A- List of countries in the sample.

Continent	Africa	America	Asia	Europe
Participant countries	24 countries	28 countries	33 countries	40 countries
Percentage of countries in each continent	44%	80%	73%	82%
	Algeria	Argentina	Armenia	Albania
	Cambodia	The Bahamas	Bahrain	Austria
	Cameroon	Bolivia	Bangladesh	Azerbaijan
	Congo	Brazil	China	Belarus
	Ivory Coast	<i>Canada</i>	Hong Kong	Belgium
	Egypt	Chile	India	Bosnia and Herzegovina
	Ghana	Colombia	Indonesia	Bulgaria
	Kenya	Costa Rica	Iran	Croatia
	Macau	Dominican Republic	Irak	Cyprus
	Madagascar	Equador	Israel	Czech Republic
	Malta	El Salvador	Japan	Denmark
	Mauritania	Guadeloupe	Jordan	Estonia
	Mauritius	Guatemala	Kazakhstan	Finland
	Morocco	Honduras	Kuwait	France
	Nigeria	Jamaica	Latvia	Georgia
	Qatar	Malta	Lebanon	Germany
	Reunion	<i>Mexico</i>	Malaysia	Greece
	Senegal	Mongolia	Malta	Hungary
	South Africa	Netherlands Antilles	Mongolia	Iceland
	Sri Lanka	Nicaragua	Nepal	Ireland
	Sudan	Panama	Oman	Italy
	Tunisia	Paraguay	Pakistan	Lithuania
	Uganda	Peru	Palestine	Luxembourg
	Vietnam	Puerto Rico	Philippines	Macedonia
		Trinidad and Tobago	Saudi Arabia	Malta
		<i>United States</i>	Singapore	Moldova
		Uruguay	South Korea	Netherlands
		Venezuela	Taiwan	Norway
			Tanzania	Poland
			Thailand	Portugal
			Turkey	Romania
			Uzbequistan	Russia
			Yemen	Serbia
				Slovakia
				Slovenia
				Spain
				Sweden
				Switzerland
				Ukraine
				United Kingdom

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## OS PAÍSES SE DIFEREM NO ACESSO À INTERNET?

**Resumo:** Este estudo analisou a existência de uma notoriedade comum sobre a audiência de *websites* em diversos grupos de países com o objetivo de levantar se, independente da variedade de influências endógenas e exógenas que podem interferir na audiência destes portais, há algum padrão de preferência de navegação. Para investigar a popularidade global de *websites*, este estudo elabora um Índice de Popularidade Virtual – IPV e o aplica com dados utilizados a partir do *website* Alexa ([www.alexa.com](http://www.alexa.com)) que fornece informações sobre os acessos de diversos portais eletrônicos, tais como, informações de tráfego, origem e tempo de acesso. Assim, por meio do desenvolvimento e utilização do Índice de Popularidade Virtual - IPV submetido a uma amostra de 2500 observações, que contempla os 20 *websites* mais acessados em 125 países, evidenciou-se que nos continentes africano, americano, asiático e europeu os primeiro oito *websites* são comuns a todos eles. Este estudo também expõe que a hegemonia de audiência de determinados *websites*, analisadas em continentes distintos, conseguem superar as eventuais barreiras de adoção pelo usuário por meio da possibilidade de personalização individual de conteúdo

**Palavras-chave:** Tecnologia da Informação; Internet; *websites*; Google; Facebook

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