ETHICAL ASPECTS OF CENTRALIZATION OF INTERNET SEARCH SERVICES

by

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At the dawn of the 21st century everyday life of the common citizen of industrialized society has become more and more intertwined with Internet technologies and services. Email and web are not only working tools, but in recent years with the advent of Web 2.0 technology they also developed into means of communication with friends and relatives, means of spending free time and relaxation, tools for education and in some cases they have replaced more traditional media like television and newspaper. The most frequently used and the most important service is still full text web search. This paper describes the history and current state of Internet search services and highlights ethical issues that are related to them.

KEYWORDS
Ethics, internet, search, web services.

Since the beginning of the 21st century everyday life of the common citizen of industrialized society has become more and more interconnected with Internet technologies and services. Email and web are not only working tools, but in recent years with the advent of Web 2.0 technology they have also developed into means of communication with friends and relatives. The Internet is slowly making its way into people's private lives. Email was followed by instant messaging applications like ICQ or MSN, and most recently by Internet telephony either SIP based or Skype. The most frequently used and probably the most important are still full text web search services. Along

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with the new technologies also new companies have risen from the ashes of the dot com bubble at the beginning of the century.

The process of commercialization of the Internet has lead to retreat from its original ideas.   The Internet was seen by its founders and visionaries as a place for free sharing of information, limitless communication, as a platform for individual creativity, plurality of ideas and a field where research activities could be performed and supported. Other principles included democratic participation and community based standardization. The original vision of the Internet imagined it as a dense distributed network with no dominant websites; Internet standards and protocols were designed with this vision in mind.[1]

There were also political and social visions. Many people believed that new sources of online information would inform citizens more about politics and would help to involve previously inactive citizens into political participation. Early visionaries believed that the Internet would become a robust forum for political debates and that the openness of the Internet would allow ordinary citizens to publish their opinions along with professional journalists.[2]

Contemporary reality differs in many aspects from how the founders of the Internet imagined its future. In the beginning of the Internet era, a typical user spent most of his time "surfing" Internet websites which meant going from one web to another, and then to another based on the links present on previous webpages. Internet traffic[3] was spread across many different websites with some local centers serving as manually maintained directories of websites usually focused on a specific theme. With the increasing amount of web pages more ambitious projects emerged – web global catalogues trying to include every important internet web site for any topic. These catalogues were created and maintained semi-automatically and were organized by a topic based hierarchy. Most of these global web directories have not survived until today, but one of them became very successful – Yahoo. Whereas today Yahoo comprises many different services, at the beginning it was for the most part a hierarchical topic based catalogue of Internet websites.

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[1]   Abbatte 1998; Berners-Lee, Fischetti 1999.

[2]   Hindman 2008:1.

[3]   By internet traffic we mean traffic on logical level: travel of an Internet user from one website to another. We are not interested here in traffic on hardware level: bandwidth usage of physical Internet communication lines.

As the amount of Internet websites grew, manually and semi-automatically maintained catalogues were not flexible enough to provide complete and reliable reference of the web content. The number of fully automatic search engines was developed with a similar central idea – crawler software browsing through web space and collecting information about webpages into a central database paired with user interface and search software performing retrieval functions on the database content. Again, there were a handful of such web services, apart from experimental and academic software, one of the first was AliWeb in 1993, then WebCrawler, Infoseek, Lycos in 1994, Magellan, Excite, AltaVista in 1995, Inktomi, Northern Light, SavvySearch, Infind, and many others later. In 1998 the Google search web site was launched. In following years it has slowly become a dominant Internet search engine. Many of its original competitors are inactive now, their websites not functioning or redirected to some other content. In some geographical areas there are local search engines that are still able to compete with Google's popularity.

Along with Yahoo and Google, the third very popular web site that includes web search service is Microsoft's MSN/Windows Live. This web site had a considerably different starting position than Yahoo and Google. While these two were from the beginning typical dot companies, which stood out in the crowd of many websites offering a similar service using their innovative technologies, catching design or modern marketing tools, Microsoft's website has been developed since its birth with immense financial support of this world leading company, building on its extensive experience with desktop software, trying to take advantage of its ability to integrate support components directly into the world's most popular operating system – Windows. Several MSN/Windows Live specific tools were developed and distributed as part of the Windows operating system and provided to users as an automatic update of the operating system or published as a free download add-on.

Search engine	Searches (thousands)	Yearly growth	Share of searches
Google	4,199,495	39.8%	53.6%
Yahoo!	1,561,903	8.9%	19.9%
MSN/Windows Live	1,011,398	69.8%	12.9%

TABLE 1: REPRESENTATION OF REAL WORLD SELVES
AND THEIR INTERACTION WITH THE CYBER WORLDS

During the last few years the following three internet websites emerged: Google, Yahoo, MSN/Windows Live – as centers of the Internet traffic and dominant web services providers on the Internet. In the Table 1 there are their websites' shares of the full text Internet search service.[4] Google is leading by a significant margin – the Internet search is Google's primary area of expertise.

We have seen that each of these websites had a different background and a different primary area of expertise. In Yahoo's case it was a large semi-automatically maintained hierarchical catalogue of websites, in case of Google it was an efficient and fast full text Internet search web service, and in case of Microsoft's MSN/Windows Live it was its strong position in desktop software and specifically its advantage as a developer of the most popular operating system. Over time these websites developed into a comprehensive suite of various web services. Their focus is no longer on enhancing and developing the service in their primary area of expertise, they are rather trying to develop and maintain a set of applications that would be able to satisfy all typical Internet users' needs. Such additional services typically include email, news, weather forecast, TV and cultural events program, photography sharing, discussion forums and many others. There are of course many specifics. While Microsoft develops the MSN/Windows Live in its core as a social networking website (based on the concept of social networking websites like Myspace[5] or Facebook[6]), enabling users to easily share information and communicate with their friends. Google tries to attract users by ability to customize their search homepage, providing online office suite applications[7] and many other small but useful gadgets like its geographical map web application,[8] online library, [9] or even house interior design applications.[10] This ability to develop and integrate this wide range of Internet applications lead some commentators to claim Google as a standard-bearer of Web 2.0.[11] All these companies – Microsoft (as part of operating system), Google and Yahoo – provide instant messenger applications: Live Messenger, Google Talk and Yahoo Messenger. Since 2006 Live

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[4]   Nielsen/NetRatings, 2007.

[5]   http://www.myspace.com

[6]   http://www.facebook.com

[7]   http://docs.google.com

[8]   http://maps.google.com

[9]   http://books.google.com

[10]   http://sketchup.google.com

[11]   O'Reilly, 2005.

Messenger and Yahoo Messenger are compatible and users of these two in-stant messaging networks can communicate with each other.
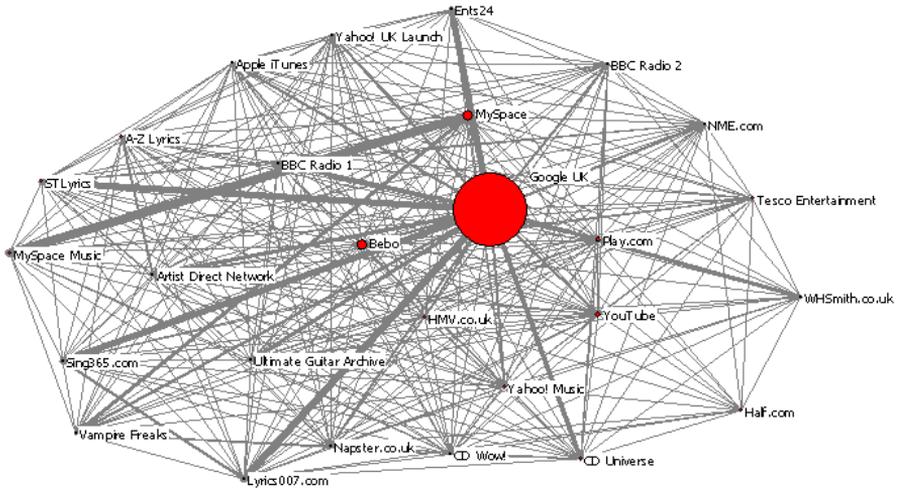

FIGURE 1

Such an approach aims at developing a complete framework of Internet applications that suits all needs of an average Internet user. Through regis-tration at one of these comprehensive websites and with intention to use an individual service (i.e. email) a user is given access to a wide range of differ-ent web services, which are intensively promoted during his stay at this website. Convenience of usage of a similar comprehensible, customizable and integrated suite of applications aims to keep the user at the provider's website, where he or she can find the most of what is usually needed without leaving for another website. The purpose of such web application suites is to keep users inside or to *internalize the Internet traffic*. A very small number of external links is offered and the user is encouraged to stay within the limits of the internal web and use only services that are provided on this website.

Users working with email, communicating with their friends, sharing photos, browsing news, checking weather forecast, etc. stay within the bor-ders of comprehensive websites and only occasionally go somewhere else. We may be however interested in what happens with a user who is trying to reach some specific content that is not available on these major dominant comprehensive websites, but is located on some specifically focused web applications that provide this kind of content. As an example of such con-

tent we may think of music. Music information, information about groups, singers, freely downloadable songs etc. are available within a wide range of Internet sites, but some of them are dominant in this particular area. These are the most popular and offer the latest and most interesting music related information and top ten songs etc. We may ask how the Internet traffic in this specific area would be structured. For an answer we may look at Figure 1 depicting the network map of the top Music websites plus YouTube, Bebo, MySpace and Google in the United Kingdom. It is easy to recognize that Google is an important source of incoming users to all of the websites and a centre of music related traffic in the UK.[12] We may also find that as secondary with regard to Internet traffic are rated the sites not focused specifically on music but social networking websites like MySpace and Bebo. It has been reported that for example in the week to 18th November 2006, 1 in 10 visits to specialized music websites came from social networking websites.[13]

The advent of Web 2.0 is characterized mainly by social networking services and web applications. As we have already described Microsoft made social networking applications the core of its MSN/Windows Live website. The website YouTube, which is also influential in the music domain as you can see on Figure 1, is focused on online video storage and streaming. Its influence in the music area can be explained by the fact that many of video streams stored on this web site are music video clips or other music relevant videos. YouTube has also recently added some social networking abilities to its web – possibility to add friends, communicate with them, see what new video streams they have added etc.

It may seem that social networking sites are competitors for sites like Google and dominant Internet websites are probably well aware of the importance of social networking in the future of the Internet. In 2006 Google acquired YouTube[14] and recently Google developed OpenSocial interface aimed to be common ground for developing applications for social networking applications. Although only a couple of not so very well-known social networking sites joined this initiative at launch – Orkut, Salesforce, LinkedIn, Ning, Hi5, Plaxo, Friendster, Viadeo,[15] later also MySpace, Bebo and SixApart announced their participation. It may be also noted that

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[12]   Figure reprinted from Hopkins, 2006.
[13]   Hopkins, 2006.
[14]   http://www.google.com/intl/en/press/pressrel/google_youtube.html
[15]   http://code.google.com/intl/cs-CZ/apis/opensocial/

MySpace was acquired in 2005 by Fox Interactive Media. In 2007 MySpace signed a partnership with a popular Internet phone company Skype – it may be seen as the dawn of convergence of social networking and communication applications. The Facebook social networking site remains the only large social networking website that is still independent.

In the light of these events another interesting questions may be considered: What websites do Internet users really regularly visit? In November 2008 Internet statistics captured totally 190 m. unique users in the USA. Google website was visited by 146 m. unique users, Yahoo website was visited by 143 m. users and websites operated by Microsoft were visited by 123 m. unique users. [16]

We may conclude that the majority of users visit three dominant sites regularly or more typically – uses them as their primary point of departure even when visiting other websites. We have demonstrated this point in the case of music – Google and two other dominant websites are the most important sources of visiting users for music related websites in the UK. Many users go to these specialized websites after searching for a keyword for example in Google and choosing from the presented list of results. In the light of presented statistics it may be also interesting to mention that there exist ongoing efforts of Microsoft to acquire Yahoo.[17]

The reason why we describe this development is to illustrate the continuous process of centralization and corporatization of the Internet. Such process implies questions relating to many different scientific areas – it may be interesting, for example from the point of view of economics, to ask whether the essential characteristics of the Internet itself necessarily result in forming of some kind of natural monopoly. Becoming a central site of Internet traffic is enormously expensive. Hindman[18] points out that Google pays out billions of dollars annually to have other websites which send visitors to his web services. Similarly, costs of computer equipment are extremely high – during the years 2003–2005 Google spend $1.33 billion on property and computer equipment. The total number of servers operated by Google has been estimated between 450 thousands and 1 million. Google does not make this information public, however it was recently revealed, that its single container data center often holds more than 45 thousands

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[16] comScore, 2008.
[17] Isidore, Lev-Ram, 2008.
[18] Hindman, 2008:84.

servers[19] and Google has more than 35 such large data centers across the globe.[20] Due to inability of standard database software (Oracle, MS SQL Server etc.) to deal with amounts of data Google has to handle, a new database system called BigTable was internally developed and is used to manage as much as 6 petabytes of data across thousands of servers.[21] Such circumstances make it extremely difficult and expensive to seriously compete with Google.

In the case of social networking websites there are strong natural psychological mechanisms that help establishing a monopoly – if you are to decide which social networking site to join, you probably join the same one as most of your friends or business partners. The fact that you joined that social networking site in turn increases the probability that your friends who did not yet decided which social networking site to join will eventually join the same social networking site as you. Such a process has many characteristics of the snowball effect – the more people join, the better incentive for their friends to join the same social networking site.

These are probably some interesting and important considerations. However in this article we want to focus also on ethical implications of the described process. At first we have to ask why this state of affairs is relevant to philosophy and what philosophically important and relevant questions it implies.

The first problem concerns the description of the situation itself. It has been pointed out, by founders of computer ethics, that there are often conceptual muddles that need to be sorted out.[22] Johnson asks "How are we to conceptualize a search engine?"[23] Technical development we have described in previous paragraphs results in technology and information artifacts that have many unique properties unlike anything else in human history. Johnson therefore believes that when we are dealing with issues like these, it is not the case of "simple" applied ethics, because it involves a complex conceptual analysis and interpretation of completely new phenomena not just applying existing ethical theory to a new situation. World Wide Web inventor Barners-Lee suggests that the complexity of the web has grown to the level of complexity of the human brain – there are 1011 webpages and

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[19]   Miller, 2009.
[20]   Shankland, 2008.
[21]   Lai, 2009.
[22]   Moor, 1985.
[23]   Johnson, 2004:68.

there is a similar number of neurons in the brain. He says that now we do not fully understand the nature of the emergent systems that have cropped up on it.[24]

The fact that search engines raise not merely technical issues but also political ones was recognized already by Introna and Nussbaum. They focus on the ranking of websites in search results and explain the nature of the problem in what we can call sociologically and technologically based bias. The technological, software design of web search engines implicates preference of specific websites, "popular, large sites, whose designers have enough technical savvy to succeed in the ranking game". There is also a socially or economically based preference of sites "whose proprietors are able to pay for various means of improving their sites' position".[25]

The social bias can be also connected even with the ethnic or racial background and current demographic patterns of the Internet access and usage. This is an area of intensive research with a number of results and publications since the nineties.[26] The important outcome is that information relevant to some ethnical group, which is not numerous or for whatever reason does not use the web as intensively as others may be ranked lower in search results sets than information on more popular websites.

As we have discussed before, typical Internet users use a web search service for determining sites that have the content, which corresponds to their requirements. We have also said that this usually determines the direction and routes of logical Internet traffic. In the end it is a search service provider who determines what results are presented and therefore has enormous influence on the user's decision where to go next. Most users choose from the first few search results and continue their browsing on these top ranking sites. Even if a user checks several pages of results returned by a search website, the complete size of a result set is usually many thousands web pages so effectively available to a user are only those web sites, which are displayed at the first few pages of results.

This constitutes what we may call *visibility* on the Internet. If dominant web search pages are major sources of incoming users for many webpages then the visibility of a webpage is determined by the position which it has in the result sets returned for some typical queried key words. This search

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[24] Marks, 2009.
[25] Introna, Nussbaum, 2000:17.
[26] See e.g. Hoffman et al., 1997, Hoffman, Novak, 1998.

engines visibility is closely related to what is in political science called *political voice* and is one of its central concepts. It has been pointed out that clear, loud, and equal voice of citizens in politics is a requirement for meaningful democratic participation.[27]

The importance of Internet visibility was recognized a long time ago by some commercial companies that offer optimization of websites aimed at reaching higher positions in the result sets returned to relevant queries. Such companies try to understand the exact algorithms used by search engines to determine the relevance and importance of websites and then by sophisticated manipulation of the chosen website enhance its position in the result set. When a company named SearchKing used a set of such techniques to artificially raise the position of its customers in Google web search result sets, Google later reacted by deliberately lowering SearchKing's position (for query "SearchKing" no link to this company was returned) and also positions of its customers. Later in October 2002, SearchKing filed suit against the search engine Google in the United States District Court. SearchKing sought a preliminary injunction against Google, asking to be restored to its previous search result position and to be awarded $75,000 in damages. The SearchKing's listing was later restored on Google; however the judge denied SearchKing's request for damages. The court held that a position in results sets[28] is constitutionally protected speech under the First Amendment of the U.S. Constitution because it is a subjective opinion.[29]

We are not interested in the legal aspect of this case. This example should illustrate the extreme importance of search result positioning of websites in the current Internet or we may even say in society. This single aspect may determine whether a new company will be successful or not. It has not to be as in the case of SearchKing the complete disappearance of website from the Google result list. If a website is on the 37th result page who will ever visit it based on such a result list.[30]

We may even think of some more disturbing examples. Let us imagine a situation preceding presidential elections (let us say in a country like the USA). Most responsible voters try to find out relevant information about their candidates. There is a lot of relevant information on television and in

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[27]   Verba et at., 1995:509. See Hindman, 2008:6.
[28]   Positions in result sets are based on PageRank – a number determining importance of the website.
[29]   http://www.internetlibrary.com/pdf/Search-King-Google-WD-Okla.pdf
[30]   Buu-Hoan, 2003.

newspapers but some people prefer to find such information on the Internet, and the importance of online information will probably even rise in future. Now what happens if a dominant search engine deliberately presents at the top of its result set webpages idealizing one of the candidates and pages containing mostly criticism and denouncement of other candidates? Such manipulation can be done in a way that is not easily recognizable. Does it have measurable effects on the results of elections? While there is a considerable amount of work trying to analyze the impact of new media on politics and democracy (see e.g. Abramson[31]) the specific role of internet search engines has not yet been sufficiently analyzed. We already know that the link structure of the Internet, the element that is the most important for most of search engines is not itself politically neutral and Roger has shown that it can be analyzed in terms of what he calls "politics of association".[32]

The exact working of a search engine and its algorithm are considered an industrial secret. Engineers and owners of the search providing company are free to modify it in any way they want. A question then may be: What is the legal status of a search service? What is the relation between a user and a service provider? Something like that is usually stated in a "terms of service" document however for example in the case of Google there is not anything mentioned regarding the characteristics of the search results.[33] Is there any obligation (legal or moral) of a search service provider related to the set of results he presents to a user? Google describes its determination to provide correct results in one of its basic documents: „ [our search results] …are unbiased and objective, and we do not accept payment for them or for inclusion or more frequent updating."[34] However exact legal (and moral) status of such a statement is unclear.

As we have seen in the case of the suit of SearchKing the search results are in fact according to the judge's opinion constitutionally protected speech under the First Amendment of the U.S. Constitution so in effect any Internet company can present as a query result set literally anything it wants. And as we have seen in the case of SearchKing, Google was able and willing to change the internal working of their search engine to erase the existence of SearchKing completely from its search results.

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[31] Abramson et at., 1990.
[32] Rogers, 2004:vii.
[33] http://www.google.com/accounts/TOS
[34] Page, Brin, 2004.

These reflections are not to be meant as an accusation of manipulation. We believe that the current state of the Internet industry does not allow any substantial manipulation. The purpose of this article is to highlight the enormous power that lies in hands of a few dominant Internet companies and the ethical issues that it raises. This power will undoubtedly grow in the future so these issues will probably become even more important. We believe that presented reasons show that it is necessary to be aware of dangers of such power concentration and risks of its abuse.

One way of overcoming such possibilities of abuse is to use the open source approach to software development. The open source approach can be defined in various ways and it can have different meanings. At the basic level it is software whose source code is available to the public. [35] It is not necessary that this code needs to be free of charge or without a copyright. However, it can be reviewed by independent authorities. In some cases commercial companies apply a partial open source approach – like in case of Microsoft which made the source code of its Windows OS available to selected public institutions and government authorities.[36]

But such an approach seems to have a number of drawbacks in the case of search websites. Introna and Nussbaum note that web search companies are loath to give out details of their webpage ranking algorithms for fear that abusers and spammers will use this knowledge to trick them.[37] There are ongoing efforts of many individuals and companies to guess details of ranking algorithms, some even with scientific backing.[38] Knowing the exact technical details of ranking algorithm will enable web designers build websites exactly to abuse these specifications and to raise artificially their search rank positions. Such an outcome is not welcome not only from the point of view of companies, but also from the point of view of the public.

Other authors suggest that some kind of regulation should take place on the Internet. However, such suggestions are made only in very general terms, without any specific regard to web search. Livingstone and Lunt say: "Access to, and the content of, the press, television, Internet, and so on

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[35]   More complex definitions of open source software require some specific characteristics of a software license based on specifications of the Open Source Initiative (www.open-source.org).

[36]   Microsoft, 2010.

[37]   Introna, Nussbaum, 2000:16.

[38]   Pringle et al., 1998.

should be evaluated, therefore, not in terms of what contents or services they provide but in terms of the possibilities they afford or impede."[39]

Anderson[40] similarly claims that there is a category of goods that should not be left entirely (if at all) to the marketplace because there are inherent ethical limitations of the market norms. There are goods for which this claim is uncontroversial, such as: person, body,[41] friendship, political rights like the right to vote, but she controversially believes that the same applies to a much wider range of goods such as public spaces artistic endeavor, addictive drugs and reproductive capacities. Introna and Nussbaum believe that also Internet search services belong to this specific category of goods and say that while for goods like cars or bottled salad dressing etc. the marketplace is a perfectly adequate distribution mechanism, for other goods this distribution fails to properly express values of the liberal democratic society committed to freedom, autonomy and welfare. Introna and Nussbaum therefore agree with Anderson in her substantial claim that goods belonging to the category of political goods have to be distributed in accordance with public principles and not just by the market mechanism. The reason for such a conclusion is the belief that while retaining a full range of options in bottled salad dressings or cars has no impact on the political sphere, retaining visibility of a full range of political options expressed on the Web has key importance in maintaining the pluralistic democratic society.[42] The argument may be reduced to this: while we may live in a perfectly democratic society with only one variety of salad dressing available, the democratic character of society would be endangered if there would be only one kind of a political opinion offered by search results of internet search services. Such a situation is purely hypothetical but as an example it aims to explain why there is a fundamental difference between goods like salad dressings and goods like Internet search services.

As a supportive argument Introna and Nussbaum claim that the special character of search services is derived from special character of Web itself. The Web is a public good and it earns this character in many of the same ways as other public goods. The meaning of the term "public" itself signifies something that is not privately owned and the Web seems to be public

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[39] Livingstone, S., Lunt, P., 2007.
[40] Anderson, 1993:141. Introna, Nussbaum, 2000:23.
[41] See also Fabre, 2006.
[42] Anderson, 1993:159. Introna, Nussbaum, 2000:23.

at least in this sense. While its constituent parts – hardware and software, could be privately owned the Web as a whole is not privately owned by any particular entity.[43] Similarly, it does not come under jurisdiction of any single sovereign state; therefore its character invokes a number of difficult legal and legislative dilemmas. [44]

Many characteristics of the Web are similar to what is usually called "common pool resources" like fresh air or water – resources that are characterized by relatively open (public) access and private consumption.[45] We can encounter similar classes of problems – just like pollution is a prime example of a common pool problem related to fresh air (over-use of the air's ability to dissipate waste gasses leads to the depletion of that ability), the email spam is an example of a common pool problem related to the Internet (abuse and over-use of the email ability to efficiently and cheaply deliver messages leads to the depletion of that ability).

Another important point is contribution of availability of information to market effectiveness. To function properly and to maximize efficiency the free market presupposed that parties involved in market exchange have information about what they are exchanging. Economic theories of free market generally assume that both parties to an exchange are equally informed. Recent research focused on how asymmetric information can affect market transactions – if one party does not have access to full information regarding the subject of transaction, we can no longer suppose that market exchanges are truly mutually beneficial and maximizing efficiency.[46] The Web then may be seen as part of "market infrastructure" that ensures that everyone does have equal access to information and therefore ensures free market efficiency. The search service obviously plays an extremely important role with regard to this function of the Web; therefore as the necessary condition of the efficient function of the market it may not be seen just as one of many marketplace subjects.

While an asymmetric information problem is relatively uncontroversial the similar problem of asymmetric bargaining power lies at root of many current economical and political controversies. Many government regulations like labor laws regulating hours and factory conditions are justified by

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[43] Introna, Nussbaum, 2000:25.
[44] See also Johnson, Post, 1996.
[45] Gaus, 2009:5.
[46] Gaus, 2009:11; Sandler, 2001.

the claim that employers and workers have asymmetric bargaining power. While some inequality in bargaining power does not harm effectiveness of the market and the mutual benefit from the exchange there are others that seem to have such an effect. Gaus[47] describing such an economical situation cites Nozick, who argues: "a person may not appropriate the only water hole in a desert and charge what he will. Nor may he charge what he will if he possesses one, and unfortunately it happens that all the water holes in the desert dry up but his."[48] If now the hypothetical appropriator of a single source of water makes an offer of a glass of water for all your property this would be what is in economic theory called "coercive offer" – an offer that exploits one's bargaining power and cannot be refused. Such a situation on market results in a sort of exploitation of those in need and not in mutual advantage.

If we now extend this line of argumentation to finalize this article with question – what if there would be only a single comprehensive search service on the Web, would not we be in a situation similar to the one described above with a single source of water in the desert?

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[47] Gaus, 2009:12.
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