

## Influence of search engines on customer decision process

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**Abstract**—This article summarizes customer decision process focusing on information search. It explains the role and use communication channels that are used during information search, particularly the internet. It describes the internet and the role of search engines during information search. It explains the use of search engines and provides better understanding of ways in which search engines support customer decision process such as reduction of information search cost, higher involvement in the search process and increased ability to search for information. It also identifies some possible disadvantages like information irrelevancy or invisible web. Paper aims to identify the influence of search engines on information search phase of customer decision process.

### I. DECISION PROCESS

ONE of important issues in research on customer behaviour is observation, analysis and search of the values that influence customers during the purchasing decision process. In order to better understand the process, there have been distinguished phases of decision making process.

According to Engel J. F., Kollat D. T. and Blackwell R. D. decision making model consist of following phases: [1]

- A. Need Recognition
- B. Information Search
- C. Evaluation of Alternatives
- D. Purchase
- E. Post-Purchase Evaluation

When unsatisfied need is recognized, the customer begins searching for information. R. E. Rice, M. McCreadie and Chang S. L. define information as a "commodity or resource, and part of the communication process." [2] G. Stigler in 1961 said that knowledge is power and one should hardly have to tell academicians that information is a valuable resource. [3] Until then, conventional economics assumed unlimited access to information and ability to obtain information at no cost. Information search is a process during which consumers look for relevant information to make a reasoned decision. Consumers want to gain a better product and/or a better price and try to make the most optimal decision. They can seek for information on prices or characteristics of service/ product. Information search can be costly. The information itself can have its price, and consumers have to pay

to access it, or the process of search implies costs and time consumption.

First model of information search was presented in 1982 by G. Punj and R. Staelin. It was based on the assumption, that consumers are looking for the best and richest source of information, in order to make satisfactory purchase decision. They have examined five variables: knowledge and experience, need and efficiency of exploration, the market environment as an acceptable set size, customer satisfaction and cost-saving as a measure of the cost of exploration and search for information.[4] In 1991, N. Srinivasan and B. Ratchford extended the above model with perceived risks and perceived benefits of information search. [5]

J. R. Bettman stated that the process of information search is made up of internal and external search for information. He claimed that consumers usually first engage in internal search for information stored in memory. Main determinants of internal search scope are: the quantity of stored information, the suitability of information and the importance of decision. Only when information available in memory is insufficient to make a decision, consumers engage in external search for information.[6] Most of searches consists both, from internal and external information search. [7]

Progress of information and communication technologies has contributed to the development of information society. Historically, the processing and distribution of information consisted of, among others: mail, newspapers, radio, telephones. A special role in information society plays the Internet, that enabled the transfer of information to match the expectations and lifestyle of the recipient. As a result of these changes, massive numbers of readers and listeners are divided into smaller groups with common goals and interests.

### II. INTERNET

The Internet has become an important source of external information, as the information traditionally available in a variety of channels, became available in a single medium - Internet, thus influencing the decision-making process [8]. According to R. A. Peterson, S. Balasubramanian and B. J. Bronnenberg Internet offers the possibility to store large amounts of information in a number of virtual locations. It allows almost unlimited access to information from anywhere. Additionally, the Internet has the advantage of efficient and effective searching, organizing and sharing gath-

ered information [12]. Provides access to information named by R. Kraut, M. Patterson, V. Lundmark, S. Kiesler as "previously unavailable" [13]. N. Nie and L. Erbring defined Internet as a "huge public library" [14].

Compared to other media, the Internet has many advantages. On the Internet, there are multiple senders of information, so we can often compare data from several sources. It should be noted that Internet traffic is highly concentrated. Only 0.5 percent of Web pages is responsible for 80 percent of Internet traffic [15].

In communication via Internet (as opposed to traditional media), the consumer (user computer) takes the initiative in the selection of information that reaches him - he decides which information is needed. Thus, in the literature, Internet is often referred to as the "pull" medium, because of the unique way of sender - recipient communication (usually unavailable in other media). Information is pulled by customers, as opposed to traditional media (television, radio, press), where the consumer is only passive recipient of message [16].

Internet provides the ubiquity of information. It allows to get information from anywhere, anytime and reduces information asymmetry by removing the existing division between the sender and the recipient, because each side is both the sender and receiver of information [17]. Information retrieval is the result of consumer active search or navigation.

### III. SEARCH ENGINES

With the development of internet technology, the amount of information available on the Internet has grown to such an extent, that navigation to desired information became difficult. These difficulties has been solved by search engines, which spider the content of the global network, and then search for Internet resources relevant to our query. According to the PWN encyclopaedia definition, search engine is a web site that allows searching web pages containing the particular keywords. R. Prytherch described the search engine as a program produced by the publisher or data provider, enabling access to its information resources by author, title or keyword [18]. M. Busby defines it as kind of browser software, which searches the resources of the Internet, identifies the contents of web pages and stores it on computer's search engine [19].

Search engines offer some additional features that improves its search capabilities. In order to offer consumers the most relevant results, search engines take into account user behaviour on the Internet – i.e. queries entered into a search engine or web pages visited. On this basis, they are able to determine the interest of a consumer and choose the correct meaning of ambiguous words. Thanks to the computer's IP number, search engines can determine its approximate location. This allows search results geo-targeting, which means returning search results that located close to an Internet user. For the purpose of this article, we will define a search engine as a tool design to find information on entered query, that takes into account the location from which the query was asked, the personal preferences of consumers, and the time of query.

Internet search engine consists of:

A. software called a robot, which follows links on the website, updates information and adds a new documents if found. Documents that change and are modified frequently or that are very important, are visited by robots more often. This does not affect the perceived by the search engine importance of the document, only the validity of the information presented.

B. Index that stores the documents found by the robot. Index is a repository of all documents that search engine can search. During information search, search engines do not actually search the Internet resources but search engine's index.

C. User Interface which is responsible for the exchange of information. It is a place where customer enters a query and gets a list of search results.

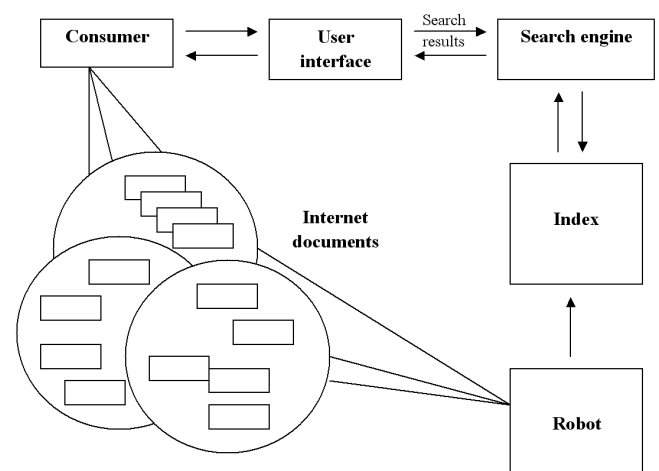


Fig. 1 Search engine architecture. Source: Own analysis

### IV. INFORMATION SEARCH ON THE INTERNET

With search engines, consumers can easily and precisely gain desired information. Use of search engine allows extremely easy and quick access to information on given topic. Internet users can find, compare and verify the information. Eric Schmidt, Google's director, described this situation as the democratization of information [21]. Through the Web, customers can very easily learn, compare and verify offers. Using so-called price search engines, they can easily compare prices and find a shop offering a selected product at the lowest price.

D.L. Hoffman i T.P. Novak distinguished two types of information search on the Internet [22]:

- A. Specific information search characterized by external motivation, focused on needs, consisting of direct search, leading to desired information.
- B. General information search characterized by internal motivation, constant involvement, consisting of indirect search and focusing on navigational choices.

## V. INFORMATION SEARCH WITH SEARCH ENGINE

Search engines enable to quickly find information on entered query, reducing the cost of information search. Yu Liang examined the long and short-term effects of reducing the information search cost. His research shows that in the short term, reduced cost of finding information will reduce the equilibrium price (The market price at which the supply of an item equals the quantity demanded). However, on the long-term basis, vendor will upgrade the product and as a result both the equilibrium price and vendors profit will increase. **Along with reduction of information search cost, consumers can look more and increase chances to find a product with better specifications.** Thus, the seller will be more motivated to offer a better product, that will have greater value for the buyer. As a result, product diversification will increase, what will reduce competition and prevent price drop to marginal cost. Reduction of information search cost will increase society welfare [25].

These advantages cause that over 85% of Internet users use search engines [26]. Typically, search engines apart from link to the website, provide some information important for the consumer. It may be the price, summarized description of a web site or phone number. This makes search engines both the source of information, as well as the way to reach more detailed information. Information access improvement by search engines depends on the importance of information obtained through the search results. Consumers use search engine to obtain the desired information. **The aim of search engine is to provide the most relevant answers to user's query.** Search engines build out their own web indexes, that collect increasing amounts of information and enhance algorithms to return the most relevant results. In a study conducted in 2000, 85% of British said that the quality of information returned by the search engine is important or very important. At the same time 31% of the examined group of respondents said that they often do not find the desired information on the web [27]. Search engine algorithms development is an ongoing process. Advances in technologies of data processing, content processing and information indexing improved information relevancy. In a study conducted in 2004, already 92% of Google users were satisfied with the results [28], what implies the constant search results improvement. **The process of information search on the web is characterized by the principle of "least effort". Users want to find information in quickest and easiest way, even at the expense of its quality** [29]. Most Internet users do not use advanced search functions, or specialized search engines, focusing on the general search engine, giving an average of two questions, consisting of two terms and only reading the first page of search results [30]. Consumers involvement in information search is associated with time spent on information access. Consumers engage in information search in order to maximize expected satisfaction with the chosen product. They compare different characteristics of products [31]. **Fast access (thanks to search engines) to desired information on the Internet may encourage the higher involvement in the search process** and offer possibility of accessing available information about the products.

Difference between search engine and web browser should be obvious. The purpose of a search engine like Google or NetSprint is to find a site for which we do not know the address. The web browser is a program to view and navigate the Web Site. We must have a browser to be able to use search engine. Nevertheless these two tools are often mistaken. In a survey conducted in six European Union countries in 2010, the question of what is a web browser, 68% of respondents said that it is a tool to access the Internet, while 40% answered that it is a search engine [32]. The above study shows that in Poland 57% of people do not distinguish between a search engine on the browser. So search engine can often replace some functionalities of web browser, giving the result of exact web site URL address and **being the first place where the consumer enters the address**, for example from a leaflet or a business card.

K. Wojcik among the determinants of consumer behaviour mentions capability of information search. The capability of information search is the consumer's own assessment of his personal capacity and motivation to perform actions associated with information search. The ability to information search is related to knowledge, experience and education of the consumer [33]. **Use of internet search engines may increase the ability to search for information** through a precise search results.

Consumers have a limited ability to process large amounts of information. Accordingly, in order to cope with information overload they make less careful choice, avoiding effort. It was confirmed by studies of K. Keller and R. Staelin [34]. They show that the quality of decisions made by consumers is deteriorating with increasing amounts of information. **Too much information on alternative choices not only does not facilitate consumer choice, but even reduces the effectiveness of this choice (information overload).** Search engines allow access to many information resources that are often not verified. This can lead to collection of large amounts of information, often difficult to process. Explained in this article disadvantages and advantages of search engines are presented in Fig. 2.

Strengths	Weaknesses
fast information access large information index reduction of information search cost increased information search ability	invisible web information irrelevancy
Opportunities	Threats
increasing information relevancy increasing information visibility	information overload

Fig. 2 Search engine influence on information search

Source: Own analysis

## VI. CONCLUSION

This article explains influence of search engine on customers decision process, particularly information search

phase. Some strengths, weaknesses, opportunities and threats have been described basing on literature, but they still require further investigation. Other possible topic that could be subject of investigation is the characteristics of different ways of search engines usage, or consumers awareness of the fact that search results hierarchy can be artificially influenced.

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