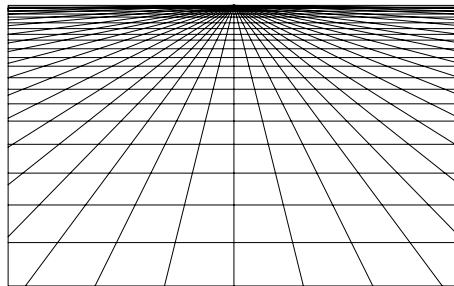UNIVERSITY OF OSLO
FACULTY OF SOCIAL SCIENCES

TIK

Centre for technology,
innovation and culture
P.O. BOX 1108 Blindern
N-0317 OSLO
Norway
http://www.tik.uio.no

ESST
The European Inter-University
Association on Society, Science and Technology
http://www.esst.uio.no

The ESST MA

Search Engine Credibility

Asbjørn Floden
University of Oslo/Université Louis Pasteur
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Abstract

While search engines have become increasingly popular over the past years, little research is concerned with how they attend to credibility. Through interviews with six Norwegian search engine companies; this study reveals how search engines attend to areas affecting credibility. Search engines appear focused towards areas affecting credibility, yet their understanding of online credibility appears to be low. The study then compares the findings with a previous study of how users assess credibility online, and finds search engines and users to have a common focus on aspects affecting content credibility. However, their overall focus on aspects affecting credibility appears less similar. The thesis also looks at how dedicated search engines are to understanding users' preferences.

Keywords: search engine, credibility, study comparison, search engine companies

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I would also like to express my appreciation to the six Norwegian companies I interviewed during the fieldwork: Eniro, Findexa, Finn, Schibsted, Tinde and Zett. Their responsiveness and flexibility made my process of conducting the interviews in Oslo both pleasing and efficient.

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Also contributing to making my stay in Strasbourg a wonderful experience, I would like to thank my friend Dag Ragnar, my sister Ranghild and her fiancée Ole Kristian, my friend Tom and my brother Gunnar, and last but not least my mother Randi and her boyfriend Arne. Thank you all for visiting me!

Finally, leaving their names fresh in your memory, my good friends Karl and Gunn deserves special attention. Not because they made me fly to Rome to attend their nice wedding in April, but because they have been utmost helpful in assisting me during the final hectic weeks and days I spent writing this thesis!

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1 Introduction

1.1 Initial thoughts

Studies of technology and society come around when new technology emerges, and maybe particularly when it becomes successful. How does the new technology affect the lives of people, and how has society contributed to and influenced the technological development? Over the past years, internet search engines have become a very popular technology and as such subject to a large number of studies, often focusing on how user behaviour online is altered by search engines.

This study is about internet search engines, but not in the perspective of users. Rather, it is in the perspective of search engine companies, inspired by social constructionists such as Latour and Woolgar (1986) and Bijker, Hughes, and Pinch (1987), although not as extensive and with a different field of investigation; namely how search engine companies pay attention to credibility among their users. Combining the fields of computer science, psychology, and science, technology and society (STS) this thesis is thus interdisciplinary. A thorough explanation of this thesis' goal follows below, but first a few words about search engines.

1.2 The Internet Search Engine

Since the commercialisation of the internet began in the early nineties, services for searching the increasing amount information in the network have been available. However, it was first when Google entered the market with their clean interface and fast response that search engines really became mainstream. In fact, Google has been so successful that some people now talk about "googling" something they want to find information about online. Whether companies are following in the success of Google, or if online information search is an ongoing trend is a discussion to take elsewhere. The competition in the search engine market is getting stronger, with new actors entering the market, also in Norway.

No matter how popular they might be or how fast the market is growing—what are these search engines? Most people would probably refer to Google if asked what a search engine is. Yet Google is just one of many search engines, and, established in 1998, it certainly was not the first.

In its broadest sense, a search engine is a service for finding information on the internet, or the World Wide Web to be specific. This is the simple answer. As getting complicated seems unnecessary, I will only elaborate a little further on what a search engine is, so that the terms emerging throughout this thesis actually makes some sense.

The wide definition above fails to distinguish between the graphical presentation people see on their computer screen and the actual "engine" responsible for the search. This complicates things a little. When people use what we so far have referred to as a search engine and will continue to call so a little longer, after having started their computer and opened their web-browser, they enter the address to their favourite search engine, and the search engine page displays. The page usually has a field for entering text, and a button labelled "Search" or something similar. To search for something, one enters the word or words one would like to find information about, for example "duck", and click the "Search" button. Now, the search *engine* begins—and finishes the next instant, providing a list of results, normally as links to documents somewhat relevant to the word(s) entered. The average user now clicks on the link for one of the documents, and if the search engine did a good job, it is all over for this time.

Except from all the things the user did, what actually happened? That is an easy question to answer. After receiving the word(s) to search for, the search engine found them in its large list of words, most often referred to as an index and along with them links to all the relevant documents. Then, it simply returned the list of matching documents. It did some other things too, such as deciding which documents is most relevant and sorting the list accordingly, but those are minor details. What is more important is how it found all the documents in the first place.

The search engine, which is now about to become a term with multiple meanings, finds its documents on the World Wide Web, also known as the internet. At its very simplest, it starts with an internet page, follows all the links from that page to the next, the next, and the next after that again, collecting links to web pages, or *crawling* through web pages, as they say. So it continues, and as the internet grows at a tremendous pace, it probably can continue forever. While doing this, it is hard for the search engine to serve relevant documents to people hungry for information. Therefore, the search engine has a *web crawler* for collecting web pages. Each web page the crawler finds is, again very simplified, stored in an increasingly huge database and analysed by the search engine, following certain rules. Unless the page is blank, this usually results in a few more entries in the index, thus making the page available to the people hungering for new information.

Now, there clearly is more to a search engine than what appears on the computer screen at home or in the office or at the internet café. While most people think about the text field and the "Search" button on the screen when they talk about search engines, this concept is no longer sufficient. As mentioned, a search engine is far more than that. Throughout the thesis I will talk about search engines, I will mention web crawlers (because not every search engine has their own web crawler and database for the web pages it finds). I will also introduce another term for search engines, but that will have to wait a few pages. For now, search engines are good for finding information. Adding to the pool, I continue with my introduction to search engine credibility, starting with how previous studies have focused on users.

1.3 Current Search Engine Studies Focus on Users

Early psychology studies on credibility took place in controlled laboratory environments (Renn & Levine, 1991). Current studies of online credibility take a more practical approach and tend to focus on identifying characteristics that are valued as more or less credible among users, often resulting in guidelines to (search engine) developers. The methods utilised in these later studies span from automated

quantitative analysis to rigorous user surveys and qualitative in-depth interviews, and provide insight into how people conceive online search engines as more or less credible, as well as an idea of which features contributes the most to credibility (Fogg et al., 2002). What they do not say, however, is whether the companies behind the search engines go about to make their services credible, and how.

1.4 Turning Towards Search Engine Companies

Although most research seems to focus on users' credibility assessment of online search engines, search engine companies are concerned about appearing trustworthy—one of the two main factors constituting credibility (Tseng & Fogg, 1999; Wathen & Burkell, 2002). A result of this awareness is, not surprisingly considering the authors' employment with today's leading search engine Google, a summary of challenges search engines face (Henzinger, Motwani & Silverstein, 2002). In short, the challenges concern automation of content quality assessment through various mechanisms, spam detection and removal from search results, and improvement of ranking algorithms and evaluation of these. However, although the mere existence of their article clearly indicates that trustworthiness is important to search engines, Henzinger et al. does not shed any light on whether or how search engine companies acknowledge credibility in their development process. This thesis aims at providing some insight into this area.

1.5 Theoretical Viewpoint

Before revealing the objective of this thesis, a few comments on the context in which it appears follows.

1.5.1 Less Science and more Technology and Society

This thesis finds it field of study within the social sciences, more precisely to the discipline of Science, Technology and Society (STS) studies. Comprising a vast area of research, scholars focus differently within the discipline. Some focus on the

scientific and technological aspects and refers to "Studies of Technology and Science" (for example Hacking, 1999, p. 64). Others, focusing more on the social aspects, refer to Social Studies of Technology (for example Wajcman, 2000, p. 448), or Studies of Technology and Society. As this thesis is more concerned with technology and society than with science, I adopt the interpretation of Studies of Technology and Society.

1.5.2   Technology as More than Objects

Technology is an ambiguous term and scholars have made many attempts at providing useful definitions. In his philosophy of technology, Mitcham (1994) gives a thorough overview of the various delineations available. Other variations may have emerged since 1994 but for the purpose of this thesis, I consider Mitcham's ideas adequate.

Common views on technology regard it as the artefacts, or things, created by humankind, and usually include as technology the knowledge required for creating and using those artefacts. In his philosophical perspective, Mitcham proposes an adaptation of the separate frameworks of McGinn and Kline, where the former delineate technology in terms of human activity and the latter focus on the artefacts and their use. In the words of Mitcham (1994), McGinn gives a "descriptive analysis of technology as human creative activity … [but where] both artefacts and their use fail to qualify as primary aspects of technology" (p. 158). Kline, on the other hand, recognises "technology as artefacts or hardware, as sociotechnical systems of production, as technique or methodology, and as sociotechnical systems of use" (p. 158). Whereas McGinn leaves out both physical artefact and its use as technology, Kline fails to recognise its creative dimensions. Based in technology as "pivotally engaged with the human [as] manifestations in the mind, through bodily activities, and as independent objects that take their place in the physical and social world," Mitcham define technology as knowledge, activity, and object. However, these three

modes of technology do not take into account the human dimension of will, and "technology as volition must thus be added as a fourth mode" (p. 159).

Mitcham's definition of technology as objects (or artefacts as is the more popular term within the literature of STS studies), knowledge, activities and volition is one of philosophical value. Yet, as it includes the social dimensions of technology, it is useful in the context of studies of technology and society.

1.5.3 Technological Development and its Relationship with Society

Studies of technological development mainly take on two different perspectives: that of technological determinism and that of social constructivism.

Technological determinism considers technological development as one unaffected by external forces—technologies appear as if their development has been predetermined. The relationship between technology and society becomes one of cause and effect: technological change cause social change. Through its emergence and appliance in society, technology changes the way in which people live. This perspective pays no attention to *how* technologies emerges, but see it as a predetermined chain of events. "This way of thinking about the relationship between technology and society has been 'common sense' for so long that it has not needed a label" (Wyatt, 1998, p. 10). Though, however common sense it may be, the problem with this way of thinking, at least as seen through the eye of the social scientist, is that "it leaves no space for human intervention and … absolves us from responsibility for the technologies we make and use" (p. 11).

This apparently one-dimensional view of technological determinism resembles the problem of asymmetry in historical studies of technology as presented by Bijker and Pinch (1984). They note how historians of technology "assume that the success of an artifact is an explanation of its subsequent development" with "no further explanatory work to be done." Not settling with this simplification of historical investigation, they emphasise that "the success of an artifact is precisely what needs to be explained" (p. 406). The technological determinist perspective

seems to possess the same asymmetry; it does not explain how technological development takes place, but merely accepts its occurrence and observe societal changes as the consequence.

The social constructivist perspective emphasise how social activities cause technological change, and represents as such the opposite of technological determinism. Unsurprisingly, this perspective appears dominant in social research on technology and view technological development as the result of negotiations between social actors, varying from engineers to end users of technology (which inevitably also includes the engineers with their instruments). Wyatt (1998) describe three ways in which technological development is subject to social influence: technology as a materialisation of the values and interests of social groups, technology as elements of daily language and symbolic universe, and technology as the result of negotiation between people, either individuals or groups (p. 15). A famous example, at least among students and scholars of STS studies, drawing "on insights from each approach" (p. 16) is presented by Bijker and Pinch (1984) in their presentation of the theory Social Construction of Technology, abbreviated SCOT.

Technological determinism and social constructivism represents the two major directions employed in studies of *technological development*. Adjusting focus towards *the relationship* between technological and societal change, other perspectives come into play alongside those already represented. Wyatt (1998) refers to a direction regarding technology as neutral. This perspective takes into consideration the way people use technology and that its effect upon society comes as the result of how it is used. The perspective does not withhold the deterministic viewpoint of cause and affect, yet it maintains that technological development is determined and unaffected by its social surroundings as "technology emerge[s] from nowhere" (ibid., p. 24). As such, one can consider the "neutral" approach as technological determinism with a twist, though a twist that renders it useful to studies of the relationship between technological and societal change rather than studies of technological change.

In addition, scholars of STS, independent of its flavour, bring around new perspectives from time to time. However, none of these attempts appears to have established themselves as major directions alongside those outlined above. It is pure speculation whether this is due to the somewhat convenient polarisation between "determinism" and "constructivism," or is the result of problems with finding another concise term or some other reason. This is, however, a discussion to take elsewhere.

1.5.4 Assuming a Constructivist Perspective

Already stated above, this thesis looks at the relationship between the technological artefact of search engines and society, and it does so in a constructivist perspective. In correspondence with Wyatt's perspectives, this can imply either or several of three things. First, it can be a study of how search engines might express the values or interests of social groups. Second, it can be a study of how people use search engines on a daily basis. Finally, it can be a study of how search engines become the result of negotiations between people.

This thesis assumes the third perspective by investigating whether peoples' judgement of credibility may lead search engine companies to make them more credible. Existing studies shed light on how people perceive search engines and other online services as credible (Princeton Survey Research Associates, 2002; Fogg et al., 2001; Fogg et al., 2002a; Fogg et al., 2002b). Inspired by Latour and Woolgar, this study focuses on whether and how search engine companies go about to meet users by increasing the credibility of their search engines.

1.6 Aims and Objectives

1.6.1 Credibility from the Search Engines' Perspective

To investigate how search engine companies work towards higher level of credibility, I take on a bilateral approach. First, I seek to disclose search engines'

awareness of their credibility among users. Second, I explore search engines' dedication to making their services credible.

The first approach aims at identifying credibility markers as conceived by search engine companies and compare them with those of users by consulting literature from previous research. In addition, I will try to disclose whether any credibility marker stands out as more important across search engine companies. With reference to the literature, I will evaluate whether such a convergence is in line with what users consider credible.

To illuminate search engines' dedication to creating credible services, I will attempt to identify the methods they employ to learn about users' preferences, the idea being that a greater variety of methods indicate a higher consciousness towards credibility and thus a higher level of commitment.

1.6.2   Research Questions

The areas of inquiry outlined above result in the following research questions:

- To what degree do search engine companies recognise credibility?

    o Which areas affecting credibility are search engines most attentive to?

    o How does search engines' focus meet users' credibility evaluation?

- How dedicated are search engines to achieving high levels of credibility?

    o Which methods do search engines utilise to understand users' preferences?

1.7   Operationalising the Research Questions

The search engine market is characterised by being international, which renders the area of inquiry vast, to say the least. Below, I operationalise the research by reducing the field to a manageable size.

1.7.1 Narrowing the Field to Norwegian Search Engines

International companies such as Google, Yahoo and MSN, alongside many others, currently dominate the search engine market. In line with the general nature of the research question, I ought to investigate how those companies attend to credibility. However, the research questions necessitate access to resources (people or documents) within search engine companies, and getting such access to international search engine companies would probably be difficult for the purpose of an independent master thesis. In addition, an international perspective would push the scope of the thesis beyond limits in both time and budget. These constraints, and my Norwegian origin, have led me to focus on Norwegian search engines. Not only does this reduce the project's scope, but it also gives me the advantage of conducting the research in my native tongue.

Limiting the research scope to Norwegian search engines resolves some problems, but introduces others. Firstly, the number of Norwegian search engines is rather small, with consequent implications for collecting data. Secondly, there appears to be very little research on how users assess online credibility in Norway. This introduces challenges to comparing companies' understanding of credibility with users' perceptions.

1.7.2 A Small Norwegian Search Engine Sector

The size of the Norwegian search engine sector is the major challenge for a research project like this. In an investigation across search engine companies, the ability to inquire several companies is crucial to the project. However, my initial search for Norwegian companies revealed the Norwegian search engine sector as rather small with only one significant actor in operation. Consequently, I had to consider alternative approaches to identifying relevant companies.

Before considering these alternative approaches, it is time to introduce a new term for search engine. Until now, a search engine has been a search engine and nothing else. From this point forward, however, a search engine is no longer simply

that, but it can be a web search engine for searching the internet, a phone directory or a classified ad service.

The solution was to consider other kinds of search engines such as online phone directories and classified ad services, both of which are primarily concerned with helping people find information online—a concept similar to that of web search engines. Yet, there are some major differences between web search engines, online phone directories and classified ad services. The difference maybe most relevant to this study, is the nature of their content. Web search engines have in principle no control over the content they bring forward to the user. They do implement various mechanisms to rank the documents that appear in their result lists so that "better" documents appear among the first results, but they have no way of controlling the content of these documents. Phone directories are on the other extreme, being very structured with full control over the data they include. Classified ad services fall somewhere in between these two, sharing the phone directories' advantage of having their own data in their own database, yet the data are freer as independent people (or companies) decide which content to include and submit. By expanding the target group of companies to include online phone directories and classified ad services, I found the number of potential respondents sufficient, assuming that not all of them would be available for study.

Luckily though, new actors are about to enter the Norwegian web search engine market this fall (Bakken, 2005), with a resulting increase in the opportunities of getting contact with more than one web search engine company. Learning this, I could omit either phone directories or classified ad services and still have a fair number of (potential) companies to study. With web search engines as the original area of interest, the less dissimilar classified ad services remained in my target group of companies to contact, and I excluded the phone directories.

Although the emergence of new, Norwegian web search engines is positive for this thesis, their newness introduced a potential problem to my research. As new actors, they might have little experience with how to deal with credibility issues.

How could these new search engines have any idea about the credibility of their services? How could these companies know which methods are better for understanding users' perceptions of credibility? As it turned out, these worries were superfluous. Shown in the company presentation below, the new companies have experience both with hosting online services in general and with search services in particular.

1.7.3 Limited Research on Users' Perception of Credibility in Norway

The first research question entails a comparison of how search engine companies recognise credibility with users' perceptions identified through previous studies. However, most studies available are concerned with American internet users. In a Norwegian newspaper article, I did find reference to a Norwegian study. Yet, conducted on behalf of a company, I was unable to find that particular report. I expect other companies to have conducted similarly studies, but anticipate their commercial nature to exclude them from publication.

      With no support in the Norwegian literature, I had to turn to the American studies. Without going into a profound discussion of the differences between online cultures in Norway and the U.S., I recognise that the use of research results from American studies may introduce some uncertainties to my discussion and conclusion. However, the literature on credibility consulted for this study finds its basis in the cultural values of western societies, of which both Norway and the U.S. are part. Furthermore, two studies of online credibility have found score averages between U.S. and Finnish respondents to match (Fogg, 2003a, p. 153). Thus, it is reasonable to believe that all other things being equal, one could expect the major findings in studies of online credibility to be similar in Norway and the U.S. On this assumption, I find the American reports usable in this study.

1.8   The Companies Participating in This Study

With the operationalisation resulting in a focus on Norwegian search engines, including classified ad services, I ended up with a list of six potential companies: three web search engines of which two are about to go live by the end of 2005, and three classified ad services. The web search engines were Findexa (not live), Eniro (www.eniro.no), and Schibsted (not live). The classified ad services were Finn (www.finn.no), Tinde (www.tinde.no) and Zett (www.zett.no). I give a more detailed presentation of the companies in below, followed by an outline of some main differences between them; the three web search engines on the one hand and the three classified ad services on the other. I contacted all six companies and scheduled meetings with all of them within a period of three working days. The interviews took place on August 18, 19 and 22.

1.8.1   The Web Search Engines

Eniro is a Swedish search engine company that owns the Norwegian search engine Kvasir. Kvasir has a long history as an internet company dating back to 1995. Although acquired by Eniro, Kvasir continues to exist as a separate brand. The web pages for Eniro and Kvasir provide access to the same content but with a somewhat different presentation. I will refer to the content of both services by the name Eniro. Eniro provides mainly three services on the internet: a theme guide or catalogue, a company directory and web search. The theme guide is a collection of categorised internet sites and was the foundation when Kvasir entered the market. The company directory resembles a phone directory with a list of companies, but also categorise the companies and adds descriptive company information. The web search service provides regular keyword based search, differentiating between search within Norwegian web pages and "the whole world." Google hosts the web search on Eniro (Ryvarden, 2004).

Findexa is the former phone directory department of the Norwegian phone company Telenor, from which it separated in 2001. [1] Findexa has several online phone directories, including white and yellow pages as well as a separate company directory comparable to that of Eniro. The web search engine of Findexa is not yet live, and its product name is unknown. I therefore refer to this search engine as "Findexa." Similar to Eniro, Findexa relies on a third party, namely Fast Search & Transfer, for crawling web pages.

Schibsted is Norway's largest media company (according to information on their web page), and owns several newspapers, a movie distribution company as well as part of Norwegian and Swedish television companies. The company also issues the free newspaper 20 Minutes in some cities in France, Italy and Spain. Schibsted has been active in the online environment since the early nineties. The web search engine of Schibsted is not yet live, and its product name is unknown. I therefore refer to this search engine as "Schibsted." Schibsted also relies on a third party for crawling web pages on the internet, namely the Norwegian company Fast Search & Transfer.

1.8.2   The Classified Ad Services

Finn is Norway's largest service for classified ads on the internet, owned by five Norwegian newspapers and Schibsted.[2] The service includes advertisements in the categories: jobs, craft services, private real estate rental and sale, commercial property rental and sale, automobiles, motorcycles, boats, and a separate section for anything else. Advertisements come from private people and small companies as

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[1] Note: As of September 26, 2005, Findexa company board announce agreement about the terms for an advised deal where Eniro acquires all shares in Findexa. If accepted by Findexa shareholders, this will result in Findexa being included in Eniro (Findexa, 2005).

[2] For a list of newspapers owning Finn, see http://www.finn.no/finn/info/;pdc=1126711202849. Schibsted ownership in Finn is currently 62% as disclosed at the bottom of this page: http://www.schibsted.no/cgi-bin/view.cgi?id=100042.

well as the newspapers that own Finn. For real estate sale, advertisements come exclusively from real estate brokers.

Tinde has along tradition on the internet, dating back to the former company Eiendomsnett established in 1996. Tinde is exclusively a service for advertisements of private real estate and commercial property, with focus on the former. Within that market, Tinde is the second largest company in Norway, succeeded by Finn. All advertisements on Tinde come from real estate brokers.

Zett is the newest of the three classified ad services in this study, established in 2002 by the Norwegian media company Orkla Media and the newspaper group A-pressen. Advertisement categories mostly equal those of Finn. Also similar to Finn, advertisements come from private people, real estate brokers, and the 70 plus Norwegian newspapers represented through A-pressen.

1.8.3   Differences between Web Search Engines and Classified Ad Services

As mentioned in the operationalisation above, there are some differences between the two types of search services included in this study, web search engines and classified ad services. These differences may affect how one should interpret the findings, and thus I highlight the differences most relevant in a credibility perspective.

Content quality is maybe the most apparent difference. While web search engines have almost no control over their content, classified ad services have much more control over the content they provide. The three web search engines (Eniro, Findexa and Schibsted) rely on a third party for crawling and indexing web pages. Hence, none of the web search engines in this study has developed their own algorithms for evaluating content quality and ranking results. Consequently, their ability to customise existing or implement new mechanisms for rating content quality and optimising page ranking relies heavily on Google and Fast Search & Transfer. Having said that, the web search engines using Fast Search & Transfer can configure how to build the index—how thorough (or sketchy) the search engine

investigate the web pages being included in the database. The classified ad services, on the other hand, does not utilise other party's service for handling data. Instead, these search services collect data into their own databases, where they have full control over them.

Content structure or lack thereof, is another difference. Web search engines "contain" web pages and other documents on the internet—documents that usually are unstructured. Classified ad services, in comparison, deals with highly structured data with the exception of job ads, which usually consists of descriptive text. The difference in content structure affects who controls the search. A more structured search (may) put the user in control by allowing for search on particular fields within the data, while a "free search" in unstructured data grants control to the web search engine. This is not particular to web search engines, but any search service allowing for so-called free text search. One way web search engines can give users some control is to disclose parts of the text surrounding the words searched, thus giving users the ability to judge briefly about result relevance before opening a document.

2 Credibility

Credibility is a complex concept subject to much investigation within several disciplines "including information science, psychology, sociology, marketing, communications, and health sciences" (Wathen & Burkell, 2002, p. 135). While theories about credibility do not illuminate how corporations view the topic, understanding credibility is essential in an attempt to identify markers indicating corporate acknowledgement of its importance. Hence, following is an overview of the literature on credibility in general, with focus on online credibility. Where available, reference to literature specific to the credibility of search engines is included.

2.1 Theories of Credibility

2.1.1 Credibility as a Competitive Advantage

In their study of the scientific laboratory, Latour and Woolgar (1986) present a practical perspective on credibility. Rather than discussing credibility as an element of persuasion, Latour and Woolgar refer to credibility in the context of reward for scientific discovery. Scientists gain credibility among peers and partners through their discoveries, leading the way to potential acknowledgment and material rewards. This perspective does not render that of persuasion superfluous in any way, but brings attention to an effect of credibility, namely that an increase in credibility may yield an increase in recognition and become a competitive advantage. Latour and Woolgar discuss this notion of credibility on an individual level, but the principle also applies to the institutional level (Renn & Levine, 1991, p. 175). Seen in the context of contemporary internet search engines, or any technology subject to competition between actors, increased credibility is thus an advantage.

2.1.2 Credibility in Persuasion

The concept of credibility often comes about in discussions of persuasion, the idea being that a higher level of credibility result in increased persuasiveness. A series of early studies by Hovland, Janis and Kelley (1953) found evidence of such, in that sources of high credibility had a greater immediate effect on opinion change than had low credibility sources (p. 270). Hence, the more credible a source is, the more likely it is to succeed in being persuasive. Fogg and Tseng (1999) refer to the persuasive nature of credibility by the term believability—a credible person is a believable person; credible information is believable information.

According to Wathen and Burkell (2002), the Elaboration Likelihood Model (ELM) identifies credibility as "an 'extramessage cue' that is a critical aspect of the persuasiveness of a message" (p. 134). Petty and Cacioppo proposed the ELM in 1986 as a model to explain how variables such as source, message, recipient and context can influence attitudes towards various objects, issues, and people (Petty & Wegener, 1999). The model itself focuses on persuasion, or attitude change, rather than credibility. Nevertheless, it regards credibility critical to the persuasiveness of a message and appears widely adopted in the literature of credibility and persuasion. Hence, a brief outline of its main concept follows.

The ELM identifies two routes to persuasion: the central route and the peripheral route. The two routes "refer to attitude changes that are based on different degrees of effortful information processing activity" (Petty & Wegener, 1999, p. 42). While the central route is at the "high end" of the elaboration continuum, characterised by deep interest in and careful study of the subject matter, the peripheral route is at the low end, characterised by cursory interest and study. The ELM postulates that attitude changes resulting from the peripheral route are weaker than those that result from maximal object-relevant thought, the central route (ibid., p. 3).

Applied to the internet, the ELM suggests that when the information-seeking episode is more casual, surface characteristics will have more influence. Positive surface characteristics may persuade users to stay; otherwise, they will leave the web site. But if motivated by stress and internet is consulted for "help-seeking activity, or if the user has a high level of personal responsibility in the outcome, finds the information personally relevant of has a high need for cognition," he/she will overcome the barrier of peripheral cues (Petty et al., 1988, in Wathen & Burkell, 2002, p. 142). Fogg et al. (2002b) provides an example of how this may affect the results of studies of online credibility, described below.

2.1.3   The Elements of Credibility

With credibility being both a key element in persuasion and an advantage in situations of competition, what identifies someone or something as more credible? Much research seeks to identify the constituents of credibility, and the majority of sources point to two qualities: *trustworthiness* and *expertise*. Hovland et al. (1953, p. 21) clearly illustrate this:

> An individual's tendency to accept a conclusion advocated by a given communicator will depend in part upon how well informed and intelligent he believes the communicator to be. However, a recipient may believe that a communicator is capable of transmitting valid statements, but still be inclined to reject the communication if he suspects the communicator is motivated to make nonvalid assertions. It seems necessary, therefore, to make a distinction between 1) the extent to which a communicator is perceived to be a source of valid assertions (his "expertness") and 2) the degree of confidence in the communicator's intent to communicate the assertions he considers most valid (his "trustworthiness").

Although Hovland et al. refers to how communicators can be credible through their knowledge and expectancy to be unbiased, they note that "the same basic factors and principles probably underlie the operation of each of the many types of sources, so … the reactions to one kind of source may be expected to be applicable to other

types" (p. 19). Stated more than half a century ago, contemporary scholars of credibility continue to acknowledge trustworthiness and expertise as its main constituents, also in the context of online media (for example; Fogg & Tseng, 1999; Wathen & Burkell, 2002).

Research in traditional media has also found message *familiarity* to increase the credibility of a message, "with more familiar messages being judged as more credible" than less familiar ones (Self, 1996, in Wathen & Burkell, 2002, p. 135). In addition, when the attitude of a message source matches that of its audience, the receiver may perceive the information as more credible and remember it more easily. Furthermore, "a member of a target audience may accept (internalize) the influence of the communication source because the advocated behaviour is congruent with his/her own value system" (Wilson & Sherrel, 1993, in Wathen & Burkell, 2002, p. 136).

Ones *social location* also influences the assessment of credibility. With a basis in "cognitive authority," being equated to influence and thereby to credibility, Olaisen (1990, in Wathen & Burkell, 2002) discuss how we "give credit and authority to certain persons and sources depending on our social location" which then "greatly influence quality factors like credibility" (p. 137). Although put forward in the context of credibility assessment of online information, the notion that ones social location affects credibility evaluations of a source or message does not come as a surprise. More surprising, then, is Olaisen's following question. Based on that electronic transfer of information may affect and change our social location as we take part in virtual social networks, does the new ways of storing, organising and distributing electronic information affects how one grant credibility or cognitive authority to it? For the purpose of this thesis, the question remains as unanswered as it does by Wathen and Burkell (2002), but it is an interesting and important one as the social dimensions of the internet increase.

Adding to the dimensions of trustworthiness, expertise, familiarity and social location explained above, message *presentation* affects credibility. Slater and Rouner

(1996, in Wathen and Burkell, 2002) found that the writing, production and organisation of a message can affect how one perceives its source as more or less credible: "well-presented messages lend credibility to the source, while poorly presented messages detract from credibility" (p. 136). However, messages from sources already perceived to be credible are not as vulnerable to poor presentation.

All the elements of credibility mentioned above, and several more alongside then (see Wathen & Burkell, 2002, p. 136 for an extensive list), applies in the online environment. In addition, Olaisen differentiates between "cognitive" and "technical" qualities particular to online credibility. The cognitive qualities determine cognitive authority, which equals to credibility as mentioned above; source expertise, source trustworthiness, source credentials and message content. The technical qualities are surface attractiveness, design of interface, speed of loading, usability/accessibility, and interactivity/flexibility. Together, cognitive and technical qualities combine into "institutional quality." Not surprisingly, in Olaisen's terms a higher level of institutional quality indicates greater cognitive authority and thus increased credibility and persuasiveness (Olaisen, 1990, in Wathen & Burkell, 2002).

The interactive quality of the internet allows for increased credibility through personalisation (Fogg, 2003a, p. 172). Here, personalisation does not refer to customisation of displayed content based on user preferences made explicit through user login, but rather through making use of the implicit knowledge about the user's state. A well-known example is the online bookshop Amazon, in its various flavours in different countries, and how it recommends another book, CD or other article based on that others who looked at or bought the same item(s) also bought some other items. Another example is the online music service Firefly described by Johnson (1997). Here, after having rated a small number of records, Firefly would recommend other records that you might like based on the ratings of others. Search engines does not currently provide "recommended search," but at least one, namely Google, automatically suggests alternative spellings to the keywords entered, usually with the consequence of a search with more (relevant) results. Context-

sensitive advertisement is another personalisation method that can increase credibility, also for search engines that knows what kind of information the user is looking for and thus can display ads related to the topic.

The list of dimensions to credibility appears endless, yet they all seem included in the two main dimensions mentioned introductory, namely that a source or message demonstrates trustworthiness and expertise. This is not to say that all the other terms are unwanted; in credibility assessments of various types of sources, messages, and mediums, some terms come more useful than others, particularly when asking people within various demographic groups to rate the level of credibility. Instead of asking people to rate the "credibility" of a source or message, terms such as "believability, accuracy, bias, and depth or completeness" (Johnson & Kaye, 2004) may be far more fruitful to the study, as respondents are likely to be more familiar with these terms and thus better able to rank along them.

2.1.4   Four Types of Credibility

Providing a framework for studying credibility, Fogg and Tseng (1999) introduce a categorisation of credibility into four types. The four types of credibility are not mutually exclusive, but "the overall assessment of [computer] credibility may rely on aspects of each of these simultaneously" (p. 83).

First, *presumed credibility* is the result of general assumptions one has of someone or something being credible: "people presume that most people tell the truth, but … also presume car salespeople may not be totally honest" (ibid., p. 83). One can dispute whether friends are more likely to tell the truth than car salespeople are. The point remains that people find someone or something credible based on presumptions and stereotypes, whether just or not.

Second, *reputed credibility* comes as the result of information from a third party, often as a recommendation from a source already regarded as credible, like a friend or a renowned institution. The term "word of mouth" is an illustration of how

reputed credibility works—by the appraisal of others, one might find something worthwhile trying which would otherwise be left untouched.

Third is *surface credibility* through initial first-hand experience. A person may appear more credible if properly dressed for the occasion, and pleasing visual design may increase the assumption of a technological artefact as credible, even though both person and device may eventually turn out bogus. This is parallel to the concept advocated by Norman (2004); that better looks yields better performance. It also correlates with the presentational dimension presented earlier; that the better one presents a message, the more credible it is likely to appear. Moreover, in accordance with to ELM, surface credibility denotes the peripheral route to persuasion in that judgements of credibility based of first impressions indicates a low level of involvement. I discuss this in greater depth below.

Finally, *earned credibility* is the result of positive first-hand experience over an extended period. Through long friendships, close friends earn a higher level of credibility than less close ones. Receiving consistently useful results from a search engine renders it more credible. This correlates with Renn and Levine's (1991) definition of credibility as "a product of long-term evidence and commonly shared experience that a source is competent, fair flexible to new demands, and consistent in its task performance and communication efforts" (p. 180). Surface credibility described above can be parallel to the ELM's peripheral route to persuasion, and one can consider earned credibility parallel to the central route to persuasion in that the attitude change is more profound because of people being deeply motivated.

2.1.5   Online Credibility Evaluation as a Three-stage Process

Synthesising the literature, Wathen and Burkell (2002) propose an iterative model for how people evaluate credibility in the online environment. They base their model on the assumption that evaluation of credibility is a staged process, and suggest three steps of acceptance/rejection before a user lands on a final judgement of a web site's credibility. First, the user considers surface characteristics of the web site. If the

characteristics suit his/her needs, the user moves on. Otherwise, the site is abandoned and no further evaluation takes place. Wathen and Burkell point out that the extensiveness of this initial judgement depends on "contextual factors and intervening variables, such as time, expertise, experience …, existing knowledge and need for information" (p. 142). Second, the message and its source is taken into consideration by evaluation of "source expertise, competence, trustworthiness, credentials, etc., …, along with the content of the message (including level of detail, examples, alternatives), its accuracy, currency, and relevance to the user need" (p. 142). The user may also consider the usefulness of the content by the degree to which it fit his/her needs. Finally, if the user finds the information to meet all requirements, assessments of how it matches previous knowledge, how badly one needs it, its familiarity, and how easily it applies to his/her situation, results in a final credibility assessment.

The model of Wathen and Burkell model appears to be little more than a new perspective on the ELM and its two routes to persuasion, including the last two types of credibility, namely surface and earned, promoted by Fogg and Tseng (1999), alongside other aspects found to influence what people consider to be credible. This is inline with their statement of attempting to "synthesise the literature into a framework that will allow for further research to address gaps in what we currently know" about how people assess credibility online (Wathen & Burkell, 2002, p. 141).

2.1.6   Online Credibility Assessment in Prominence-Interpretation Theory

Extending to rather than synthesising existing knowledge of how people judge credibility online, Fogg (2002) promotes another model that he calls Prominence-Interpretation theory. Although developed to explain how people assess credibility on the World Wide Web, the theory applies to "a wide range of credibility assessments" (p. 1). The theory "posits that two things happen when people assess credibility: a person 1) notices something (prominence), and 2) makes a judgement about it" (p. 1). Both steps must be present for a credibility assessment to take place.

Furthermore, Fogg identifies five factors that affect prominence and four affecting interpretation. In order of importance, the factors affecting prominence are level of user involvement or motivation (as explained by the ELM), content type (for example news, entertainment), user's task (seeking information, amusement etc.), user experience and individual differences in learning, literacy level etc. The factors affecting interpretation are, in order of importance, user assumptions (culture, past experience, heuristics etc.), user's skill and level of competency, the context in which the interpretation takes place (environment, expectations, situational norms etc.) and users goals. [3] Fogg notes that neither list of factors is complete, and future research may reveal others.

At first glance, Fogg's prominence-interpretation theory may appear parallel to the model of Wathen and Burkell. However, Fogg's theory goes beyond their staged "surface-content-evaluation" process; prominence denotes the likelihood of an individual noticing an element when evaluating credibility, and interpretation points to the individual judging the element. Fogg does not constrain the theory to specific elements (such as surface or content characteristics)—although the evaluation process bears signs of being "staged," it can be applied to all levels at which one can make credibility assessments. The four types of credibility described earlier perhaps most clearly identify such levels.

Another characteristic of Fogg's theory is that it can explain discrepancies in findings from other studies of online credibility. Fogg refers to how Princeton Survey Research Associates (2002) found privacy policy to be important to web site credibility, while the study by Fogg et al. (2002b) found privacy policy to be insignificantly important, being mentioned in less than one per cent of the comments received in the study (p. 86). While these findings would be conflicting in a traditional perspective on online credibility, prominence-interpretation theory can

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[3] In Fogg (2003b), the number of factors affecting interpretation is reduced to three, removing "user goals" from the list.

explain the findings in both studies. The study by Princeton Survey Research Associates asked people whether they considered privacy policies important to web sites credibility, in other words about their interpretation of the importance of privacy policies. On the other hand, the study by Fogg et al. asked people to visit and compare two web sites and comment on what made them perceive either as more or less credible, and thus mapped what people actually noticed—what they found to be prominent.

2.2   Credibility Consequences to Search Engines

According to the ELM, by rejecting information as not credible one will not learn its message, nor will it have any other impact (Wathen & Burkell, 2002). Superimposed to search engines, whose main objective is to help people find information online, rejecting a search engine as not being credible may not only result in the rejection of one single piece of information, but to the rejection of all the other information available through the search engine. The consequence is however not as dramatic as the argument might anticipate. There are many search engines available, and unless one finds the concept search engine repulsive and refuse to use any one of them, the other search engines serves as alternative routes to the information. Hence, the result of rejecting a search engine due to lack of credibility is more likely to skew the user to another search engine, resulting in a small shift in the market balance, rather than block her or him out of the online information sphere.

2.3   Studying Credibility as a Perceived Quality

Credibility is the result of social perceptions (Renn & Levine, 1991, p. 180) and most scholars of credibility concur upon credibility as a perceived quality (Fogg & Tseng, 1999). As a quality of human judgement, one cannot quantify credibility by some definitive metric, but rather evaluate it by asking people whether they find someone or something more or less credible. A large amount of research on online credibility takes this approach through user surveys (for example; Fogg et al., 2002; Johnson &

Kaye, 2004; Fallows, 2005) or personal interviews (for example; Stanford, Tauber, Fogg & Marable, 2002).

However, asking people directly is not the only way to explore credibility. Wathen and Burkell (2002) refer to two proxy measures of credibility: 1) changes in knowledge and 2) changes in attitude or behaviour, both considered the effect of exposure to credible sources (or messages). Yet, they regard the former proxy, knowledge change, a rather weak indicator because of its assumption that "only credible information is processed enough to be recalled" (p. 135). Hovland et al. (1953) supports this notion in their conclusion on communicator credibility: "The positive effect of the high credibility sources and the negative effect of the low credibility sources tended to disappear after a period of several weeks" (p. 270). Alas, to the degree that subjects recalled information, it was regardless of whether the source was credible or not.

While the proxy measure of knowledge change may be a weak one, Wathen and Burkell consider change in attitude or behaviour a stronger proxy of credibility, as "information must be credible, and thus believed, before it can affect attitudes or behaviour" (2002, p. 135). In the context of search engines, change in popularity may be an indicator of changes in user attitude and/or behaviour and can as such provide as one measure for their credibility, with log analysis as a proxy for measuring change in attitude and behaviour (for example; Bookelmann et al., 2005). However, there is not always a connection between popularity and credibility. One might argue that increased credibility is likely to result in increased popularity, and maybe even stronger argue that decreased credibility will result in decreased popularity. Research shows, however, that, at least in the case of search engines, popularity may be high while credibility is low (Fogg et al., 2002b, p. 78).

3 Methodology

Although focused on credibility, the research questions appear open with regard to how one can approach them. They also differ in nature; the first main question demands both an investigation of which credibility areas search engines focus on, and how these areas match with those found most important to users. The second main question requires investigation similar to the first.

3.1 Uncovering the Credibility Focus of Search Engines

To illuminate the major research questions, it is necessary to collect information from search engine companies. For collecting this information, one can choose either a quantitative or a qualitative approach.

3.1.1 Choosing a Qualitative Approach

As soon as I had settled for the thesis' subject, I realised that a qualitative approach would be appropriate. The objective is to gain insight into how search engines recognise credibility and their level of commitment to it, and the operational constraints described earlier limit the field of study to a few Norwegian companies. A quantitative approach would become more relevant in a study of users rather than companies, for instance by looking at how users perceive search engines as credible, where a desire to generalise the findings would likely be more prevalent.

Hoepfl (1997) broadly defines qualitative research as "any kind of research that produces findings not arrived at by means of statistical procedures or other means of quantification" (Strauss & Corbin, 1990, p. 17, in Hoepfl, 1997, p. 48). Through focus on extensiveness, numbers and quantity "quantitative researchers seek to discover causal determination, prediction, and generalization of findings" (Hoepfl, 1997, p. 48). Qualitative researchers instead focus on content, conditions and meaning, seeking "illumination, understanding, and extrapolation to similar

situations … [, which] results in a different type of knowledge than does quantitative inquiry" (ibid., p. 48).

Within qualitative methods, Hoepfl (1997) point to two main ways of conducting research: in-depth interviews and observation. Both of these methods are appropriate for disclosing the information sought, but on different levels and at substantially different cost. Observation provides more in depth knowledge than interviews, but is very time consuming both during fieldwork and in post field analysis. In my case, such an approach would restrict the number of companies I could study, and thus limit my ability to look for tendencies and possible correlations across them. In addition, getting permission to observe within one or maybe two companies might have proven more difficult than to conduct less intrusive interviews with representatives from several companies. Consequently, the less time-consuming and more available interview is the research method chosen in this thesis.

A drawback of conducting interviews is that people may say what they mean, but not always do as they say. To reveal what people actually do, one has to observe their actions. However, as argued above, the observational approach was unsuitable for this research project. Hence, I have to rely on respondent's answers, yet consider the incorporated uncertainties.

Another issue about interviewing is the possibility of bias in respondents' answers. Open and honest answers does not represent a problem, yet no matter how honest and well intentioned, people may direct their answers towards personal and/or corporate interests and opinions. One countermeasure to reduce personal bias is to interview several representatives from each company. Likewise, meeting with several companies reduce corporate bias. In an ideal situation, both approaches would be utilised. However, limitations in time and the focus on the search engine sector rather than a particular search engine company, leads this thesis to strive for interviewing several companies.

3.1.2 Conducting the Interviews

I interviewed company representatives in charge of product development in order to get the companies' perspective on credibility rather than those of the individuals interviewed. On one occasion, I initially interviewed an engineer, but got a new interview with an appropriate representative. On another occasion, I interviewed both a representative from product development and a representative from the marketing department. Conducting two interviews inescapably results in more data than one interview. However, while some of those data were overlapping, other was superfluous. Hence, in the analysis I treat data from the two interviews with these two companies as one interview with each company.

All interviews took place during normal work hours. For the interview subjects to feel comfortable with the setting, I let them decide whether to do the interviews in an office meeting room or in a more informal setting like a café. Consequently, of the total eight interviews, six took place in company offices and two in cafés.

For collecting data, I took notes during the interviews. To support the notes, I also used a tape recorder. While theory of qualitative methodology suggests that the use of recording equipment may affect subjects' replies (Lincoln and Guba, 1985, referenced in Hoepfl, 1997, p. 53), it is unclear whether the presence of the tape recorder affected respondents' replies in this study. In my experience, it is difficult to point to any supportive or unsupportive cues of such an effect. A greater concern is the fact that the tape recorder introduced technical challenges, occasionally running out of tape or battery. As a result, parts of the interview recordings were incomplete and my reliance on them to support my field notes may have resulted in some loss of data. However, listening to the successful recordings has proven my field notes to be quite extensive. I therefore find this loss to be of minor significance.

To allow the interviews to take on a free form as possible, I did not require the respondents to answer specific questions. Instead, I prepared a list with a few topics

related to online credibility, the idea being that a conversation around those subjects would reveal what the companies considered important to their credibility among users. The use of a topic list rather than direct questions about credibility would also allow for the potential discovery of new perspectives. The topics on the list were quality, navigation, personalisation, strategy, advertising and methods.

3.1.3   Interviewee Representativeness

Company representatives had different knowledge about their service. I have already mentioned the two extreme cases in the methodology section: in one company, I initially interviewed an engineer responsible for general product development, and got a new interview with a person more responsible for development of their search service. At the other extreme, one company gave interviews with both the person responsible for development and the person in charge of marketing. Consequently, responses from the latter company are likely to be more all-inclusive than from the other companies. All other interviewees were responsible for their search service I was interested, and thus representative for this study.

3.1.4   Ordering Credibility Areas

With the purpose of uncovering any tendency in focus across companies, I rank the credibility areas by the number of companies focusing on each area. As the six companies are much fewer than the categories in the coding scheme, some clustering of categories is likely to occur. For giving an impression of companies' focus on credibility, this clustering has minor significance. However, to compare properly companies' focus with that of users, a definitive order is necessary. Consequently, after ordering by number of companies, I order the categories by a coding index so that the categories mentioned by the same number of companies appear in order of significance, reflecting the qualitative content of the interviews. The coding index is

a scale from zero to 100 where 100 represent the largest number of codes. As all categories must have at least one comment, zero will not occur.

3.1.5 Ordering Methods

Similar to the list of categories to which search engine companies pay attention, the list of methods they use to learn about users' preferences appears ordered by number of companies utilising each method. The intention with this list is to give an indication of the number of methods companies use. Hence, the list only needs ordering by number of companies utilising each method.

3.1.6 Systemising Information from the Interviews

The first main research question aims at revealing what search engines focus on with respect to credibility, and thereafter compare their conception with that of users. Consequently, I had to identify a user study relevant for such comparison, and found a study by Fogg et al. (2002b) to be useful. For my data to be comparable with those of Fogg et al., I adopted their coding scheme for coding my interviews. However, coding along a scale developed for a user study may not cover all aspects emerging in a study of companies. To resolve this issue I utilised a sort of "coding triangulation" and coded the interviews twice. First, I coded the interviews iteratively, letting the codes emerge from the interviews. Thereafter I coded along the preset scheme. Finally, I compared the resulting schemes, matching the codes from the first and second coding.

4 Search Engines' Attention to Credibility

From the literature review, it is evident that credibility is a vast topic, mostly because it is a very general one—it can apply to practically all situations of communication involving one or more persons. In the online environment, one grants (or revokes) credibility to (or from) the software in use. With reference to previous studies, the literature review showed that people evaluate a large number of characteristics in their assessment of credibility online. However, the literature does not seem concerned about how software companies go forward in their development of credible software. What do search engines pay most attention to when developing their services?

4.1 How Search Engines Recognise Credibility

To answer the first research question of how the interviewed companies attend to credibility, I coded the interviews into categories affecting credibility. To enable comparability with a previous study of users' evaluation of aspects affecting credibility, I used the same coding scheme as Fogg et al. (2002b). I elaborate on the implications of adopting the coding scheme of someone else in chapter 5 below.

Table 1 shows the result of the interview coding, ordered by the number of companies mentioning each credibility aspect. Aspects mentioned by the same number of companies appear by level of attention they received, indicated in the column Code Index. To preserve anonymity towards the companies involved in this study, the table only displays the number of companies mentioning each credibility area. Yet, for comparability between web search engines and classified ad services, the table shows the number of companies for both categories.

The interviews revealed that neither of the companies focuses particularly on credibility in their product development, yet all companies show considerable attention to a wide variety of aspects affecting credibility. Overall, all companies emphasise on information scope, functionality, and that information is relevant.

Following, brand awareness and advertising get more attention than visual appearance. Companies thereafter pay attention to that information is up to date, easy to navigate and understand. Company motives receive slightly more attention than information quality, lack of bias, and users' previous experience. Finally, companies pay less attention to the tone of language and customer service, along with company ownership and data corrections.

In the following, I present how the companies focused on the different areas. I present them in the same order as they appear in the table, with the one mentioned by most companies first, and the least mentioned last.

Table 1: Search Engine Companies' Focus on Credibility

Category	Number of Companies			
	Web Search Engines	Classified Ad Services	Rank (N=6)	Code Index*
Information Focus	3	3	6	100
Site Functionality	3	3	6	91
Information Usefulness	3	3	6	87
Name Recognition and Reputation	3	3	6	83
Advertising	3	3	6	70
Design Look	3	3	6	65
Currency of Information	2	3	5	70
Information Design	2	3	5	57
Readability	2	3	5	57
Motive of Organization	2	2	4	35
Information Accuracy	2	2	4	35
Information Clarity	2	2	4	30
Information Unbiased	1	2	3	22
Past Experience with Site	1	2	3	13
Writing Tone	2		2	22
Customer Service	1	1	2	17
Affiliations	1	1	2	9
Corrections	1	1	2	9

* Code Index represents the number of codes in each category, where 100 equals the largest number of codes.

4.1.1 Companies Focus on Data Volume, Functionality and Relevance

The top three categories, Information Focus and Site Functionality, reflect companies' focus on information quantity and variety, value-adding services, and search relevance.

Web search engines focus on including a large number of web pages in their databases, but also to provide other useful content, for example online maps, news or phone directory data. Likewise, the classified ad services focus on volume in their

databases of advertisements, but less on extending their functionality. The category Site Functionality also includes performance aspects such as response times, to which web search engines are more concerned than classified ad services.

Data relevance comes forward as Information Usefulness—a search engine that does not give relevant search results would not provide very useful information. Web search engines and classified ad services has a similar focus on producing relevant results by giving users what they want, and not what they do not want. They say that a large number of search hits can be just as much a problem as few search results, and to prevent users from leaving the web site it is important that they find the information useful without having to look through a large number of results.

The less structured content in web search engines brings forward one aspect unique to them; the challenge with words having multiple meanings. For example, the English term "right" which can be interpreted as the opposite of "left" in one instance and the opposite of "wrong" in another.

4.1.2 Branding, Advertising and Visual Appearance

All companies emphasise name recognition and reputation as important to how users perceive their service. Some point to the importance of having a well-known brand and stress the need to build brand awareness through commercial advertisement in diverse media. Others emphasise on strong owners with a good reputation.

Web search engines appear most alert to issues regarding commercial advertising, and refrain from displaying commercial ads within the list of search results. One company also refrains from displaying commercial advertisement in separate popup windows. Yet, web search engines are in general positive to commercial advertisement on their web pages, and one company says that commercial advertisements demonstrate seriousness, though they should not be overwhelmingly dominant on the web page. All companies emphasise that

commercial ads are acceptable, and even consider them valuable content, as long as they are relevant to the users' search.

All search engines emphasise the importance of "simple" and "clean" appearance" "without disturbing elements." They do not want their pages to become overgrown, but want to keep "a professional look" to signify that they are serious in their business. Furthermore, they designate users as the decision makers with respect to how things should appear. One company pointed out that graphical navigation had a positive effect on the number of users, with more people using the service.

4.1.3 Information shall be Up to Date, Well structured and Readable

All but one search engine stress up to date information as vital. Web search engines emphasise that data should be valid and include new web pages. They also point to gradual introduction of new features, making the service more "living." One web search engine also brought attention to the display of news items among search results.

Classified ad services mainly refer to their data being up to date by means of data import frequency. These services receive parts of their data from other companies, and say that the intervals at which these data are imported affect their ability to present fresh data and offer new services to their users.

Alongside data freshness, most companies pay attention to how information is organised on the web site. Web search engines emphasise on simple navigation with tools for advanced users. Classified ad services focus on element positioning and consistent navigation, and mention that it should be easy to know one's position within the web site.

In order to increase the readability of their search results, web search engines concentrate on removing superfluous information, in the interviews described as "noise". Classified ad services also pay great attention to the removal of superfluous

information in order to increase readability, although not so much within the search results but rather from the information surrounding them.

4.1.4 Motive of Organisation

Web search engines and classified ad services appear equally concerned with how users perceive their motives, and companies of both search engine types express attention to legal issues and ethical concerns. Web search engines exemplify this by declining to include advertisement within their search results and offering filters against offensive content. Classified ad services try to motivate people to buy and sell used objects (rather than new) and suppress advertisements of illegal or harassing character.

4.1.5 Information Quality and Bias

When talking about issues related to data quality, web search engines lean to the companies they use for crawling the web, with reference to how these third parties have a better understanding of the challenges of information on the World Wide Web than the web search engines have themselves. The classified ad services, on the other hand, retrieve their own data themselves and direct focus on information accuracy by verifying that the received data is complete.

Information clarity reflects how concise the information is. Resembling readability, information clarity focuses more on information content than its presentation. Web search engines and classified ad services focus equally much on using concise language—both within information presented on the web page, and in other communication.

Three of the companies express determination to being unbiased. Web search engines uphold this through fair and balanced treatment of all sources. To classified ad services, unbiased information means that they do not censor information, but leave ads untouched. As mentioned earlier, some censorship occurs towards advertisements of illegal or harassing character. Apart from stopping such ads

completely, the ad services take no other action towards ads and even spelling mistakes remain untouched.

4.1.6   Past Experience with Site

Both web search engines and classified ad services are attentive to that users should have a positive experience with their service, and continue to use it. Classified ad services points to that people enjoy submitting their own ads by themselves.

4.1.7   Writing Tone, Customer Service, Affiliations and Corrections

Two web search engines mention issues related to writing tone. This is somewhat paradoxical, considering that web search engines are more likely to focus on content produced by third parties compared to classified ad services. Anyway, the web search services focus on keeping a low "tone of voice" and avoid offensive language.

Two companies pay attention to the importance of good customer service, and focus on the importance of personal customer service; that if a person calls the company, the company's customer service should deal with him or her in an appropriate manner.

Both companies alert to affiliations point out that while their owners are well-known Norwegian companies, they promote their independence from these.

Corrections come forward as a problem with web pages using false keywords in their META-data, which can result in pages being erroneous displayed as relevant while they are not. For example, a shop selling cars could include the keyword "Mobile Phone" in their META-data (alongside many others), and appear in the result list when people are searching for "phone."

4.2   Areas Prominent to Search Engines Companies

Noted in the chapter introduction, the companies interviewed did not appear conscious about the term credibility. A possible explanation for this may be that credibility is a recent topic in the online environment, with the study reports of Fogg

et al. (2001, 2002a, 2002b) all claiming to represent groundbreaking research of online credibility. Another reason may be that credibility is part of psychology and therefore finds its audience within academic circles rather than corporate businesses. Despite this apparent lack of awareness towards credibility, the interviews reveal that companies are attentive to several areas that affect credibility.

Of the 18 categories of credibility revealed during interview coding, six receive attention from all search engine companies, and three more categories get the attention of five search engines. There is no major tendency indicating that search engines focus on particular aspects of credibility, and the various kinds of credibility categories are fairly well distributed. However, some patterns emerge in the ordered list of categories.

4.2.1 Tendency towards Earned Credibility

Factors affecting earned credibility get the most attention. The three categories appearing at the top of the list, Information Focus, Site Functionality and Information Usefulness, are all qualities that affect credibility after prolonged exposure. These three categories refer to the search engine companies' focus on large data volumes, extensive functionality, good performance and good search relevance—all qualities that over time will lead to increased credibility (Fogg & Tseng, 1999).

Interestingly, right after the factors contributing to earned credibility comes two factors affecting reputed credibility, Name Recognition and Reputation, and Advertising.

Factors affecting the surface credibility, which resembles the first contact between search engine and user, appear after those affecting reputed credibility. The categories supporting surface credibility are Design Look, Information Design and Readability.

4.2.2 Search Engines Focus towards Factors of Expertise

The three categories ranking highest indicate that search engines focus on expertise. Paying the most attention to Information Focus, search engines focus on gathering large amounts of data, one of the central aspects of a search service. Particularly important to web search engines and their demonstration of competency, data volume also demonstrates expertise for classified ad services. While web search engines can gather data freely on the internet, classified ad services relies on users to submit their advertisement. This way of gathering data is a time consuming process; not only does it take long to collect data from individuals, but the same data expires after a relatively short period. Hence, collecting and maintaining a large set of data requires continuous effort, providing a service in which an increasing number of advertisers find it worthwhile to place their ads.

For the web search engines, the skew towards expertise becomes even stronger when their focus on collecting data is not only restricted to static web sites on the internet, but also to a wide variety of other information sources. This perspective comes forward through the category Site Functionality. The interviews introduced information sources such as updated news, maps, and directory services, giving an idea about the complexity of data sources these services must handle. Seen in the light of their strong focus on search relevance represented by the category Information Usefulness, the impression of a focus on expertise gains even more strength. A good example comes forward in how web search engines aim at interpreting the different meanings words can take. When a word can have multiple meanings, it may be that one of those meanings dominates the resulting list of matching data sources. However, web search engines involved in this study point out that these interpretations should come forward, not letting one of them totally dominate the others.

4.2.3   Web Search Engines are more positive to Advertising

The category Advertising appears quite anonymously among the other areas in Table 1, yet behind this anonymity are some interesting differences between web search engines and classified ad services. Both web search engines and classified ad services are positive to commercial advertising on their web pages, as commercial ads give income to the search engines.

Although positive to commercial ads in general, all three classified ad services interviewed state commercial advertising on their web page as a challenge in the sense that users are accustomed with online content being free (of charge). However, all three companies include commercial advertisements on their web pages, even though the classified ad services have income from those submitting the classified ads. Contrary, only one web search engine mention a similar challenge of balancing between commercial advertisements and a good user experience. A notion put forward by one of web search engines enhances the imbalance; that commercial ads may actually contribute to a higher degree of perceived seriousness for a web page.

One explanation to this difference in accepting commercial ads can be that web search engines have a stronger tradition for displaying commercial advertisements on their pages. Opposed to classified ad services, which usually charge their customers for submitting advertisements into their databases, web search engines have no tradition for charging neither users nor web page authors. Hence, they have a strong tradition for sponsorship through commercial advertising. Whether classified ad services have a less strong tradition for displaying commercial advertisements on their web pages is pure speculation, but the fact that they point out commercial ads as a problem far more often than web search engines, leads one to think it may be so.

4.2.4   Advertisements as Useful Content and Personalisation

All search engines emphasise that ads which display alongside similar search hits adds value to the search engine—not only in the sense that the search engine

receives money for displaying the ad, but also that the user gets access to the ad in a context where it might be useful.

This kind of "smart" advertising demonstrates expertise by displaying relevant ads next to the search, and trustworthiness by *not* displaying irrelevant ads, for example shampooing products and microwave ovens next to a "car rental" search. Consequently, context sensitive advertisement can lead to increased credibility. On the other hand, if the context sensitive ads displayed erroneously, the consequence could be a severe drop in credibility, which could take a long time to regain (Tseng & Fogg, 1999, in Wathen & Burkell, 2002).

Fogg (2003a) refers to this behaviour as personalisation, which can increase credibility in two ways. First, as already mentioned by demonstrating expertise, and second by making people believe the web site understand their preferences (p. 172). As mentioned in the methodology chapter, my list of topics for the interviews included the term personalisation. The intention behind including this topic was to find out what the search engines would associate with it.

When faced with the topic "personalisation," one company mentioned implicit personalisation by reference to how the online store Amazon.com recommends books, CD's and other goods based on what others have bought before. The same company also gave the example of how the web search engine Google suggests alternative spellings of a search term based on how other people have searched. However, most of the companies consider personalisation as a way of customising data presentation to known users, that is, users known to the service by a user name. In that sense, all the classified ad services are personalised *per se*, as users (usually) log in and submit their advertisements, after which they can view (and change) them without having to search for them first. In other words, the classified ad services present the logged in users with a list of their own personal data.

The commercial dimension of advertising is important, but the fact that search engines does not recognise context sensitive advertisement as a way of

personalisation may indicate a low level of awareness towards factors contributing to credibility.

In defence of classified ad services, one explanation to this apparent neglect of context-sensitive ads as a way of personalisation can be that they are common to logged in users and consequently see personalisation in that perspective. In support for the web search engines interviewed, although less plausible as an answer, all of them utilise the services of third parties for the factual search process, and may therefore not be aware of the connection between search terms and advertisements. On the other hand, one would expect each search engine to facilitate advertisement sales themselves. Thus, another answer may be more relevant. Two of the web search engines are not currently live, and being in an early state their focus might have been elsewhere when the interviews took place. Finally, it may simply be that the representatives I interviewed were not involved in, and therefore not conscious about, connecting advertisement to search terms.

Nevertheless, the fact that neither kind of search engines sees context sensitive ads as a way of increasing credibility through personalisation, supports the initial notion the Norwegian search engines are not consciously aware of their products' credibility.

5 Search Engines versus Users

The second research question lies out to compare whether search engine companies focus on the same areas as users. Does companies' focus harmonise with the elements found to be most important to users' assessment of credibility?

5.1 Comparing Company Interviews and Users Comments

The first research question aims at comparing what companies emphasise as important to their credibility with what previous studies have found users to focus on. Although appealing, such a comparison is not straightforward. Does the target audience in the user study match that of the search engine companies? Do the studies measure along comparable scales? How does the utilised methodology affect comparability between studies? Does the user study measure expectations or real life behaviour? Finally, as the online environment changes fast, are the results from the former study still valid?

Fogg et al. (2002b) represents a user study suitable for comparison. The study utilised an online survey with more than 2.500 respondents, and asked people to evaluate and comment on the credibility of web sites. The study included 100 web sites evenly distributed across ten types, one of which was search engines. After ranking two randomly selected web sites within one of the ten types as either more or less credible, most respondents provided free-text comments about the sites' credibility. The researchers coded these comments into categories representing aspects of credibility and ranked the categories by number of comments, thereby giving a measure of which credibility aspect users paid most attention to, both across all ten web site categories and within each type of web site.

5.1.1 Demographics

For their study of how users evaluate credibility online, Fogg et al. recruited participants through non-profit groups with the incentive of five U.S. dollars for

each respondent completing the study (the respondents chose themselves which non-profit to donate to). The study aimed at recruiting participants with a "diversity of ages, income levels, political leanings, and more" (Fogg et al., 2002, p. 13). Participants were not required to leave demographic information, "yet 60.1 percent of the participants did so" (p. 14). The resulting demographics reveal 58.1 percent female and 48.1 percent male participants. The average age was 39.9 years, and the average participant used the web 19.6 hours per week. "The vast majority of participants live in the U.S." (p. 14).

This demographic group appears representative for the purpose of comparison. All but one of the companies I interviewed defines their target group very loosely as "everyone," and neither company had any specific profile of its "ideal" user. The last company target real estate brokers and interested buyers of private or business property. One of the web search engines tended to express values favouring younger users, but this may be the result of my interpretation as the company representative was young and lively. In fact, when I asked about target audience, the company representative said that they did not any particular users. Among the classified ad services, one company noted the exception of people looking for cars, dominated by male users. The other sections of the ad service had an even distribution of male and female users. All the companies are Norwegian and focus on the Norwegian market.

The study by Fogg et al. has a slight dominance of female users and the average user is neither particularly young nor particularly old. This goes well with the target audience of the companies I interviewed. The one thing with the most impact on the comparability is that American users dominate the study by Fogg et al. whereas the companies I interviewed all focus on the Norwegian market. However, as mentioned in the introduction both Norway and the U.S. represent the cultural values upon which the literature on credibility for this study finds its base. In addition, Fogg (2003a) notes that in two successive studies of online credibility, score averages between "U.S. and Finnish respondents closely matched" (p. 153).

Finally, Norman (2004) opens his book with a story of a suspicious Israeli scientist. A Japanese experiment had shown that ATMs with buttons and screens arranged attractively were perceived to be easier to use than less attractive, yet equally functional, ATMs. The Israeli scientist claimed aesthetic preferences to be culturally dependent, and based on the notion of Israelis as action-oriented he repeated the experiment. However, "not only did he replicate the Japanese findings, but … the results were stronger in Israel" (p. 18). Thus, national differences—even across cultures—have little significance to how people perceive aspects affecting credibility. Consequently, different nationality is insignificant when comparing the findings from credibility studies conducted in the U.S. and Norway.

5.1.2   Measuring Along Similar Scales

Besides demographic coherence, measurements must follow similar scales in order for the studies to be comparable. In their study, Fogg et al. used a coding scheme with 24 categories, each category representing a quality or aspect of web sites affecting their credibility. Five credibility guidelines from Consumer WebWatch formed the scheme basis (see Fogg et al., 2002, pp. 102-103; WebWatch, 2005) and the researchers supplemented these with "emerging themes in the consumer comments themselves" (Fogg et al., 2002, p. 20).

In order for my study to provide findings comparable to the ones from Fogg et al., I decided to adopt their coding scheme for the coding of my interviews. As it provides a framework for categorising data, utilising an existing coding scheme may seem appealing and trivial. However, using an existing coding scheme also introduce some challenges.

First, one must understand the scheme. What information goes into which category in the scheme? This becomes particularly important with a detailed scheme such as the one used by Fogg et al. Of the 24 categories, some describe clearly different aspects affecting a web site's credibility while others represent nuances. As a result, coding along the rough lines of the scheme is trouble-free, whereas

differentiating between the nuances is far from trivial. Providing assistance for dealing with these nuances, Fogg et al. include their coding scheme in an appendix, revealing not only the categories with their codes and explanations, but also example comments for each code. Although these are examples of user comments, they proved helpful to distinguishing between the closely related categories in the coding scheme.

Second, some codes in the scheme may remain unused when coding different kinds of data. In my case, the interview coding resulted in data for 18 categories. This leaves six of the 24 categories from Fogg et al. unused. These six unused categories were Identity, General Dislike, General Suspicion, Privacy, Performance on Test by User and Sponsorship. Identity, Sponsorship and Privacy are among the WebWatch (2005) guidelines, which are mostly concerned with disclosing information on the web site. The fact that these categories remained unused does not mean that the companies were not attentive to their identity, sponsorship or users' privacy. Rather, it implies that the companies did not stress disclosing these on their web pages as recommended by WebWatch. The remaining three categories, General Dislike, General Suspicion and Performance on Test by User, were simply not relevant. The former two refers to how users' general opinion about the web sites, while the latter third includes comments regarding how users tested the web sites.

Finally, a third problem with using an existing coding scheme is that it might not capture all relevant data. This could be particularly relevant in this case as the data sources are very different, representing user comments on the one hand and company perspectives on the other. I approached this problem by "scheme triangulation." I first created an independent scheme by coding the interview data iteratively, letting the scheme categories emerge from the data. This resulted in a coding scheme with 23 categories. Independent of the first coding I thereafter coded the interviews along the scheme from Fogg et al., resulting in a second coding scheme utilising 19 of the 24 categories as described above. Finally, I compared the categories in both coding schemes, searching for matches between them. As the

scheme from Fogg et al. is quite extensive, searching for matches became a question of translating category names and grouping similar categories from the first iterative scheme. Eventually, this resulted in all categories from the first scheme to match with a category in the scheme from Fogg et al.

Ultimately, although coding the interviews was a complicated process, I consider the resulting data to be accurate and illustrative to what came forward during the interviews.

5.1.3 Methodological Differences

Fogg et al. (2002b) found "design look" to be the by far most commented factor affecting the credibility of the web sites included in the study. Based on their knowledge from previous studies, this finding came somewhat surprising to the researchers. Previous studies suggested users would evaluate privacy policies as important to web site credibility, whereas the new study found this to have little influence on credibility as "fewer than 1 percent of the comments about the 100 Web sites mentioned anything about a privacy policy" (p. 86). Fogg et al. explains this difference with reference to Prominence-Interpretation theory. Utilising phone interviews and online surveys, the previous studies had asked people to assess the anticipated impact certain aspects would have on web site credibility, "such as knowing who owns the Web site and having a privacy policy" (ibid., p. 85). In other words, these earlier studies asked about peoples' interpretation. The new study, on the other hand, focused on prominence (p. 86), asking people to rate two web sites as more or less credible based on what they actually noticed.

The distinction between what people actually do and what they claim to appreciate, between prominence and interpretation, appears parallel to the methodological difference of choosing between observation and interviews. Through observation, one study what people actually does, while interviews bring forward peoples' perspectives on the issue at hand. However, the study by Fogg et al. is not one of qualitative observation, but rather one of quantitative registering. Resembling

an online survey, it lies closer to a quantitative methodology as it registers data from a relatively large amount of respondents, contrasting to the qualitative approach of observing human behaviour. Yet, the method employed has an element of qualitative methodology to it, represented by the free-text comments and their coding.

While Fogg et al. represents a quantitative study with qualitative elements in it, my study is qualitative with quantitative elements. Although not extensively present, the quantitative aspect in my study comes forward as I rank companies' focus on the different aspects affecting credibility. The comparison between web search engines and classified ad services also introduce a slight quantitative perspective to the otherwise qualitative data emerging from the interviews.

Different methodological approaches affect how data emerge. The study by Fogg et al. (2002b) resulted in 2.440 comments after filtering (p. 19-20), representing a definitive amount of information. The respondents gave their comments over the internet, and although the researchers had some influence on the setting in which the comments were given when designing the study, they could not direct and influence respondents in action. Two persons then coded the comments independently before a third person reviewed them and resolved any discrepancies (p. 20).

Conversely, I collected my data taking notes and recording interviews with six company representatives. Adding to the tangible notes and recordings come my interpretation of what the respondents said. In other words, the information was less definite than that of Fogg et al. Furthermore, during the interviews I sometimes asked for more information about a topic or initiated talk about another topic. Hence, I had considerable influence on the respondents and their replies. Finally, I coded the interviews without the opportunity of having them reviewed by another person.

Do these differences in methodology affect comparability between the studies? In the perspective of Prominence-Interpretation theory, the study of Fogg et

al. appears as one of prominence whereas my study is one of interpretation. As described by Fogg (2002), prominence and interpretation are not variants of the same, but sequential steps in the process of assessing credibility. First, one notices something, what is prominent, and then one makes a judgement, an interpretation, of whether it is credible or not. This explains why different studies land on different conclusions with respect to what do people evaluate as credible—some studies evaluate what people find prominent, while others evaluate their interpretations. The question affecting the comparability of Fogg et al. and my study is whether mine is one of prominence or interpretation. The answer to this lies in how I gathered the data—how I conducted the interviews.

Described earlier, I used an open approach in my interviews. Rather than asking the companies what they consider important to their credibility among users, I directed interviewees towards issues relating to credibility using a list of relevant topics. Thus, the responses reflect companies' stated actions towards issues affecting their credibility, and not their idea of what make them more or less credible. Although this is not purely an observational approach to investigating companies' actions, it resembles the element of prominence stronger than that of interpretation in Fogg's theory. Consequently, both studies capture the same dimension of credibility assessment, although in a different manner.

5.1.4 Timeliness

The final issue regarding comparability of the studies is about their distance in time. Normally, comparing two studies three years apart should not be a problem. However, on the internet, three years is a significant period during which new technologies enter the market, existing ones improve, and people change their habits. The internet-based telephony company Skype is a good example.[4] During the two years since its establishment in 2003, Skype has grown from being a company to

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[4] See www.skype.com.

becoming a phenomenon, providing people all over the world with the opportunity to call each other over the Internet free, or from the internet to regular and mobile phone networks at local prices.

Another example of how internet changes are two studies conducted by Fogg (2003a) at the Stanford Persuasive Technology Lab. The first study took place in 1999. The second study took place in 2002 and was a follow-up of the first study. However, Fogg and his co-researchers "discarded a few questions that seemed outdated, reworded a few questions, and added some questions to probe new issues in the shifting landscape of Web use and technology" (p. 150) for the second study.

The examples above suggest that the three years between my interviews and the study by Fogg et al. (2002b) may affect the comparability of the two studies.

5.2   How Search Engines' Focus match Users' Assessment of Credibility

Comparing the interview findings with the research results from Fogg et al. reveals a moderate correlation between users' evaluation of online credibility and companies' attention to aspects affecting credibility. Figure 1 illustrates how the areas affecting credibility correlate between the user study of Fogg et al. and the interviews with search engine companies conducted in this study. To prevent from skewing how categories correlate, categories that only appeared in one study are marked out rather than removed.[5]

Eight of the 16 matching categories have relatively high correlation, marked with thick lines in Figure 1. Distributed fairly well, the correlating categories show a tendency to cluster towards the categories with higher ranking among users as well as companies. In addition, five of the eight categories relate to information quality; information focus, usefulness, accuracy, clarity and bias. With seven (comparable)

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[5] Fogg et al. (2002b) does not disclose the results for categories with less than 3% incidence. This explains why Currency of Information does not appear in the list over what users evaluate. The category Corrections received no comments in their study.

categories relating to information, this indicates clustering towards aspects regarding content.

Four categories correlate moderately, marked with thinner lines in Figure 1. The remarkable with these categories is how evenly dispersed they are, both in terms of ranking and category type. To the extent that there is any kind of clustering between these four categories, it is that they skew towards organisational qualities, represented by the two categories Affiliations and Motive of Organisation.

Finally, another four categories shows low correlation, marked with broken lines in Figure 1. This last group appears even more dispersed than the groups of high and medium correlating categories. Furthermore, this group is even more diverse in "content" than the group of categories with medium correlation, spanning from Information Design to Readability, continuing with Past Experience with Site before ending in Name Recognition and Reputation.

Users Evaluate

Design Look

Information Design

Advertising

Information Focus

Site Functionality

Information Usefulness

Motive of Organisation

Performance on Test by User

Past Experience with Site

Information Accuracy

Writing Tone

Name Recognition and Reputation

Affiliations

Identity of Site Operator

Information Clarity

Information Bias

Readability

General Suspicion

Customer Service

Companies Attend to

Information Focus

Site Functionality

Information Usefulness

Name Recognition and Reputation

Advertising

Design Look

Currency of Information

Information Design

Readability

Motive of Organisation

Information Accuracy

Information Clarity

Information Bias

Past Experience with Site

Writing Tone

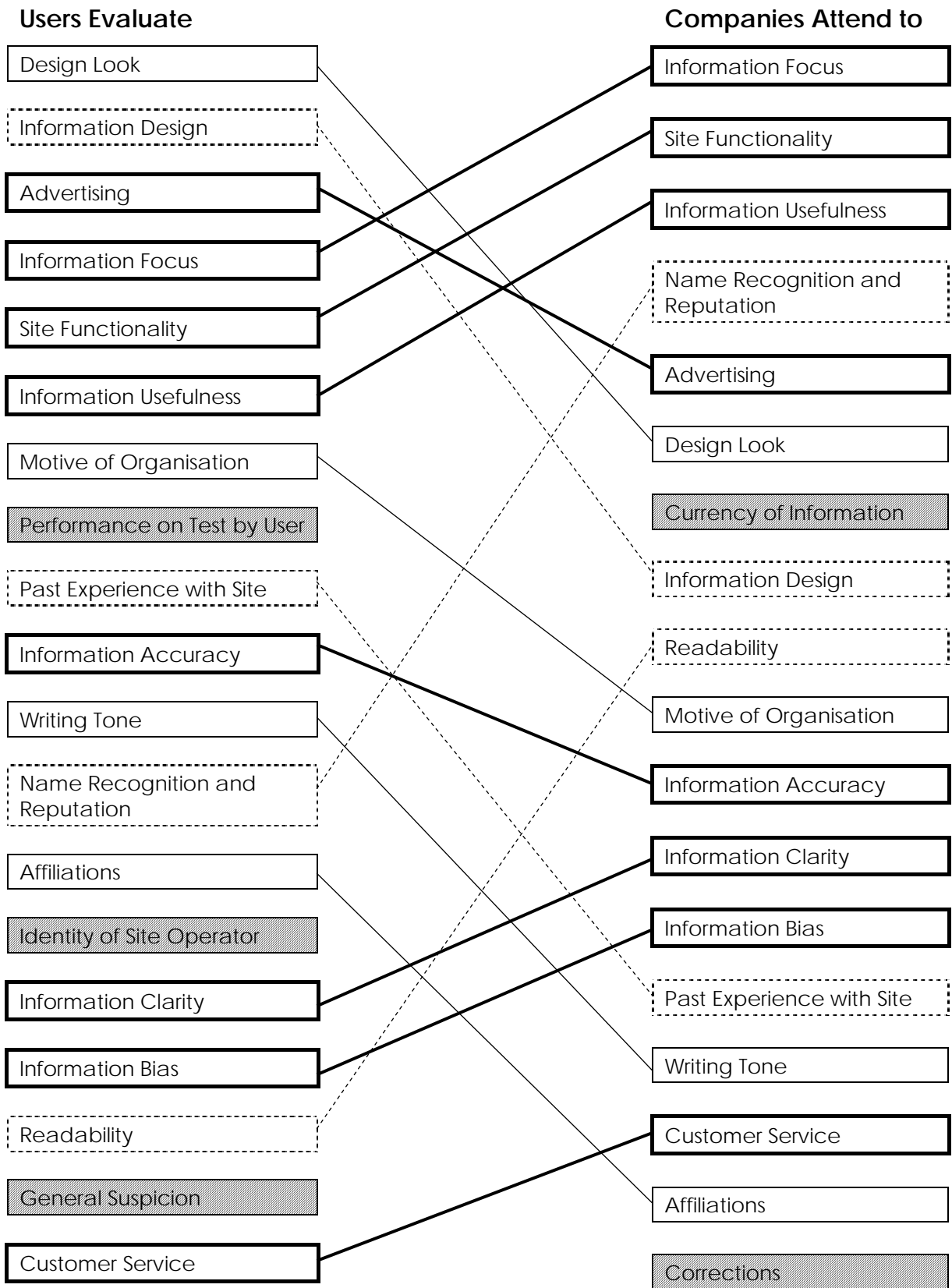Customer Service

Affiliations

Corrections

Figure 1: Correlation between Users' Credibility Assessment and Company Focus.

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5.3   Degree of Correlation between Search Engines and Users

Of the total 18 categories used after coding interviews with Norwegian search engine representatives, 16 categories have a corresponding category among those used by Fogg et al. (2002b). Eight of these 16 categories correlate relatively close. With a relatively high correlation for 50% of the comparable categories, it appears that the search engine companies in general are in line with what users focus on when they assess search engine credibility. A closer look at Figure 1 gives strength to this notion, as four of the categories with high correlation are among the top six categories in both studies. Among the remaining eight categories, four have medium correlation and the last four does not correlate very well.

The comparison reveals many interesting patterns for discussion, and there is not room to discuss all in the space available here. I therefore focus on the perhaps most evident, and to some degree extreme, patterns emerging.

5.3.1   No Strong Correlation between Search Engines and Users

The share of categories with relatively high correlation is large at 50%. However, none of these relatively highly correlating categories is equally important to users and search engine companies. There is no strong correlation between users' assessment of credibility and search engines attention to aspects affecting credibility. There are several possible explanations to this lack of strong correlation.

Given that one would expect strong correlation between some categories, signifying that search engines and users approach credibility similarly, the most obvious explanation is that the data represents the situation as it is, and that the Norwegian search engines interviewed in this study simply are not in line with the users in the study by Fogg et al. (2002b).

It may also be that the users do not match with the target audience for the search engines. This calls for a new study, investigating how Norwegian rather than U.S. users assess search engine credibility. However, if the assumption that cultural

differences have little influence on credibility holds, there is no need to conduct such a study and the explanation lies somewhere else.

Another explanation may be that the two studies do not measure the same thing. Described earlier, Fogg's (2002) Prominence-Interpretation theory explains how studies of credibility may land on very different results and still be independently valid. With this in mind, it may be that the approach of interviewing company representatives does not give a picture comparable to the study by Fogg et al. (2002b). Consequently, one should conduct a new study investigating how search engines attend to aspects affecting credibility, but rather than utilising the interview approach, it should shift towards one of observation.

Alternatively, the lack of strong correlation may be explained with reference to the main features of the ELM, and how the level of motivation affects how one judge credibility. A somewhat extensive topic, I shed light on this alternative in the following sub-chapter.

5.3.2 Search Engines Focus on Quality, Users on Presentation

Figure 1 shows that users in the study of Fogg et al. (2002b) focus on the presentational aspects Design Look and Information Design. Design Look relates to the visual look of a web site, and Information Design relates to how information is structured or organised and how easy navigation is.

On top of the list of categories to which search engine companies pay attention are the qualitative aspects Information Focus and Site Functionality. Information Focus relates to how extensive the information is, and Site Functionality relates to technical performance and the services offered. Although both Information Focus and Site Functionality have a relatively strong correlation, they appear at the opposite end of the spectrum when compared with the two qualities users consider most important.

To Fogg et al. (2002b) the dominant position of Design Look came as a surprise as it stood out as "the most prominent issue when people evaluated Web site

credibility" (p. 58). Although expressed in the context of the study's overall coverage of web sites, this finding was particularly dominant to search engines with 52.6% of the comments on search engine credibility relating to design look, with the second most commented quality ending at 42.6% and the third at 24.6%.[6]

Scholars of persuasion support the perspective that pleasing appearance might have a positive effect on credibility. The earlier mentioned example of the sceptical Israeli scientist who with overly success repeated a Japanese experiment, finding aesthetics to shape peoples' perception of ease of use, clearly confirm this (Norman, 2004). Similarly, Fogg et al. (2002b) explains the surprising focus on Design Look with reference to psychological research showing that "physically attractive sources (usually people) have been perceived to be credible sources" (p. 58).

Furthermore, Fogg et al. point out that in their study, respondents were not motivated by deep personal interest or need, but by the incentive of a donation for a non-profit organisation. With reference to the ELM, Fogg et al. explains, "Without deep motivation, people will rely on peripheral cues, such as appearance, for making [credibility] assessments" (p. 58).

Critchfield (1998, in Wathen & Burkell, 2002) supports this as "information coupled with a well-designed interface and attractive graphics may result, in the absence of more substantive cues, in a tendency for users to make a positive credibility judgment" (p. 138). The reference to the absence of more substantive cues resembles not only the central route to persuasion in the ELM, but also Slater and Rouner's (1996, in Wathen & Burkell, 2002) description of how presentation can affect credibility. Slater and Rouner say that message presentation can influence how a source is perceived to be credible, but "if a source is initially seen as expert and credible … the message and source are more likely to retain credibility in the face of poor presentation" (p. 137).

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[6] In the study of Fogg et al. (2002b), only financial web sites got a higher score for comments regarding visual appearance.

During the interviews, the search engine representatives were enthusiastic and deeply focused on providing users with the highest quality possible. They were eager to develop a service capable of supporting the deeply motivated user. This does not mean that they did not pay attention to the visual appearance of their web sites, but as Figure 1 shows, they were more concerned with qualities supporting the motivated user. This contrasts with the users participating in the study of Fogg et al. (2002b), who according to the researchers "did not likely have the motivation to process the Web sites deeply" (p. 58).

Conclusively, it may be that if compared with a study involving more motivated users, correlation might be stronger between search engines' focus and users' assessment of credibility.

5.3.3   Should Norwegian Search Engines Shift Their Focus?

Users and companies are not in line with respect to which quality of credibility is most prominent. However, Figure 1 reveals that although users pay more attention to the visual features of search engines, user and company perspectives correlate relatively well if one disregards users' focus on visual appearance. This indicates that although users' primary determinant when assessing the credibility of search engines is its visual characteristics, the qualitative aspects form a close follow-up.

The almost immediate presence of the qualitative characteristics following users' main focus on visual appearance, indicate that once users' break the "visual barrier," their attention match the areas towards which search engine companies attend. Figure 1 does not reveal the relative distance between the categories considered most important to users, but to shed some light on the topic, the categories Design Look and Information Design have 52.6 and 42.6 percent, respectively. Information Focus follows with half the score of Design Look at 24.6%, just 0.1% behind Advertising.

This staged behaviour, if relevant to denote the ranking of categories as staging, match the model proposed by Wathen and Burkell (2002). In their model,

credibility evaluation is a staged process where users go through each stage before landing on a final credibility assessment. Adapted to how users in the study of Fogg et al. (2002b) place importance on different factors affecting credibility, the model by Wathen and Burkell appears confirmed. As Wathen and Burkell suggests, users clearly pay most attention to the surface characteristics of search engines. It is not clear from the data that users accepting the search engine after a visual inspection will continue with an inspection of the information. Yet, with a basis in more users commenting on surface than on content characteristics in the study by Fogg et al., it is reasonable to believe that users rejecting the search engine after initial inspection can lead to the lower number of comments regarding content.

If the observation above is correct, the Norwegian search engines may face some challenges attracting new users. As mentioned above, the study by Fogg et al. (2002b) did involve users with assumable low motivation, resulting in a higher rejection based on visual cues than if the users were highly motivated. Although one should take about judging users, such cursory users may not be in the main target group of Norwegian search engines. This attitude is however less likely. Consequently, the dominating focus content qualities have over visual characteristics in Norwegian search engine companies may result in slow user acceptance.

5.3.4 Highly Correlating Categories Cluster towards Content

Five of the eight categories with a relatively high level of correlation are directly concerned with content qualities. The categories are Information Focus, Information Usefulness, Information Accuracy, Information Clarity and Information Bias. Not only do these five categories represent the majority of the seven categories directly related to content quality, but they also appear in the same order in both studies. Also worth noting is that except for the category Information Accuracy, all categories rank relatively higher among search engines than users. This indicates that search engines pay more attention to aspects affecting peoples' motivation than their cursory behaviour.

6 Search Engines' Dedication to Credibility

The third research question aims at measuring search engines' level of commitment towards creating services with high credibility.

6.1 Methods Indicating Dedication to Achieve High Credibility

With one exception, all companies interviewed define their target audience as "everyone" (who has internet access). With this as a starting point for investigating companies' commitment to maintaining high levels of credibility, I present the methods that the companies involved in this study say that they utilise.

During all interviews, I asked if how the companies learned about users' preferences. Sometimes I asked in relation to a particular area of interest. On some occasions this lead to the interviewee mentioning other methods as well. In addition, I sometimes asked, "Which methods do you use to understand what your users appreciate?"

Table 2 shows all the methods mentioned during the interviews, ordered by the number of companies who said they utilised each method. Methods used by the same number of companies appear alphabetically. To preserve anonymity towards the companies yet allow for comparison between web search engines and classified ad services, I have grouped Table 2 by company type.

In the following, I present the companies' perspectives to each of the methods listed in Table 2. I present the methods in the same order as they appear in the table.

Table 2: Methods Utilised for Understanding Users' Preferences

	Frequency		
Method	Web search engines	Classified ad services	Rank (N=6)
User Testing	3	3	6
User Feedback	3	2	5
Expert Evaluation	2	2	4
Traffic Log Analysis	1	3	4
Client Feedback	2	1	3
Market Analysis	2	1	3
Online Polls	2	1	3
Benchmarking	2		2
Focus Groups	2		2
Online Surveys	1	1	2
Ad Hoc Groups	1		1
Seminars		1	1
Telephone Surveys	1		1
Version Comparison		1	1

6.1.1 User Testing

All companies conduct so-called user tests on their services, that is, early tests of new functionality or concepts in order to reveal and resolve potential pitfalls before going live with the new or improved service. The companies recruit test participants both through external agencies and by themselves. When recruiting internally, participants appear as friends or family of employees within the company—not as employees.

Alongside the split of internal and external recruiting to user tests, some companies conduct the user tests themselves while others prefer external agencies. Interestingly, they use the same argument as both benefit and detriment. Some companies find it superfluous to possess the competency to conduct user test within

their own company, while other companies consider this competency a valuable resource.

Companies told that user tests are highly useful, and have solved various issues. One company noted that they prefer conducting small user tests frequently during product development, as they are less time-consuming to conduct and resolves most issues effectively.

6.1.2   User Feedback

Most companies appreciate the feedback they get directly from users, both as e-mail, through online forms available on the search engine or ad service's web page. Companies find this feedback valuable in product development. Yet, they also point out that most feedback come from people who appears involved in the service.

6.1.3   Client Feedback

Feedback also comes from company clients, usually in the meeting with sales representatives who forward the feedback to their company. To most companies, and maybe particularly to the web search engines, the clients are buyers of advertisement space. As one might assume these clients' satisfaction to rise when they get more advertisement space or sales increase, one can question whether this feedback contributes positively to credibility.

6.1.4   Expert Evaluation

The majority of the companies say that expert evaluation contributes to increase the usefulness of their products. Most companies refer to this by terms of how the knowledge of company employees contributes to the product development. Yet, one company also include external experts, represented by students of informatics, in their description of "expert evaluation."

6.1.5 Traffic Log Analysis

Most companies mention analysis of traffic log as a method for understanding user behaviour. However, as two of the web search engines are not yet live, the classified ad services both mention this method more often and appear more experienced with how they are used. Among the classified ad services, tools for advanced analysis are either already in place or in use. One of the classified ad services has just introduced a tool for advanced analysis of traffic logs.

6.1.6 Market Analysis

Half the companies interviewed refer to market analysis as a source for learning about user preferences in the online environment. One of the companies refer to the Norwegian agency TNS Gallup, which regularly compare and rank different internet sites in Norway by their number of visitors.[7] Companies have to subscribe in order to be included in the ranking, which currently include all companies interviewed in this study—either directly or, in the case of Schibsted and Findexa, indirectly by one or more of their existing internet sites.

It is not certain whether the other companies refer to TNS Gallup when they mention market analysis, but as they are all included in their ranking it seems likely to believe they are. In addition, knowing that all companies are included in the ranking, one might expect all companies to keep an eye on these analyses. Hence, the data appears incomplete at this point with only three companies mentioning market analysis.

6.1.7 Online Polls

Half the companies use online polls as a method for collecting data from users. These polls usually take the form as popup windows, but one company explicitly mention

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[7] The latest analysis appears on this internet page: http://www.tns-gallup.no/index.asp?type=tabelno_url&did=185235&sort=uv&sort_ret=desc&UgeSelect=&path_by_id=/12000/12003/12077/12266&aid=12266.

that they find such windows disturbing to their users and instead include links to the poll on their web page. Interestingly, another company argues the contrary—that users do not discover links to polls on their web page—and consequently use popup windows to increase response rates. Some companies design and execute the polls internally while others hire external agencies.

Companies emphasise online polls as useful to their product development. Yet, they also point out that most responses tend to come from involved users—users that actively use the service and thus appear interested in contributing to its further development. These responses are mostly positive. Negative responses also occur, but in smaller numbers.

6.1.8 Benchmarking

Two web search engines mention that they benchmark themselves against other actors in their market segment. To some degree, this is similar to following market analyses such as the one by TNS Gallup mentioned above, yet benchmarking also includes self-conducted performance tests and comparison with international actors.

6.1.9 Focus Groups

Two web search engines utilise focus groups to learn about user preferences. They both recruit and conduct the focus groups using external agencies, but participate as observers to get insight into the responses.

6.1.10 Online Surveys

Online surveys get similar attention from web search engines and classified ad services. Opposed to online polls, which most often appear as popup windows, online surveys are more extensive and requires more effort to develop and conduct. Consequently, both companies mentioning this method rely on external providers for designing and conducting these surveys.

6.1.11 Ad Hoc Groups

One web search engine mentioned the use of ad hoc groups for investigating users' preferences. Unlike focus groups, which usually takes place in a controlled setting and has a strong moderator, the ad hoc groups mentioned took on a more intervening form by asking youths about their preferences out on the street.

6.1.12 Seminars

One might say that attending seminars is not a method for understanding what users appreciate, and that this method should rather be included in expert evaluation above. However, as the focus of this part of my thesis is to understand how devoted search engine companies are to understand and learn what users appreciate, I find participation on seminars relevant as a separate method.

The company mentioning seminars say that seminars help understanding users from the perspective of other companies. Seminars also introduce new challenges and perspectives on how to solve them.

6.1.13 Telephone Surveys

One company mentioned telephone surveys as a way of investigating users' preferences. The company conduct all such surveys externally.

6.1.14 Version Comparison

One company mentioned version comparison as an emerging and interesting approach to evaluating new product versions, for example to find out whether a certain change has positive or negative effect on users' success. The approach is to compare two versions of the same service running simultaneously, and compare the results for each version. The method is currently emerging in the U.S., and the company had not tried this method themselves.

6.2   Search Engines' Concern for Users

The search engines involved in this study utilise a large variety of methods for understanding their users. However, the number of companies who use each method is rather small, indicating that differences between companies is large. Web search engines utilised both the greatest variety of methods, and are more active in their testing. Classified ad services stand out as heavy users of traffic log analysis.

The most used method is User Testing, which all companies employ. Thereafter, companies listen to the feedback users give, and rely on their own expertise. Feedback from customers also plays an important role, with Market Analysis, and Online Polls following.

Surprisingly few companies make use of market analysis, seen in the light that all companies are included in the market analysis performed by TNS Gallup. The reason for this may be that the company representatives did not know whether they were part of the analysis. It may also be that the market analysis was not considered as a method for understanding users, and thus was not mentioned in the interview.

7 Conclusion

This study has investigated how Norwegian search engine companies recognise credibility in their products. With a basis in interviews with search engine representatives, I have investigated their areas of focus with respect to credibility. With a basis in a former study, I have compared search engine companies' focus towards credibility with that of search engine users. Finally, I have looked at how dedicated search engines are to developing credible search engines by considering the methods they use for understanding users' preferences.

7.1 Search Engines' Focus on Aspects Affecting Credibility

Through the interview analysis, I found that the search engine companies focus mainly on aspects affecting earned credibility. They primary focus is on information quantity, performance and functionality, and search relevance, all aspects effecting users' perception of credibility through repeated experience.

The areas of focus are also signifiers of expertise; if companies demonstrate that they actually have a wide collection of content, that their performance is good, that their functionality is valuable and their search results highly relevant. If they manage to demonstrate mastering these areas, they certainly demonstrate their expertise.

Adding to these aspects of search engine's focus on credibility, I highlighted their perspective on advertising. Both kinds of search engines, web search engines and classified ad services, are positive to commercial advertisement, although classified ad services express more concern to the dilemma of making services useful versus displaying commercial ads on their web pages. All search engines also acknowledge context sensitive ads as advantageous over traditionally static ads. However, none of the search engines recognises context sensitive ads as a way method for improving their perceived credibility among users. Thus, search engines do not appear to be consciously aware of how to increase their credibility.

7.2 Level of Correlation between Search Engines' and Users' focus

Having identified search engines' focus on aspects affecting credibility, I compared the findings with those of a previous study investigating what users find most important when evaluating the credibility of search engines.

The comparison revealed that there is no strong correlation between search engines and users attention towards areas affecting credibility. However, relative correlation is high among half of the corresponding areas affecting credibility. Furthermore, most of the areas with relatively high correlation relate to content quality.

The comparison also revealed that while search engines focus on aspects affect earned credibility, visual appearance strongly dominate the factors users judge when assessing credibility. Fogg et al. (2002b) explain this mismatch with users not being deeply motivated when evaluating the credibility of search engines.

However, the Norwegian search engines involved in this study might benefit from focusing more on visual appearance in order to meet users as more credible.

7.3 Search Engines' Dedication to Understanding Users

The last part of this study focused on how dedicated search engines are to understanding their users. The measure employed investigated which methods search engine companies use to learn about users' preferences.

In general, search engines appear dedicated to understanding their users. The number of methods used by search engine is long, yet it gets less support across companies. This indicates that different companies use different methods. Furthermore, web search engines appear to be more dedicated to understanding users than classified ad services.

7.4 Implications for Search Engines

The findings indicate that search engines are less aware of the aspects affecting credibility. This notion first comes forward through their lack of acknowledging

context sensitive advertising as a method for personalisation and thereby a way of increasing credibility. Second, the comparison between search engine companies and users indicate that search engines do not meet users' focus on visual appearance in credibility assessments. Although search engines are not at level with users with respect to visual appearance, both search engines and users pay equal attention to aspects of information quality.

This apparent lack in recognising the dimensions of credibility suggests that the Norwegian search engines involved in this study might benefit from an increased awareness of credibility. From the investigation of their dedication to meet users' preferences, one might suggest that search engines increase their use of different methods for understanding what users appreciate.

7.5 Areas for Further Inquiry

This thesis has identified some correlations and some discrepancies in how search engines companies and users focus on aspects relating to credibility. However, the user study utilised is from 2002, and as the online environment changes fast, a new study of how users assess credibility online should take place. Such a study should strive to observe how highly motivated users assess online credibility. Similarly, to deepen the understanding of how companies engaged in the online environment attend to credibility, studies utilising methods of observation should come forward.

8 Appendix A – Coding Scheme

This is the coding scheme adopted from Fogg et al. (2002b). It appears here to explain what each category implies. For a detailed explanation, see Appendix B in Fogg et al.

Category	Description
Identity	Consumer WebWatch Guideline #1, which addresses identity issues.
Sponsorship	Consumer WebWatch Guideline #2, which addresses issues of sponsorship.
Customer Service	Consumer WebWatch Guideline #3, which addresses issues of customer service. Also, comments relating to how an organization operated were coded in this category.
Corrections	Consumer WebWatch Guideline #4, which addresses issues of correcting false information.
Privacy	Consumer WebWatch Guideline #5, which addresses issues of privacy.
Design Look	The look of the site.
Information Design	How the information is structured or organized on the site.
Information Focus	The scope or focus of the site.
Information Accuracy	The accuracy of the information on the site.
Information Bias	The perceived bias of information on the site.
Information Usefulness	The usefulness of the information on the site.
Information Clarity	How the site's content is (or is not) clear and understandable.
Readability	The site's readability––how easy or hard it was to read what was on the pages.

Currency of Information	How current (up to date) the information is on the site.
Writing Tone	The tone or attitude conveyed by the site's content.
Site Functionality	How the site functions, both technical performance and the services the site offers.
Performance on Test by User	Tells about a test the user performed to evaluate the site's credibility.
Past Experience with Site	Previous experiences people had with the site under evaluation
Name Recognition and Reputation	Name recognition of the site or the reputation of the operator.
Advertising	How users perceive advertising on the site.
Motive of Organization	The perceived motive—good or bad—of the organization behind the site.
Affiliations	The site's affiliates, supporters, or partners.

9 References

Bakken, J. B. (2005). Skal lage en bedre norsk søkemotor. [Building a better Norwegian search engine]. *Digi.no*, July 8, 2005. [Online]. Available: http://www.digi.no/php/art.php?id=216357. Last accessed July 26, 2005.

Bijker, W. E., Pinch, T. J. (1984). The Social Construction of Facts and Artefacts: Or How the Sociology of Science and the Sociology of Technology Might Benefit From Each Other. *Social Studies of Science*, Vol. 14, No. 3, pp. 399-441.

Bijker, W. E., Hughes, T. P., & Pinch, T. J. (1987). The Social Construction of Technological Systems. New Directions in the Sociology and History of Technology. Cambridge MA.: MIT Press

Bookelmann, N., de Boer, B., Rorjie, M., Knetsch, S., van der Loo, J., Tijsseling, G., & Elgersma, E. (2005). *What do People Want? Mining Query Logs*. [Online]. Available: http://ilps.science.uva.nl/Teaching/0405/PIRResources/p5-final-report.pdf. Last accessed July 24, 2005.

Fallows, D. (2005). *Search Engine Users: Internet searchers are confident, satisfied and trusting—but they are also unaware and naïve*. Washington, DC: Pew Internet & American Life Project. [Online]. Available: http://www.pewinternet.org/PPF/r/146/report_display.asp. Last accessed July 17, 2005.

Findexa. (2005). *Foreslått salg til Eniro.* [Suggest Sale to Eniro]. Corporate Press Release, September 26, 2005. [Online]. Available: http://cws.huginonline.com/F/133752/PR/200509/1013204_1.html. Last accessed September 27, 2005.

Fogg, B. J. (2002). Prominence-Interpretation Theory: Explaining How People Assess Credibility. A Research Report from the Stanford Persuasive Technology Lab, Stanford University. [Online]. Available: http://www.webcredibility.org/pit.html. Last accessed September 7, 2005.

Fogg, B. J. (2003a). Persuasive Technology: Using Computers to Change What We Think and Do. San Francisco: Morgan Kaufmann.

Fogg, B. J. (2003b). Prominence-Interpretation Theory: Explaining How People Assess Credibility Online. *Proceedings of CHI 2003*, Ft. Lauderdale, FL, April 5–10, 2003, pp. 722-723. ACM. [Online]. Available: http://credibility.stanford.edu/pit.html. Last accessed July 19, 2005.

Fogg, B. J., & Tseng, H. (1999). The elements of computer credibility. *Proceedings of CHI'99*, Pittsburgh, PA, May 15–20, 1999. ACM Press, New York.

Fogg, B.J., Marshall, J., Laraki, O., Osipovich, A., Varma, C., Fang, N., Paul, J., Rangnekar, A., Shon, J., Swani, P., & Treinen, M. (2001). What Makes Web Sites Credible? A Report on a Large Quantitative Study. Conference paper from *SIGCHI'01*, March 31-April 4, 2001, Seattle, WA, USA.

Fogg, B.J., Kameda, T., Boyd, J., Marshall, J., Sethi, R., Sockol, M., & Trowbridge, T. (2002a). *Stanford-Makovsky Web Credibility Study 2002: Investigating what makes Web sites credible today.* A Research Report by the Stanford Persuasive Technology Lab & Makovsky & Company. Stanford University. [Online]. Available: http://www.webcredibility.org

Fogg, B. J., Soohoo, C., Danielson, D., Marable, L., Stanford, J., & Tauber, E. R. (2002b). *How Do People Evaluate a Web Site's Credibility?* [Online]. Available: http://www.consumerwebwatch.org/dynamic/web-credibility-reports-evaluate-abstract.cfm. Last accessed September 14, 2005.

Hacking, I. (1999). *The Social Construction of What?* London: Harward University Press.

Henzinger, M. R., Motwani, R., & Silverstein, C. (2002). Challenges in Web Search Engines. *ACM SIGIR Forum*, Vol. 36, No. 2, pp. 11-22. [Online]. Available: http://portal.acm.org/citation.cfm?coll=GUIDE&dl=GUIDE&id=792553. Last accessed July 26, 2005.

Hoepfl, M. C. (1997). Choosing Qualitative Research: A Primer for Technology Education Researchers. *Journal of Technology Education*, Vol. 9, No. 1, pp. 47-63.

Hovland, C. I., Janis, I. L., & Kelley, H. H. (1953). *Communication and Persuasion*. (12th printing, 1970). New Haven and London: Yale University Press.

Johnson, S. (1997). *Interface Culture: How Technology Transforms the Way We Create & Communicate*. New York: Basic Books.

Johnson, T. J., & Kaye, B. K. (2004). For Whom the Web Toils: How Internet Experience Predicts Web Reliance and Credibility. *Atlantic Journal of Communication*, Vol. 12, No. 1, pp. 19-45.

Latour, B., & Woolgar, S. (1986). *Laboratory Life: The Construction of Scientific Facts*. New Jersey: Princeton University Press.

Mitcham, C. (1994). *Thinking through Technology. The Path between Engineering and Philosophy*. Chicago. The University of Chicago Press.

Norman, D. A. (2004). *Emotional design. Why We Love (or hate) Everyday Things*. New York: Basic Books.

Petty, R. E., & Wegener, D. T. (1999). The Elaboration Likelihood Model: Current Status and Controversies. In S. Chaiken & Y. Trope (Eds.), *Dual process theories in social psychology*. New York: Guilford Press, pp. 41-72.

Princeton Survey Research Associates. (2002). *A Matter of Trust: What Users Want From Web Sites. Results of a National Survey of Internet Users for Consumer WebWatch*. [Online]. Available: http://www.consumerwebwatch.org/news/report1.pdf.

Renn, O., & Levine, D. (1991). Credibility and trust in risk communications. In R. E. Kasperson & P. J. Stallen (Eds.), *Communicating Risks to the Public*. Dordrecht: Kluwer, pp. 175-218.

Ryvarden, E. (2004). Du kan ikke stole på Google [You cannot trust Google]. *Digi.no*, October 4, 2004. [Online]. Available: http://www.digi.no/php/art.php?id=110336 Last accessed September 14, 2005.

Stanford, J., Tauber, E. R., Fogg, B.J., & Marable, L. (2002). *Experts vs. Online Consumers: A Comparative Credibility Study of Health and Finance Web Sites*.

Wajcman, J. (2000). Reflections on Gender and Technology Studies: In What State is the Art? *Social Studies of Science*, Vol. 30, No. 3, pp. 447-464.

Wathen, C. N., & Burkell, J. (2002). Believe It or Not: Factors Influencing Credibility on the Web. *Journal of the American Society for Information Science and Technology*, Vol. 53, No. 2, pp. 134-144.

WebWatch. (2005). Credibility Guidelines. [online]. Available: http://www.consumerwebwatch.org/consumer-reports-webwatch-guidelines.cfm. Last accessed September 23, 2005.

Woolgar, S., & Grint, K. (1997). Chapter Configuring the User: Inventing New Technologies. *The Machine at Work*. Cambridge, UK: Polity Press.