

# **BUSINESS ECONOMICS IN A RAPIDLY-CHANGING WORLD**

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**BUSINESS ECONOMICS IN A RAPIDLY-CHANGING WORLD**

# **BEHAVIORAL ACCOUNTING**

**ANDREAS HELLMANN**  
**EDITOR**



*New York*

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*Chapter 1*

## INFORMATION BEHAVIOR OF PRIVATE INVESTORS IN THE AGE OF THE INTERNET

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### ABSTRACT

The internet is increasingly used by corporations for investor relation purposes and by investors as source of information. This chapter outlines how corporations incorporate this technology in their financial reporting strategies, and reviews relevant literature in regard to the online behavior of private investors. Specifically, the chapter outlines the development of the internet from its beginning in the 1960s to a major source of information for private investors, and highlights the different types of online information disseminated by corporations. It identifies that prior research focused on the internet financial reporting practices of companies, and largely ignored information needs of investors. This chapter suggests that future research about the effectiveness of internet financial reporting should incorporate a user-perspective in their research design. For this purpose, it introduces Wilson's model of information (seeking) behavior, which may be useful in guiding future research examining the information behavior of investors. Specifically, this model depicts information seeking behavior as an iterative process which is influenced by several factors such as the context of information needs and the socio-cultural environment. Prior research focused largely on a description of internet financial reporting based on content analysis. Such research can be enhanced using experimental and qualitative research approaches derived from Wilson's model. This would be useful because it clearly shows that information seeking behavior is mainly driven by behavioral aspects such as human relationships.

**Keywords:** Internet, financial reporting, information seeking, investment decisions

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## 1. INTRODUCTION

Investors can be differentiated into two main groups, namely institutional investors such as fund managers, strategists, asset allocators, risk managers, corporate financiers and analysts, and those individuals who invest their private savings from time to time or on a regular basis. In order to make their investment decisions, both groups rely on information provided by companies. As a result, companies engage heavily in investor relation activities to communicate with potential and existing investors. The primary objective of investor relation activities is to provide information needed by investors in order to make capital allocation decisions (Deller, et al. 1999). For this purpose, financial statements are typically regarded as primary source of information because they provide detailed information on public corporations' economic activities and are directly available from companies or discussed in condensed form in the financial press (Palepu, et al. 2007, p. 12).

However, financial statements are complex products and both institutional and private investors may refer to them differently. Due to their professional background, institutional investors are likely to spend more time analyzing financial statements prior to making their investment decisions. However, private investors may not have the accounting knowledge to evaluate financial statements, and those who do not seek guidance from brokers or other intermediaries, are unlikely to consult financial statements. They may seek information which is easier to comprehend than financial statements. For this purpose, the Internet is increasingly used by corporations to attract investors scattered around the world and to disseminate not only financial statements but also press releases, speeches, investor conference calls, links to products such as broker reports, or other investor relations information such as policies on corporate governance or corporate social responsibility (Ashbaugh, et al. 1999, Ettredge, et al. 2001, Lymer & Debreceny 2003, Robbins & Stylianou 2003, Bollen, et al. 2006).

Internet financial reporting changed the way corporations and private investors interact with each other not only because new types of investor relations information is available to investors but also because such information is available in real time. Motivated by the increasing importance of the Internet for both corporations and investors, this chapter has the following objectives: (1) to explain the nature of corporate information which is presented on corporate web sites; (2) to provide a better understanding of the information seeking behavior of financial information users; and (3) to provide a general introduction to some key theoretical concepts utilized in information science research. Importantly, these theoretical concepts may be useful in future research examining information behavior of investors. For the purpose of this chapter, information behavior describes the ways human beings interact with information, namely information seeking and utilizing information (Case 2007, p. 5). The focus is on information seeking; issues in regard to utilizing information is discussed in chapter 2.

The rest of the chapter is structured as follows. First, relevant literature is examined with a focus on information content of corporate web pages. Next, private investors and their information seeking behavior are described. Next, some theoretical concepts from information sciences are discussed that may enable accounting researchers to improve the research methodology, theoretical development, and hypothesis formulation for future

research into the behavior of financial information users. Finally, concluding comments are made.

## **2. INTERNET FINANCIAL REPORTING**

The Internet has provided corporations with a new channel to communicate with investors and other stakeholders around the world. Today, investor relations web sites provide financial and other information in real time, which investors are able to access independent of their physical location. Investors can also subscribe to a mailing list and have real time information delivered to their inbox. This section provides some background regarding the development and content of the investor relations web sites, which is important for a better understanding of information seeking behavior of investors. It is structured as follows. First, general information on internet financial reporting is provided. Second, benefits and issues related to internet financial reporting are discussed. Third, types of information provided on corporate web sites are described.

### **2.1. Development of Internet Financial Reporting**

Originating from research conducted in the United States in the late 1960s, today's Internet is a global system of interconnected computer networks (Comer 2007, p. 62). Since its origin, the Internet has developed into the world's largest computer network with over 2 billion users (Internet World Stats 2011). Many applications and services have been devised that use the Internet, such as Email and the World Wide Web ("The Web"). The Web is a particularly popular internet application linking together textual or non-textual information stored on many computers (Comer 2007, p. 208). This information is then gathered by individuals using powerful search engines from giant companies such as Google and Microsoft. Since the mid-1990s, a large number of organizations are using the Web to create web sites in order to provide corporate information to Internet users. For example, using a sample of 290 nonfinancial U.S. firms, Ashbaugh et al. (1999) documented internet financial reporting practices of 177 firms and provide evidence that large firms (as defined by assets) in particular are integrating the Internet in their financial reporting strategies. Similarly, Debreceeny and Gray (1999) show that 49 of the 50 largest industrial US corporations established corporate web sites by 1996. Debreceeny and Gray (1999) also show that corporate web sites are not a phenomenon limited to the United States. In Europe, 44 of 45 large European corporations based in the UK, Germany and France also featured corporate web sites in 1999 and in Germany Deller et al. (1999) found that 76% of companies listed on the German Stock Index had a web site.

The corporate web sites surveyed by these early researchers included pieces of financial information not necessarily combined in a dedicated section on the corporate web site. This changed fundamentally in the past decade and today, internet financial reporting is an integral part of corporate web sites and financial reporting information is typically included in a dedicated investor relations section. For example, all 30 corporations included in the German

Stock Index<sup>1</sup> maintain not only corporate web sites but also feature a specific investor relations section.

This clearly shows that corporate web sites including an investor relations component are important communication channels and that the Internet plays a vital role in modern trading markets. Indeed, in a recent guideline on the use of company web sites, the Securities and Exchange Commission (2008, p. 4) in the United States considers “company web sites as a significant vehicle for the dissemination to investors of important company information”. The Securities and Exchange Commission (2008, p. 11) concludes that “the availability of information in electronic form is the superior method of providing company information to most investors, as compared to other methods”.

The Securities and Exchange Commission was the first regulator to use the internet since 1995 to receive and disseminate corporate filings through its Electronic Data Gathering, Analysis and Retrieval system (also commonly known as EDGAR). Such systems also exist in countries like China, where listed companies are required since 2000 are required to provide their annual reports, interim reports, and prospectuses on the web sites of the China Securities Regulatory Commission, the Shanghai Stock Exchange, and the Shenzhen Stock Exchange. However, Xiao et al. (2004) point out that data submitted to systems of regulators only contain information that is required to meet the regulatory standards and does not include timely information on stock prices and other corporate news. These data depositories are not perfect substitutes for investor relations web sites (Xiao, et al. 2004). In certain trading markets, however, companies are required by regulators to establish and maintain corporate web sites. For example, the New York Stock Exchange requires most of its listed companies to establish and maintain their own web sites, which is highlighted in Section 303A.04 of the listed companies manual. It requires that companies “must make its nominating/corporate governance committee charter available on or through its website” (New York Stock Exchange 2012).

## **2.2. Benefits and Issues Related to Internet Financial Reporting**

There are several advantages for companies to establish corporate web sites and a dedicated investor relations section, most notably the notion that web sites enable companies to make “information available to investors quickly and in a cost-effective manner” (Securities and Exchange Commission 2008, p. 6). Similarly, Ashbaugh et al. (1999), Ettredge et al. (2001), and Lodhia et al. (2004) point out that, using corporate web sites, companies can provide a quantity and timeliness of information to private investors previously available only to institutional investors. They argue that corporate web sites enable companies to make available new kinds of information such as transcripts or audio versions of analyst conference calls, thereby reducing the costs of printing and mailing traditional financial information. Furthermore, companies are able to communicate directly with a broad

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<sup>1</sup> The German Stock Index (Deutscher Aktienindex) is a stock market index consisting of the 30 major German companies trading on the Frankfurt Stock Exchange. In 2012, these companies are Adidas, Allianz, BASF, Bayer, Beiersdorf, BMW, Commerzbank, Daimler, Deutsche Bank, Deutsche Börse, Deutsche Post, Deutsche Telekom, E.ON, Fresenius Medical Care, Fresenius SE, Heidelberg Cement, Henkel, Infineon Technologies, K+S, Linde, Lufthansa, MAN, Merck, Metro, Munich RE, RWE, SAP, Siemens, Thyssen Krupp, Volkswagen.

range of stakeholders. The reason for this is that the demographics of internet users are more inclusive of varying educational and income levels compared to traditional communication methods (Perry & Bodkin 2000). The internet also allows one-way, two-way and multi-way communication which permits the development of highly interactive applications (Debreceeny, et al. 2001). This may result in tailored information which can satisfy the diverse information needs of users. Specifically, interactive applications allow companies and users to create an unlimited number of independent perspectives over the same web site (Debreceeny, et al. 2001).

However, internet financial reporting may also have some disadvantages relative to traditional financial reporting. For example, Debreceeny et al. (2002) argue that the rapidly increasing amount of information provided on corporate web sites may cause a condition called information overload<sup>2</sup>. This condition highlights that too much presented information may cause confusion which may make it difficult for people to make appropriate decisions (Eppler & Mengis 2004). Importantly, many aspects of internet financial reporting are not regulated. This can make it difficult to control both the content of information and the context in which information is used, which may result in security and trust issues (Debreceeny & Gray 2001, Lymer & Debreceeny 2003, Xiao, et al. 2002). The unregulated nature of internet financial reporting also impacts the audit of a corporation. Using a sample of the 50 largest industrial U.S. corporations, Debreceeny and Gray (1999) found that 34 had annual reports on their web sites but only 19 of these included the auditor's report. Analyzing the web sites of 250 companies based in the USA, UK, Canada, Australia and Hong Kong, Allam and Lymer (2003) found audit reports on the web sites of 240 companies and suggest much greater availability of audit reports. However, they noticed that 111 companies provided unsigned reports. Similarly, Fisher et al. (2004) found that 79 per cent of 188 companies in New Zealand feature an auditor report without a scanned signature of the auditor, which makes it difficult for users to make an assessment concerning the authenticity of the audit report document. This is problematic for investors because financial information is considered reliable when independent auditors certify it. As financial reports are normally delivered on just one part of a corporate web site, misleading or unreliable information may potentially be presented alongside the financial data for which the auditor is primarily responsible (Gowthorpe 2004). Lymer and Debreceeny (2003) point out that in such cases corporations would give investors the incorrect impression that all information on the web site has been audited.

Moreover, the internet makes financial reporting portable and globally accessible, which, in turn, makes it more difficult to regulate cross-border financial reporting. The reason for this is that the internet is decentralized and any government can only regulate actions taken in its own territory. This problem also applies to enforcing regulations, especially as there is no control over the context of the financial information. In other words, enforcement bodies have no control over other (non-audited) information on a web site, which may not even be presented under the heading 'investor relations'. Despite the increasing use of the internet, internet financial reporting is not comprehensively regulated. As highlighted above,

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<sup>2</sup> The problem of information overload may be reduced by the development of the eXtensible Business Reporting Language (XBRL) led by the American Institute of Certified Practicing Accountants. Using XBRL, documents can be created where specific pieces of information are tagged in plain language. This allows for easy exchange of information between formats and tailor-made extraction of data. Hodge et. al. (2004) find that users who use XBRL are better able to acquire and integrate information than those who do not use it.

regulators such as the Securities and Exchange Commission in the United States provide guidance on internet financial reporting, and stock exchanges such as the New York Stock Exchange require selected information to be made available on corporate web sites. However, the two globally accepted accounting regimes, namely U.S.-GAAP and International Financial Reporting Standards (IFRS), do not feature any standard regulating internet financial reporting. This means that, provided that it is not fraudulent, corporations are largely free to present the quantity and type of investor relations information that they desire on their web sites.

### **2.3. Information Provided on Corporate Web Sites**

The previous section clearly shows that internet financial reporting is an essential strategy for corporations. Maintaining an investor relations web site and the extent of using the internet for financial reporting may depend on many factors such as firm size, leverage, industry, listing status, and profitability. Several studies provide evidence that firm size is the most significant factor affecting internet financial reporting and the amount and nature of information that is provided (Ashbaugh, et al. 1999, Craven & Marston 1999, Ettredge, et al. 2001, Hedlin 1999, Marston 2003, Marston & Polei 2004, Xiao, et al. 2004). For example, Debrecey et al. (2002) find that voluntary adoption of internet financial reporting in 22 countries is associated with company size and listing on an U.S. stock exchange. They also find that larger companies are more likely to provide financial information on the internet than smaller companies.

The extent to which corporations use the Internet changed considerably since the beginning of its widespread commercial adoption in the mid-1990s. Lymer and Debrecey (2003) highlight three stages for implementing internet financial reporting in a company's communication strategy: First, companies use the Internet only for distributing the existing printed annual report. In this stage, the internet is simply used as a new distribution channel. Second, they change the presentation format of the annual report and disclose the information in a form with which web browsers and search engines can readily interact. Third, they provide not only the annual report on web sites but also additional information that cannot be produced cost-effectively in a printed format such as corporate presentations and conference calls. Additionally, interactive tools may be provided which can be used to analyze the information directly on the web site.

At the early stage of internet financial reporting, Lymer et al. (1999) surveyed the 30 largest companies in 22 countries and found that internet reporting primarily duplicated the printed financial statements in an electronic format. In recent years however, two types of information are disseminated. One type consists of reports that have been filed with a regulator such as the Securities and Exchange Commission. These reports include mainly financial information. The second type is all other voluntary information, mostly including nonfinancial data (Ettredge, et al. 2002).

By analyzing the web sites of 402 U.S. companies, Ettredge et al. (2001) find that the most common accounting items on corporate web sites are quarterly reports and annual reports. They also find that the most common non-accounting items are financial news and links to stock data. Other common financial information on web sites include condensed financial statements, weekly, monthly and quarterly operating statistics, and pending or



recently completed mergers and acquisitions. Other common nonfinancial information includes reports on labor relations and corporate social responsibility (Ashbaugh, et al. 1999). Table 1 summarizes common types of information found on corporate web sites.

**Table 1. Information provided on corporate web sites**

<b>Financial disclosures</b>	<b>Nonfinancial disclosures</b>
Analyst fact books	Business strategies
Back orders	Directors and officers
Earnings announcements	Environmental practices
Global operations	Environmental reports
Financial statements	Industry specific reserves
Labor contracts	Labor relations
Mergers and acquisitions	Philanthropic activities
Monthly/weekly sales	Press releases
Segment disclosures	Size of customer base
Stock plans	Social responsibilities
Stock price and performance	Year 2000 updates
Financial highlight summary	Chairman's message
Auditor's report (none, signed, not signed)	Corporate information
Balance sheet	Customer profile
Income statement	Employee profile
Cash flow statement	Social reports
Statement of shareholder's equity	Management report
Notes to financial statements	Vision statement
Segment report	Calendar
Statement of Directors	Speeches
Proxy Statements	Legal disclaimer
<b>Financial disclosures</b>	<b>Nonfinancial disclosures</b>
Financial Ratios (in context only, tables and in context)	Director's biographies
Consolidated Statement of operations	Email news alert

Quarterly Statement	Audio content
Analyst (lists of or links to analysts following the company)	Video content
Current stock price	Presentations
Dividend reinvestment plan information	
Historic share price	
Forecast information	

Source: Abdelsalam, et al. 2007, Ashbaugh, et al. 1999, Gowthorpe 2004, Lodhia et al. 2004, Lymer & Debreceeny 2003, Marston & Polei 2004, Pirchegger & Wagenhofer 1999.

Ashbaugh et al. (1999) find substantial variation in the quality of companies' internet financial reporting practices. Specifically, they find that some firms provide more timely financial disclosures such as monthly sales, while other firms report outdated financial data such as two-year old annual reports. Ettredge et al. (2001) provide evidence that companies tailor content specifically for web sites. Specifically, 17% of companies from their sample of 402 U.S. companies provide excerpts from annual reports which usually include complete income statements (71.6%) and balance sheets (64.2%) but few cash flow statements (34.3%) and statements of shareholders' equity (26.9%). Notes were only found among 20.9% of the excerpts.

Additional to the increasing amount of information provided on web sites, its presentation is becoming more complex (Debreceeny, et al. 2002). In regard to presentational features, Marston and Polei (2004) find that annual reports are typically disclosed in HTML and PDF versions, and that video files are becoming increasingly important for communication purposes. The use of graphical information in annual reports increased substantially in recent years (Beattie & Jones 1997). By using the emotive power of elements such as design, color and music in the context of the multi-dimensional possibilities of the internet, companies may have greater exponential power to influence decision makers than in the two-dimensional format of the traditional annual report. This allows companies to emphasize the positive and provide interpretation for potentially negative information.

### 3. INFORMATION SEEKING BEHAVIOR OF PRIVATE INVESTORS

Private investors are increasingly being regarded as important contributors on capital markets (Vogelheim, et al. 2001). Important reasons for this development may be that, due to technology advancements such as the Internet, private investors can easily and quickly participate in, or withdraw from, the market, and can receive information for relatively low cost (Peress 2005, Ynesta 2008). Indeed, ownership in equities is an attractive investment choice for individuals around the world, which is reflected in studies aiming to identify the ownership structure of listed companies. In a comprehensive share ownership study across European countries, the Federation of European Securities Exchanges (2008) found that

individual investors amount to 14% of the market value of listed shares in Europe<sup>3</sup>. Moreover, it reported that market participation of individuals varies across European countries. For example, Italy is reported as having a high rate of individuals' market participation at 26,6%, Germany is reported as having a moderate level of 13,3%, and the Slovak Republic with the smallest level of European countries at 2% (Federation of European Securities Exchanges 2008). Relative to these figures from European countries, the U.S. is having the highest level of individuals' market participation with a rate of 36,6% (Fox & Lorsch 2012). These figures show that equity ownership is regarded as a main source of wealth for individuals.

This section provides a better understanding of private investors with respect to their online information behavior. As highlighted above, an important dimension of the ways human beings interact with information is information seeking. While institutional investors can easily access specialized databases and often have direct contact with companies' investor relations staff, private investors often lack a similar direct and easy access. As a result, the availability of information on the internet would represent useful support for them. In 2008, the Securities and Exchange Commission examined what kind of information sources on the internet are used by investors for their investment decision. The Securities and Exchange Commission found that corporate web sites of individual companies are the most important information source (frequently used for information seeking by 38% of investors), followed by private financial investment information web sites (24%), the web sites of specific funds (10%), search engines such as Yahoo (9%), and news web sites (8%) (Securities and Exchange Commission 2008). Interestingly, female investors regard corporate web sites of individual companies as being more important for investment decisions than male investors. Specifically, the Securities and Exchange Commission (2008) found that 49% of female investors refer to the web sites of individual companies for information seeking purposes, compared to 42% of male investors.

The literature on information available on the internet described in the previous section is largely descriptive and consists mainly of surveys of current reporting practices (for example Ashbaugh, et al. 1999, Ettredge, et al. 2001). While these studies provide important insights into the development of internet reporting, they do not consider the information needs of private investors. In other words, the studies highlighted in the previous section are not providing evidence about the usefulness of information provided on web sites for private investors. Despite the growing use of the internet for disseminating financial information, there is little evidence to suggest that internet-based information has become increasingly useful for users. Only limited research is investigating what kind of information provided on the internet is considered by investors as being important and useful. This is surprising because Gowthorpe (2004) revealed that corporate managers tend to use their experience (or visit the web sites of competitors to get new ideas about information content) to assume investor's needs in an unsystematic way in order to design their web sites.

There are only few studies that have examined the effectiveness of web sites as perceived by investors. Beattie and Pratt (2003), for example, examined user groups, namely expert users, private shareholders, finance directors, and audit partners in regard to their attitudes toward different kinds of electronically provided information, their perceptions about the

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<sup>3</sup> This report has been published in the context of the Global Financial Crisis, which negatively impacted global financial markets and caused loss of financial wealth.

usefulness of different navigation and search aids, and their views on the portability of information under different formats. They found that most user groups rely on key management information, favor a free search function integrated on a web site, and prefer layered and pre-packaged information, periodic updating, and indexing. Hodge and Pronk (2006) found that private investors rely more on management's discussion of financial results than on financial statements. They also found that investment familiarity (i.e., whether investors are evaluating a current investment or researching a new investment) affects the type of financial information they view within a financial report. Specifically, they found that investors evaluating a current investment conducted their own investigation of the main financial statements more often than investors researching a new investment. Debreceeny et al. (2001) examined desired information content attributes of accounting professionals and academics and found that traditional elements of the financial statements (including the main financial statements, notes, and the auditors' report) are the most highly ranked information attributes. They also found that information such as performance forecasts, the vision statement, and background information such as customer and employee profiles, were not rated as highly as traditional content attributes. Debreceeny et al. (2001) argue that poor web site design and site functionality may cause disorientation and cognitive overload, and found that the form of information presented on web sites had an impact on the behavior of the participants. Specifically, they found that download time is a concern for participants which may negatively impact their willingness to open large documents<sup>4</sup>. However, a study by Mezick (2001) involving 97 U.S. investors, found that the majority of investors saw the internet as a reliable source of financial information compared to other sources.

Mainstream accounting and finance research has been built on the notion that human beings make rational investment decisions by evaluating all risks and returns of all possible investment options to arrive at an investment portfolio with the highest return or lowest risk (Hellmann & Scagnelli 2011). However, it is important to note that the increased amount of information available online, new kinds of electronically provided information, and the design and functionality of web sites and content may affect decision making of private investors. For example, the availability of information through the internet can cause an illusion of knowledge and control<sup>5</sup> (Barber & Odean 2001). If private investors place online orders directly without human intermediaries or personal advisors, they tend to be overconfident in regard to their knowledge, exhibit a confirmation bias and hindsight bias<sup>6</sup> (Daniel, et al. 2002, Kourtidis, et al. 2010). Research provided evidence suggesting that the confidence of investors in their forecast accuracy tends to be higher than the actual accuracy if more information is presented (Hoge 1970, Oskamp 1965, Peterson & Pitz 1988, Slovic & Corrigan 1973). As a result of increased information, accurate predictions may decline and heuristics are likely to be used during the investment decision process<sup>7</sup> (Keller & Staelin 1987, Stewart, et al. 1992, Nofsinger 2005.). A recent study involving 1500 Portuguese

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<sup>4</sup> It has to be noted that download speed increased for many internet users since the time of Debreceeny et al.'s (2001) study. Because of the rapid changes in internet technologies, their results may also quickly change.

<sup>5</sup> Illusion of control can be defined as believe that personal involvement can influence the outcome of chance events (Presson & Benassi 1996).

<sup>6</sup> See chapter 2 for further discussion on biases.

<sup>7</sup> Heuristics in this context are defined as the use of experience and practical efforts to answer questions or to improve performance (Fromlet 2001).

private investors provides evidence that the internet is also affecting trading frequency of investors (Abreu & Mendes 2012). Specifically, they find that overconfident investors trade less frequently when they collect information via friends and family and not from the internet, compared to non-overconfident investors who trade more frequently when they use specialized sources of information such as corporate websites (Abreu & Mendes 2012).

In summary, very few studies have attempted to describe the use of web sites by investors and there is little empirical research on user preferences for information provided on the internet. A possible reason for this gap in the literature might be that web-based financial reporting is a relatively new phenomenon. However, such research is urgently needed given the increasing importance of the internet for private investors. The next section provides an overview of information seeking theories which may help guiding future research in this area.

## 4 INFORMATION SEEKING THEORIES

### 4.1. Historical Roots

Information behavior research started at the beginning of the 20<sup>th</sup> century and is described by Bates (2010, p. 2381) as “the many ways in which human beings interact with information, in particular, the ways in which people seek and utilize information”. As a result of improvements in information retrieval methods and tools, information behavior studies focused the research interests on behavior scientific questions. The scientific roots of information behavior research lie in the traditional library and information sciences (LIS). As early as in 1948, the Royal Society Scientific Information Conference in London focused with selected topics on information seeking behavior. Wilson (2000, p. 50) considers this conference as the starting point for extensive research activities on modern information seeking behavior. One focus was on information retrieval (IR), which is a combination of quantitative and qualitative methods in the information sciences to examine the information needs of users. Specifically, IR aims to match the information needs of users with documents or other sources on the basis of structured or less structured questions adopting technology and algorithms. The efficiency of those automated algebraic and probabilistic information retrieval techniques and matching processes are typically summarized in performance and correctness indicators such as “precision”, “recall” or “fall-out”. Web search engines, for example, work on the basis of such algorithmic-based information retrieval models and principles (Kuroпка 2004).

However, in the early days of information science research there was a large gap between the precision and recall of the founded documents and the information needs of the users. A pure technological view of information retrieval methods was not sufficient enough for a substantially and satisfying explanation of users’ information needs and information behavior. In order to improve retrieval-, search- or information systems and to reduce information seeking and processing times, it was necessary to extend existing research by focusing on human-oriented and user-centered research questions. Bates (2010, p. 2381) describes the driving forces of the beginning of research activities on these behavior-oriented questions as follows:

“Librarians wanted to understand library users better, government agencies wanted to understand how scientists and engineers used technical information in order to promote more rapid uptake of new research results, and social scientists generally were interested in the social uses of information in a variety of senses...Within library and information science, these various streams of research are drawn on for what they can contribute to a richer understanding of information behavior.”

As a result, information behavior research shifted from a system-oriented approach to a user-orientated approach. The first comprehensive collection of research studies on information science were published by Davis and Bailey in the 1960s in their *“Bibliography of use studies”*. In this collection, Davis and Bailey (1964) defined their research on human information behavior as “use studies”. Two years later, Menzel (1966) introduced the term “information seeking” in his publication *“Information needs and uses in science and technology”*. This was the beginning of concrete research interests on user interaction with information within LIS and it was the breakthrough of a new research field “information seeking”. It is interesting to note that “information seeking” remained the specialist term for all behavioral studies in LIS for a relative long time. Since the early 1990s, when behavioral approaches became more and more relevant and commonly used in different science disciplines, the term “information seeking” was subsumed under the term “information behavior”.

Several conferences in the 1970s continued to focus on information needs of users and information behavior, especially in the area of “information seeking behavior” or “information search behavior”. The 1970s were also the time in which the area of computer science enriched research on data and information in several disciplines including the humanities. Investigations into requirements relevant to satisfy users’ needs were concerned almost entirely with how a user navigated a given system and what he or she could do with the data made available by the information systems (Wilson 2000, p. 49). However, research in that area was not concerned about what kind of information is needed.

Tom Daniel Wilson was among the first to study information needs in LIS in the 1980s who became later one of the most influential researchers in that specific research field in LIS. Wilson was one of the first researchers who developed various models of information behavior till the end of the 1990s (for example, Wilson 1981, 1997, 1998, 1999, Wilson, et al. 2002, Wilson & Walsh 1996). Wilson (2005, pp. 33-34) claims that his framework is not derived from any theory proposed by other writers but from an analysis of human information behavior, partly a priori, but also from the detailed analysis of the information behavior of social workers and their managers carried out as part of Project INISS<sup>8</sup>.

Wilson’s research accelerated interest in and lay ground for more information behavior research in LIS. For example, the compendium “Theories of Information Behavior” edited by Fisher et al. (2005) includes the great number of 72 conceptual frameworks about this phenomenon. This publication provides a state of the art overview in information behavior research. Theoretical frameworks about human information seeking processes, information management, the (interactive) sharing of information and the use patterns of information are

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<sup>8</sup> INISS: information needs in local authority social services departments.

in the center of this compendium<sup>9</sup>. It presents theoretical frameworks and modeling activities in information behavior of scientists from different international schools, which are, however, primarily initiated by Wilson's fundamental theoretical work. Another example is "A philosophy of Informing Science" published by Cohen in 1999. Driven by Wilson's work on information behavior, Cohen introduces the notion of informing science which focuses on users and that they are provided with information, in a form, format, and schedule that maximizes its effectiveness" (Cohen 2009, p. 6). Cohen later founded the multidisciplinary "Informing Science Institute" (ISI, Santa Rosa, USA) in 1999 with representatives of different scientific disciplines including computer science, biology, linguistics and information science. The major focus of informing science therefore is concentrated on the following research fields:

- 1) Biological and psychological issues in how clients attend, perceive, and act on information provided,
- 2) The decision-making environment itself, including its sociology and politics,
- 3) Issues involving the media for communicating information,
- 4) Error, bias, misinformation, and disinformation in informing systems (Cohen 2009, p. 6).

Cohen's theoretical framework supports a multidisciplinary approach and he argues that because both the informer and the client are influenced by human-relationship issues, they are best examined by those fields of study that deal with understanding cognitive, behavioral and social issues. Further, he concludes that information needs of an individual are complex and are a function of context, environment, social or job role or task, and the individual's psychology (Cohen 2009, p. 8). This is a broader understanding of information behavior and incorporates findings from behavioral sciences and neurobiology.

The third example for the relevance and influence of Wilson's work on information behavior research is the organization of the annual "Information Behavior Conference", organized by Information Seeking in Context (ISIC). The first conference was held in 1996 in Tampere, Finland, which focused on all research areas concerning information seeking, information searching, use and sharing in specific contexts, in virtual social networks, in real and virtual communities, during decision-making processes on the basis of different theories (social network theory, actor network theory, cultural-historical activity theory, genre theory, communication theory), the determinants of information requirements (for information systems) and information needs, the design of information delivery systems, the management of collaborative information seeking and searching processes, the information architecture and the communication of information<sup>10</sup>.

In summary, multidisciplinary research approaches and a combination of approaches from natural sciences and humanities on information behavior dominate research efforts today. Adopting theoretical developments from the early researchers outlined above,

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<sup>9</sup> Topics, for example, include cognitive work analysis, information poverty, Dervin's sense-making theory, diffusion theory and information behavior, ecological theory of human information behavior, everyday life information seeking, flow theory, the imposed query, information encountering, information horizons, nonlinear information seeking, the principle of least effort, the ELIS model, Nan Lin's theory of social capital, information use environments, web information behaviors and world wide web information seeking.

<sup>10</sup> <http://informationr.net/isic/>

information behavior research has been conducted in various professional contexts including health sciences, law and business (Bates 2010, p. 2384). The next section provides more insights into Wilson's model of information (seeking) behavior and other theories that influenced the development of that model.

## **4.2. General Information Behavior Theories**

It is important to note that there is no single information behavior theory. However, Wilson's model of information (seeking) behavior can be regarded as a major framework in information behavior. In general, information behavior theories aim to find answers, for example, to the following questions:

- What are the relevant determinants of human information behavior within the process of information seeking, information searching and information use resulting from a special information need?
- Which sources and information channels are important and why?
- What are the reasons for active, motivated, self-determined human information behavior, for example within a face-to-face communication, or more inactive (passive) information behavior with a reception of information without a concrete intention to handle (i.e. watching TV advertising)?

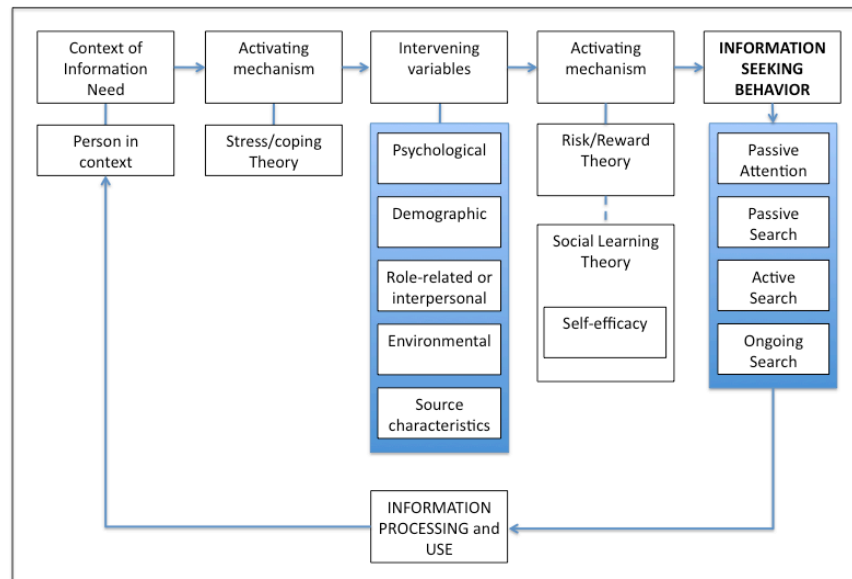
### ***4.2.1. Wilson's Model of Information (Seeking) Behavior***

Wilson considers a precise conceptual delimitation of the different research disciplines within the information behavior of greatest importance. He defines the term "information behavior" as follows:

Information Behavior is the totality of human behavior in relation to sources and channels of information, including both active and passive information seeking, and information use. Thus, it includes face-to-face communication with others, as well as the passive reception of information as in, for example, watching TV advertisement, without any intention to act on the information given (Wilson 2000, p. 49).

In a general model of information behavior, Wilson (1999) tried to integrate his research findings of longtime research studies (which started in 1981) and theoretical consideration on information behavior in a general theoretical model of information (seeking) behavior focused on problem-solving (Wilson 2000, p. 53). This model is depicted in Figure 1.



**Figure 1. Wilson's model of information (seeking) behavior.**

Source: Wilson, T. D. (2000). Human Information Behavior. *Informing Science*, 3(2), p. 53.

Wilson (2000) tried to find explanations on how information seeker or users try to identify and satisfy their information needs. One of the most relevant research questions for Wilson was: Which variables determine mostly information seeking behavior? He described his theory approach as a “cycle of information activities” where the information needs are only secondary needs, following and caused by other primary needs, which can have affective, cognitive or/and physiological origins (impetus). These information needs activate a more or less intentional information behavior to collect new or confirming information. Activating determinants may include curiosity (non-utilitarian, common), meaning seeking, order seeking, or an understanding of an unknown phenomenon.

Importantly, the context of information needs, such as the social and work role, the work environment, the social cultural environment, the political-economic and the physical environment, has to be considered as it has great influence on the information behavior of every person as information seeker. Attention should be paid to several intervening variables such as psychological, demographical, role-related or interpersonal, and environmental variables and source characteristics. They induce new activating mechanism within the cycle of information activities, which can be explained by the risk and reward theory or the social learning theory (self-efficacy). After these steps the information process starts: the purposive information seeking activity. Wilson (2000, p. 49) describes information seeking behavior as the purposive seeking for information as a consequence of a need to satisfy some goal. In the course of seeking, the individual may interact with manual information systems (such as a newspaper or a library), or with computer-based systems (such as the World Wide Web). Importantly, the information need and its context determinate the information seeking behavior. It also determines the relevance of sources and the use intensity of the different sources.

#### ***4.2.2. Ellis's Behavioral Model of Information Seeking Strategies***

Wilson (2000) integrated Ellis's behavioral model of information seeking strategies (Ellis 1987, Ellis, et al. 1993) in his information seeking behavior model. Ellis analyzed the iterative seeking behavior process and its different stages, and the main question included the following: What characterizes the typical information seeking behavior or strategy of information seeker? Ellis (1987, 1993) suggested iterative process includes the following steps:

- First step (Starting): An information seeker is aiming to get an overview by asking other people or by using a first source. Here, the initial search for information begins. The information search often starts with more or less familiar sources, especially sources which are known to the information seeker.
- Second step (Browsing or chaining or monitoring): Ellis describes "browsing" as semi-directed or semi-structured searching in certain sources (Wilson 2000, p. 52). Important for browsing are tables of contents, lists, (web) links, names, persons, organizations, and so on. Choo et al. (1998) explain that browsing takes place in many situations in which related information is grouped together according to subject affinity. "Backward chaining" occurs when the information seeker follows footnotes and citations in known material or "forward chaining" from known items through citation indexes (Wilson 2000, p. 52). "Chaining" indicators include, for example, topical documents, citation frequency, and actuality of the document, the author, cost and time exposure. "Monitoring" means that the information seeker keeps up-to-date (Wilson 2000, p. 52).
- Third step (Differentiating): This is the first stage where an evaluation takes place. It has an important filtering purpose, which strongly depends on the experiences of the information seeker with the sources or on reviews or personal recommendations of other people. The information seeker attempts to judge the quality, usefulness and relevance of the search outcomes. Here the information seeker is filtering the amount of information obtained (Wilson 2000, p. 52).
- Fourth step (Extracting): The information seeker is able to select and identify the relevance of his information sources and material, mostly by concentrating on the most relevant core sources.
- Fifth step (Verifying): Is the obtained information correct and reliable? The information seeker is "checking the accuracy" (Wilson 2000, p. 52) of his information outcomes.
- Sixth step (Ending): The whole seeking process ends and the information seeker combines the information outcome(s) with his personal knowledge.

Ellis information seeking model outlined above was modified by other researchers. Meho & Tibbo (2003), for example, complemented Ellis' behavioral model of information seeking strategies by adding three additional steps, namely "Accessing" (to full text documents), "Networking" (direct and indirect communication with other people about the information results) and "Information Managing" (information storage).

Already in 1998, Choo et al. (1998) tried to verify Ellis' information seeking process theory on the internet. On the empirical basis of questionnaires, personal interviews with managers and IT specialists, and on the basis of using customer-developed tracker

applications for the monitoring of the participants' web browser activities, they studied the different web information seeking patterns. Choo et al. (1998) viewed the web as a hyperlinked information system distributed over numerous networks, where most of the information seeking behavior categories in Ellis' model was already being supported by capabilities available in common web browser software. Similar to Ellis's theory, Choo et al (1998) suggest the following steps:

- First step (starting): The information seeker can start from familiar or new websites by identifying the pages with include information of interest.
- Second step (chaining): Here the information seeker follows (hypertextual) links to other websites with substantial content both forward and backward.
- Third step (browsing): The focus of this information seeking step is the scanning of (top-level) selected web sites.
- Fourth step (differentiating): Parallel to or after the third step the information seeker can bookmark relevant sources for revisiting and references.
- Fifth step (monitoring): The user can receive site updates or can prepare summaries of interest or make reports.
- Sixth step (extracting): Now the information seekers is satisfied with his/her information and can extract the necessary content of a local web site or he/she is disappointed and starts from the beginning again.

Choo et al. (1998) pointed out that findings appeared to support the behavioral model, both in terms of the modes of scanning and the moves of web information seeking associated with each mode. Overall, the study suggests that a behavioral framework that relates motivations (the strategies and reasons for viewing and searching) and moves (the tactics used to find and use information) may be helpful in analyzing web-based information seeking.

#### **4.2.3. Kuhlthau's Stage Model**

Kuhlthau (1991, 1993) emphasizes the importance of the emotional experience for information seeking behavior. The first step of her information seeking model, the initiation, is accompanied by a certain degree of uncertainty. This means that thoughts are regarded as general and vague, ambiguity dominates, and the first activity is to recognize the information need. The second step should lead to optimistic feelings, when the so-called "selection" gives the chance to select and to identify the relevant topics and information sources. The third step, the exploration, can lead to some confusion, frustration or doubt. The task of the information seeker is to investigate relevant information. The fourth step, the formulation, should give the information seeker more clarity. He or she can define more precisely the concrete topics. As a result, the satisfaction increases. With the fifth step, the collection, Kuhlthau wanted to express that the information seeker earns more self-confidence by gathering the relevant information, his or her interest increases and he or she knows more about the meaning of the obtained information. The information seeking process ends with the sixth step, the presentation, where the satisfaction can reach its highest point or the disappointment of an unsuccessful or failed search dominates.

Wilson proposed to integrate Ellis' "Behavioral model of information seeking strategies" and Kuhlthau's "Stage model" with his general information behavior model (Wilson 2000, p.

55). Wilson emphasizes that the consequences of such a target-oriented, intentional information seeking behavior, is characterized by passive attention, active or passive search or ongoing search. For those search activities, Wilson (2000, p. 49) defines an own behavior segment:

The Information Searching Behavior is the ‘micro-level’ of behavior employed by the searcher in interacting with information systems of all kinds. It consists of all the interactions with the system, whether at the level of human computer interaction (for example, use of the mouse and clicks on links) or at the intellectual level (for example, adopting a Boolean search strategy or determining the criteria for deciding which of two books selected from adjacent places on a library shelf is most useful), which will also involve mental acts, such as judging the relevance of data or information retrieved.

The last step of the iterative information cycle process included in Wilson’s model of information (seeking) behavior is information processing and use. It is one of the crucial points in Wilson’s theory and he speaks of “Information Use Behavior” as the third partial form of human information behavior. Wilson (2000, p. 50) defines it as follows:

Information Use Behavior consists of the physical and mental acts involved in incorporating the information found into the person’s existing knowledge base. It may involve, therefore, physical acts such as marking sections in a text to note their importance or significance, as well as mental acts that involve, for example, comparison of new information with existing knowledge.

Depending on the degree of information satisfaction, the information seeker stops the process or starts again with the definition of his concrete information need(s).

## 5. CONCLUSION

The rapidly changing business environment in today’s globalized world is forcing corporations to provide timely and relevant information to decision makers. Given that 2 billion people routinely access the internet (Internet World Stats 2011), maintaining a web site to disseminate financial information has become an important strategy that corporations adopt to provide relevant information to decision makers. Many corporations not only disclose an electronic copy of the annual report on their web sites, but maintain investor relations sections on their corporate web sites. These investor relations sections typically feature a range of different types of information, ranging from text-based information such as reports on labor relations and corporate social responsibility to interactive and multimedia tools such as video files and customized search algorithms. Indeed, internet financial reporting may enable companies to make customized information available to investors quickly and in a cost-effective way. It can help corporations to provide a quantity and timeliness of information to private investors which were previously available only to institutional investors. This is especially important because in many capital markets, private investors are increasingly regarded as being important capital contributors (Vogelheim, et al. 2001).

Despite the trend that financial information is increasingly disclosed on corporate web sites, very little is known about the information behavior of private investors. Specifically,

prior literature largely focused on the supply-side (i.e. what types of information are provided on corporate web sites) and did not rigorously examine how users access and use online financial information. In other words, it effectiveness of current internet financial reporting practices remains unclear. This is an important issue because it has been argued that information overload may cause confusion and make it difficult for users to make appropriate decisions (Epppler & Mengis 2004). As such, this chapter argues that future research needs to incorporate both the information provided by corporations and also the information needs of private investors. Importantly, the medium internet can influence the information behavior of investors and aspects such as presentation of information, design, and usability should also be addressed in future research.

To guide future research in this area, this chapter outlines Wilson's model of information (seeking) behavior, which is a comprehensive framework from the library and information sciences. Specifically, this model outlines a cycle of information activities, and shows variables that determine information seeking behavior. It is a very general model that might help to explain the more fundamental aspects of human behavior by highlighting the importance of personal and environmental contexts. Importantly, information seeking behavior as described in this model is observable, whereas needs being internal mental states, are not. Wilson's model stresses the interrelated nature of theory in this field by incorporating Elli's behavioral characteristics of information seeking and Kulthau's treatment of the information search process, which have been also described in this chapter.

This chapter provides valuable insights into the context in which internet financial reporting is used and suggests that future research about the effectiveness of internet financial reporting is needed. For this purpose, researchers need to adopt a user-perspective in their research design. This would be especially useful for companies aiming to enhance their investor relations activities

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