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**Audit of the Future - An Analysis of the Impact
of XBRL on Audit and Assurance**

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Abstract

The eXtensible Business Reporting Language (XBRL) has been developed as a standard for business reporting on the Internet. As such it will impact the audit profession that provides assurance over financial information, an issue that has not yet received enough attention. Therefore, the overall research purpose of this study is to describe the effects that the use of XBRL has on audit and assurance services by analyzing the implications on services to the public and the way assurance providers conduct their work in providing those services. The study looks at effects of both Internet reporting and continuous assurance, which are inextricably interwoven through their technological basis. Representatives of the audit profession and other groups affected by assurance services, e.g. users and government agencies, are interviewed using a semi-structured interview technique. Interview transcripts are used to compare the answers of the audit profession with those of the other interviewees in order to draw conclusions about what the impact of XBRL will be. The results indicate that XBRL adoption will not significantly change audit and assurance services to the public in the medium-term. However, it will have decisive impacts on the work tasks that assurance providers have to execute in providing services.

Keywords: assurance, continuous assurance, Internet financial reporting, XBRL.

Abbreviations

AICPA	American Institute of Certified Public Accountants (US)
ERP	Enterprise Resource Planning
GAAP	Generally Accepted Accounting Principles
HTML	HyperText Markup Language
IAASB	International Auditing and Assurance Standards Board
IASB	International Accounting Standards Board
IFAC	International Federation of Accountants
IFRS	International Financial Reporting Standard
ISA	International Standard on Auditing
ISAE	International Standard on Assurance Engagements
ISRE	International Standard on Review Engagements
ISRS	International Standard on Related Services
IT	Information Technology
NIVRA	Nederlands Instituut van Registeraccountants (Dutch Institute of Certified Public Accountants)
PCAOB	Public Company Accounting Oversight Board (US)
PDF	Portable Document Format
PKI	Public Key Infrastructure
SEC	U.S. Securities and Exchange Commission
SME	Small and Medium sized Enterprises
SOX	Sarbanes-Oxley Act of 2002 (US)
US	United States
W3C	World Wide Web Consortium
XARL	eXtensible Assurance Reporting Language
XBRL	eXtensible Business Reporting Language
XML	eXtensible Markup Language

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1 Introduction

Ever since the creation of corporations, stakeholders have demanded accounting information in order to get an insight into the firm's finances. This was first materialized in Italy with the double-entry bookkeeping several centuries ago, and has developed over time to become the complex financial reporting which is the base for both internal and external decision making today (Boritz & No, 2003). While reporting for internal users of financial data usually has been unregulated, reporting requirements for tax purposes, shareholders, and protection of creditors has experienced an ever increasing volume of regulations. To ensure that financial reports give a true and fair view, financial statements and accompanying information based on generally accepted accounting principles (GAAP) have to be audited by external auditors (Hunton, Wright & Wright, 2003).

Traditionally, during the audit process the financial statements, prepared by the company's accounting department, were controlled and manually compared to the evidence of transactions that occurred during the accounting period. However, the dynamic business environment of today creates complex businesses that demand more sophisticated financial reporting methods. Further, constantly changing accounting rules such as the Sarbanes-Oxley Act of 2002 (SOX) or International Financial Reporting Standards (IFRS) make financial reporting evolve with society (Bergeron, 2003; Cohen, Lamberton & Roohani, 2003). The technological advances since the invention of the computer, and especially the personal computer and local area networks, have made this process easier in the way that it is possible to trace changes in the statements that are caused by certain transactions. On the other hand, new accounting solutions also demand for changes in the way the audit is carried out. The increasing number and complexity of transactions prohibits controlling every single one. Instead, auditors focus more on the examination of procedures and internal controls to prevent fraudulent statements (Alles, Kogan & Vasarhelyi, 2002).

The challenge today consists of providing the appropriate information in a timely, frequent, assured, and customized manner to the various users, while controlling the costs of complying with new requests. Due to these demands, there have been dramatic changes in how companies communicate with investors, customers, and suppliers. Thus, computer technology has brought about new improving tools for business reporting as well as difficulties (Hunton et al., 2003; Roohani, 2003).

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As changes in computer technology altered the audit process before, the invention of the Internet, and in particular the World Wide Web, provides the possibility to spread electronic information in an easy and economical way. The first step of electronic business reporting is to present documents like annual reports for reading on a computer screen or possibly for printing, in HyperText Markup Language (HTML) or Portable Document Format (PDF). However, as these documents do not contain semantic information, that is information about the context in which information is used, these formats only present text and multimedia for the human eye. Important functions such as intelligent search and data exchange are not possible. Therefore, despite the conveniences with presenting information on the Internet, the absence of a generally accepted computer understandable format for exchange of business information makes human interaction necessary, creating costs and space for human errors (Bergeron, 2003; Boritz & No, 2003).

To overcome those problems the eXtensible Business Reporting Language (XBRL) has been developed to act as a standard in corporate reporting on the Internet.

1.1 Background of XBRL

In 1998 the World Wide Web Consortium (W3C) developed the eXtensible Markup Language (XML) to facilitate electronic publishing. XML is a general-purpose language for constructing and presenting documents with accepted formats and rules. It uses metadata for explaining layout and logical structure of the content, and allows for any user to extend the language for special purposes (Boritz & No, 2003; W3C, 2004). Therefore, the step from HTML, only used to present data, to XML, designed to describe data and to focus on what the data represents, improved the possibility for various uses of financial data (Boritz & No, 2003).

In 1999 XBRL International, a non-for-profit consortium comprising companies and organizations like the American Institute of Certified Public Accountants (AICPA), International Accounting Standards Board (IASB), Microsoft, and PricewaterhouseCoopers, was founded. Its main goal is to enable and facilitate the publishing of financial business data in electronic form with a standardized method by developing, maintaining, and disseminating XBRL, which can be seen as the financial profession's adaptation of XML for financial reporting. It is based on a system of making data understandable by tagging it to define its meaning for

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further analyses in different information systems. This means that within one organization or between different organizations, data exchange without human interference and independent of technology platforms is made possible (Weber, 2003). Therefore, XBRL claims to be a standard format for financial information that makes reporting and analysis faster, cheaper, and significantly easier to automate. The vision is to be able to turn unstructured data into structured data that computers can process and reuse (PCAOB, 2005; Tie, 2005).

XBRL consists of several parts: the specification, taxonomies, and instance documents. The specification, currently available in version 2.1, contains technical grammatical rules for creating taxonomies and instance documents. Taxonomies are referred to as dictionaries and define all the concepts to be used in a particular instance document that follows this taxonomy. Taxonomies exist for several financial reporting purposes. The specification and the taxonomy set out the framework for constructing instance documents. Instance documents finally contain the actual financial information in a machine readable format. All data items are surrounded by tags that provide a context to the information. Figure 1 shows an extract from an instance document and its representation in human readable form. The transformation from the instance document into other formats, such as HTML, PDF, or spreadsheets, can be automatically done through the use of style sheets.

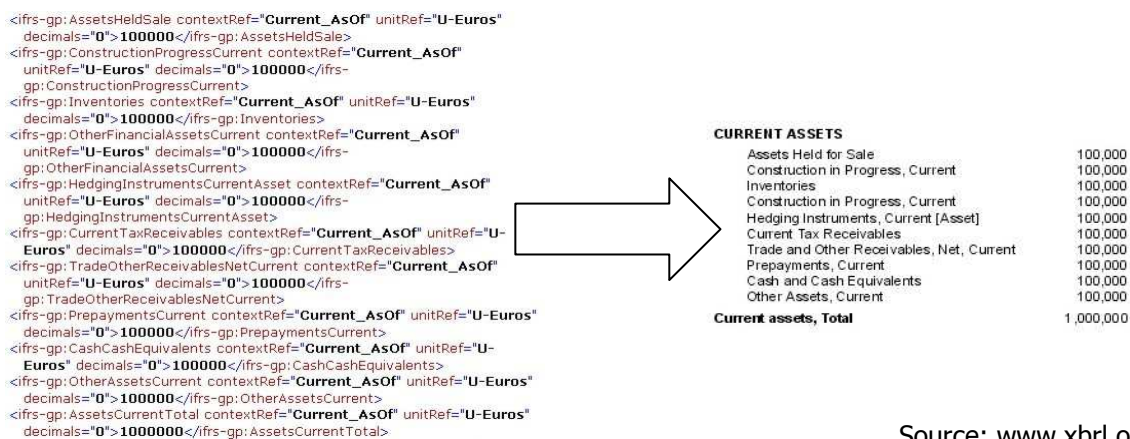


Figure 1: Example of XBRL

The aim of XBRL is to benefit many different stakeholders. Its intention is to serve the needs of preparers, intermediaries, and users of business information, as well as software vendors (XBRL, 2005). Preparers of business reports should be able to overcome incompatibilities between different information systems and

provide more timely business information. Auditors or financial information providers may also profit from an easier integration of XBRL documents into their own systems. Governments could more easily gain access to detailed information for tax purposes and assimilate the information, whereas shareholders and analysts may benefit from more timely reports to assess a company's situation. Finally, the adoption of XBRL should provoke a development of new software, which benefits its vendors. Nevertheless, many firms are not voluntarily providing more frequent information. On the one hand, this can be explained by the large initial development and implementation costs of XBRL, and on the other hand, it can be explained by companies' unwillingness to give out too much information to competitors. Managers want to be able to control the nature and timing of reporting to some extent (Boritz & No, 2003; Hunton et al., 2003; Weber, 2003).

1.2 Research Issues

As could be seen from the preceding section, the efforts surrounding XBRL have endured for more than half a decade by now. In the meantime, a substantial amount of research has taken up the challenge of XBRL and investigated the implications XBRL has, or will likely have, on corporate financial reporting (Bovee, Ettredge, Srivastava & Vasarhelyi, 2002; Hodge, Kennedy & Maines, 2004; Wagenhofer, 2003). Considering the broader topic of Internet financial reporting, the quantity of research conducted is even larger (Deller, Stubenrath & Weber, 1999). Several of these studies also mention implications of the ongoing changes in Internet financial reporting on the tasks of auditors (Xiao, Jones & Lymer, 2002). However, no research was found that concentrates on these issues and further elaborates on the findings.

One of the implications of the technological progress is the advancement of continuous reporting. As Hunton et al. (2003) argue, technology is not a problem anymore in the progress towards continuous reporting. Through their technological basis, Internet financial reporting and continuous reporting are inextricably interwoven. Apart from Internet financial reporting or XBRL in particular, there exists firm research groundwork on continuous auditing and assurance (Alles et al., 2002; Krell, 2004). However, these studies only consider implications of continuous reporting and neglect all other aspects that Internet financial reporting and reporting using XBRL have.

For the future acceptance of XBRL it is important that all its implications are known and can be addressed. As can be seen from the argumentation above, an

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important problem to answer, which constitutes the research question of the thesis, is:

How does corporate financial reporting using the eXtensible Business Reporting Language affect audit and assurance services?

This issue can be split into several subquestions. Numerous studies mention changing tasks of auditors in connection to Internet financial reporting. Most obvious in this context is the assurance of information published on the Internet (Xiao et al., 2002). But continuous reporting may also create new demands for assurance services apart from the traditional statutory audit of financial statements (Hunton et al., 2003). To evaluate which new services will be provided by the audit profession, but also whether there will be a discontinuation or demand for changes of existing services, the first subquestion is as follows:

Which implication does the use of the eXtensible Business Reporting Language have on the provision of audit and assurance services to the public?

However, public services are only one part when considering effects of XBRL on the audit profession. According to Bergeron (2003), today's accounting information systems are characterized by incompatibilities between different software vendors. This is a problem in business combinations as well as for auditors that need access to companies' financial information to conduct their audit. In consequence, the data retrieval may be a troublesome and lengthy process. XBRL, on the contrary, is an open standard that is not dependent on a particular hardware architecture, operating system, or application. Thus, it can be expected that the use of XBRL in companies' reporting process also changes the way auditors have to conduct their audit. To analyze this, the second subquestion is as follows:

Which implication does the use of the eXtensible Business Reporting Language have on the way audit professionals conduct their work?

The research question thus combines several research issues proposed by different researchers. Kogan, Sudit, and Vasarhelyi (1999), for example, specified several issues for further research in continuous auditing. One matter mentioned that particularly relates to this study is the analysis of changes in the kind of audit opinion that will be provided. This may include changes in reporting frequency as

well as transformation to reports on demand. But the research question also relates to matters of data tagging as, among others, proposed by Hodge et al. (2004).

1.3 Purpose

In answering the above research question, the study contributes to the growing research on XBRL. So far, research studying the implications of XBRL on audit and assurance services is very limited. The thesis can thus serve as a starting point for a systematic examination of this issue. The purpose of the thesis can be subsumed as follows:

To describe the effects that the use of the eXtensible Business Reporting Language has on audit and assurance services by analyzing the implications on services to the public and the way professionals conduct their work in providing those services.

The thesis' aim is to give a comprehensive picture of the situation by ascertaining the positions of the audit profession as well as other groups likely affected by assurance services, and contrasting this with earlier research. As XBRL is still to be widely adopted, the thesis can contribute by showing what is to be expected once it gains a more mature position in the business environment. It can show practices that are conceivable in different surroundings and thus present a starting point for the development of best practices.

1.4 Limitations

The thesis focuses on the implications of Internet reporting through the use of XBRL on audit and assurance processes. This includes changes of tasks as well as the effects on organizations involved. Internet reporting also involves many technical issues that have an impact on assurance processes, but the broad aspect of technical issues that arise when implementing XBRL for corporate reporting lies outside the scope of this thesis.

Another limitation of the study concerns data availability. Worldwide, all large accounting firms have projects in the developing area of XBRL reporting, but due to geographical reasons the study mainly concentrates on the Swedish auditing market. However, the limited development of XBRL in Sweden necessitated the use of some experts from Europe and overseas.

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Although the use of XBRL is picking up momentum, it is not very prevalent, yet. The number of auditors and corporations with experience in the field of XBRL is restricted. The main limit to the investigation therefore is the ability to get in contact with enough specialists to conduct interviews. Moreover, at this stage of development, mainly large companies and accounting firms consider the use of XBRL. Therefore, the investigation naturally has to be limited to this segment and can not include small and medium sized enterprises (SME).

1.5 Thesis Outline

The thesis is divided into six chapters. After this introductory chapter, the methodology used in the study will be clarified in chapter 2. The purpose of the chapter is to show how the study was carried out and analyzed. Motivations concerning the choice of using the interview method are given, and the implications of choosing this method are discussed. Thereafter, the interview guide, the interview sample and the collection of data are clarified. Finally, practical constraints and analytical issues, as well as the credibility of the study are discussed.

The underlying theory to the study and previous research are explained in chapter 3, Theoretical Frame of Reference. It provides the foundation to the subsequent empirical investigation and the analyses. Assurance is put in the context of the corporate reporting supply chain, and the concepts of auditing and assurance are clarified in order to give the reader an understanding for the implications of technological changes on assurance. Agency theory and transaction cost economics are used to explain why audit and assurance have such an important role in today's business world. After the overview of the business reporting context, assurance implications of XBRL are discussed in detail.

The first step in the chosen three-step analytical approach is conducted in chapter 4, where the empirical findings of the interviews are treated. Based on the interview guide exposed in chapter 2, interviewees' answers are structured and categorized. Each question of the interview guide is discussed separately. Where appropriate, the answers are illustrated using survey style tabulations. Quotes are used to underline the arguments of the respondents.

The analysis in chapter 5 contains the results of the interviews and is the second step of the analytical approach. The interview responses are divided into two groups; assurance providers and other respondents, as they frequently express

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different opinions. All findings from the interviews are compared and contrasted with previous research and references are made to the theory chapter. The findings from the interviews are categorized in four sections: the assurance on XBRL, the work tasks, Internet reporting, and continuous assurance and the corporate reporting supply chain.

The final chapter, Conclusions, finalizes the analytical approach. The research question and the subquestions are answered, supported by the findings of the analysis. Further, overall conclusions to the study are given. Finally, suggestions for further research are provided.

2 Methodology

To accomplish the aims of the study, choices had to be made about a methodological strategy to gather empirical evidence. This chapter explains the choices that were made and the reasons behind them. The chapter starts off by describing the chosen research approach in the first section. The research design is important for any study. Therefore section 2.2 explains in detail on what kind of data the study is based. That choice has implications on the research method and the collection of data, which are presented in own subsections. Thereafter, the practical constraints encountered during the study are discussed. Section 2.4 considers analytical issues, followed by considerations about the credibility of the study. The last section summarizes the chapter.

2.1 Research Approach

Research can be conducted in a variety of ways and there is not one research method available that is equally appropriate for all studies. One of the main distinctions is the one between a quantitative and qualitative methodology. A methodology is, according to Silverman (2001), a general approach to the study of research topics. It defines the general way of studying a phenomenon. Methods, on the other hand, are specific research techniques. Both quantitative and qualitative methodologies offer a wide variety of research methods.

Common for quantitative research is that it depends on the definition of variables that are subsequently used for the collection of data about the research subject to allow the testing of hypotheses. As Denzin and Lincoln put it, “quantitative studies emphasize the measurement and analysis of causal relationships between variables, not processes” (2000:8). The general aim of quantitative research is to allow the formulation of general laws by isolating causes and effects, and generalizing the findings. A condition for this is a sufficiently large sample size that is randomly selected and according to a certain distribution in the population, to allow a statistic inference for a larger group. All aspects of the study have to be controlled as far as possible to be able to rule out other causes (Flick, 2002).

Qualitative research has the advantage that it is not bound to such an approach. Even some researchers that prefer quantitative methods suggest qualitative studies to explore a subject in the beginning (Silverman, 2001). According to Flick (2002), qualitative research exhibits certain essential features. In contrast to quantitative research, qualitative research subjects are not chosen based on the applied

method. Rather, methods and theories have to be appropriate for a particular study. Qualitative studies allow discovering new aspects of exceptional situations, and not merely testing already formulated theories. Denzin and Lincoln state:

The word *qualitative* implies an emphasis on the qualities of entities and on processes and meanings that are not experimentally examined or measured (if measured at all) in terms of quantity, amount, intensity, or frequency. Qualitative researchers stress the socially constructed nature of reality, the intimate relationship between the researcher and what is studied, and the situational constraints that shape inquiry (2000:8, emphasis in original).

Qualitative research thus views the subject in its entirety and reflects on the diversity of meanings. It allows for different viewpoints and considers the perspectives of participants. Moreover, the researchers play an active part in the process and do not merely observe. Common in qualitative studies is that no hypotheses are explicitly formulated at the outset of the study, but rather induced during the research (Silverman, 2001).

The aim of this study is to describe the situation of assurance providers that may evolve in a business world that uses XBRL to communicate business information. To be able to explain the processes in the corporate reporting supply chain it is necessary to view the situation from different perspectives. This can be achieved best by following a qualitative research methodology. Besides, although XBRL in its current version 2.1 has been available for around two years now, the state of adoption for purposes other than relatively small scale projects does not allow for a quantifying study of implications.

2.2 Research Design

The novelty of the field also has the implication that prior research and thereby existing data in the field of assurance on XBRL documents is rather limited. This, in consequence, effectively limits the degree to which it is possible to base the study on secondary data. The abundance of monographs and overview articles that can be found in other research areas, showing the position of academic research, is not available. At this point in time, the only book publicly available in print dealing with XBRL is Bergeron's (2003) practical survey aimed at managers. Most magazine and journal articles are also written from a practical point of view (Cunningham, 2005; McKie, 2004). Academic articles, as mentioned in section 1.2, mostly either concern continuous assurance or Internet reporting, but not explicitly the implications XBRL has on assurance services in general.

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The logical conclusion of this is that this research has to be based largely on primary data; data specifically generated for the purpose of the research. Major methods for the collection of primary data in qualitative research are observations, interviews, and recording naturally occurring talk (Silverman, 2001). The focus of observations lies in determining actual actions of those studied. If no action is taking place, recording and transcribing naturally occurring talk can serve to gather data about communication between research subjects in their natural surrounding. Interviews, on the other hand, always imply an interaction with the researcher. This interaction represents the opportunity to elicit statements that are otherwise not observable. Because interaction was needed in conducting this research, interviews were chosen as the appropriate method.

Interviews as a Method

Interviews can be conducted in a variety of ways. There exist two commonly used interview techniques; the structured and the unstructured. Structured interviews use a predefined interview guide with questions to be answered by interviewees. This type of interview normally correlates with a positivistic perspective. In positivism both interviewer and interviewee are seen as objects that merely follow a research protocol and reveal facts about behavior and attitudes. A main issue in positivistic research is comparability of interviews. Standardization is promoted, to become independent of research settings and the researcher. Flexibility of answers, on the other hand, is discouraged as it results in a lack of comparability between interviews (Silverman, 2001). The objectives of standardizing and minimizing are not compatible with the aims of this research. This study is dependent on the expertise of professionals that are knowledgeable about XBRL and assurance. As only very limited experience with XBRL is existent, it must rely on the imagination of those professionals and cannot solely collect facts. Additionally, the interviewees come from different professions and it is therefore not feasible to get standardized answers from all of them.

The opposite of standardized interviews are unstructured interviews. These are open-ended and not limited to certain questions in an interview guide. Unstructured interviews are used to reveal authentic experiences following an emotionalist perspective. Emotionalism treats both interviewer and interviewee as subjects that try to achieve a mutual understanding of a situation and reveal authentic experiences. The interviewer creates an interview context and the interviewee either complies with the resulting situation or tries to resist and change it. Unstructured interviews are based on the assumption that no order of

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questions is appropriate for all interviewees. Moreover, the respondents shall be able to raise important issues that have not been prescheduled in an interview guide. Emotionalists are less concerned with threats to validity based on the bias from varying interview experiences, but more with authenticity (Silverman, 2001). As further explained in section 2.4, the results of this study are based on comparisons. This conflicts with the lack of comparability of unstructured interviews. Without an interview guide and similar questions to all interviewees, the analysis of responses becomes very difficult and extremely time-consuming.

For this study semi-structured interviews were chosen. The semi-structured technique exhibits features of both structured and unstructured interviews. By using this method it is possible to benefit from the advantages of both extremes, while at the same time avoiding their downsides. The semi-structured technique of this study permits to raise important issues in answers to more openly phrased questions during the interview as well as in the end, in case something important has not been addressed before.

In following a semi-structured technique, the interview guide in Figure 2 was developed. Both during designing the interview guide and conducting the interviews, four criteria have to be met: non-direction, specificity, range, and depth and personal context. First, non-direction refers to the necessity that questions do not lead the interviewee towards a preferred answer. To do so, unstructured questions shall be asked first, followed by semi-structured and later structured questions (Flick, 2002). The interview guide reflects this by starting with two very broad questions regarding the business environment. In later parts follow more structured questions concerning certain groups. The questions themselves are openly formulated with more structured subquestions to follow up.

Second, specificity refers to the aim of eliciting specific elements from interviewees and not “remaining on the level of general statements” (Flick, 2002:75), while still avoiding that the structure is prescribed. In the study this is also reached by starting with broader questions that allow interviewees to respond in a way appropriate for them. Only if important aspects are not considered, subquestions are asked to gain specific insights.

Third, in semi-structured interviews it has to be secured that the whole range of aspects is covered. The researcher has to introduce new aspects and return to ones not covered in enough detail, but also give the interviewee the chance to introduce

Methodology

Introduction	
1.	What is your name and position?
2.	Why are you working with XBRL and what does this work look like?
3.	When and how did you get in contact with XBRL for the first time?
General Questions	
4.	Can you characterize the need for assurance on XBRL documents and specify for what kind of information this need exists?
5.	Given a situation where assured information in XBRL format is used, how will the relation between preparers, users and assurance providers be? <ol style="list-style-type: none">Will this mean that users are more active in voicing demands or do they continue to rely on traditional audit evidence for the most part?Will assurance providers and preparers work more closely together or be more independent from each other?
6.	What additional direct steps to provide assured information does the use of XBRL technology demand, and how can these be handled? <ol style="list-style-type: none">What implications does the method of using taxonomies have?Which risks do evolve through the use of tags for information?What techniques exist to overcome the risks?
Questions Regarding Regulators	
7.	How important is the use of XBRL for electronic filing with government agencies compared to a free supply of information by companies? Will this situation change in the future? <ol style="list-style-type: none">For example some researchers suggest a direct access to company databases for extraction of information directly suited for users' needs. Obviously that information cannot be assured in the traditional sense. On the other hand many regulators consider XBRL for their statutory filing requirements. How do you assess the likeliness of those scenarios?
8.	What role will regulators play in assurance services when XBRL is widely adopted? <ol style="list-style-type: none">Will assurance be mostly arranged by supply and demand or will regulators control the assurance process?How important will the traditional statutory audit of financial statements be?
Questions Regarding Preparers	
9.	What involvement will assurance providers have in preparers' information systems to allow the provision of assured information using XBRL? <ol style="list-style-type: none">Will assurance providers' work tasks change?Who will be in charge of the information systems?
10.	What implications will this involvement of assurance providers likely have? <ol style="list-style-type: none">How will the independence of assurance providers be affected and what are the further consequences of this?
11.	Does the process of disseminating business information using XBRL give rise to new audit activities or other related assurance services? If so, how? <ol style="list-style-type: none">How can the integrity of information on the Internet be secured?Do the dynamic structure of the Internet and the use of references to related information pose a threat to the credibility of an assurance provider's report or the information in general?
Questions Regarding Users	
12.	What importance does assurance of information have for users of business information? <ol style="list-style-type: none">Who are the users of assured business information?What are the reasons for its use?
13.	How can XBRL help satisfy users' current needs for assured information?
14.	How will the demand for assurance services develop with the availability of information in XBRL and its possibilities?
15.	Some studies suggest the development of payment systems to facilitate payments by users of assured information instead of preparers. How do you assess the likeliness of this and in what way would this change the relation between the involved groups? <ol style="list-style-type: none">Could you for example imagine a future trend leading to insurance instead of assurance services where the payment to the provider of these represents an insurance premium?
16.	Are there any more aspects of XBRL regarding audit and assurance that you did not bring up so far that you consider important?

Figure 2: Interview guide

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topics by himself (Flick, 2002). The interview guide in this study is aimed at supporting this by addressing issues referring to one particular group of stakeholders after another. The interviewees always have the ability to mention aspects that seem important to them. In case some issues were not addressed during the interview, the last question in the interview guide is provided as an opportunity to voice them.

Finally, the depth and personal context mean that responses to interview questions should be based on personal beliefs that are grounded in the context of the interviewee (Flick, 2002). In this study all questions are formulated to base answers on the individual understanding of the interviewee. This is in particular clear for the questions 7 and 15.

The interview guide was prepared after an in-depth literature review that was also the basis for the Theoretical Frame of Reference (Chapter 3). The first three questions aim at gaining a deeper insight into the situation the interviewees are in and being able to integrate their responses appropriately in the analysis, as well as generating a comfortable interview situation. Question 4 was inspired by the examination of assurance based on agency theory and transaction cost economics in section 3.3. As several authors addressed changes to the corporate reporting supply chain as explained in section 3.1 and the subsection Implications on the Corporate Reporting Supply Chain in 3.4, question 5 aims at examining these changes. The subsection Changes in Assurance Work in section 3.4 examines steps that are needed to be able to provide assured information in XBRL, an issue considered in question 6. The questions regarding regulators also mainly address changes in the corporate reporting supply chain. Question 9 regarding involvement in information systems concerns Changes in Assurance Work as well as Move to Continuous Assurance in section 3.4, and the following question aims at Implications on the Corporate Reporting Supply Chain. Question 11 is included to discuss issues explained in Information Dissemination in section 3.4. The piece of the interview guide concerning users starts with two questions that return to the theoretical implications in section 3.3. Question 14 aims at the issues from Move to Continuous Assurance from a users' perspective. This is continued in question 15, which also moves on to the issue of Implications on the Corporate Reporting Supply Chain. Finally, the last question serves as a conclusion and gives the interviewees the opportunity to raise additional aspects about the topics dealt with.

Collection of Data

In conducting research, several decisions have to be made concerning the collection of data samples, hence called sampling strategies. Sampling strategies in the data collection phase of interview studies comprise sampling groups of cases and case sampling. Sampling groups of cases refers to the decision of which groups of persons to interview. As explained above, the study aimed at interviewing the groups involved in the corporate reporting supply chain. Another decision made relating to sampling groups of cases is the concentration on Swedish interviewees with additional contacts in Europe and the United States (US) mentioned in section 1.4. This decision can be seen as convenience sampling, as it “refers to the selection of those cases which are the easiest to access under given conditions” (Flick, 2002:68). Given the limited resources at hand, however, this was the only way to allow the realization of the study.

The second, and more important, decision is that of case sampling. Principally, sampling strategies can be divided into two extremes: abstract, a priori decisions about the sample structure, and concrete, gradual determination of the sample structure during the research process. The first extreme relates to statistical sampling as it is used in quantitative studies. Gradual sampling, on the other hand, is based on theoretical sampling, which implies that the sample selection is made in relation to the expected contribution to the research aim. The sample size is not fixed in advance and the sampling process is completed when the goal is reached. Flick (2002) shows that this principle is the typical form of sampling in qualitative research. This study is no exception from this as it relied on a gradual selection of interviewees.

Already early in the process the Swedish XBRL jurisdiction was approached and contact with two members of XBRL Sweden was established. Through a meeting in mid June 2005 and via e-mail, some valuable suggestions for the thesis process were received. These two early contacts were also the first respondents for the interviews. Additional interviewees were searched on websites of XBRL International and national XBRL jurisdictions, websites of organizations involved in one of the jurisdictions or otherwise involved in XBRL projects, and through recommendations from other respondents. Where possible, the potential interviewees were directly contacted. The majority was willing to participate in the study and e-mails were sent out with additional information about the thesis and a shortened version of the interview guide with subquestions left out. Where no phone number could be found or direct contact was not possible for other

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reasons, an e-mail was sent to prospective interviewees. In that case, however, the ratio of persons willing to participate was lower.

The decision of contacting a person was based on two concepts. First, participants were chosen on a type of critical case sampling. The selection, thus, made sure to include those experts that seemed to be most knowledgeable about the subject under investigation. Second, a strategy of including a maximal variation was followed. This meant to select interviewees that were “as different as possible, to disclose the range of variation and differentiation in the field” (Flick, 2002:68). This led to a selection of assurance providers that ranged from experts in statutory audits to technical experts in XBRL. Figure 3 gives an overview of the participants in the interviews and the participating organizations. However, the interviewees gave their personal views which do not necessarily correspond to the organizations’ official standpoints.

Group	Characteristics	Codes
Assurance Providers	7 interviewees 4 firms and 1 professional organization included 5 from Sweden, 1 from The Netherlands, and 1 from the US	A1 – A7
Government Agencies	1 interviewee 1 from Sweden	G1
Regulators	1 interviewee 1 from the US	R1
Users	2 interviewees 1 from Sweden, 1 from Germany	U1 – U2
Other	1 interviewee 1 from Belgium	O1

Participating Organizations		
Bolagsverket	Deloitte & Touche	Deutsche Bank
Ernst & Young	Grant Thornton	Öhrlings PricewaterhouseCoopers
PCAOB	Royal NIVRA	UC
XBRL in Europe		

Figure 3: Sample characteristics and participating organizations

Where possible, interviews were conducted face-to-face. Due to limited funds, however, this was only possible for the five interviews with assurance providers in Sweden. All other interviews had to be held as telephone conversations. All except two interviews were tape-recorded and transcribed afterwards. During all interviews additional notes were taken that subsequently were used as an aid in the transcription process. For the interviews where no recording was possible, the notes served as primary source of input. The notes from those interviews that were not tape-recorded were sent to the interviewees for approval. In

consequence, this transcription procedure implies that during the data interpretation no further material sampling was carried out, but all data collected was also used in the analysis (Flick, 2002).

2.3 Practical Constraints

Numerous practical constraints can be encountered during the process of writing a thesis. The biggest constraint for this thesis was geographical distances. When possible, travel arrangements were made in order to conduct face-to-face interviews with the respondents. Unfortunately, when experts outside of Sweden were interviewed, resource constraints made long-distance travel impracticable and hindered meetings with foreign experts. This constraint imposed telephone conversations as an alternative interview method.

Another constraint was related to experts and their time limit. In a first stage, possible interview subjects had to be persuaded to set aside time to participate in the study. The interview schedule was designed to be completed in half an hour and all the interviewees were asked to reserve this amount of time for the interview. However, when the actual interview took place, the majority of the experts was willing to go deeper into the questions and set aside more time.

2.4 Analytical Issues

To answer the research question, a three-step analytical approach was chosen. The three steps correspond to the Empirical Part in chapter 4, the Analysis in chapter 5, and finally the Conclusions in chapter 6.

The first step of the analytical approach does not only include a descriptive analysis of the results, as presented in chapter 4, but already starts when taking notes during the interviews and when transcribing the interviews, as pointed out by Silverman (2001). Consequently, the empirical data was analyzed throughout the process in order to verify that the research question and the research design were appropriate for the study. Notes were taken during all interviews, together with tape-recording, and the transcripts of all interviews were done as soon as possible after the interview with the aim of discussing different findings before the following interview.

In chapter 4, the responses from the interview participants are described and presented. In structuring that chapter the interview guide was followed as closely as possible. All answers for each question were manually analyzed by the authors and subsequently discussed and compared, before presenting the results.

Silverman (2001) highlights that even when conducting qualitative research, numerical data can be helpful for understanding the research results. Therefore, where possible, a quantification of the answers was carried out and the interviewees' answers were categorized and presented in survey style tables. This procedure offers a good overview to the extent and the quality of the answers. Sometimes interviewees were unable to answer the questions, and other times respondents contributed with multiple answers. This results in tables that do not add up to the sample size of twelve. However, this does not impair the credibility of the study. On the contrary, a question that does not generate any answers from one group of respondents provides insights as to how prioritized the issue is, and how well the group in question is prepared for changes. When a survey style presentation was not possible, the individual responses were presented and set into context. Characteristic quotes were used to illustrate the categorization and provide insight into respondents' reasoning.

The second step of the analytical approach is given in the comparative analysis in chapter 5. The data from the empirical chapter and findings from theory were contrasted and analyzed. As the interviewees had varying knowledge about the topic, two groups of interviewees could be discerned; assurance providers and other experts. This division was used in order to make the analysis clearer. For example, when one group had a very limited knowledge about a topic, the analysis concentrated on the other group. This does not mean that these questions were pointless. Quite the opposite, as it could be established what issues are important for certain groups of the corporate reporting supply chain. After the initial mapping of answers, the interviewees' responses could be summarized into four broad topics: assurance on XBRL, changes of work tasks, implications of Internet reporting, and continuous assurance and the corporate reporting supply chain.

Finally, the conclusions constitute the last step of the analytical approach. Chapter 6 presents the conclusions drawn from the analysis of the study's findings. The subquestions as well as the overall research question are answered and the findings set into a wider context of future assurance.

2.5 Credibility of the Study

A study has to demonstrate certain quality norms to be considered to present valid conclusions. Flick (2002) applies what he identifies as the classical criteria, validity and reliability, for assessing the procedure and the results of research.

Validity

Silverman (2005) defines validity as truth. There are two possible errors that can affect the validity of a study; to falsely reject a statement or to falsely believe that a statement is true. To assess the validity between studied relations and a researcher's conceptions, the concept of critical rationalism is often used, meaning the efforts made to falsify the initial assumptions in the research. Methods used in critical rationalism include analytic induction, constant comparative method, deviant-case analysis, comprehensive data treatment, use of appropriate tabulations, and triangulation of different sources.

In this thesis, an approach where the initial data from the interviews was analyzed and used to formulate hypotheses was adopted. Further, Silverman points out that “[s]imple counting techniques, theoretically derived and ideally based on members’ own categories, can offer a means to survey the whole corpus of data ordinarily lost in intensive, qualitative research” (2005:220). Chapter 4, Empirical Part, contains a quantification of interview responses, based on categories derived from the same answers. In this way, the reader can get a better picture of the data and is not only left to the authors’ judgment of the situation.

Reliability

According to Silverman (2005), the reliability of a study refers to its consistency. Cases must be assigned to the same categories either by the same observer on different occasions or by different observers. Therefore, what are called low-inference descriptions, are preferably used in studies. Transcriptions of tape-recorded interviews qualify as a low-inference description as long as attention is paid to certain criteria. Therefore, when transcribing the interviews, the exact wordings of the respondents were used. Attention was also paid to the correct reproduction of speech, including hesitations and hemming. The reliability of this study is further enhanced by careful documentation of the research procedure.

2.6 Summary

The aim of the methodology chapter was to give the reader a hint to what the study included and why certain choices were made in the process. Consequently, the first section of this chapter explained why a quantitative methodology was appropriate for the study. It laid the foundations for all the subsequent choices in the research process.

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In section 2.2, the availability of data was discussed and it was concluded that primary data derived from an interview study is the appropriate option for this research issue. Thereafter the choice of using a semi-structured interview technique was defended. The semi-structured technique fits the aims of the study as it allows for a planned interview with possibilities for the respondents to raise new issues during the interview. The interview guide was exposed and it was explained how the questions were elaborated in relation to four criteria: non-direction, specificity, range, and depth and personal context.

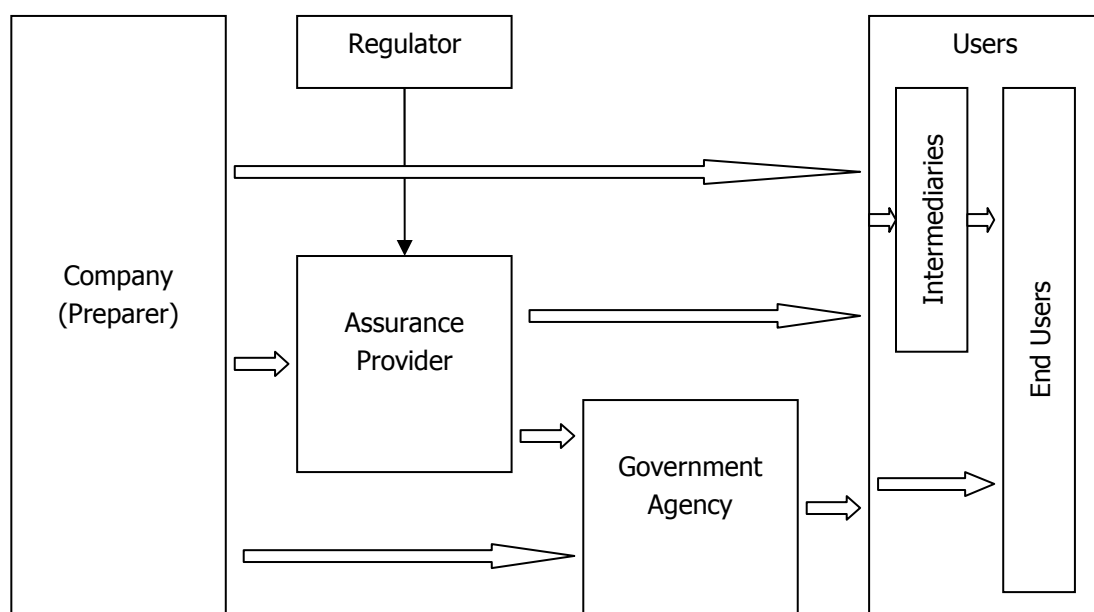
The three following sections explained in turn the practical constraints encountered during the research process, the analytical three-step approach chosen, and finally the credibility of the study, based on the classical criteria of validity and reliability.

3 Theoretical Frame of Reference

This chapter provides a theoretical foundation for the following empirical investigation and the analyses. It starts by putting assurance providers in the perspective of the corporate reporting supply chain in section 3.1, followed by a definition and description of assurance engagements and the tasks to be carried out in providing assurance services. Section 3.3 gives the theoretical underpinnings of the role audit and assurance have in today's business world. Before a concluding summary of the frame of reference, the penultimate section elaborates on the findings of previous research regarding changes in the work tasks during an assurance engagement, relating to reporting on the Internet, and other changes like continuous assurance.

3.1 Corporate Reporting Supply Chain

The adoption and use of XBRL is dependent on the relations between the different stakeholders in a business environment. Because of that it is important to understand the use of business information and its flows in the corporate reporting supply chain. This helps to understand the need for assurance and the potential changes in an XBRL environment. Figure 4 gives an overview of the corporate reporting supply chain and the ways to supply business information from a company to its intended users.



Source: adapted from Wagenhofer, 2003, p. 264

Figure 4: Corporate reporting supply chain

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All information originates from the company as the preparer of business information. From there information can take four different ways towards users. Another possibility to differentiate is the distinction between information directly to end users, or via an intermediary.

To begin with the flows including government agencies; information from corporations directly to government agencies refers mainly to ad hoc releases, for example about share transactions of managers. Government agencies are organizations that perform tasks assigned to it by the government. They are thus able to enforce regulatory filings. For certain reports, like annual financial statements and interim reports, regulators demand the previous attestation of an assurance provider, either in form of a statutory audit or other assurance engagements. Whether it is possible for users to access business information filed with a government agency is dependent on regulations. In certain countries and concerning certain regulators this is possible free of charge, in others it is subject to a fee or not possible at all.

One of the government agencies considered in this thesis is Bolagsverket. Bolagsverket is the Swedish company registration office, a government agency under the Ministry of Industry. Bolagsverket receives, among other things, annual accounts of registered companies and makes this information publicly available for a certain fee (Bolagsverket, 2005). In the US the Securities and Exchange Commission (SEC) has the mission to protect investors and maintain the integrity of the securities markets. It receives several filings like securities registrations, annual and quarterly filings, and filings related to mergers and acquisitions. Filings to the SEC are available to the public free of charge (SEC, 2005).

Additionally to regulated information flows it is possible that companies voluntarily release information to the public or specific users, which is not subject to enforcement. Here exist two possible information flows as well. Either information is directly provided to users, or it is assured by an assurance provider. Non-assured information refers, for example, to press releases concerning issues the company is not obliged to publish. An example of assured information is the attestation that the company follows certain sustainability standards.

In providing services, assurance providers have to follow rules that govern their work. These rules are laid down by regulators of the audit profession. Which rules have to be followed by an assurance provider is dependent on the country or region in which an assurance engagement is performed. In the US, in accordance

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with SOX the Public Company Accounting Oversight Board (PCAOB) was established as an independent oversight body for audits of public companies subject to US securities laws (USC, 2002). Before that, the audit profession in the US was self-regulated through the AICPA, which still acts as the regulator for non-public companies (AICPA, 2005). In Sweden the audit profession is still self-regulated through FAR, the institute for public accountants. However, regulation was changed in 2002 to follow international standards as closely as possible (FAR, 2005). These international standards are explained in the following section.

Finally, the intended users of business information can be divided into intermediaries and end users. End users are the ultimate receivers of information. Examples of end users are financial analysts and banks. They need business information to make decisions about transactions on financial markets and loans to preparers of the information, respectively. Professional end users mostly rely on the work of intermediaries and do not use information directly from companies or government agencies. Intermediaries provide services like aggregation of information from several sources and format transformations. Examples of intermediaries are Informa in Spain, UC in Sweden, and Bureau van Dijk in Europe (BvDEP, 2005; Informa, 2005; UC, 2005).

3.2 Auditing and Assurance Services

The International Federation of Accountants (IFAC) is the umbrella organization for more than 160 member bodies from the accountancy profession and represents accountants in public practice, industry and commerce, the public sector, and education. The International Auditing and Assurance Standards Board (IAASB) is one of the IFAC standard-setting committees and develops standards on auditing, review engagements, and other assurance engagements, as well as quality control standards. The statements of the IAASB are aimed at being a worldwide benchmark for auditing and assurance standards (IFAC, 2005a). As this research is conducted in an international environment, the study is based on the definitions of audit and assurance of the IAASB that are explained in the following subsection. Subsequently, the procedures in the assurance process are presented, as they provide the basis from which to analyze changes in work tasks through XBRL.

Assurance Engagements Defined

In the International Framework for Assurance Engagements, an assurance engagement is defined as follows:

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“Assurance engagement” means an engagement in which a practitioner expresses a conclusion designed to enhance the degree of confidence of the intended users other than the responsible party about the outcome of the evaluation or measurement of a subject matter against criteria (IFAC, 2005b:178).

The particular standards that fall under this definition are International Standards on Auditing (ISA), International Standards on Review Engagements (ISRE), and International Standards on Assurance Engagements (ISAE). The former two are to be applied in audits respective reviews of historical financial information while ISAE address assurance engagements dealing with subject matters other than historical financial information. Common to all assurance engagements is that they exhibit five elements:

1. A three party relationship involving a practitioner, a responsible party, and intended users;
2. An appropriate subject matter;
3. Suitable criteria;
4. Sufficient appropriate evidence; and
5. A written assurance report in the form appropriate to a reasonable assurance engagement or a limited assurance engagement (IFAC, 2005b:182).

In assurance engagements, three separate parties are involved. The practitioner, a professional accountant in public practice, is also called auditor when performing audits or reviews of historical financial information. In this thesis the term assurance provider is used instead to refer to either the practitioner responsible for conducting an assurance engagement or the responsible firm. The responsible party is in charge of the subject matter and responsible for choosing the criteria. Typically it is also the responsible party that engages the assurance provider, however this is no requirement. The intended users can be one or several persons, or classes of persons, but not only the responsible party itself (Hayes, Dassen, Schilder & Wallage, 2005; IFAC, 2005b).

Subject matters can take many forms. They can be qualitative or quantitative, objective or subjective, historical or prospective, and cover a period or regard a certain point in time. A subject matter is appropriate if it is identifiable, can be evaluated or measured against identified criteria to create the subject matter information, and sufficient evidence can be gathered about the subject matter information to support an appropriate assurance opinion (IFAC, 2005b).

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Criteria have to be identified to evaluate or measure the subject matter. Suitable criteria are relevant, complete, reliable, neutral, and understandable. They “are required for reasonably consistent evaluation or measurement of a subject matter within the context of professional judgement. Without the frame of reference provided by suitable criteria, any conclusion is open to individual interpretation and misunderstanding” (IFAC, 2005b:186).

The aim of the assurance provider is to collect sufficient appropriate evidence to allow a conclusion whether the subject matter information is presented fairly, in all material aspects. No matter who engages the assurance provider and the degree of involvement of the responsible party and the intended users, it is the assurance provider that “is responsible for determining the nature, timing and extent of procedures” (IFAC, 2005b:184) to obtain this evidence. To collect sufficient appropriate evidence for a reasonable assurance engagement the assurance provider has to execute an iterative, systematic process that involves the following:

1. Obtaining an understanding of the subject matter and other engagement circumstances which, depending on the subject matter, includes obtaining an understanding of internal control;
2. Based on that understanding, assessing the risks that the subject matter information may be materially misstated;
3. Responding to assessed risks, including developing overall responses, and determining the nature, timing and extent of further procedures;
4. Performing further procedures clearly linked to the identified risks, using a combination of inspection, observation, confirmation, recalculation, re-performance, analytical procedures and inquiry. Such further procedures involve substantive procedures including, where applicable, obtaining corroborating information from sources independent of the responsible party, and depending on the nature of the subject matter, tests of the operating effectiveness of controls; and
5. Evaluating the sufficiency and appropriateness of evidence (IFAC, 2005b:192).

Finally, an assurance engagement concludes with the issuance of a report by the assurance provider, stating the opinion about whether the evidence allows the conclusion that the subject matter conforms to the identified criteria. In a reasonable assurance engagement the report is expressed in a positive form, whereas in a limited assurance engagement the report is expressed in a negative form, indicating a lower level of evidence-gathering procedures (Hayes et al., 2005).

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A typical example of an assurance engagement is the statutory audit of the annual report. In this case the subject matter is the financial performance of the company during the last financial year and the resulting financial condition. Suitable criteria for this subject matter are IFRS, so that the resulting subject matter information is the recognition, measurement, presentation, and disclosure of the financial statements according to IFRS. The responsible party for preparing the subject matter information may be the board of directors, and the intended users the supervisory board, the shareholders, or the public at large, depending on national legislation. In this case the assurance provider will base his conclusion on evidence like accounting records and other information underlying the financial statements (Hayes et al., 2005). In the case of reviewing financial statements, which would be applicable to interim reports, this evidence gathering process is deliberately limited and primarily based on analytical procedures and inquiries, omitting inspection, observation, confirmation, recalculation, and re-performance (IFAC, 2005b).

Other assurance engagements could be related to the examination of prospective financial statements or non-financial information, like environmental reports. Behavior can also be subject to examination by an assurance provider, as well as systems and processes, as it is required for internal control systems under SOX (Hayes et al., 2005).

Although the definition of assurance engagements encompasses a wide variety of services as explained above, not all work conducted by professional accountants in public practice is considered an assurance engagement. The consulting business of accounting firms is one such service that does not meet the definition of an assurance engagement. Others are agreed-upon procedures engagements and compilations of information, for which the IAASB issued International Standards for Related Services (ISRS), as well as the preparation of tax returns (IFAC, 2005b).

Assurance Work

While conducting an assurance engagement, the assurance provider needs to collect sufficient appropriate evidence by performing the steps explained above following a systematic approach. According to Hayes et al. (2005) this process can be divided into four phases to form a standard process model: 1. client acceptance, 2. planning, 3. testing and evidence, and 4. evaluation and reporting. Each of these phases comprises several procedures to reach the phase's objectives.

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The objectives of the first phase, client acceptance, are the acceptance of a responsible party or client and the acceptance by the responsible party. To be able to accept the responsible party, the assurance provider has to obtain sufficient knowledge of the business to be able to identify and understand events, transactions, and processes that possibly have a significant effect on the subject matter. The assurance provider then has to decide whether the ethical and specific competence requirements are met or not. Ethical requirements mainly refer to independence requirements, which are explained in more detail in section 3.3, and specific competence requirements concern, among other things, the ability to gather enough team members with needed expertise. The third procedure in the client acceptance phase concerns the decision whether an expert with special knowledge and experience in a field other than accounting and auditing is needed to collect sufficient evidence. Assurance of XBRL documents may, for example, entail the need of specific information technology (IT) expertise. Moreover, before accepting an assurance engagement an assurance provider is required to consult a predecessor assurance provider to secure that no issues stand in the way of the engagement. If this is the case it is the assurance providers' task to prepare an engagement proposal that has to be accepted by the responsible party. After acceptance by the responsible party the objective and scope of the assurance engagement, the responsibilities, and the form of the report will be codified in an engagement letter (Hayes et al., 2005; Woolf, 1997).

According to Hayes et al. (2005) the planning phase has the objective to determine the amount and type of evidence required to allow a conclusion whether the subject matter is presented fairly, in all material aspects. In order to do so the first procedure in this phase is to enhance the understanding of the entity and its environment. This is done by making inquiries about the objectives and expectations of the responsible party, performing analytical procedures like comparisons of company information with industry benchmarks, observing the activities of the business, and inspecting documents. In this step it is also important to assess internal control systems. These systems are based on the principle that transactions can be separated into three functions: authorization, custody, and recording, which have to be properly supervised by management (Woolf, 1997). The understanding of the entity allows for a risk assessment to determine the likelihood of a material misstatement of the subject matter information. The higher the risk, the more evidence has to be collected subsequently. Prior to the risk assessment values for materiality have to be

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defined, considering “quantitative and qualitative factors, such as relative magnitude, the nature and extent of the effect of these factors on the evaluation or measurement of the subject matter, and the interests of the intended users” (IFAC, 2005b). The last step in the planning phase is to prepare a plan of the assurance procedures to be conducted during the following phase.

Phase three, testing and evidence, has the objective to test for evidence that supports the effectiveness of internal controls and the fairness of the subject matter information. Accordingly, the procedures in this phase are the test of controls and substantive testing. In order to test controls the assurance provider has to make sure that the controls are in place and determine how and by whom they are applied and if they are applied consistently. Substantive testing is used to obtain evidence about completeness, accuracy, and validity of the subject matter information. It includes both the test of details and more analytical procedures (Hayes et al., 2005).

The final phase in the process model is called evaluation and reporting since the final objective is to express an opinion. Before that, however, some evaluating procedures like the identification of events after the period of time covered by the assurance, review of the subject matter information, and wrap-up procedures have to take place (Hayes et al., 2005; Woolf, 1997).

3.3 The Role of Assurance

Assurance services are not conducted for the sake of it but serve defined purposes. This section will give a theoretically grounded explanation for the role of audit and assurance in today’s business world by considering agency theory and transaction cost economics. Both theories deal with imperfect information and the creation of measures to decrease market deficiencies. They further explain the use and value attached to business information. Advantages for both agency costs and transaction costs through the use of XBRL are highlighted.

Agency Problem

The agency theory is used to illustrate the relationship between a principal and an agent, their diverging interests, and the costs of resolving conflicts in the absence of public, free and equally available information. It states that a principal, often pointed out as an owner of a firm, delegates to an agent, the top management, the task to run the firm on his behalf in the company’s best interest. However, the agent has self-interests that are not completely aligned with the firm’s. In

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consequence, the agent desires to maximize personal compensation while minimizing personal costs, which may lead to a conflict of interests including agency costs. In order to minimize agency costs the principal might enter into a contract with the agent that induces efficient performance and involves a shift of risk to the agent (Cohen et al., 2003; Spulber, 1999).

Agency costs are caused by information asymmetry; the fact that the agent has more information about his efforts and the health of the company than the principal. In an effort to monitor the agent's performance, the principal spends money on information. Regularly, accounting measures are used for this performance measurement, which is then used to allocate compensation as incentive for the agent to increase the company's value for the principal (Cohen et al., 2003). However, it is the agent's responsibility to prepare the information that is to be used for performance measurement. In order to allow monitoring of the agent through the information it is necessary to obtain an independent opinion whether the subject matter information is presented fairly, in all material aspects, through an assurance report. To keep confidence about the reliability of the assurance report, the independence of the assurance provider that issues the opinion is essential (Hayes et al., 2005). Given the independence requirement, assurance "is a risk reduction practice which benefits the principal because it inhibits the value reducing actions by agents" (Power, 1997:5).

Power (1997) states that the amount of assurance demanded by principals will be dependent on the curve progression of both benefits obtained and costs incurred. Thus, by changing the progression of one of those or both together, the use of XBRL may change the demand for assurance and decrease the information asymmetry that exists between principals and agents. Eventually, it thereby might further alter the relations between preparers, owners as end users, and assurance providers in the corporate reporting supply chain (see Figure 4).

Transaction Costs

A condition of the agency theory is some kind of accountability relationship between the agent and the principal (Power, 1997). However, not all relations in the corporate reporting supply chain involve this kind of relationship where the preparer acts as an agent to account for actions. Nevertheless, these relations exhibit contractual obligations, self-interests of actors, and goal incongruence. The underlying reasons for the cooperation between these actors are economic exchanges. Therefore, transaction cost economics, based on costs of economic

exchanges instead of relationships, can explain how information asymmetry is reduced by assurance (Cohen et al., 2003).

Transaction cost economics is based on the theory of the firm by Coase (1937) and seeks to explain the existence of firms, as opposed to all exchanges being done directly on the market. When markets do not efficiently organize production or allocation of goods and services, firms that seek to lower the transaction costs will emerge. Any firm will seek to minimize the sum of transaction costs by adapting its structure and investments, and by choosing which contracts to enter into (Spulber, 1999). The theory is developed further by adding bounded rationality of managers and contractual incompleteness. The incapacity of managers to foresee all possible eventualities in a complex transaction creates uncertainty. Compensation of uncertainty leads to further transaction costs that affect economic agents, which base their decisions on market information. Therefore, firms exist in order to help contracting in a business world characterized by incomplete information and a changing and hazardous environment (Ricketts, 1994; Spulber, 1999).

Contracts can lead to a dependence on the contractual partner, for example through asset specificity in the form of sunk costs for equipment or specialized training (Cohen et al., 2003). Combined with the risks of asymmetric information and self-interest, this demands for monitoring of the partner. However, monitoring itself generates transaction costs. Thus, information about, and enforcement of, transactions are costly (Spulber, 1999). According to Stump and Heide (1996), monitoring of contractors is less likely to occur when performance is difficult to measure. Therefore, the demand for monitoring is mostly demanded for stable industries with defined standards. It will further only be demanded if it lowers the transaction costs of the economic exchanges the parties enter into.

Analogous to the agency problem, assurance can be seen as a way to lower transaction costs. If the cost of an independent assurance of business information provided by the contractual partner is lower than the costs of direct monitoring the partner, then assurance will be demanded in that economic exchange. XBRL has the potential to alter this demand by either lowering the costs of assurance or the direct monitoring costs.

3.4 Assurance Implications of XBRL

As explained in the preceding section, considering both agency problem and transaction costs, XBRL has the potential to change the demand for assurance. This section goes more into detail about the changes that seem possible, as revealed by earlier research. It will start with an overview of the changes in the way assurance work will be conducted. As the changes will likely involve modifications in the way assured information is disseminated, this is also considered. Thereafter follows an examination of the possible transformation to continuous assurance and the wider consequences all these alterations have on the corporate reporting supply chain.

Changes in Assurance Work

Previous research has found several changes in conducting assurance work on XBRL documents. First, the possibility of XBRL to provide additional assurance services that have not been possible before has to be examined. Second, the impact of XBRL on the assurance process model has to be considered, which also includes changes in execution of work tasks and necessary additional tasks.

XBRL makes it possible to provide assurance not only on information in document form, like the financial statements, but also on more specific and less aggregated data. This new form of assurance is called data level assurance (Cohen et al., 2003). Trites (2002) notes in his paper that data level assurance considers the context of data, so that the problem of lost context of individual items in traditional reports is overcome. Data level assurance can be a service opportunity for assurance providers, as its importance will grow with widespread use of XBRL. Of particular importance becomes data level assurance in electronic commerce. In electronic commerce participants in a transaction tend to be unknown to each other and the speed with which transactions are processed would raise transaction costs to prohibitive amounts if contractors had to monitor each other. An independent assurance of the data exchanged thus provides a means to overcome the risks of electronic commerce (Nicolaou, Lord & Liu, 2003).

In spite of new assurance services, like the data level assurance just explained, the objective of assurance, to improve the quality of information, stays the same even if XBRL is used in the process. Xiao et al. (2002) found that assurance providers will try to stick to the traditional assurance process model as explained in section 3.2 as long and as much as possible in providing their services. The experts in

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their study, however, took opposing positions whether assurance practice will have to change significantly or not at all. A reason for the ability to stick to existing assurance processes may be found in the process of developing taxonomies. As Bovee et al. (2002) reveal, taxonomies are derived from assurance procedures, which explains the resulting fit between existing assurance procedures and taxonomies. But no matter how good the fit is, the preparation of XBRL documents involves an additional step in the process of preparing subject matter information, which also needs to be regarded during the assurance procedures. The preparation of an XBRL document is conducted either manually or automated. During a manual preparation, for example from a spreadsheet, data is tagged using concepts from a particular taxonomy. Before an automated creation, taxonomy concepts have to be mapped to certain data from the information system. In a second step the XBRL document is then automatically filled with data provided by the system (Trites, 2002).

The preparation step, which is different from the traditional data accumulation, leads to a need for additional assurance procedures in the planning as well as the testing and evidence phase of the standard assurance process model explained in section 3.2. Internal controls that are established to ensure a proper preparation process also need to be tested. In particular, Trites brings up “a review of the controls over the use of an appropriate taxonomy, the tagging of data, and the integrity of the tagged data” (Trites, 2002:8). Boritz and No (2003) give an example concerning a taxonomy for financial reporting according to GAAP. If a new version of the taxonomy is published because of changes in GAAP it has to be made sure in the assurance process that the old taxonomy version is applied to statements that concern the time span before the changes in GAAP became effective, and the new version for the time span after the changes became effective. Referring to the tagging of data, they explain the lost comparability through application of a “cash and cash equivalents” tag to either cash only or cash and cash equivalents. This is no change from today’s assurance process where the adherence to applicable GAAP has to be tested, but equivalent checking is also needed for all other kinds of assurance services that involve XBRL.

According to Trites (2002) it is one of the assurance concerns to ensure that all relevant data to be included in the XBRL document is actually tagged. This demands observation and inspection of the tagging system, especially if data to be included does not balance as is the case with accounting data that for example

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affects both sides of the balance sheet. As XBRL documents will likely not be read directly, but transformed through style sheets or analysis software, Wagenhofer (2003) points to the possibility of preparers not only to not tag information or hide it in a certain tag, but also to define own tags in an extension taxonomy, to use those instead of tags from the official taxonomy. A procedure to assist in assurance services mentioned by Trites (2002) is the use of special taxonomies to retrieve data needed in the assurance engagement. The use of software in the assurance process, moreover, makes it possible to automate and thereby speed up former labor-intensive tasks like sample selection and recalculations (Cohen et al., 2003).

Besides the implications in the second and third phases of the assurance process model, XBRL also has a decisive impact during evaluation and reporting. Even though there is disagreement about the future existence of paper versions of the annual report and other reports, for example for a formal audit sign-off, statutory filing, or other regulatory requirements, assurance on XBRL documents demands other ways to provide the assurance opinion (Xiao et al., 2002). In a paper based assurance opinion the report attains its status through the signature of the assurance provider. An electronic assurance report on an XBRL document needs an equivalent electronic signature to attain its legal status and ease users' concerns (Cohen et al., 2003). Documents are electronically signed by creating a message digest, a unique number representing the document content, that is subsequently encrypted with the private key of the signatory and attached to the original document. The recipient can inspect the signature by decrypting the message digest with the public key of the signatory and comparing it to the message digest calculated from the received document. A prerequisite for this process to work is a public key infrastructure (PKI). In a PKI, certificate authorities control the creation of public/private key pairs and store information about the key owner together with the public key, so that this information is publicly available (Boritz & No, 2003). Electronic signatures and PKI, however, have additional benefits in the dissemination of information on the Internet. Therefore, the dissemination part is considered before explaining the eXtensible Assurance Reporting Language (XARL), an integrated concept for issuing and disseminating XBRL documents together with assurance reports that makes use of electronic signatures.

Information Dissemination

The Internet offers an easy and interactive communication channel between preparers and users of business information. The low cost of disseminating

information through company websites affects distribution and communication of reports (Wagenhofer, 2003). The study by Xiao et al. (2002) shows that Internet reporting helps decrease costs for rapid dissemination of information. As such, businesses may be willing to disclose additional reports, for instance on non-financial information and future predictions. Additional and faster information has the potential to reduce information asymmetries between principals and agents and hence also agency costs. Additional information also reduces the need for additional monitoring in economic exchanges and consequently transaction costs.

According to Xiao et al. (2002), it is anticipated that additional work of assurance providers is needed to cover publications of documents on the Internet. The identification of the risks of Internet reporting helps to understand this need and develop assurance solutions that tackle the identified issues.

The Internet makes it easy for anyone to produce and disseminate information. Therefore it is necessary to consider the integrity of information, before using it in decision making (Boritz & No, 2003). The integrity of information is a guarantee for the exactness and completeness of the information and processing methods. In practice, this will imply the verification that the information sent is the same information as received (Ponte, 2005). If annual financial statements are published on the Internet, “[r]ather than being a highly controlled element of a tightly defined physical document, the auditor’s report becomes part of the chaotic morass of information that characterizes the web” (Debreceeny & Gray, 1999).

Xiao et al. (2002) found a whole list of issues that stand in the way of providing assurance on information that is disseminated via the Internet. If assured and non-assured information coexists on the Internet it is difficult to distinguish both parts. In consequence this will then undermine the integrity of the assurance report. In addition to this coexistence, hyperlinks can be used to link from assured to non-assured information and vice versa. Another issue is that the disclosed information can be changed at any time, which raises the problem that the assurance provider needs to become aware of those changes and re-assure the information. Moreover, if the assurance report is part of the preparer’s website, it might be changed by the company after the issuance without knowledge of the assurance provider (Debreceeny & Gray, 1999).

In the electronic world it may be possible to extract certain information from an assured document and to distribute only this extract instead of the whole document together with the assurance opinion, or even the assurance opinion

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alone. Once the assurance report is published, the assurance provider is no longer in charge of the distribution channels and thus cannot control who will get access to the report. Moreover, if information is disseminated via web pages the design of those pages can cause interpretation problems. Especially the possibility to publish misleading information and website security issues make the experts in the study of Xiao et al. (2002) believe that assurance practices will have to change.

Wagenhofer (2003) agrees that website security, in particular the difficulty of controlling access and attempts of hostile intruders and hackers to manipulate data, is an issue that affects information quality. It may also happen that someone attacks the systems and protocols underlying communication on the Internet to lure users on forged websites (Debreceeny & Gray, 1999). Moreover, the flexibility of the Internet is described as a disadvantage for credibility and authenticity.

All these problems, which have to be faced when making assured information publicly available on the Internet, may lead people to adopt the simple solution of only providing non-assured information. This resembles the present situation where, technically, the same data as in audited annual financial statements is, if retrieved electronically from a web page, not audited (Trites, 2002). As most corporate information, apart from annual financial statements, is not assured today, Wagenhofer (2003) sees this as a possibility for information on the Internet as well. On the other hand, Xiao et al. (2002) report at least a singular opinion that all Internet reporting will be audited or reviewed.

A first solution to tackle the issues of distinguishing assured and non-assured information and, at least partly, the design of websites is to disallow hyperlinks towards the assurance providers report from particular information. This could prevent the appearance that the document or part of a document containing the hyperlink is assured, when in fact it may not be (Debreceeny & Gray, 1999; Wagenhofer, 2003). One step further goes the proposal to store the assurance opinion directly on the assurance provider's website, instead of the preparer's. By this, according to Debreceeny and Gray (1999), most security problems are removed and the assurance provider is able to control the presentation of the report. To solve the problem of subsequent changes of information once it is published by the company and assured by the assurance provider, the information itself could be stored on the assurance provider's website as well. A similar solution is given by Wagenhofer (2003). Instead of providing access through the assurance provider's website, the increasing number of government agencies that

consider electronic filing could make it possible to store the assured document together with the assurance report on the agency's website. Another opportunity to detect subsequent changes is to sign the assured document and the assurance report with an electronic signature (Debreceeny & Gray, 1999). The use of an electronic signature, however, has additional advantages. Already mentioned above was the purpose to give the assurance report a legal effect. The signature can also be used to identify the signer. The authentication of the document, mentioned by Debreceeny and Gray (1999), together with an authentication of the signer, both through a PKI, can assure the authenticity of a document. Additionally an electronic signature could also carry a declaration of commitment and act as a warning (Hertz & Cardholm, 2004). Moreover, by adding an encryption to the document, only authorized users could access the information, adding the advantage of confidentiality of information (Ponte, 2005).

Boritz and No (2003; 2005) combined the above solutions into a single comprehensive approach for the assurance of XBRL documents that are disseminated via the Internet. They developed XARL as an extension of XBRL and designed a system around it that is able to provide assurance by using Web services technology. A Web service is a service that is based on XML and can be evoked automatically over the Internet. In a first step, the preparer obtains a XBRL taxonomy from XBRL International. Like in all following communications, the document to be sent, in this case the XBRL taxonomy, is signed with the sender's private key and the whole message is encrypted with the receiver's public key. Thereby only the intended receiver is able to decrypt the message with its private key. The preparer uses the XBRL taxonomy to create an instance document. The assurance provider then requests the instance document and, if authorized, receives it in signed and encrypted form. The assurance provider then obtains a XARL taxonomy from an official organization, again signed and encrypted. A XARL taxonomy is similar to a XBRL taxonomy and acts as a "template that defines the assurance tags and describes how assurance data is interrelated" (Boritz & No, 2003). After performing the assurance engagement, the assurance provider issues an opinion in the form of a XARL document that is stored in the assurance providers IT system. The XARL document contains the tags from the original XBRL document and additional tags that provide precise assurance information. If a user now wants to access the XARL document, the request towards the assurance provider is checked, and in case authorization is granted, he receives the signed and encrypted XARL document.

Move to Continuous Assurance

In recent years the speed in which the business world acts has increased tremendously. Nowadays economic exchanges can be initiated, deals closed, and claims settled in a matter of seconds. This has caused a demand for continuous, more frequent, reporting of business information to external parties like investors, creditors, and government agencies. Cohen et al. (2003) suggest that this is the case especially when information asymmetry is strong, monitoring is cheap, risk sharing is expensive and agency costs are high. According to Hunton et al., “definitions of continuous reporting range from nanoseconds to months” (2003:7). Common ground, however, is that continuous reporting refers to more frequent reporting than quarterly or annual reports. The more reporting approaches real-time, the more desirable seems dissemination of business information on demand instead of periodically. Likewise, with more frequent reporting, demand for more frequent assurance is expected (Roohani, 2003).

XBRL permits faster production and distribution of business information, likely resulting in more frequent reporting and assurance. In consequence this may help to reduce agency and transaction costs by increasing the reliability of business reporting and thereby giving a better performance measure of agents or contractual partners, respectively. XBRL-related technologies might further affect internal and external assurance functions, making it less costly to monitor efforts. In the internal area, the technologies may be used to provide accurate feedback to management, and in the external area the assurance provider’s frequent reporting may be used as an alarm system for issues that needs a solution before the next scheduled business report. Business reports are not desired in themselves by the principal, but generated in order to solve the problem of information asymmetry between principal and agent. When new technologies are implemented that increase the frequency of business reporting, this will reduce the information asymmetry. The traditional audit estimates the results of a company. More frequent assurance will likely decrease the variance of these estimates, lead to a reduction in moral hazard and thus decrease agency and transaction costs (Kogan et al., 1999).

Several researchers have conducted investigations about technological enablers of continuous reporting and continuous assurance. The overall results indicate that supporting technologies, such as enterprise resource planning (ERP) systems and high-bandwidth networks, are mainly in place (Alles et al., 2002; Hunton et al., 2003). XBRL gives an additional opportunity to make sure business information is

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not only recorded and stored in electronic form, but also available for continuous remote access (Bovee et al., 2002; Kogan et al., 1999). XBRL, moreover, also meets the condition that “[i]nformation must be disseminated in accordance with standardized information specifications that facilitate capital suppliers’ access to, and acquisition and analysis of, the information” (Elliott, 2002:140). Bovee et al. (2002) argue that non-technical enablers like new regulations, in particular regulation FD (fair disclosure) about simultaneous information dissemination to all users, adopted by the SEC in 2000, can also advance continuous reporting. A similar argument is also brought forward by other authors in relation to continuous assurance. Here especially the compliance with SOX is given as a reason for implementing continuous assurance in order to be able to identify and deal with issues before the year-end audit procedures (Cohen et al., 2003; Krell, 2004).

Although technological enablers are available, a switch towards continuous assurance raises several issues. As Hunton et al. argue, continuous reporting introduces a “fundamental change in the current information systems, as it demands quicker processing of economic events and timelier reporting of business results” (2003:7). In line with this, continuous assurance needs to be able to depend on reliable automated systems (Cohen et al., 2003). Roohani (2003) foresees an additional need for security, privacy, and authentication systems. These issues were also found by Krell (2004), together with the costs for a permanent connection between assurance providers’ and preparers’ information systems.

According to Alles et al. (2002), continuous assurance can be provided using one of two opposing approaches. The first solution is a mirroring approach. Using this, all data processing activities in the preparer’s system will have to be repeated in a mirror system controlled by the assurance provider. A mirroring approach however, seems harder to implement than the second solution; a monitoring approach:

Such system monitoring would have to include continuous testing of internal controls, continuous monitoring of transaction flow integrity, and continuous monitoring of the system’s digital signatures to assure that the system has no unauthorized changes. Applications have their natural timing, and analytical procedures for their monitoring must be performed along this cycle. For example, many organizations bill in daily cycles throughout the month. Consequently, billing completion tests can only be performed for one daily cycle at a time (Alles et al., 2002:128, note 2).

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In any way, reporting in real-time demands a change from a mainly outcome-related assurance process to process-related assurance procedures, as a subsequent assurance based on the outcome would cause an undesirable delay in publication (Wagenhofer, 2003). Continuous assurance procedures based on monitoring can produce exception reports if additional attention from the assurance provider seems necessary, combined with additional software to monitor conditions and generate reports for further inspection at random intervals (Trites, 2002). This could be done by software agents, pieces of software that act autonomously in an environment and pursue their goals intelligently through both reactive and proactive measures (Nehmer, 2003). Thus, software agents are a type of embedded assurance modules that have been conceptualized since the late 1980s, but have not been adopted in current ERP systems, yet. Embedded assurance modules aim at monitoring the capturing and processing of information as well as changes in the system itself (Alles et al., 2002).

Whether a system shall be mirrored or monitored, all these solutions demand a high involvement of the assurance provider even into the operational processing of the preparer (Nehmer, 2003). Monitoring devices like embedded assurance modules need to be highly integrated with the company's information systems. This means that the system that is to be assured and the system that is used to provide the assurance are interlinked and not independent of each other. As systems integration involves high costs and may lead to the situation that the assurance provider is responsible for parts of the company's system, this might also impact the independence of the assurance provider (Alles et al., 2002).

Continuous assurance will only become an important service, if the costs for providing the assurance are lower than the benefits. Moreover, someone has to be willing to pay for the costs of the assurance engagement (Cohen et al., 2003). In the present situation, generally the responsible party is also paying for the assurance service. With a move to continuous assurance, however, the group of users of a particular assurance opinion diminishes and eventually only consists of one user in case of assurance on demand. The user can be more active in voicing its demand for specific business reports, or could even have direct access to company databases to extract the needed information. This individual and active access of business information and assurance thereon may, in an additional step, allow the development of payment systems where the assurance provider is paid for his services based on the number of times the assurance opinion was obtained.

This payment could then be made either by the company like before, or by the user itself (Elliott, 2002).

Implications on the Corporate Reporting Supply Chain

Xiao et al. (2002) found a growing importance of non-financial business information, information that would be more prospective and not audited like the financial statements. However, assurance of information is still believed to be of importance and become even more important in the future. This presents a great opportunity for assurance providers, but at the same time a serious risk. Assurance of information in XBRL documents and the systems used in the preparation demands high IT qualifications. If assurance providers are not able to satisfy the demands for additional assurance, these services may be conducted by other professionals instead. Weber (2003) states that specialist service providers may emerge for the provision of audit and assurance on XBRL and other XML documents.

If reports and accompanying assurance opinions are disseminated via the Internet, it can be made possible to identify the users of this information (Hunton et al., 2003). The same applies to continuous reporting and assurance on demand. Therefore, these assurance services can be provided in an environment where the use of information demands the prior conclusion of a contract. In these contracts the assessor's liability can be limited and thus, without the threat of high compensations under tort law, the provision of assurance services can be facilitated (Alles et al., 2002; Elliott, 2002). If, moreover, users pay for assurance services directly, it may be possible to abstain from the independence requirements for assurance providers. Instead, assurance engagements would be replaced by insurance engagements. The user pays an insurance premium instead of a service fee. If the assurance provider did not prepare his report with enough professional care, the user may then be entitled to compensation according to the insurance terms in the contract between assurance provider and user (Elliott, 2002).

Elliott (2002) describes an additional effect on the corporate reporting supply chain. As mentioned above, reporting in XBRL allows a more active participation of users in the corporate reporting supply chain. The users have the possibility to voice their demands and may possibly even have direct access to company databases. These individual needs can not be met through an information flow including government agencies. Even if companies do not allow direct database

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access, direct communication between companies, users, and possibly assurance providers, for example in the way the XARL solution proposes, may become more important. Therefore it could be assumed that government agencies will become less important.

3.5 Summary

This chapter has provided a theoretical foundation for the understanding of the following empirical investigation and analyses. It first explained the relations in the corporate reporting supply chain. The second section brought up the issue of assurance, as XBRL likely will have implications on the way assurance services are carried out. The concept of assurance was discussed. This was followed by section 3.3 that provided a theoretically grounded explanation for the role of audit and assurance in today's business world. The agency theory and transaction cost economics were used to highlight how XBRL can benefit the economy. At last, a literature review in the following section revealed possible changes in relation to assurance provision that may occur when XBRL is widely adopted. Four areas of change could be identified from the literature; changes in assurance work, changes in information dissemination, transformation to continuous assurance, and impacts on the corporate reporting supply chain. Each of these issues was treated in its own subsection.

4 Empirical Part

This chapter presents the results from the interviews with people knowledgeable in the fields of assurance and XBRL. As explained in the methodology chapter, where appropriate the answers were quantified and presented in survey style tables to give a good overview. Categories were derived from the interviewees' responses and thereafter answers allocated to the categories. However, due to the open character of the questions this was not always possible. Therefore, the number of responses in the following tables does not necessarily add up to the sample size. The interview respondents are divided into two groups that are contrasted in the analysis that follows in chapter 5. Therefore, the answers in the tables are divided to reflect the two groups; the assurance providers (Ass. Prov.) and the group of others (Others). Concerning some questions the array of responses was so wide that a categorization did not seem appropriate. In this case the individual responses are presented and set into context. Characteristic quotes are used to illustrate the categorization and provide insight into respondents' reasoning. In structuring this chapter the interview guide was followed as closely as possible.

4.1 Need for Assurance

As an introductory question, respondents were asked to characterize the need for assurance on XBRL documents and to specify what kind of information needs to be assured. Table 1 gives an overview of the quantification of the need for assurance as given by the respondents.

<i>Quantification of need</i>		Big need / Very important		Additional need		Need / Important	
Number of responses		1	1	1	0	3	1
Ass. Prov.	Others						

Table 1: Need for assurance on XBRL documents

A characteristic answer for the category "Big need / Very Important" is the following:

If XBRL, the financial statement, the financial report in itself, should reach validity, so to speak, it has to be assured in some way. And there will obviously be a big need for assurance (A5).

"Additional need" for assurance is given by the following statement:

Let us start with an assumption that we continue to provide only the current level of assurance. That will still mean that we are

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going to have to provide additional assurance to what we currently provide... (A6).

The category “Need / Important” is generated from statements like:

I would say that XBRL documents enable better assurance on information that maybe is not audited or to be viewed as assured information today. I would say, yes, there is a need (A1).

Other interviewees did not quantify the need for assurance. Those answers are more directed towards specific characteristics of assurance need on XBRL documents, which is expected to be dependent on the intended users. This can be seen in the following comment:

...there has been some anticipation that assurance may be needed for the financial analysts and the investment community to be interested in using the XBRL information (R1).

But there are not only particular groups that need XBRL documents to be assured. Differences also exist within them:

Some of [the banks] said: “We don’t need [information from borrowers] to be audited. It is more important to have the information early.” But some of the banks said that it is important that it is the actual audited figures (A2).

Concerning the kind of information, for which an assurance need exists; the question gave rise to the answers given in Table 2.

Kind of information	Number of responses	
	Ass. Prov.	Others
Financial statements	2	1
Annual report	3	0

Table 2: Kind of information with need for assurance

It can be seen that, although XBRL is a language for business reporting, the main use, as far as assured information is concerned, are traditional financial statements. This can also be seen from the following quote:

XBRL documents could be used in a number of different reporting processes; say an annual report being one. And it could be any type of regulatory reporting. And not all or I would say quite few

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regulatory reports demand the documents to be audited from an auditor (A1).

This has implications for the understanding of the following questions. As can be seen from the answers above, a majority of the respondents tended to talk about assurance of traditionally assured documents in digital format, and did not imagine assurance of other business reports or the necessity or possibility of continuous reporting.

4.2 Relationships in the Corporate Reporting Supply Chain

The corporate reporting supply chain was discussed in section 3.1. The interviewees were asked to give an explanation of the relations between the groups in the corporate reporting supply chain, focusing on preparers, assurance providers, and users, and assuming that assurance on XBRL documents is available. The interview guide also contained subquestions on users' proactive voicing of demands and the proximity of preparers and assurance providers. However, no interviewee gave an opinion concerning the activity of users. An overview of the interviewees' positions on the other issues is given in Table 3.

<i>Evolution</i>	No changes		Contingent changes		Changes	
Number of general responses	1	2	1	1	0	2
Ass. Prov. Others						
Number of responses concerning proximity of preparers and assurance providers	3	0	0	0	0	1
Ass. Prov. Others						

Table 3: Evolution of the corporate reporting supply chain through assured XBRL documents

From the table it can be seen that the highest number of responses is in the “No changes” category, which indicates that the relationships in the corporate reporting supply chain and between the preparers and assurance providers will remain unchanged. Typical answers in this category were:

It will improve the quality of the information, but as such the relationships will not be modified (O1).

But the relationship between the auditor and the client: I think it will be pretty much the same. I mean, basically what we do now in our audit is that we audit financial statements. And all information that we audit is basically computer based. I mean, it is

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data stored, or processed, or handled through computer systems. So, I mean, already today in our audit we have an approach that is linked to the IT systems ... It will affect our work, but I do not think it will be any major changes in the audit process or our interaction with a customer or anything (A5).

The interviewees considering changes in the corporate reporting supply chain contingent on other factors saw different reasons for this. One assurance provider believes that there will be no change concerning the annual report. If, however, the users can select certain parts of information and use them in a variety of ways that have not been anticipated when it was published, this makes a big difference in the relationships and demands that it is exactly defined what is assured (A4). The other reason can be the character of regulatory filings, as explained in the following quote:

What I would say is that the relationships that exist today are really fundamentally the same in terms of the preparers and the users and the assurance providers. There is not a fundamental shift at this point, given the nature of [the XBRL Voluntary Financial Reporting Program on the EDGAR System of the SEC] and the way it is constructed right now. It could change if they adopt a more permanent program and if they change the form of it (R1).

An answer in the “Changes” category was that it will definitely change the relations. The reason is that it would make it possible for end users like banks, which need to be sure that information complies with certain quality criteria, to receive assured information directly from the preparers. Thus it ends the dependence on intermediaries (U1). Concerning the proximity of preparers and assurance providers an interviewee answered:

We believe that they will work more together (G1).

It can be concluded that the interviewees do not see a substantial disruption of existing relationships between preparers and assurance providers, preparers and users, and assurance providers and users. The only changes foreseen are within the heterogeneous group of users, in the degree of cooperation between the groups, and the demand for specification.

4.3 Assurance Provision with XBRL

After an overview of the environment that exists with assured XBRL, the next question addressed the immediate steps to be performed by assurance providers to be able to provide assurance on XBRL documents. The answers addressed a variety of tasks, concerning the methods of using taxonomies and tagging information touched upon in the subquestions, but also concerning systems and controls and other specific tasks. An overview of the responses is given in Table 4.

Taxonomies	Number of responses	
	Ass. Prov.	Others
Ensure appropriateness of taxonomy	2	1
Validate / ensure quality of taxonomy	3	0
Identify taxonomy when multiple versions exist	1	0
Keep track of new taxonomy versions	1	0
Verify proper use of extension taxonomies	1	1
Tagging		
Verify correct tagging	1	0
Check need for re-tagging after taxonomy update	1	0
Systems and controls		
Audit IT system itself	2	0
Understand system, controls, risks, implementation	1	0
Verify that reporting process is controlled	1	0
Other specific tasks		
Assure additional translations step to XBRL	1	0
Verify accuracy	1	1
Verify adherence to format and content regulations	0	1
Verify authenticity	2	0
Verify integrity	2	0
Add audit opinion	1	0

Table 4: Tasks in order to be able to provide assured XBRL documents

A good overview of the tasks needed to provide assured information in XBRL format is given by the following quote:

I can clearly see that if we were to provide comfort on XBRL reporting there are a number of steps that we need to perform in order to come to the final conclusion where we can deliver an opinion on this. First you need to audit the basic underlying raw data, in the beginning. Then of course you need to audit the tags of the taxonomy, that everything is tagged correctly. Then I would clearly see the need to audit that the system itself is working correct. So everything that you tagged in a specific way ends up in a specific way if you search in a specific way ... Then we have system

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audit carried out. We have an audit of the company's internal control to ensure that the company has sufficient controls in place; together with a system audit of the system itself. And then, depending on the result of those audits, we can then finally make the decision whether the final audit can rely on the systems (A7).

The issues around taxonomies are also portrayed by one interviewee:

We then have issues of extension taxonomies. XBRL by its very nature is extensible. If an element does not exist in the XBRL taxonomy that you are using, that is appropriate, you have the ability to create a new element ... So, you are going to have situations where the auditor has to look at the company specific extensions, and has to look at the taxonomy, and has to determine whether or not an extension is actually required ... You also, then, have issues of, the auditor needs to make sure that the company producing the XBRL-related document uses the appropriate taxonomy ... And therefore, is your financial report or your business report in XBRL linked to a taxonomy that reflects current accounting policy (A6)?

There are still a lot of questions that have to be solved, especially if XBRL is not only used in the last step of the report preparation. One of the assurance providers asked how it is possible to give assurance on certain transactions, style sheets, or instance documents; whether it is possible or necessary to provide reports that show a static picture at a point in time; and how often information has to be assured (A4). However, certain ideas and aides exist to provide assurance on XBRL documents by performing the tasks mentioned in the table above. These are specified in Table 5.

Aides	Number of responses	
	Ass. Prov.	Others
Education	3	0
Document viewer	1	0
Automatic checksums	1	0
Analyses through style sheets	1	0
Metadata on every transaction	1	0
Automatic comparisons to underlying transactions	1	0
Review of controls	2	0
Control of changes on IT systems	1	0
Electronic signatures	1	1

Table 5: Aides in order to be able to provide assured XBRL documents

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As can be seen from the table, the suggested aides take very different forms. Many of the interviewees foresaw different tasks to be solved, so naturally the aides differ as well. It does not seem like one person can provide a complete solution, but cooperation between assurance providers and the different parties in the corporate reporting supply chain would result in the best solution.

4.4 Oversight influence

The next part of the interview guide concerned the influence of government agencies and regulators of the audit profession in the provision of XBRL documents. As both questions in this part produced similar answers they are treated together. The next subsection describes the importance of regulatory filings. Subsequently the importance of a free, voluntary information supply is examined and the role of regulators of the audit profession discussed.

Importance of Regulatory Filings

All interviewees considered regulatory filings with government agencies an important factor in the use of XBRL. As one interviewee responded:

When I started to pay interest to XBRL a few years ago, I considered two effects. The first was a kind of voluntary effect from the companies towards the, let us say, stakeholders, the essential (?), on one hand. That is what I called the push effect. On the other hand you have the pull effect, which is the public authorities, public agencies, that were asking for such information. Well, on both sides I was completely wrong. I completely overestimated the first, this voluntary effect from companies towards the financial community. And I completely underestimated the effect from the public agencies. What I mean is, that today XBRL is mainly driven by public authorities who are making XBRL use mandatory; in every country, all over the world; including the US, but mainly here in Europe. So, what I mean is that electronic filing, there is no doubt any more. It will come from the public agencies, not on a voluntary base (O1).

A reason for this development is given by another interviewee:

...I think that what is happening now with regulators is very important, because they are different from companies. Most of the time they are able to mandate it, like in the Netherlands with

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electronic corporate filing that is mandated. And it is also easier for them to have critical mass; like in the Netherlands where we have 600 000 companies. They have to file their corporate tax filings electronically. Now it is interesting for software vendors to provide software for this because there is a huge market, 600 000 companies. And I think that will be the same with XBRL (A3).

The ability to mandate regulatory filings in XBRL partly explains why its share is large in comparison to voluntary reporting. But the question is also, why government agencies are interested in XBRL for regulatory filings in the first place. The reasons for this as explained by the interviewees are given in Table 6.

Advantages for government agencies	Number of responses	
	Ass. Prov.	Others
Cost savings	3	1
Easier dissemination between agencies	2	2
Time savings	2	1
Higher quality	3	0
Ability to benchmark and automate analyses	3	0
Faster, easier data collection	2	0
Advantages for preparers		
Higher efficiency	1	1
Cost savings	1	0
Advantages for users		
Information quality	1	1
Official character	0	2
Cost savings	1	0
Access to data about non-public companies	0	1

Table 6: Advantages of using XBRL for regulatory filings

It can be seen that especially the advantages that directly concern the government agencies are identified by several interviewees. Two quotes mentioning several of those advantages are the following:

...you would get the information a lot faster to the regulator. And then, if they present figures out to the market place it would be a fast communication on figures then. And also, I know that if the Swedish companies could deliver XBRL filings to government bodies, it would support the usage of the same information; that the companies only need to send in one annual report and a lot of other government agencies could use the same information. And that would be very good, it would be a relief on the companies not to need to send the financial information to a lot of different

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government bodies ... So, I guess it would be one thing, the efficiency for the companies not to be sending information to a lot of other government bodies (A2).

What XBRL does for the regulator community is that it enables the regulator community to perform their oversight and their review and their protection function that much faster, that much cheaper. There is a huge return on investment for the regulators. ... [The SEC] will need smarter, automated systems to perform basic and fundamental reviews of all filers (A6).

It can be seen that the advantages for the government agencies, but also for preparers and users, are numerous. This explains the increasing number of projects for regulatory reporting through XBRL from government agencies. The remaining question is, however, the importance of a voluntary information supply, which will be addressed in the following subsection.

Importance of Voluntary Information Supply

As shown by the response of interviewee O1 above, the amount of voluntary information in XBRL format has not come up to the level expected in the past. Asked about this issue, the interviewees came up with a couple of reasons, why voluntary information supply may be advantageous. These can be found in Table 7.

Advantages for preparers	Number of responses	
	Ass. Prov.	Others
Easier reporting to market	1	0
Advantages for users		
Faster access to data	1	2
More efficient possibilities to analyze data	1	0
Easy switch between taxonomies	1	0
Extraction on demand	1	0

Table 7: Advantages of using XBRL for voluntary information supply

Most advantages of using XBRL for voluntary information supply are similar to those of regulatory filing using XBRL. An additional opportunity according to interviewee A4 would be to provide annual statements in XBRL with the ability to easily switch between different taxonomies that represent certain GAAP. The advantages shown in the table above are mainly advantages for users of the information. The following quote explains the advantage for the preparers:

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XBRL could make it possible for companies to report information much easier straight to the market, if that is something that they want. You could also see it from the other way. You often hear them saying, "We don't want to open up and give away too much information to the market" (A1).

It shows that companies may have an advantage, but most are reluctant of providing more information anyway. This can be explained by the disadvantages that companies have to face by doing so. One interviewee explains this:

I do not think that in the short run companies will let their financial information stored in the financial system be accessible. I mean, there are a lot of reasons for that. I mean, the obvious reason is competitive reasons (A5).

Even if companies recognize the possibilities XBRL creates for them to publish information, they have to consider the costs that come with it. Given the interviewee's answers, at the current situation the disadvantages of using XBRL for voluntary information supply seem to exceed the advantages.

Role of Regulators of the Audit Profession

Regulators of the audit profession are not directly involved in the corporate reporting supply chain. However, they have an influence through their oversight over the assurance providers. Therefore it is important to consider their stance on assurance of XBRL documents. This is also recognized by the interviewees:

Already PCAOB have issued a paper on auditing of XBRL records. And that is a regulator in the US. So, I guess that they will have to sit down and think about what the implications really are from implementing XBRL widely (A5).

All interviewees commenting on the role of regulators for the audit profession predicted that there will be some influence from the regulators. Their exact role however, seems to be unclear, as it depends on several factors:

There are a couple of ifs in here. If the SEC decides to go ahead with an XBRL filing requirement and they also require there to be some independent attestation relating to that XBRL information, then it will be up to our organization to decide what the appropriate standards need to be for that kind of information. But

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at this point that is really all that we can say. If the SEC decides not to go ahead or decides that they are not going to (actually) require an independent attestation that could change what we might do in terms of assurance services (R1).

If the regulators do not have a clear definition of their oversight role, the responsibility of the preparers becomes important for the credibility of XBRL documents.

4.5 Preparer Responsibility

This section covers three questions regarding the cooperation between preparers and assurance providers. The first two questions concern the involvement in preparers' information systems. Afterwards, the implications of information dissemination on the Internet are treated.

System Access and Control

The first question regarding preparers addressed the involvement of assurance providers in the information systems of companies that prepare information in XBRL format. The answers to this question shown in Table 8 give a pretty clear picture of the attitude of the interviewees towards this issue.

Involvement	Number of responses	
	Ass. Prov.	Others
Independence rules prevent changes	4	1
Big involvement, similar to SOX compliance	1	0
Inspection of change management, as today	1	0
Inspection of access management, as today	1	0
Inspection of control structure, as today	1	0
Extension of scope to include websites	1	0
Partly preparing accounts	0	1

Table 8: Assurance providers' involvement in preparers' information systems

It can be seen that only one interviewee dissents from the otherwise unanimous opinion that the extent of the work should not and can not exceed today's tasks:

I see some cases where assurers are involved in the preparing of the accounts. In some other cases they are only receiving the files and that is it (O1).

The prevailing opinion, though, is that existing regulations prevent a higher connection with the systems. However, the involvement is already very high:

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A7: *I guess we need full involvement if we were to provide comfort.*

Interviewer: *Full access?*

A7: *Full access, yes; like in companies' accounting systems today. We will need full access.*

Interviewer: *Will it also be that maybe the auditors are in charge of parts of the information systems?*

A7: *Not in charge! No responsibility! We can not be in charge. We can not be the one doing it.*

This position of the interviewees is the reason, why the next question about the implications of the involvement of assurance providers in the preparers' information systems only resulted in limited results. In general, interviewees saw no implications of the continuing level of involvement. One exception is given in the following quote:

When the auditors have to provide an audit opinion they will require that they are able to audit it. And the companies have to provide internal controls. So I think there could be a major impact for the preparers. That is why we have to come up with guidance for the preparers; what they need to do, what kind of controls they need to have to be able to control it by themselves and to be audited by the audit profession (A3).

Thus, assurance providers have a high involvement in the information systems of the companies already today, but existent laws and regulations prevent further interactions. However, when business information is published on the Internet, the question about assurance of websites has to be brought up. The extension of the scope of assurance providers' involvement to include websites is covered in the following section.

Information Dissemination

The second question regarding the preparers concerned the development of assurance activities in regard to the dissemination of information via the Internet. The question consisted of two parts. At first, respondents were asked whether they think the change to Internet reporting will lead to new assurance activities or services. These answers are tabulated in Table 9. Thereafter, Table 10 display what work tasks the new activities may involve.

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<i>New assurance activities</i>		Assurance on XBRL document		No additional services		Dependent		Additional services	
Number of responses									
Ass. Prov.	Others	2	1	2	1	1	1	1	0

Table 9: New assurance activities in relation to the dissemination of business information using XBRL

The table shows that several interviewees responded that a new service would be the assurance on the XBRL document to be published on the Internet:

...yes, in that the additional assurance service is the provision of assurance over the XBRL report (A6).

Others implied this and only considered additional services. An example of an answer in the category “no additional services” was:

I do not think the auditor has to think about more than assuring that the financial records being signed of on, so to speak, are accurate (A5).

A typical answer in the category “dependent” was:

It will depend on the nature of the program or processes in place and the SEC’s program (R1).

Finally, only one respondent foresaw additional services:

I guess it would be a demand for more ad hoc work for auditors ... if it is easier to send the information to [the assurance provider], maybe it could be more demand for us to do it as a part of the audit process. I do not know (A2).

Some respondents identified threats in relation to publishing information in XBRL format on the Internet. Three of them foresaw that there will be a threat to the credibility of the information, especially if there are references to related information from the XBRL document. Some respondents suggested that there should be a clear definition of which information the auditors take responsibility for in order to solve this problem. A4 stated that the auditor is not the owner of any information except the audit report. He elaborated his statement by saying that if the information is reused to produce an incorrect picture that lures users into making wrong investment decisions, the auditor will likely be blamed, although he is not directly responsible. This is a possible problem in the future,

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but still most responsibility should lie with the company and not the auditor and these responsibilities should be clearly defined.

The possible impacts that were expected from disseminating information in XBRL format on the Internet are summarized in the table below.

New work tasks	Number of responses	
	Ass. Prov.	Others
Assure the credibility of the information	2	1
Electronic signatures	3	0
Assure the authenticity of the information	2	0
Assure the integrity of the information	2	0
Authentication of the information	1	0
Assure the confidentiality of the information	1	0
Hash sums	1	0
Access controls	1	0
Locking of information	1	0
Website assurance	1	0

Table 10: New work tasks that arise due to information dissemination on the Internet

One of the respondents stated that currently there is an increasing demand for customized information with an audit opinion. He continued in relation to the security of information published on the Internet using XBRL:

I know that there are technical solutions to assure the integrity of the information, to assure the authenticity, authentication, and also integrity, and also the confidentiality. One of the solutions could be public key infrastructure, digital signatures (A3).

Another respondent had other suggestions on possible future assurance activities concerning the integrity and credibility of dynamic information on the Internet. He mentioned that there exist different techniques, for example hash sums and access controls. Whether the dynamic structure of the Internet is a threat to the credibility depends on what the assurance provider assures. If an element of an assured statement is moved somewhere else, this may represent a problem. Perhaps tags may also be marked as being audited or not, which, however, raises the problem of locking the fields with audited information to prevent later alterations (A4).

Thus, the question of XBRL information disseminated on the Internet gave rise to diverse opinions regarding challenges, problems and assurance solutions. If new assurance activities evolve, assurance providers will have to deal with several issues involving security.

4.6 User Requests

The next group of stakeholders discussed during the interviews was users of business information. Four questions that particularly relate to this group were asked to the interviewees. The first question concerned the importance of assurance of information for users. Two subquestions; who the users of assured business information are and the reason for use of assured information, were asked in order to make sure that all respondents' definition of users of business information corresponded. The next question treated XBRL and how the technology can help satisfy users' needs for assured information, followed by how the demand for assurance will develop with XBRL. Finally, the last question brought up the issue of paying for assurance.

The Importance of Assurance

The respondents were asked what importance the assurance of information has for users of business information. Further, if not defined earlier in the interview, the interviewee was asked to define the users of business information and also to point out the reasons for the use of assured information.

Ten of the respondents answered this question and two did not mention the importance of assured information at all. Table 11 groups the respondents' answers into two resulting categories.

<i>Importance</i>		Important		Depends	
Number of responses					
Ass. Prov.	Others	3	3	4	0

Table 11: Importance of assurance for users of business information

A typical statement from the group that found the assurance of information important for the users was:

What importance does assurance of information have? It is extremely important. I mean, look at the recent scandals of WorldCom and Enron (A1).

Another assurance provider discussed the cost of capital in relation to assurance of business data:

Assurance over business reported information is critical because fundamentally it drives down the cost of capital. If you seek to access the capital markets and you are unable to provide assurance over your financial statements, then the markets will build in a

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risk premium based on the lack of confidence that they have in your financial report (A6).

Further, one user of business information claimed that assurance is important for end users (U1). One interviewee claimed that the whole industry of selling business data would not exist if assured business information was not important by saying:

...if that was not a big issue or an important issue for our customers, we would not be in operation (U2).

In the category depends, where only assurance providers are represented, typical answers were:

...I think that, at least now, it would be a need for audited information. And by time when you see that the internal controls and the processes internally with financial information are getting better and better then the need for, or the demand for, audited information would be lower (A2).

I mean, there are a lot of users that really want to have comfort on numbers and information. In a rights issue offering, when you have prospectors, it is very difficult to go to the market with the prospectors with unaudited information ... it depends on how much they will rely on this information as opposed to the standard financial information (A7).

Another respondent pointed out that different categories of users need different assurance:

I think that also depends on their requirements ... a company who has lent money from a bank has to provide a financial statement. And when it is a big company they have to provide a financial statement and an audit opinion because the bank wants to know for sure that the financial situation of the bank is okay ... I think the banks are interested in the audit opinion but I think that the analysts are not (A3).

This interviewee further brings up the question whether banks will accept financial statements in digital format or not.

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It can be concluded that assurance is important for users of business information, concerning the reliability and credibility of the information, but also in relation to the cost of capital. The degree of importance might depend on various factors, such as companies' internal controls, how the information is used and who the users are.

Satisfaction of Assurance Needs through XBRL

The next question followed up the first question on users by investigating how XBRL can help satisfy users' current needs for assured information. The following table quantifies the number of interviewees that responded that XBRL in itself cannot help satisfy users' current needs for assured information and the number of respondents that consider that XBRL can help in some way, but maybe does not provide a complete solution.

<i>Satisfaction of assurance need</i>		XBRL is not the solution by itself		Contingent satisfaction		Strengthens assurance	
Number of responses		2	1	3	2	1	1
Ass. Prov.	Others						

Table 12: Satisfaction of users' needs for assured information through XBRL

The majority of respondents made a statement to this but three of the respondents did not take up a definite position. Three of the interviewees considered that XBRL in itself cannot help satisfy users' need for assured information:

XBRL in and out of itself does not satisfy the users' need for assurance over information. However, XBRL with assurance, XBRL information that has assurance on it, will be significantly easier to consume and use by the market and by the banks etc... (A6).

However, most recognized that it can help assurance providers in some way. One interviewee replied that XBRL itself is of no help, but if it were easier to add assurance information to transactions it would facilitate the audit work (A4). Another said:

I think that depends on the users ... if XBRL can satisfy users' current need for assured information ... the first requirement we have to meet, a controllable and auditable process to make sure that the information provided in electronic means is reliable (A3).

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Two respondents had an opposite opinion and clearly saw that XBRL will strengthen the assurance on business data:

...if you take this, the annual report, now, that is electronically signed, it will strengthen the assurance for the user (A5).

Moreover, several of the interviewees foresaw possible benefits of XBRL, as displayed in Table 13, that do not necessarily bring about better assurance of information.

Benefits	Number of responses	
	Ass. Prov.	Others
Faster and automatic analyses	2	1
Faster publication	1	1
Controlled information exchange	1	0

Table 13: Non assurance-related benefits of XBRL

Some examples of benefits that were mentioned are as follows:

Yes, it would be a lot faster, the information. I mean, as I said before, if you do not have the demand or the need for audited information, you could have the information instantly a couple of days after, or when they close their books. But if you need audited information you still need for that process to be ended. But then you do not need to wait for a printed annual report or something (A2).

...XBRL, sure, number wise, can make it easier because they, you can automate some of the analytical work or checking... It can automate some of the number crunching, the checks and more time could be spent on processes and quality, internal controls (A1).

I presume that the information will be more reliable that the banks and analysts get. And that the different lead times will be shortened (G1).

Therefore, XBRL can not be claimed to constitute a complete solution for assurance provision in the future, but carries about other benefits.

Development of Assurance Demands

After making clear whether assured information is important or not and how XBRL is involved in the assurance process, the respondents were confronted with

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a question about how the demand for assurance services will develop in the future with the availability of information in XBRL. It became apparent that this was a tricky question to answer as three respondents could not predict anything. The remaining responses concerned two aspects; the prerequisites needed for additional assurance services to develop and the effects of XBRL on additional demands. No respondent could specify what kind of assurance services would develop. The responses are classified and summed up in the following tables.

Preconditions	Number of responses	
	Ass. Prov.	Others
Standardization	0	1
Controllable and auditable process	1	0
Regulator's initiative	2	0

Table 14: Preconditions for the development of demand for assurance services

Four of the interviewees identified criteria for the development of additional assurance services to even start taking place. One of them suggested that there is a need for standardization before XBRL will be widely adopted:

It is a hen and egg problem: everyone waits for other people to start using XBRL. There are a number of initiatives and the technical framework is there. The question is whether people will find a common solution. The tax accountants and the auditors will have to find an official standard together with public authorities (U1).

One interviewee explained the essentials for adoption of XBRL, and further enlightened why assurance is important for the adoption of XBRL:

...assurance is controllable by companies and auditable by auditors. And in digital reporting, I think, that for me that is essential for adoption. ... So I think that when XBRL, or whatever standard, is not able to provide, when it is implemented is not able to provide, this kind of assurance, then it will not be used (A3).

Two of the respondents acknowledged that the development of XBRL or additional assurance services most likely will have to be triggered by a regulator's initiative. The first said anything from no change to total transformation seems possible, but changes probably have to come from regulators because the user community is very diverse (A4). The other suggested:

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The demand will grow in two ways. It will grow initially pushed by the regulators (A6).

This interviewee further anticipated the demand to evolve in a second step, even for non-listed companies, as a response to cost of capital constraints:

...my estimation is that the banks will begin to, if not require XBRL, then certainly through the cost of capital that they provide to privately held businesses, the cost of capital differential between a business report in XBRL with assurance and a business report without assurance or a business report in XBRL without assurance, that the incremental benefit in cost of capital will more than pay for the additional assurance being provided over that XBRL piece (A6).

The respondents further anticipated how the effects of new demand will appear, as illustrated in the following table.

Effects on assurance demand	Number of responses	
	Ass. Prov.	Others
Unspecified growth of demand	2	0
New assurance providers/services	0	1
Assurance of XBRL	1	0
Continuous assurance	1	0
No effect	1	1

Table 15: Effects of XBRL on assurance demand

The predictions on the effects can be illustrated by the following quotes:

I think [the demand for assurance services] will develop. If, again, if those who focus on it, then I think the demand will increase for assurance services related to this (A7).

I assume that there will be other operators, trying to create application and information techniques using data from other sources than from, maybe from Bolagsverket using information from the company itself (U2).

...the audit of XBRL documents; I mean, that would be a whole new assurance service (A1).

So, maybe it could be other types of assurance you could do. ...maybe it could be like continuous (A2).

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It appears that when certain requirements are met, an assurance demand for documents in XBRL format will develop and bring about new assurance services. However, no respondent could specify exactly what kind of assurance services would develop.

Payment Implications

Finally, the last question in the users group asked the respondents to assess the likelihood that users of business information will pay for the assurance of XBRL documents instead of the preparers as the situation is today. The answers are summarized in the following table.

<i>Likelihood</i>		Payment possible		Payment unlikely		Depends on circumstances	
Number of responses		0	1	3	2	2	0
Ass. Prov.	Others						

Table 16: Likelihood that users of business information will pay for assurance in the future

The interviewee that did imagine a possibility that future users will pay for assurance claimed that end users already today are paying intermediaries for services that are similar (U1).

The group of respondents that assessed the likelihood of users to pay for assurance services in the future categorized under “payment unlikely”, often referred to current legislation as a reason and stated:

So that would actually require a statutory change to create a different kind of relationship. ... But right now it is pretty well settled that the audit committees of the preparers, I guess, as you refer to them, are responsible for the compensation (R1).

I cannot see under the current legislation that that could work, because [the assurance providers] are engaged by the shareholders to perform an audit, and we have a confidentiality agreement. (A7).

If it depends on the circumstances, the reason could be:

...say it will not be mandatory for the smaller companies to have audited financial statements. Maybe the bank wants that anyhow. And maybe then they would like to pay for it (A5).

One of the respondents stated that at this moment the companies are paying for the assurance, mandated by law. But the interviewee recognizes that it would be interesting to discuss whether the auditor will charge an extra fee for providing assurance on the XBRL documents as well.

4.7 Other Assurance Issues Related to XBRL

As a final question the interviewees were asked to provide additional input for the study and freely talk about anything important concerning audit and assurance in relation to XBRL that was not mentioned during the interview.

Several of the interviewees (G1, A4, A5, A6, A7) pointed out that so far XBRL is still in a development phase and that the implementation is slow and complex. O1 considered that the technology for electronic accounting and continuous assurance is available. However, there are not yet any concrete examples of how it will work in practice. G1 stated that while many companies in Sweden have expressed interest in using XBRL, it is a long way to actually start using it. Further benefits for SME are needed as they represent the majority of companies. A4 stated that XBRL is rather easy to implement for SME. Bigger companies, on the other hand, probably need to develop extension taxonomies and implement XBRL deep into their systems, but can draw bigger benefits. A4 further imagined that in the future the reports from companies will be sent with electronic signatures of the board members to the auditor, who in turn will add his signature before he passes the document on to the government agency.

Other respondents stressed the upcoming changes for the audit profession. R1 stated that assurance providers' responsibilities might substantially change and that they might become responsible for all data in the business reports. This could also create opportunities to create better tools for analyses. A1 as well as A2 stated that XBRL in itself can automate analyses and facilitate the auditors' work tasks.

Finally A3 believed that XBRL in itself should not be emphasized. XBRL is just the technology that should work in the background, and people should use electronic information without talking, or even knowing, about XBRL.

4.8 Summary

This empirical chapter constitutes the first step in the chosen three-step analytical approach. By quantifying responses from the interviews and illustrating different opinions by quotes, combined with comments, the understanding for the different

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viewpoints is enlightened. The structure of the chapter closely matches the structure of the interview guide used as a base when conducting the interviews.

The environment around XBRL was treated in the first section of this chapter. The interviewees concluded that assurance on traditionally assured business data is important when the data is provided in XBRL format, too. They further stated that existing relationships in the corporate reporting supply chain will remain fairly stable, XBRL will only affect the work of assurance providers. Naturally, XBRL-related technologies are not yet finalized, but many suggestions of how it can be improved came to hand.

Thereafter, three questions treated regulators and their role in the XBRL environment. Government agencies play an important role in the corporate reporting supply chain today, and will play an important role in the future as well. Regulatory filings appeared to be an important factor in the adoption and use of XBRL. All stakeholders are perceived to benefit from XBRL reporting, but government agencies seem to have most to gain from an adoption. Voluntary supply of XBRL information is slow and constitutes high costs for the companies.

Subsequently, the responsibility of the preparers regarding information preparation and dissemination on the Internet was discussed. Assurance providers are confronted with regulatory constraints that hinder them to get more involved in preparers' information systems than they are today. But new assurance activities related to the Internet will likely develop.

Assured information is of high importance for users of business information, but XBRL can not in itself satisfy the users with this need. Therefore, an increase in demand for assurance services is anticipated. The development of payment services, however, is questionable.

Finally, many of the respondents pointed out that XBRL is in a first phase and that it is not yet fully developed. Many new possibilities of this new technology will emerge during the development, but also many challenges.

5 Analysis

This chapter analyzes the empirical data from the interviews and contrasts it with the findings from the Theoretical Frame of Reference. The analysis is divided into four parts, highlighting the different themes that came up during the interviews. The first section treats the assurance on XBRL-related documents and section 5.2 follows up by treating the different work tasks for assurance providers in the future. Thereafter the implications on Internet reporting and continuous assurance in relation to the corporate reporting supply chain are discussed. Finally, there is a short section summarizing the findings of the empirical data before the conclusions are drawn in the following chapter.

The analysis compares findings from the two groups of interviewees; the assurance providers and the other interviewees; including one government agency, one regulator, two users of business information and one other expert.

5.1 Assurance on XBRL

The assurance on XBRL documents emerged as an important issue, both during the literature review and during the interviews, especially for the assurance providers. The interview schedule contained three questions that particularly aimed at assurance; one regarding the importance of assurance for users, one regarding the need for assurance, and the third how XBRL can contribute to these needs. The following section brings forward the interviewees' opinions on assurance and related issues.

Need and Importance of Assurance

Most assurance providers had an opinion about both the importance of assurance and the need for assurance for users of business information, which is not surprising considering their work of assuring documents.

The assurance providers' overall opinion was that assurance is important today for users of business information. Several persons brought up recent accounting scandals as reasons for the focus on assurance. The general opinion was that assurance will continue to be important in the future, but will not necessarily gain greater importance than today.

Concerning the importance of assurance on XBRL documents, the other interviewees' opinion did not noticeably differ from the assurance providers'. The users and the regulator were of the same opinion as the assurance providers and

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stated that the assurance of business information is important for users. The other two interviewees did not voice an opinion.

All of the respondents that answered the question of importance of assurance said that it is important to some degree. No respondent claimed that assurance is not important for business data. This is consistent with the literature review. Boritz and No (2003) explain the value of reliability and authenticity of business information being used for important decision making. Another report by Nicolau et al. (2003) emphasizes the importance of assurance services in electronic exchanges. Wagenhofer (2003) points out that the flexibility of electronic reporting can create a disadvantage for credibility and authenticity. Therefore, information provided electronically, for example in XBRL, might be less credible and comprehensive assurance becomes important.

The need for assurance by users' of business information seems to be taken for granted. The assurance providers imagined that users' need for assurance of business information is important, at least in certain circumstances. It might depend either on the users, on the use of information, or on the nature of the information itself. However, the need seems to be limited to assurance of the information that is already assured today, mainly the financial statements.

The other interviewees' held opinions similar to the assurance providers. The users of business information found the need for assurance important or very important. The regulator stated that it is important for analysts and the investment community. No one foresaw the need to assure additional documents than those assured today.

The need for and importance of assurance is dependent on who, when and how information will be used. Both groups of interviewees had a general opinion that assurance is an important issue and will continue to be so in the future. The users and the regulator gave a strong feeling that assurance is important and that there is a need for it. However, they did not show a nuanced picture of how, why and when assurance is important.

While the respondents of the interviews mainly pointed out the need for assurance on financial information, the literature on XBRL suggests that there will be more non-financial and non-periodic information in the future that will expand the auditors' work (Xiao et al., 2002). The literature review suggests that business information is used by stakeholders for decision making, but the needs may vary

depending on the user. However, many elements strongly point towards an increase in the need for assured information (Boritz & No, 2003; Nicolaou et al., 2003). Other authors likewise indicate that the need for assurance will be greater in the future, especially when users are able to select which data to incorporate into their reports and analyses (Elliott, 2002). While the interviewees agreed on the importance, they did not see additional assurance needs.

Ability of XBRL to Satisfy Users' Needs for Assurance

Most assurance providers agreed that XBRL does not hold the capabilities to solve future's assurance needs. Only one assurance provider pointed out that XBRL has the potential to provide assurance well beyond just the financial information. However, the same assurance provider also imagined a future including XBRL, where the assurance providers continue to provide the current level of assurance as today. The other interview group held a much more diverse picture. One user considered that XBRL in itself can not help satisfy users' need for assurance; two persons said that XBRL has other benefits, and two persons did not have an opinion.

Both assurance providers and other interviewees foresaw that XBRL will introduce other benefits to the parties in the corporate reporting supply chain, like faster analyses and publication of business data, but will not satisfy all assurance needs for the users of business data.

In concordance with the interviewees' responses, no study displays XBRL as the ultimate solution to satisfy the need for assurance, but it is brought up as part of a complete solution (Boritz & No, 2003; Nicolaou et al., 2003).

5.2 Work Tasks

When XBRL is widely adopted, the work tasks of the assurance providers are expected to change, as explained in section 3.4. Two questions brought up during the interviews treated this issue. In a first question, the interviewees elaborated on what technical issues need to be solved in order to be able to assure XBRL. Additionally, the interviewees were asked to comment upon assurance providers' involvement in the preparers' information systems. The problem of assurance providers' involvement in preparers' information systems relates to the issue of auditors' independence treated in section 3.3.

Technical Challenges

It appears from both existing literature and assurance providers that there are still many technical challenges to overcome before XBRL can be fully implemented and the documents can be assured.

It is clear that the assurance providers are in a good position to identify controls and technical implementations that have to be solved before the use of XBRL is possible. Several issues were brought up that need to be treated before a complete assurance of XBRL documents is possible. Five out of seven assurance providers foresaw that taxonomies will cause most problems in the implementation process. Other identified problems are the risks that evolve through the use of tags, the systems and controls and other tasks, for instance the authenticity and integrity of the information displayed in XBRL documents. It appeared that other concerned parties did not possess much technical knowledge in the new XBRL-related technologies, or have not given this issue any consideration before.

The assurance providers did not only identify the problems to solve in order to be able to assure documents in XBRL format. They also had a good insight as to how these challenges can be overcome. Five of the assurance providers foresaw some solutions to these risks. Most assurance providers have their own solutions to the risks, but it seems like a good start would be to educate people and to introduce new people with fresh ideas into the profession. One of the assurance providers gave concrete examples such as using automatic checksums, style sheet analysis and automatic comparisons to transactions. Another assurance provider introduced the idea of adding metadata to every transaction to get a complete picture. The issue of internal controls was brought up again as an issue of importance. Finally, one assurance provider stated that a standard for electronic signatures is of high importance.

Various literature sources point out the identified problems by the interviewees, but also numerous others. As explained in 3.4, Trites (2002) identifies the biggest risks in using XBRL as the accurate mapping of the accounts to tags, the integrity of the tags, and the use of appropriate taxonomies. This was also discovered by the assurance providers. Other authors stress the importance of creating new software and audit models (Rezaee, Sharbatoghlie, Elam & McMickle, 2002), or suggest network security and website availability as important solutions to the use of control templates for data level assurance (Nicolaou et al., 2003). Another study talks about issues regarding information quality and its credibility. The same study

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further points out that there is a possibility in the future that assurance providers have to monitor the client's website (Elliott, 2002).

Companies' Information Systems

As the assurance providers both have good knowledge of the shortcomings in today's technology in order to provide assurance on XBRL documents, and of the solutions to these, the question of assurance provider involvement in preparers' information systems was brought up. The general opinion was that due to laws in force, assurance providers are not allowed to get involved in the information systems. One assurance provider pointed out that the auditors already today have access to their clients' information system, but that they have no responsibility for it. This interviewee referred these limitations to independence reasons, as did several other assurance providers. One assurance provider foresaw the need to assure company websites when they are changed frequently. Another assurance provider thought that assurance on internal controls and compliance to SOX will be more important than today. A third assurance provider foresaw the need for change management, access management and control structure. At last, one person thought that the assurance providers themselves have to come up with guidance on controls.

It appeared that other concerned parties did not have a great knowledge of these issues either. Only the regulator had an opinion of what assurance providers are allowed to do and stated that assurance providers will be allowed to offer technical advice to their clients. This regulator also brought up the issue of independence that limits the involvement of assurance providers in information systems. Overall, this was a difficult question for many of the respondents who were not assurance providers. It does not seem to be a prioritized issue in this context and the question of technique is left to the assurance providers.

However, there is a consensus that assurance providers will not be involved in the information systems of clients that they also audit due to independence reasons. In conformity with the assurance providers, and as discussed in section 3.3, the literature also brings up the topic of auditors' independence (Alles et al., 2002) and contrasts this with the fact that their involvement in information systems is unavoidable and questioning how one can assure their independence.

5.3 Internet Reporting

Putting aside the technical aspects of XBRL reporting, other things that will likely change, are the services required from assurance providers. This section brings up the changes in the assurance providers' work tasks that do not relate to the technical part.

When data is published on the Internet, using XBRL-related technologies, this will have an impact on the business information and will lead to new audit and assurance activities. The assurance providers had many opinions on these impacts, for example the issues of integrity and authenticity of the distributed information. But before new assurance services will develop, certain criteria have to be met. The assurance providers noted that if regulators identify where additional assurance services are needed and push the development in that direction, XBRL will be accepted quicker. The assurance providers are positive that new activities will arise and they brought up a variety of possible scenarios, including various techniques and assignments, which reflect the wide range of experiences of the interview subjects. It can be noticed that the assurance providers found the definition of responsibility of each party involved important when providing assurances.

Similar to the previous issue concerning technical work tasks, the other interview subjects did not express any opinions concerning this issue. Most of the interviewees had not considered the issue before.

In concordance with the assurance providers, the literature suggests that numerous assurance products will evolve with XBRL documents. Elliott (2002) states that the accounting profession is highly affected by the new technologies. Users of accounting and auditing services will have increasing needs for relevant, reliable and timely information. As discussed in 3.4, Cohen et al. (2003) suggest that data level assurance, offering assurance on specific items, will develop as an additional activity to today's services. Even though not explicitly mentioned by the interviewees, this was discussed by the assurance providers using more general terms. Elliott (2002) further elaborates on a possible development of a demand for continuous assurance and assurance on more specific items in the report, not necessarily being financial information. Also touched upon in section 3.4, some literature suggest that XARL, an extension based on XBRL designed to enable assurance providers to report on the reliability of information distributed over the

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Internet, will be a prevalent technology (Boritz & No, 2003). However, this was not brought up at all by the interviewees.

New assurance services likely result in new work tasks for the assurance providers that possibly bring about higher assurance fees. Therefore, a natural question is who is going to pay for the additional assurance provision. It can be concluded from the interviews that the most probable scenario is that it will continue to be the company itself that pays for the assurance of its business information, due to existing laws and regulations. However, there is a small chance that in the future it will change due to political reasons, and depend on who the user of the information is, or what the information is used for. Similarly to the previous issue concerning technical work tasks, the other interview subjects did not express any opinions concerning this issue. Naturally, there was neither any consensus about the payment implications of additional assurance services.

While the respondents were quite skeptical about a payment system for users of XBRL information, some authors, for example Elliott (2002), declare that the new technologies open up a possibility for this system. The users of information can get a more active role and select the information they want assurance on. The distributors of business information will be able to identify who accessed information, what information was accessed, and when it was accessed. As discussed in section 3.4, under Move to Continuous Assurance, when continuous and customized information develop and are applied to their extreme, users may have to pay for their demands. The reason why the interviewees did not suggest this might be that this development lies very far in the future.

5.4 Continuous Assurance and the Corporate Reporting Supply Chain

In section 3.1 in the theoretical frame of reference, the corporate reporting supply chain was introduced in order to explain the relations between stakeholders in a business environment and the flow of business information between them. Therefore, some interview questions discussed how the supply chain will be impacted by XBRL-related technologies.

Relationships and Benefits in the Corporate Reporting Supply Chain

The assurance providers were rather undisputed that the relationships between the preparers, assurance providers, regulators, and users of business information will remain similar to what they are today, because there is no need to change the

relationships with the introduction of XBRL. As highlighted in the previous sections, there are advantages by using XBRL for all parties in the corporate reporting supply chain. Some of the advantages that benefit all participants are cost and time savings. However, many assurance providers have especially remarked advantages for government agencies in using XBRL for regulatory filings. There is a consensus that the importance of regulatory filings for XBRL adoption is high.

The group of other respondents was less homogenous in their answers. Half of the group believed that there will be a change in the relationships between the parties in the corporate reporting supply chain and half of the group believed that the relationships will remain the same. The remaining person was unsure about the changes. These interviewees share the same opinion as the assurance providers when it comes to the importance of regulatory filings. All of them judged it important. Few advantages from XBRL for preparers of business information were identified, but many for the users of business information and for the government agencies.

Wagenhofer (2003) brings up the issue of regulators' influence and regulatory filing of XBRL documents. It is anticipated that regulators will continue to have an influence over the audit profession, in line with the conclusions from the interviews. XBRL reporting should benefit all parties in the supply chain. Xiao et al. (2002) also point out the need for regulatory filings to get control over Internet reporting.

Voluntary Supply of Business Information

According to the assurance providers, a large amount of voluntary information supply from firms is unlikely, even if the spreading will become easier with XBRL. Today, the amount of information supplied for mandated regulatory filings exceeds the amount of voluntary filing. This has two reasons; on the one hand, the costs for the firms are too abundant, and on the other hand, they do not want to put themselves in a competitive disadvantage by giving away too much information. Additionally, SME are not able to take full advantage of the technology, so for them costs are even higher. Therefore other incentives are needed, presumably introduced by a government agency. The other interviewees did not provide much input, but seem to think that it is not important compared to regulatory filing.

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Wagenhofer (2003) argues that the benefits for users of XBRL exceed the costs incurred by firms, contrary to the interviewees' responses. However, the individual benefits for the firms are not significant unless there is a standard for using XBRL. A regulatory filing requirement might trigger a positive network effect for XBRL that will attend the critical mass of users.

5.5 Summary

The literature review and the interview answers converge in relation to the importance of assurance of business information and the need for it. While the respondents in the interviews imagined a slightly less altered future, the literature review revealed that assurance may well become more important in the future and may be needed on additional documents. There was a consensus concerning XBRL and its shortcomings to fulfill assurance needs and its benefits in terms of time, cost and resource savings.

The assurance providers' opinions and the literature review recognized similar challenges regarding the technical issues inherent in XBRL-related technologies. It was stated that there are a number of challenges to overcome before being able to provide accurate assurance on XBRL documents. Possible solutions to some of these problems were also brought up. Nevertheless, as one assurance provider pointed out, XBRL is not yet concrete and other difficulties might rise to the surface in the future. It was likewise pointed out that the auditor's independence requirements in current laws are a hindrance to assurance providers' involvement in clients' information system. As for the other group of interviewees, no opinion was given and it seems to be a low prioritized issue.

There is a possibility that a variety of assurance services will emerge with XBRL-based Internet reporting, when certain criteria are met. From the interview results and the literature review, there seem to be opportunities for assurance providers to start providing new assurance services to business data preparers, but no conclusion as to how these services will look like is reached. Further, these additional assurance services will most likely be paid for by the companies themselves.

Most interviewees stated that no significant change of the relationships in the corporate reporting supply chain will take place. The perceived advantages of XBRL benefit all parties, even though most profits identified benefit the

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government agencies. This will, however, indirectly benefit the investment community and companies by lowering the cost of capital.

The costs of implementing XBRL have made voluntary filing slow and rare. Today, the costs of introducing XBRL exceed the perceived benefits, but if a sufficient amount of agencies adopt it, these costs might decrease. Therefore, the regulatory filings are important in order to reach a sufficient number of users of XBRL for it to be beneficial to all parties. Further, it is considered important that regulators continue to have an influence on the audit profession and the XBRL adoption, but their exact role remains unclear.

6 Conclusions

This chapter presents the conclusions drawn from the analysis of the study's findings in section 6.1. The subquestions as well as the overall research question will be answered and the findings set into a wider context of future assurance. Subsequently, the last section of the thesis gives suggestions for further research.

6.1 Findings of the Study

The thesis has investigated the expectations for different stakeholders of business information when XBRL is widely adopted. In doing so, the study tried to answer the research question, "How does corporate financial reporting using the eXtensible Business Reporting Language affect audit and assurance services?" Using a qualitative methodology, a literature review was carried out to consider the effects of both Internet reporting and continuous assurance, which are inextricably interwoven through their technological basis. Representatives of the audit profession and other groups affected by assurance services, for example users and government agencies, were interviewed using a semi-structured interview technique. Interview transcripts were used to compare the answers of the audit profession with those of the other interviewees and previous research in order to analyze the future impact of XBRL on audit and assurance services.

The study shows that on the one hand XBRL will have a slight impact on the provision of audit and assurance services to the public in a short and medium term. The findings of the analysis suggest that the future demand for assurance provision will remain stable and mainly concern traditionally assured documents. The main change will consist in assurance being provided not only on information on paper, but also on XBRL documents. However, there is a possibility that assurance will be needed on more than financial statements in the long term. Therefore, XBRL brings about many opportunities for its users, but it is not the complete solution for assurance provision over the Internet. Assurance providers possess the necessary knowledge to provide additional services, like the design of information systems and help in tagging data for inclusion in XBRL documents. Nevertheless, due to existent laws and regulations, which, by unanimous opinion of the interviewees, will not change, assurance providers are not allowed to get involved in both assurance and accounting or consulting services.

On the other hand, the way assurance providers conduct their work will likely be affected by XBRL. As XBRL is an emerging technology, not all consequences of

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its use are known, yet. However, the technological concepts of taxonomies and tags around data items clearly present future challenges. It allows for automation, but also implies that information in XBRL documents has to be especially reliable and unambiguous. To be able to assure this, the scrutiny of internal controls has to be advanced once more. In order to disseminate assured XBRL over the Internet it is necessary that the documents are electronically signed. Electronic signatures provide a way to secure authenticity and integrity of electronic documents, and as such they will become an indispensable tool in assurance providers' work.

As a general conclusion, the results of this study indicate that XBRL adoption will not significantly change audit and assurance services to the public, at least not in a medium term. However, it will have decisive impacts on the work tasks that assurance providers have to execute in providing services. XBRL was initially perceived as a new revolutionary means to spread business information that was quickly going to alter the way assurance is carried out. The predictions about an XBRL revolution did not come true, but a slow and steady evolution of assurance services seems to be under way.

Ever during the development of today's dynamic and complex business environment reporting has been forced to evolve. Further, new laws and regulations have caused significant changes as to how reporting is carried out. In consequence, the assurance of business information, an element that is just as important as the reporting in itself, has also progressed. Traditional assurance methods are being substituted for new technologies. These changes affect assurance providers, but also companies, government agencies, users of business information, as well as other stakeholders, and the changes that might take place are important to understand.

One of the most apparent reasons for the change is technological progress. The Internet and the World Wide Web have enabled companies to spread their reports to various stakeholders in an easy and economical manner. However, in the early stages no universally accepted standard for the exchange and reporting of business information existed, which caused unnecessary additional costs and errors in the exchange of data. XBRL was developed to overcome these issues. Whether XBRL will reach the critical mass necessary to become widely adopted, or be replaced by another technology, this study has shown impacts of modern technology on audit and assurance services that give a glimpse of the future.

Conclusions

In our opinion, it is apparent that electronic exchange of business information is the future of audit and assurance. During the research process XBRL has emerged as the only available standard that has the potential to be used for this purpose. While implementation issues still prevail, XBRL technology itself has reached a mature position. We believe that the adoption of XBRL will follow the life-cycle of technology transition. This means that pervasiveness of XBRL use can only be reached if it is able to leave the stage of early adoption. The key to this seems to be the enforcement in regulatory filings with government agencies. Those filings will then likely also be distributed in other ways. Still, society is not ready to embrace more comprehensive changes in reporting principles. Neither users, nor regulators or government agencies have considered the extent of implications of XBRL, yet. Therefore, although XBRL could bring a lot of additional benefits, a development of continuous reporting and assurance in a medium term seems highly unlikely. Nonetheless, before adoption increases, the audit profession will have to prepare itself by recruiting and educating people that possess knowledge in both XBRL and assurance.

6.2 Suggestions for Further Research

The purpose of this thesis was to describe the effects that the use of XBRL has on audit and assurance services by analyzing the implications on services to the public and the way professionals conduct their work in providing those services. For the study, interviews have been conducted during the beginning of the fourth quarter 2005 and the views presented by the interviewees are therefore specific for that point in time. A follow-up study could be conducted to find out whether and how the views of the interviewed groups and persons change as time passes, which will certainly be the case.

At the moment, developments related to XBRL accelerate through several projects of government agencies. This gives the opportunity to add preparers of business information to the interviewee group, which was unfortunately not possible for this study. Moreover, as soon as assurance of XBRL is actually implemented in the business world, this offers the chance to observe the actual assurance process, for example by means of a case study.

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