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XBRL From Audit Companies' Perspective

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Abstract

The main objective of this study is to find out how XBRL will affect big audit companies. Purpose is to find out first of all, why audit companies are involved in developing XBRL and secondly, what are the main outcomes of XBRL for these companies. Also, the value-added of XBRL for other information process participants from audit companies' perspective is discussed.

The specific point of view of audit companies in relation to XBRL is little researched in the past and thus, there is no ready-made theory to be tested. Instead, theoretical part presents previous research that suggests and helps to understand potential implications of XBRL for audit companies. In addition, theory about effective capital markets and information efficiency is utilized.

The study is exploratory in nature as audit companies' point of view in relation to XBRL has not received much attention in the literature so far. Qualitative data was gathered through semi-structured interviews with professionals from audit companies that represent different countries and knowledge areas.

Interviewees' answers to the first research question, what are the underlying reasons for audit companies to be involved in developing XBRL, revealed that audit companies are involved in developing XBRL because of the reputational gains. They also need to understand XBRL well in order to be able to provide assurance on XBRL documents and consulting services for their clients. As XBRL is predicted to change financial reporting practices, it is perceived to be natural for audit companies to be involved in its development. To be involved in innovations was also considered important. Related to the second research question, to whom is XBRL mainly developed for and its value-added for information process participants, the interviewees saw that XBRL benefits mostly authorities and users of financial information such as analysts.

Answering the third research question, what are the main outcomes of XBRL for audit companies, requires that four background factors are taken into account. First factor is whether reporting in XBRL is made mandatory or not in a given country. Without a mandate, XBRL is not likely to have great implications for any function. Second, for what purposes XBRL is used (for example filing financial statements, tax filings or supervisory reporting) determines which functions are affected by it. For example, banks use XBRL and they may need consulting and risk services offered by audit companies. Third, the history and structure of audit firms differ which means that same aspects of XBRL are dealt with in different functions. Lastly, the characteristics of the reporting firm have to be considered. If companies choose to implement XBRL deeper into their accounting systems, then they must have effective internal controls and it also enables more effective way to analyze information.

Keywords XBRL, Big 4, Audit companies, Financial reporting

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Tutkielman tavoitteena on selvittää, miten XBRL vaikuttaa suuriin tilintarkastusyhteisöihin. Tarkoituksena on ottaa selvää ensinnäkin, miksi tilintarkastusyhteisöt ovat mukana kehittämässä XBRL:ä ja toiseksi, miten XBRL vaikuttaa näihin yhteisöihin. Lisäksi keskustellaan XBRL:n lisäarvosta muille informaatioketjun jäsenille.

XBRL:ä tilintarkastusyhteisöjen näkökulmasta on tutkittu vain vähän kirjallisuudessa, joten tutkielmassa ei testata valmista teoriaa. Teoreettinen osuus sen sijaan muodostuu aiemmasta kirjallisuudesta, joka auttaa ymmärtämään XBRL:n mahdollisia vaikutuksia tilintarkastusyhteisöihin. Lisäksi hyödynnetään teoriaa tehokkaista markkinoista ja informaatiotehokkuudesta.

Koska kirjallisuudessa ei ole käsitelty kattavasti tilintarkastusyhteisöjen näkökulmaa XBRL:n liittyen, tämä tutkimus on luonteeltaan tutkiva. Kvalitatiivista aineistoa kerättiin puolistrukturoitujen haastatteluiden avulla tilintarkastusyhteisöjen edustajilta, jotka ovat eri maista, ja joilla on kokemusta eri tilintarkastusyhteisöjen funktioista.

Haastateltavien vastaukset ensimmäiseen tutkimuskysymykseen, mistä syistä tilintarkastusyhteisöt ovat mukana kehittämässä XBRL:ä, liittyen paljastivat, että kehitystyössä ollaan mukana maineen takia. Tilintarkastusyhteisöjen täytyy myös ymmärtää XBRL:ä, jotta he voivat tarjota konsultointi- ja varmennuspalveluita. XBRL:n sanotaan muuttavan taloudellista raportointia, joten haastateltavat näkivät myös, että osallistuminen on heille luonnollista. Lisäksi osallistuminen innovaatioihin nähtiin tärkeänä. Toiseen tutkimuskysymykseen liittyen, kenelle XBRL on pääasiassa kehitetty ja sen lisäarvo informaatioketjun jäsenille, haastateltavat olivat sitä mieltä, että XBRL tulee hyödyttämään eniten viranomaisia ja taloudellisen tiedon hyödyntäjiä, kuten analyytikkoja.

Jotta kolmanteen tutkimuskysymykseen, mitä seurauksia XBRL:llä on tilintarkastusyhteisöille, voidaan vastata, täytyy ottaa huomioon neljä taustatekijää. Ensimmäiseksi täytyy ottaa huomioon, onko raportointi XBRL muodossa pakollista vai ei. Mikäli se ei ole pakollista, XBRL:llä ei ole suuria vaikutuksia mihinkään funktioon. Toiseksi se, mihin tarkoitukseen XBRL:ä käytetään (esim. tilinpäätösten lähettäminen, veroilmoitusten täyttäminen tai pankkien viranomaisraportointi), vaikuttaa siihen, mitkä funktiot ovat tekemisissä XBRL:n kanssa. Esimerkiksi pankit käyttävät XBRL:ä ja ne voivat tarvita konsultointi- tai riskipalveluita. Kolmanneksi, eri tilintarkastusyhteisöjen historia ja rakenne poikkeavat toisistaan, joka tarkoittaa sitä, että samoja XBRL asioita käsitellään eri funktioissa. Viimeinen tekijä, raportoivat yhtiön ominaisuudet, on myös otettava huomioon. Mikäli yritykset päättävät implementoida XBRL:n syvemmälle laskentatoimen järjestelmiin, niillä on oltava tehokkaat sisäiset kontrollit ja tällöin myös tiedon tehokkaampi analysointi on mahdollista.

Avainsanat XBRL, Big 4, Tilintarkastusyhteisöt, Taloudellinen raportointi

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Abbreviations

AICPA	American Institute of Certified Public Accountants
APA	Authorized Public Accountant
APRA	Australian Prudential Regulation Authority
AUP	Agreed-upon Procedure
Big 4	Refers to big audit companies (Deloitte, Ernst & Young, KPMG and PwC)
CICA	The Canadian Institute of Chartered Accountants
CISA	Certified Information Systems Auditor
COREP	Common Reporting
CPA	Certified Public Accountant
EIOPA	European Insurance and Occupational Pensions Authority
FASB	Financial Accounting Standards Board
FFIEC	Federal Financial Institutions Examination Council
FINREP	Financial Reporting
GAAP	Generally Accepted Accounting Principles
GRI	Global Reporting Initiative
HTML	HyperText Markup Language
IFRS	International Financial Reporting Standards
IQ	Information Quality
ISA	International Standards on Auditing
iXBRL	inline-eXtensible Business Reporting Language
PCAOB	Public Company Accounting Oversight Board
PDF	Portable Document Format
RTE	Real-Time Economy
SBR	Standard Business Reporting
SEC	The U.S. Securities and Exchange Commission
SOX	Sarbanes-Oxley Act
XBRL	eXtensible Business Reporting Language
XBRL FR	eXtensible Business Reporting Language for Financial Reporting
XBRL GL	eXtensible Business Reporting Language Global Ledger
XML	eXtensible Markup Language

1. Introduction

First part of this introductory chapter presents the background and purpose of this study. These parts will explain why the topic is important and timely and presents the research questions. After that, the Real-Time Economy project, to which this thesis belongs, is presented. Finally, the method and structure of the thesis are briefly discussed.

1.1 Background of the study

XBRL, eXtensible Business Reporting Language, is an electronic markup language for reporting financial information. Each financial and non-financial item in reports is enclosed by XBRL tags that contain semantic information of the item and describe the meaning of it. This makes financial reports computer-readable which is not possible if reports are sent using for example PDF-format. The current paper paradigm is designed for human review but the data is not usable for computers. (Cohen, 2004.) Basically XBRL will provide a standard way to electronically and automatically prepare, publish, exchange and extract financial statements. With decreased manual work, XBRL provides a faster and less error-prone way to utilize information and thus it is expected to have widespread effects on financial reporting. (Wu & Vasarhelyi, 2003.)

AICPA (American Institute of Certified Public Accountants) has kept XBRL in its top ten technologies list for several years now because it provides more flexibility, ease of use and timeliness in financial reporting, something that users of financial statements have been calling for. Business scandals and the following Sarbanes-Oxley Act (SOX) have created an environment where information quality can be improved by the adoption of XBRL. (Baldwin & Trinkle, 2011.) In fact, one of the reasons why the SEC (U.S. Securities and Exchange Commission) mandated the use of XBRL was to increase transparency in the securities markets (XBRL USA, 2010). For example, if Enron had filed in XBRL, it would have been easier for SEC to notice that Enron's reported revenues, cash flows from operations, profits and growth rates were far above the industry norms which could have led SEC to flag those items and investigate deviations earlier (McNamar, 2003).

XBRL was first started to be developed in the U.S. by AICPA in 1999 after CPA Charles Hoffman a year earlier presented a prototype of how XML could be utilized in financial reporting (Corkern & Morgan, 2012). Ten years after the first meeting in the U.S. the SEC

issued the final rule that mandates large U.S. firms to use XBRL to improve financial reporting. Despite the relatively rapid progress in the U.S., other nations such as Australia, China and the Netherlands are even more advanced with the use of XBRL. (Alles, 2009.) Some authors (e.g. Keeling & Domingo, 2004; Doolin & Troshani, 2004) state that the progress of XBRL has been slower than expected compared to all the predictions made about its success in the early years. Currently there are 22 jurisdictions in the world developing XBRL taxonomies and all the major economies, such as U.S., China, Japan, Germany and U.K. are involved (XBRL International, 2012a) which means that XBRL is becoming an important part of the world's financial reporting.

Big 4 audit companies (Deloitte, Ernst & Young, KPMG and PwC) worldwide are actively involved in different consortiums that develop XBRL taxonomies and promote its use (XBRL International, 2012a; Doolin & Troshani, 2004). In fact, XBRL relates closely to different functions of audit companies. First of all, auditing is an important part of financial information supply chain (Lennox & Pittman, 2011). How information moves along that supply chain will be changed by XBRL and thus it will inevitably have an effect on auditors (Coderre & McCollum, 2004). Audit firms also analyze financial information and use it for example in their transaction and due diligence services (Tissen & Sneidere, 2011). XBRL is also expected to have an effect on companies' internal controls and it needs to be implemented in accounting systems (Bizarro & Garcia, 2011) and this is something that audit companies can help their clients with. In general, Troshani and Doolin (2007) expect that the benefits of XBRL, fewer errors and faster data extraction, translate into increased revenue for audit companies and improved value for their clients.

Even though XBRL has effects on audit companies, as explained above, and it in general has reached a considerable level of maturity in the research domain (Alles & Debreceny, 2012), still no academic study, to researcher's knowledge, about XBRL or its implications takes into account the whole audit company. This study tries to fill this research gap by taking a qualitative approach, which, according to Alles and Debreceny (2012), is lacking in XBRL studies and could provide great benefits to the academic community. Also Doolin and Troshani (2004) call for research that encompasses perspectives of concerned stakeholders and models their experiences with XBRL. Baldwin et al. (2006) focus their desire for additional research on intermediaries, those being auditors and information collectors (see figure 1). Research to date about XBRL and financial reporting has discussed for example the characteristics of early XBRL adopters, quality of filings, the nature and benefits of XBRL

adoption, assurance and security of filings as well as users' perceptions about XBRL (Alles & Debreceny, 2012). There have been predictions about XBRL's impacts on the accounting professions but these predictions are supported by little research and much more information is needed about the potential and actual impacts (Baldwin & Trinkle, 2011). Even though audit companies are not mentioned in many XBRL studies, all articles that discuss XBRL and financial reporting are important for this research because, as explained before, XBRL has at least indirect effects on audit companies. These studies are discussed in the literature review part. The wider theoretical framework consists of the role of information in efficient capital markets because the whole meaning of XBRL is to provide better financial information. The attributes of good quality information are also discussed.

1.2 Purpose of the study and research questions

The main objective of this research is to look at XBRL from audit companies' perspective. Audit companies must have some reasons why they spend a lot of time and money in different countries for the development projects around XBRL. Thus, the first objective is to understand the main underlying reasons for audit companies' involvement. The second objective is to find out to whom XBRL is mainly developed for and is the value-added of XBRL positive or negative for information process participants from audit companies' perspective. Lastly, as XBRL is said to revolutionize financial reporting, it must have some effects on audit companies as well and thus the last objective is to find out what are the main effects of XBRL for audit companies. To find answers to the above mentioned issues, the following research questions were identified:

- *What are the main underlying reasons for audit companies to be involved in developing XBRL?*
- *Is XBRL developed mainly for regulators, intermediaries, target companies or end-users and is the value-added of XBRL positive or negative for information process participants from audit companies' perspective?*
- *What are the main effects for audit companies in getting involved with XBRL?*

As XBRL is unique as an innovation, it suggests that existing theories may not be readily applicable (Troshani & Rao, 2007) and thus this study presents issues from previous literature that partly relate to audit companies. The main purpose, however, is to focus on the empirical part and contribute to the existing literature by presenting interviewees' opinions about how XBRL will affect their organizations.

Information Supply Chain Roles

Roles	Description of Roles
Systematizers	• XBRL taxonomers: XBRL Consortium • Accounting standard setters: FASB, IASC, etc. • Legislators and regulators: FDIC, SEC, etc. in their role of determining what information should be collected. • System developers: Microsoft, SAP, etc. • Researchers: ontologists
Providers	• Organizations and individuals o Companies, divisions, subsidiaries o Governments and governmental units: Oregon, U.S. Army, etc. o Not-for-profits: United Way, etc. • Software systems and subsystems
Intermediaries	• Auditors and others who review and express opinions regarding financial information. • Financial Publishers: structure, aggregate, archive, and provide access to business data from a variety of sources. o Aggregators: Collections of information, databases. Edgar Online etc. o Statisticians: Industry averages, quartiles etc. Dun and Bradstreet etc. o Publishers: Financial news. Wall Street Journal, Business Week etc.
Users	• Analysts • Investors: individual investors, mutual funds, pension funds etc. • Creditors: banks, companies selling on credit, etc. • Regulators: in their role of reviewing the information provided • Managers • Researchers

Figure 1 Financial reporting supply chain roles (Baldwin et al. 2006)

In the context of information supply chain, this thesis focuses mainly on the intermediaries section where auditors are placed in figure 1. They are the ones who review financial information before it goes to end-users. Audit firms also collect and utilize collected information in their consulting and due diligence services so in that sense also aggregators and analysts from the users-section can be thought to be relevant parts of the supply chain even though in figure 1 they are considered to be separate parties. In the second research question also providers' and systematizers' parts are included as the value-added of XBRL for reporting companies and system developers is discussed.

1.3 Real-Time Economy Program

This Master's thesis is part of the Real-Time Economy (RTE) Program that is a joint collaboration of Aalto University School of Business, Aditro and Tieto Corporation. Real-Time Economy project promotes paperless business environment where all the transactions between companies are in electronic form and automatically produced. Paperless environment

enables the move towards electronic filing and bookkeeping. The benefits are huge for the whole society from the perspective of both productivity and the nature. (Aalto RTE, 2012a.)

XBRL is part of the Real-Time Economy Program and the focus of that is to digitalize financial reporting. To be more precise, the goal is that companies would report their financial information electronically using XBRL format. (Aalto RTE, 2012b.) One thesis (Asatiani, 2012) has already been made from the financial report receivers' perspective which includes the Finnish Tax Administration, National Board of Patents and Registration of Finland, Statistics Finland and Finnish Financial Supervisory Authority. This study, on the other hand, takes the perspective of an important stakeholder in the financial reporting supply chain, the one of audit companies. As already mentioned, the presence of Big 4 audit companies in different XBRL consortiums has been strong worldwide (XBRL International, 2012a) and also in Finland they have representatives in working groups that try to foster the use of XBRL in Finland (Tieke, 2012). For these reasons a study that combines XBRL and audit companies was undertaken in the RTE project.

1.4 Method and structure of the thesis

This study is qualitative in nature as its methods can be used to uncover and understand what lies behind a phenomenon about which only little is known (Strauss & Corbin, 1990, 19-23). A multiple case study is utilized in this thesis as case studies in general are useful when the phenomenon under investigation is difficult to study outside its natural setting and when the concepts and variables are difficult to quantify (Ghauri & Grønhaug, 2002, 171). In this thesis the case is the development of XBRL and its implications for audit companies and the data comes from multiple audit companies.

To understand what implications XBRL has or will have for audit companies, in total 7 representatives of audit companies were interviewed and those interviews followed a semi-structured form. Interviewees came from four different countries and they represent different knowledge areas which ensures the richness of the data. Interviews were coded using Atlas.ti software which helps to analyze answers and to form a picture of the subject. By coding interviews it was possible to recognize four background factors that need to be considered in answering the third research question. In addition to interviews, other materials, such as conference presentations from the XBRL Nordic Seminar held in summer 2012 and audit companies' internal materials about XBRL, were utilized to understand the phenomenon and to see whether there are any new aspects that the researcher should take into account.

After this introductory chapter this thesis moves to the theoretical part. The second chapter presents basics of XBRL and describes how it can be used. It also provides general information about audit companies and their XBRL-related services. In the third chapter the theoretical framework, efficient capital markets and information efficiency, is presented. The fourth chapter focuses more on the previous research about XBRL and summarizes findings from that. Method used in this study is presented in the fifth chapter. The sixth chapter discusses findings from the interviews after which the seventh chapter summarizes the results and presents the framework that is constructed based on the interviews. Finally the last chapter provides conclusions and suggestions for future research.

2. XBRL and audit companies

In this chapter basics of XBRL as a technology and different ways of how to utilize it are discussed. Also the history and structure of Big 4 audit companies as well as their services related to XBRL are presented briefly. Lastly, these two aspects are combined in a picture that clarifies the role of both, XBRL and audit companies, in the financial reporting chain.

2.1 Basics of XBRL

XBRL is promulgated by XBRL International which is a not-for-profit consortium. Currently it consists of over 600 companies and agencies around the world that work together in order to build XBRL language and promote its adoption. (XBRL International, 2012c.) Since AICPA started to develop XBRL for financial reporting purposes in 1999, many taxonomies have emerged. Taxonomies are like dictionaries that take into account the accounting rules in each country and so the development of those taxonomies is the responsibility of local jurisdictions and regulators. (XBRL International, 2012d, Locke & Lowe, 2007.)

XBRL as a technology belongs to the family of XML, eXtensible Markup Language, and it is becoming a new standard way to handle communication between businesses and report information on the internet. The standard internet page or a normal document treats financial information solely as a block of text, but now with XBRL it is possible to tag each individual item of data and make it computer-readable. XBRL will greatly increase the speed of handling financial data and save costs as it cuts off manual re-entries of information and allows computers to select, analyze, store and exchange data with other computers. (XBRL International, 2012b.) This will be a big change from the current reporting practices where the exchange of information is done via non-interchangeable formats like pdf, spreadsheets or HTML. Because further processing, analysis and re-keying are done manually, current practices are very time-consuming, labor-intensive and error-prone. (Troshani & Rao, 2007.)

To be able to understand XBRL's effects on financial reporting and related stakeholders, such as audit companies, it is necessary to comprehend how XBRL documents are created and know the key concepts. When information producers are creating an XBRL document, they take the accounting information that is to be reported from their accounting systems and code each individual data in a way that is described by an appropriate taxonomy (Wu & Vasarhelyi, 2003). This coding process is also called "tagging" which in plain language means assigning coded identifiers to data (KPMG, 2008). Available identifiers are included in taxonomies and from the taxonomy user selects the most appropriate "tag" to identify

individual reporting concept that exists in their financial reports (Moeller, 2010, 347). In addition to containing concepts, taxonomies also describe their interrelationships that are to be used in a particular type of business reporting. The end result is that each item in the financial statements, for example goodwill, has attributes identified for it. Standard attributes are presented in figure 2. Those attributes include label, meaning the term for the element, tag name, which is the computer-readable term for the element, a description of the element and data type, which shows the unit of measurement that can be monetary, string, date or number of shares. Last two attributes are balance type, which indicates whether the element is debit or credit and period type that shows whether the element is as of a point in time (balance sheet item) or for a period ended (income statement item). (KPMG, 2008; Plumlee & Plumlee, 2008.)

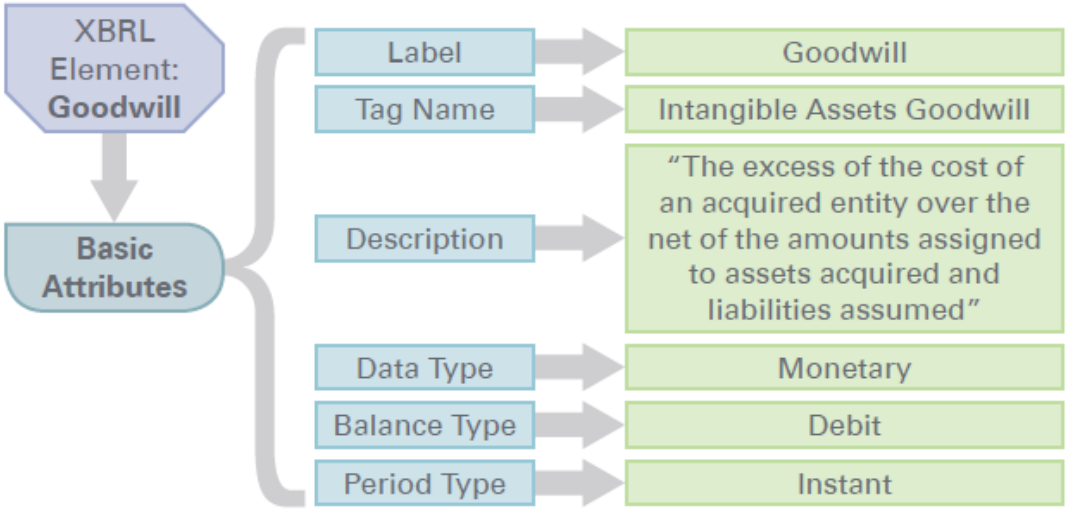

Figure 2 Basic attributes for XBRL element (KPMG, 2008)

In addition to attributes that are assigned to each element in financial statements, each element is assigned relationships which are presented in figure 3. There are three kinds of relationships; reference, presentation and calculation. Reference tells where the authoritative guidance for the element can be found. It can be for example FASB (Financial Accounting Standards Board) reporting requirement or some AICPA document. Presentation relationship determines how an element is displayed in the rendered document that is based on the taxonomy. The calculation relationship shows how the element is included in calculating other financial statement amounts. (KPMG, 2008.)

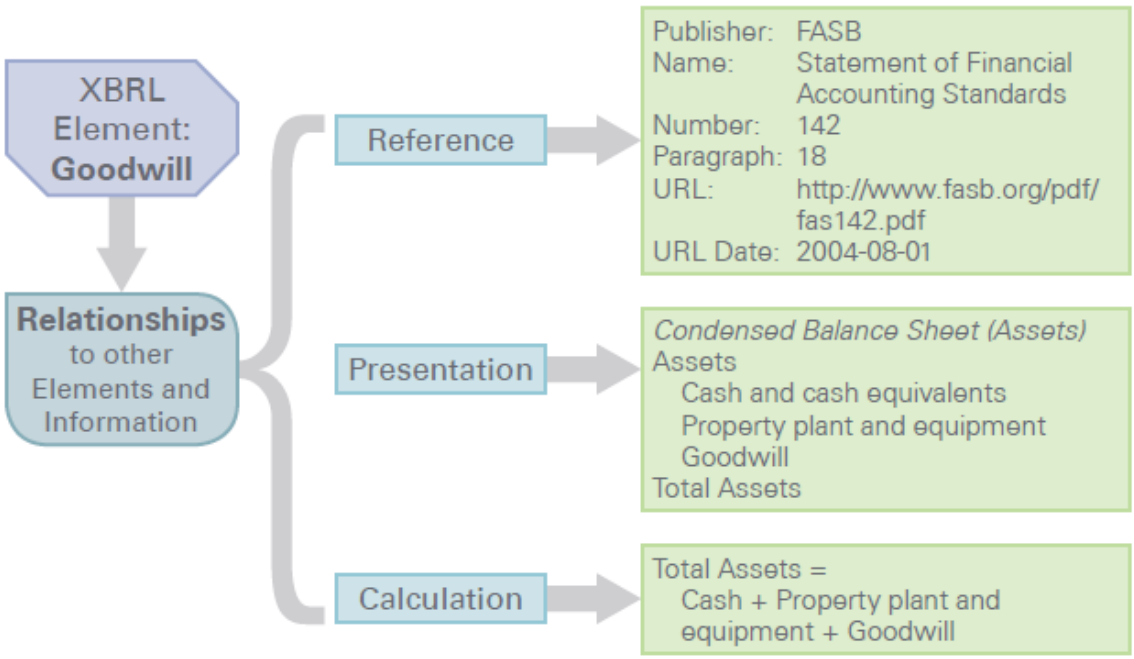

Figure 3 Element's relationships (KPMG, 2008)

It is also possible for companies to customize taxonomies by creating new concepts. This is called "extending" the taxonomy and this extensibility feature of XBRL plays an important role when the reporting company has some unique item in its financial statements that is not found in taxonomies. (KPMG, 2008; Cohen, 2004.) But this feature entails a tradeoff between a comprehensive taxonomy that allows firm-specific information to be reported and standardization that improves comparability between firms if all companies used the standard taxonomy (Baldwin et al. 2006; Alles & Gray, 2012).

After the correct taxonomy has been recognized and possibly extended, and the tagging process has been finished, the end product is an instance document which is by definition an XBRL-coded business report. Instance documents are those that are immediately processable by another XBRL-enabled application. (Wu & Vasarhelyi, 2003.) The data in the instance document is only numbers, texts and brackets and thus it is not normally viewed by a person in its raw form (Boritz & No, 2004). A style sheet application is needed to convert the XBRL data in an instance document into a traditional looking financial statement (KPMG, 2008; Plumlee & Plumlee, 2008).

What is fundamentally different between traditional financial statements, which are reported in pdf, html or excel formats, and XBRL documents, is that in XBRL documents each number contains semantic information and it is computer-readable without the need for manual re-entries (Wu & Vasarhelyi, 2003).

2.2 XBRL's usage currently

As the legislation concerning companies and accounting standards vary between countries, each country must have its own taxonomy. For example, U.S. GAAP (Generally Accepted Accounting Principles) differs from IFRS (International Financial Reporting Standards) so there has to be a taxonomy for both of them so that companies are able to report according to these two different standards. (Wu & Vasarhelyi, 2003.) Additionally, one country may have several different taxonomies for different industries. In the U.S. they have, for example, one taxonomy for commercial and industrial companies (U.S. GAAP CI) and another one for insurance companies (U.S. GAAP INS). (XBRL US, 2012.) These taxonomies are known as XBRL FR (Financial Reporting) taxonomies. They are based on accounting standards and regulator specifications and they are used for external reporting. (Locke & Lowe, 2007.)

In addition to taxonomies for external reporting, there is one taxonomy, XBRL GL (global ledger), that goes deeper into the accounting systems and differs in that sense from other taxonomies. XBRL GL can be used to process and store transactional data from business documents, update the general ledger and to produce financial reports. (Bizarro & Cargia, 2011.) Using GL taxonomy requires infusing the technology into internal recording systems which requires more work from the reporting company (Locke & Lowe, 2007).

This difference in XBRL's level of integration was something that many articles especially in the early years seemed to ignore when praising the benefits of XBRL (Locke & Lowe, 2007). Also, most current articles discuss only XBRL FR because it is embraced by many countries (Locke & Lowe, 2007; Bizarro & Garcia, 2011). An exception is the article from Garbellotto (2009) where the author presents three different ways to use XBRL; bolted-on solution, in which ready-made traditional financial statements are solely converted into XBRL, built in at reporting applications level, or deeply embedded in ERP applications and ledgers, which reminds of XBRL GL. Until now, companies have used the bolt-on approach so that tagging happens only at the end of the reporting process (Fisher, 2008; Alles & Gray, 2012) and in isolation from enterprise systems (Alles & Debreceny, 2012) but as Locke and Lowe (2007) and Cohen (2009) remind; if XBRL's efficiencies are to be fully utilized, it is a combination of XBRL GL and XBRL for external reporting that is needed. Some companies have even outsourced the creation of their XBRL documents and thus just as in bolt-on approach, lose some of the benefits of XBRL (Janvrin & No, 2012).

The usage of XBRL in financial reporting is likely to evolve from the present practice where traditional financial statements are converted to XBRL and both versions are offered for external consumption (XBRL International, 2006; Boriz & No, 2009). For example in the U.S. this is how listed companies report to the public (SEC, 2009). The XBRL International's assurance working group is expecting this to change so that XBRL reports actually become the primary financial statements with no corresponding report in paper (XBRL International, 2006). Plumlee and Plumlee (2008) go a step further and state that at some point XBRL tags are incorporated into accounting software and ERP systems and then tagging will become a part of the process of creating reports.

In addition to financial statements, also tax reports can be filed using XBRL. For example in the U.K. it is mandatory to file tax reports using a special form of XBRL, the inline XBRL (Brands, 2012). Monterio (2011) claims that XBRL for tax data is one of the hottest issues and that tax authorities have gotten behind it because they have seen evidence of its benefits. Some countries have gone as far as combining different reporting requirements for different authorities into one taxonomy. This is known as standard business reporting (SBR) and the intention is to decrease the reporting burden for companies (Alles, 2009; Cohen, 2006). There are SBR projects underway in the Netherlands, Australia, Singapore, New Zealand (Debreceny & Farewell, 2010) and in Finland (Ojala et al. 2012).

In the banking sector XBRL has already been used for some time. For example in the U.S., quarterly bank Call Report reporting to the members of the Federal Financial Institutions Examination Council (FFIEC) was converted to XBRL already in 2006 (Alles & Debreceny, 2012). Australian Prudential Regulation Authority (APRA) that regulates banks was the first organization in the world that implemented XBRL (Doolin & Troshani, 2004).

2.3 An overview of history and structure of Big 4 audit firms

As mentioned in the preface of this second chapter, in addition to knowing the basics of XBRL, it is important to understand how audit companies are structured in order to understand the impacts of XBRL on their work. Also, to understand the current structure, one needs to consider the history and changes that audit firms have gone through.

All of the current Big 4 accounting companies, Deloitte Touche Tohmatsu (now on Deloitte), Ernst & Young, KPMG and PricewaterhouseCoopers (now on PwC) have their roots in the late 19th and early 20th century. Since then, the audit profession has undergone significant

changes in form of many mergers that has resulted in the former Big 8 firms becoming Big 4 (OECD, 2010). The main reason for the mergers has been the cost of increased regulation, litigation and competitive survival (Lawrence & Glover, 1998).

In the beginning of the last decade, there was a trend among audit companies to divest their consulting services due to conflict of interest problems in the industry. Problem was highlighted by the collapse of Enron and its auditor Arthur Andersen. Enron was an important customer for Andersen as it paid higher consulting fees than audit fees for Andersen (Glater, 2002) and according to some, that led Andersen to purposely overlooking the accounting fraud at Enron (Morrison, 2004). To resolve independence issues, three of the Big 4 companies decided to sell their consulting functions. Ernst & Young sold their consulting division to Cap Gemini in 2000 (CNET 2000), PwC sold theirs to IBM (PwC 2012a) and KPMG continued to hold a majority stake in their consulting unit that they partly sold to Cisco Systems (Liu & Nabar, 2006). Deloitte, on the other hand, chose not to sell their consulting activities which allowed it to maintain its rather big consulting function (Deloitte, 2012a).

Currently all the big audit firms offer a wide range of similar services although their functions are arranged differently inside the companies. Deloitte has organized its functions into audit, consulting, financial advisory, tax and enterprise risk services (Deloitte, 2012b). Ernst & Young has five main categories under which they operate; advisory, that includes risk services, assurance, under which there are both financial accounting advisory services and financial statement audit, transactions, tax and specialty services (Ernst & Young, 2012a). KPMG provides services under three categories; audit, tax and advisory, which includes risk services (KPMG 2012). PwC on the other hand has more services than the other companies. They offer audit and assurance, which includes internal audit, consulting, services related to deals, family business services, human resources, legal and tax services (PwC, 2012b).

Following the accounting scandals there are now some limitations to offering non-audit services to audit clients (Maijoor & Vanstraelen, 2012). For example, the Sarbanes-Oxley Act of 2002 restricts audit firms from providing any financial information system design and implementation services as well as internal audit, bookkeeping and legal and expert services not related to audit (Kinney et al. 2004). These, however, do not restrict audit companies from providing this wide variety of services to their non-audit clients.

In this thesis three functions of audit firms are separated from each other to; audit, risk services, including internal audit, and advisory that includes normal consulting services, transaction services and tax advising. This classification is based on what has been discussed in the previous literature about XBRL in relation to audit companies. Assuring XBRL documents has been a hot issue among researchers (eg. Plumlee & Plumlee, 2008; Srivastava & Kogan, 2010; Elliot, 2002), an impact of XBRL on internal controls and risk has also been discussed in some papers (eg. Baldwin & Trinkle, 2011; Alles & Gray, 2012; Bartley et al. 2011; Gunn, 2007) and few have discussed consulting opportunities for external parties (eg. Troshani & Rao, 2007; Doolin & Troshani, 2004). Tax services and services related to transactions or due diligence are considered to be part of advisory as their nature is to give advice. Internal audits are separated as its own area because of the restrictions on providing both auditing and internal auditing services for the same client and because internal controls have been discussed as its own area in some papers.

2.4 XBRL-related services offered by audit companies

As already mentioned, audit companies have had a major role in the development and implementation of XBRL in different jurisdictions worldwide. Doolin and Troshani (2004) have noted that audit companies have attempted to incorporate XBRL components into their existing business advisory services as well. In addition to only consulting their clients, some of the companies have also been active in assisting governmental agencies with the implementation of XBRL-based initiatives in those organizations. KPMG, for example, has developed an XBRL solution for Australian Prudential Regulatory Authority (Doolin & Troshani, 2004) and Deloitte was developing the first taxonomy for sustainability reporting, the GRI (Global Reporting Initiative) taxonomy (GRI, 2012).

Audit companies also tell in their websites, what kind of services they provide. Deloitte (2010), for example, offer training, ensure quality of XBRL filings by doing agreed-upon services, implementation services and help with disclosure management process. PwC (2011) mention in their article that internal audit organizations can help company in understanding the risks associated with XBRL by evaluating whether risks have been addressed appropriately and whether the process is producing high quality XBRL submissions. They are also seeing a growing interest from companies in engaging external auditors to perform agreed-upon services. On the other hand, a survey conducted by Ernst & Young in 2010 revealed that only 24% of 1000 respondents indicated that they have already involved or are

planning to involve their external auditor to address risks in complying with complex rules (Ernst & Young, 2011).

2.5 XBRL in the financial reporting chain and the purpose of audit

Providing auditing services has a defined purpose that goes back to the agency problem where shareholders are the principals and managers are their agents. When ownership and management are separated, a problem, where managers' incentives differ from owners' incentives, arises. It can happen that managers try to maximize their personal compensation and not the firm value. That is one way how agency costs arise. Another situation, where agency costs incur, is when shareholders incur costs to monitor the management. The agency problem would not be there if both parties had the same information but that would only be the situation when management and ownership were merged. In the asymmetric information situation, one way for the owners to reduce the first-mentioned agency cost type is to hire an independent auditor to audit financial statements. (Brealey et al. 2008, 8, 329-330.) Thus, auditing is a form of monitoring that owners use to constrain managers from using discretion in reporting and therefore it reduces information risk (Chen et al. 2011).

As the economy is moving towards real-time information exchange, it will require a change from the assuring party as well. The traditional auditor focuses on firm's history but the real-time auditor is ready to work with current information. (Vasarhelyi, 2010.) Even if the surroundings and requirements change, the inherent nature of audit and assurance does not change (Rezaee et al. 2001). The overall purpose of an audit is defined in ISA 200 (International Standards on Auditing) as follows: "The purpose of an audit is to enhance the degree of confidence of intended users in the financial statements. This is achieved by the expression of an opinion by the auditor on whether the financial statements are prepared, in all material respects, in accordance with an applicable financial reporting framework." (IFAC, 2012.) In every assurance engagement there must be a subject and appropriate criteria. In traditional audits, the financial statements are the subject of the engagement and GAAP is the criteria applied in determining what kind of opinion is expressed by the auditor. (XBRL International, 2006; Plumlee & Plumlee, 2008.)

Figure 4 presents the business reporting supply chain that shows companies' processes starting from business operations and going all the way to investment decisions and policymaking. Figure also lists participants and places them under those processes where they

cooperate with the company. It can also be seen where XBRL GL and XBRL FR come into play in the supply chain.

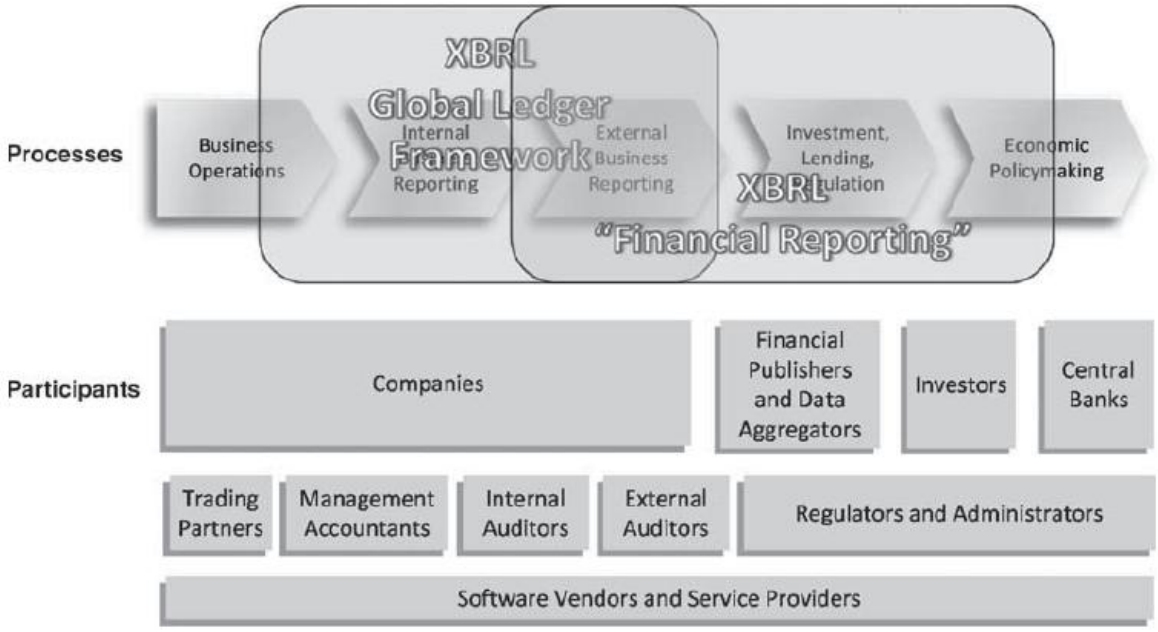

Figure 4 Business reporting supply chain (Cohen, 2009)

For this thesis, the important thing is to see, where internal and external auditors are placed in the supply chain. Aggregating the data is also relevant for audit companies. Big 4 audit companies offer internal audit and risk services to make sure that company has the right controls in the right places to prevent malpractice and to verify that information runs correctly from subledgers to financial statements. External auditors also have to verify that controls are working as part of the audit process but the most visible part of their work is to provide a report that financial statements are free from material misstatements. Another important aspect is to see the difference between XBRL global ledger and XBRL financial reporting.

3 Theoretical framework

In this chapter the wider theoretical framework, the theory of efficient capital markets and the information efficiency, that is utilized in this study, is presented. Emphasis is placed on the role of information in efficient capital markets and the attributes of good quality information.

3.1 Efficient capital markets and information efficiency

Overall, the role of capital market is to allocate ownership of the economy's capital stock and the ideal situation is when prices provide accurate signals for resource allocation. Next, a market where prices always fully reflect available information is called efficient. (Fama, 1970.) The expression that "prices fully reflect" means that excess returns cannot be earned (Verrecchia, 1979). The theory of efficient markets has been tested successfully with the help of expected returns theory in which information plays a key role (Fama, 1970).

The empirical work on the theory of efficient markets has been concerned with whether prices fully reflect three particular available information subsets; weak form tests, semi-strong form tests and strong form tests. In the weak form tests the information subset of interest is only past price or return histories meaning that no other than historical information is considered. Studies conducted about this weak form tests strongly support the efficient market model. (Fama, 1970.)

Next, in the semi-strong tests the concern is whether current prices fully reflect all obviously available information. Here information generating events, such as stock splits, announcements of financial reports by firms and new security issues are considered. (Fama, 1970.) The future is also considered because, for example, Fama et al. (1969) found that the market uses the announcement of a stock split to re-evaluate the stream of expected income from the shares and the information implications of a split are fully reflected in the price of a share almost immediately after the announcement. Also tests about semi-strong form support the efficient market hypothesis (Fama, 1970).

Finally, in the strong form tests the efficient market models test whether all available information is fully reflected in prices meaning that no individual can expect higher trading profits than others because he or she has a monopolistic access to some information (Fama, 1970). It has been recognized, though, that this description does not fully reflect the reality as some officials or stock exchange specialists and corporate managers sometimes have this monopolistic access to information (Emery, 1974). Despite these two special groups, Fama

(1970) states that the efficient market model seems like a good approximation to reality for the purposes of most investors and contradictory evidence is sparse (Fama, 1970).

Emery (1974) discusses the problem raised in Fama's (1970) paper that management occasionally has monopolistic access to information that is not disclosed in financial reports. Having monopolistic access to information raises the question whether there is an optimum strategy to disclosing this information. It is suggested in the literature that accountants tend to smooth the income of firms with accounting procedure choices and thus all the relevant and correct information may not be visible in the financial statements. But if this income-smoothing strategy is used to enhance the value of the firm, the accounting numbers must imply some information that is not already impounded in current market prices. (Emery, 1974.) However, Emery (1974) finds out in his study that even though companies make adjustments in their financial statements, the market can estimate what the correct accounting number should be and prices the security accordingly. This implies that despite the smoothing strategy, the market can acquire the same information through alternative sources and thus enhances the market efficiency (Emery, 1974).

In the efficient capital markets hypothesis the concept of information efficiency is important. However, it has been difficult to interpret from a theoretical perspective. (Verrecchia, 1979.) In Fama's work (1970) it is assumed that when the market assessment of the underlying uncertainty of a security is sufficiently accurate, it is not possible to earn excess returns. Verrecchia (1979), on the other hand, suggests a positive theory for how a market achieves information efficiency in a wide set of circumstances. In his paper Verrecchia (1979) suggests that as the number of traders who participate in the market becomes large, the variations in the price of a security caused by the variations in traders' beliefs make the market price vary as if traders all knew the "true" distribution of that security's returns. He states that this convergence means that prices vary as if all traders knew the true distribution of a security and this then implies that it is not possible to earn excess returns, i.e. that the market is efficient.

Verrecchia (1979) concludes his paper by stating that to test his hypothesis one needs to have a measure for market participation. He suggests that measures could include the trading volume, number of shares outstanding or number of shareholders. His analysis suggests a hypothesis that those securities for which there are more market participants will show lower quasi-profits (profits that are available ignoring all information and transaction costs) than

those securities for which there are fewer market participants. An alternative measure for market participation mentioned in Verrecchia's (1979) paper is the relative size of a firm. He reasons that as it is shown that excess returns can be earned after the announcement of accounting earnings or dividends, those accounting reports can be more valuable to investors in smaller firms. Consequently, this leads him to expect that rather smaller than big firms supply accounting information prior to disclosure laws. (Verrecchia, 1979.)

Piotroski (2000) investigates in his study whether a simple accounting-based analysis strategy can shift the distribution of returns earned by an investor when applied to a broad portfolio of high book-to-market firms. He finds out that the benefits of financial statement analysis of these companies are concentrated in small and medium-sized companies, companies that have a slow share turnover and in firms with no analysts following (Piotroski, 2000). These results support the hypothesis by Verrecchia (1979) that providing accounting reports is valuable for investors of small companies and that markets are more efficient for companies with more market participants.

3.2 Quality of information

Accounting information found in financial statements is one important source of information, although not the only one, that investors take into account when making investment decisions and the quality of financial statements influences to a great extent the quality of investment decisions (Singhvi & Desai, 1971).

Information plays a key role in communication and often poor quality information is connected to lost productivity. Availability of information is no longer an advance for companies, but the quality of information is. Yet, what actually are characteristics of quality of information are often loosely defined or ignored. (Bovee et al. 2003.) There are different information quality (IQ) models but for the purpose of this thesis the model provided by Bovee et al. (2003) is chosen because it revises previous models.

Bovee at al. (2003) have developed an information quality model based on a user-centric view to assess overall information quality. They give examples of their model in the hospital context and talk about patient registers but as their model is partly based on the one provided by FASB, the main idea is easily convertible to financial information as well. The information quality model by Bovee et al. (2003) consists of three attributes that are extrinsic to information: accessibility, interpretability and relevance. The fourth attribute is integrity that

the authors consider as intrinsic to the information. Integrity consists of four subattributes; accuracy, completeness, consistency and existence.

XBRL can be seen to improve almost all of these important attributes for good quality information mentioned by Bovee et al. (2003) as well as increase information efficiency that Verrecchia (1979) talks about. First of all, Bovee et al. (2003) state that information must be accessible for it to be of use. XBRL makes information more accessible for information users because for example in the U.S. listed companies' financial statements can be retrieved from SEC's pages (SEC, 2010). Another feature of XBRL is that it has different languages in it. It supports many regional languages and now investors can find numbers and understand them from companies all over the world. (Kernan, 2008.) This aspect of XBRL relates to Verrecchia's (1979) definitions of information efficiency as well because he states that quasi-profits are more difficult to earn when there are more market participants**.**

Secondly, Bovee et al. (2003) define interpretability as having information that must be understood and which has to have a meaning that conveys to the user some sense and significance. This aspect is significantly improved by XBRL as taxonomies have definitions behind tags for the standard accounting terms used (Kernan, 2008). Also Hobson (2011) finds that reducing complexity in accounting information about the fundamental value increases the processing of that information by traders which in turn increases the market efficiency.

Third attribute of good quality information in the article by Bovee et al. (2003) is relevance which means that information has to be relevant to the purpose of interest in a given context. According to the authors, this is close to the FASB's criterion that information is useful if it has the capacity to influence decision making (Bovee et al. 2003). This aspect is not directly retrievable from XBRL's characteristics but it relates to XBRL because it is taken to the financial statements that are one of the cornerstones of decision making by investors (Francis & Schipper, 1999). Bovee et al. (2003) also mention that in all cases they require that information must be timely. Also Francis and Schipper (1999) state that the issue of when information is reported is one of the concerns that has arisen in discussions that financial statements may have lost some of their value-relevance for investors. This aspect, on the other hand, can be improved by XBRL according to e.g. (Baldwin & Trinkle, 2011) because if XBRL is taken deeper into the accounting systems, it can speed up the creation of financial statements.

The last aspect mentioned by Bovee et al. (2003) is integrity which in essence means that information has to be free from defects of flaws. Integrity consists of four subattributes; accuracy, completeness, consistency and existence. All of these subattributes aim to ensure that information is correct and in financial statement and information reporting context auditors are responsible for these to some extent. Thus, they are discussed in more detail in chapter 4.3.2.

4 Previous research in the area of XBRL

In this literature review chapter the first part discusses how XBRL affects financial reporting and what risks relate to its use. Then, adoption of XBRL among companies and audit firms' role in XBRL's diffusion is reviewed. After these two more general subjects, chapter moves on to present XBRL issues from prior literature that relate to audit, internal controls and advisory services.

4.1 XBRL's effects on financial reporting

As already mentioned in the introductory chapter, XBRL is expected to have widespread effects on financial reporting and beneficiaries are not limited to only accountants, but are said to include also company management, creditors, analysts and regulators (Wu & Vasarhelyi, 2003).

First of all, preparing financial statements can become easier with XBRL if technology is implemented to the software. XBRL-enabled softwares can generate financial reports quickly and information needs to be keyed into the system only once. (Wu & Vasarhelyi, 2003.) The elimination of the need to re-key data means that companies can theoretically provide real-time data to investors (Baldwin et al. 2006). XBRL can also be taken to the account level, as is the intention with SBR projects, where a national taxonomy is created which includes all the information that is to be reported for all authorities in that country. It means that the reporting company can send the information using that taxonomy and separate reports for different authorities are not needed anymore. (Ojala et al. 2012; Raportointikoodisto, 2012.)

When information flows smoothly between separate systems, it saves a lot of time and reduces entry errors because re-keying is no longer needed. Exchanging information becomes also easier because standardized tags are independent of software formats and computer platforms. (Wu & Vasarhelyi, 2003.) In fact, Locke and Lowe (2007) state that XBRL is an answer to the increased need for interoperability between disparate systems created by rapid developments in Information Communications Technology (ICT).

Since XBRL documents provide users considerably more information in machine-readable form, users can then do large-scale analyses of it (Richardson et al. 2010). Hodge et al. (2004) investigated whether using an XBRL-enhanced search engine helps non-professional financial statement users acquire and integrate information contained in financial statements when doing investment decisions. They found that XBRL in fact does facilitate these activities and

that in turn led to better investment decisions (Hodge et al. 2004). In a similar research conducted by Pinsker and Wheeler (2009), the perceived efficiency and effectiveness of XBRL-formatted reporting was compared with paper-based reporting in relation to financial statement analysis. Researchers found that non-professional investors using information in XBRL format had higher perceptions of analytical effectiveness and efficiency compared to the other group working with traditional paper-based reports. Despite the advantages of using XBRL reports, the authors remind that individual users still need to choose their preferred method of analysis. (Pinsker & Wheeler, 2009.) In fact, when making their study about whether XBRL-enhanced search engine helps non-professional investors acquire and integrate information from the financial statements better, Hodge et al. (2004) had to eliminate 50 % of the answers because the respondents chose not to use XBRL at all.

In addition to improved exchangeability of information and analytical possibilities, comparability of information has been raised as one of XBRL's benefits. XBRL facilitates comparability among firms if common taxonomies are used because then users actually know what is meant with different concepts and thus terminology issues related to homonyms and synonyms in financial statements are reduced. Yet, XBRL does not solve the inconsistency of measurement that is allowed by GAAPs (Baldwin et al. 2006) and there is still subjectivity associated with selecting appropriate tags and doing extensions to taxonomies. (Venkatesh & Armitage, 2012; Burnett et al. 2006.) If many firm-specific concepts are used then comparability suffers. Unfortunately, it seems that many extensions to taxonomies are needed in order to accommodate information contained in notes among multiple companies. (Baldwin et al. 2006.)

Standardized presentation of information will also improve information gathering around the world. For example, Apostolou and Nanopoulos (2009) mention that China and Japan saw the need for standardization of their financial statements that usually are difficult to understand because of the complex accounting system and the language. Now with XBRL, those financial statements are understandable to foreigners as well. Valinetti and Rea (2012) also noticed that there are differences between current reporting practices of Italian listed companies that report with IFRS and use the IFRS taxonomy. It means that Italian companies have their own unique way of reporting under IFRS, as do companies in other countries in Europe as well, but if the common IFRS taxonomy is used, then it would possibly standardize the reporting practices around Europe.

Through these benefits, Hodge et al. (2004) state that this new search-facilitating technology makes financial information more useful and usable for ordinary investors and also makes financial reporting more transparent. In addition, based on their results, Hodge et al. (2004) expect that XBRL reveals management's choices of reporting certain items and encourages managers to be more neutral when making choices about estimates and assumptions which can be used to artificially enhance the financial performance. It is also suggested by the literature that with increased quality and timeliness, it would be possible for oversight bodies to screen, analyze and review companies and detect frauds to reduce the risk of future financial scandals (Baldwin et al. 2006; Debreceny & Farewell, 2010). Pinsker (2003) also believes that faster reporting made possible by XBRL reduces the time management has to manipulate information. Baldwin and Trinkle (2011) note that especially when the accounting software vendors incorporate XBRL into their products, and the creation of financial reports becomes automated, preparing misleading financial statements becomes more difficult. Although this improvement seems to be good and logical, it must be kept in mind that markets also use other information than only financial statements and can adjust prices accordingly (Emery, 1974).

Some of the XBRL's benefits for information efficiency have already been tested. A research conducted by Hyungwook et al. (2011) found a significant and negative association between XBRL adoption and information asymmetry for large companies in the setting of Korean stock market. Their regression analysis showed that XBRL reduces the time and cost to circulate corporate information in stock markets and enhances the comparability of that information. It also increases the transparency and quality of corporate information in the capital market and facilitates corporate disclosure which reduces the information asymmetry of the capital market. On the other hand, for small and medium-sized companies the effect was not significant. (Hyungwook et al. 2011.)

Kim et al. (2012) carried out a similar study in the U.S. markets and examined 1 536 first-year mandated XBRL submissions. They found an increase in information efficiency, a decrease in event volatility and a reduction of change in stock returns volatility post-XBRL disclosure. Thus, they suggest that XBRL has the potential to decrease information risk and information asymmetry through improved transparency. (Kim et al. 2012.) A study made by Ly (2012) also found that, first of all, there was an increase in analysts' earnings estimates following first year XBRL filings and, secondly, that there was a decrease in the dispersion of those earnings forecasts when she investigated XBRL filings in the SEC's EDGAR system. These

studies show that XBRL actually has the ability to improve information efficiency discussed in chapter 3.

Despite all the benefits of XBRL, it still must be kept in mind that XBRL is only a tool, not a cure for all problems. Some papers have addressed the problems that relate to XBRL filings and the primary limiting factor for the realization of XBRL's benefits is the quality of data and its formatting (Vasarhelyi et al. 2012). Bartley et al. (2011) examined errors in filings under the voluntary filing program in the U.S. and found that all the 22 examined companies had errors in their XBRL filings. Errors related to missing and incorrect elements, wrong signs in numbers, incorrect amounts, duplicate elements and display errors. However, errors decreased dramatically during the next couple of years. (Bartley et al. 2011.) Also Boriz and No (2009) found errors in their mock assurance on XBRL-related documents of United Technologies Corporation (UTC). They found redundant elements in UTC's extended taxonomy and missing labels in the instance document. In addition, a couple of sums were omitted in the instance document and textual narratives that were shown as a single section in the paper version were spread throughout the instance document. (Boriz & No, 2009.) Baldwin et al. (2006) remind that mistakes like selecting an incorrect tag or creating extensions when they are not needed can also be intentional and the existence of well-developed taxonomies does not prevent investors from being misled. A real concern is also the potential for material misstatement due solely to tagging process (Plumlee & Plumlee, 2008).

In addition to mistakes in filings, it is possible that limiting the extensibility of taxonomies has negative consequences on the amount of information provided by companies. Valinetti and Rea (2012) found that there is a general discrepancy between the traditional financial statements prepared by Italian listed companies and the IFRS taxonomy tags. Financial statement items are more disaggregated than the taxonomy tags meaning that if the taxonomy is applied, it could cause a significant potential loss of interoperable information. (Valinetti & Rea, 2012.) These studies show that even though XBRL has the potential to improve financial reporting, its complexity and preparers' inexperience create a risk for errors which affects XBRL's usefulness.

4.2 Adoption of XBRL and participation in consortiums

As mentioned earlier, XBRL is not used in all countries and researchers have wondered why XBRL adoption has been limited given the benefits of innovation. There are also examples

where efforts have been made to adopt XBRL but the end result has been a failure. For example, New Zealand was one of the first jurisdictions to adopt XBRL but despite the promising start, none of the companies there has adopted XBRL formally (Cordery et al. 2011). In South Africa an oversight body that regulates non-banking financial industry gathered registered retirement funds' financial reports in XBRL format. Although the experiment was successful and XBRL helped to save considerable amount of time and costs for both parties, the XBRL initiative has now collapsed into a .CSV (comma-separated value) initiative. (Buys, 2008.)

Reasons provided by researchers for non-adoption are numerous but two explanations are mentioned more often than others. First, if companies are not obligated to use XBRL, they are not likely to adopt it. This is because businesses are busy with other issues that are more important to them. (Cordery et al. 2011; Buys, 2008.) Second reason for non-adoption is that companies do not often see the benefit and financial gain of using XBRL (Cordery et al. 2011; Steenkamp & Nel, 2012; Bovee et al. 2005). Surely there are benefits for regulators who receive reports and are able to enhance regulatory analysis, streamline the intensive information processing and thus avoid manual work (Buys, 2008; Gray & Miller, 2009; Jones & Willis, 2003) but for reporting companies benefits are not so obvious (Enofe & Amaria, 2011), especially if XBRL is only used for external reporting purposes. It is then seen by companies as an additional cost rather than a benefit. (Fisher, 2008; Cohen, 2009.) Locke and Lowe (2007) also state that producing data from normal ERP systems and then using another procedure to produce an instance document delivers much lower cost savings and lower levels of efficiency than being able to generate instance documents directly from those ERP systems. To be able to achieve this other, more cost-efficient option means that companies would need to use XBRL GL instead of a just "bolted-on" system (Locke & Lowe, 2007).

In South Africa's case Buys (2008) explained that because of the limited acceptance of XBRL and skills shortage, the initiative was not successful. According to him, the key stumbling factor in the expansion is the limited knowledge of what XBRL is and what it can do (Buys, 2008). In New Zealand's case Cordery et al. (2011) found the very reasons of lack of government push and companies' disbelief that XBRL would lower compliance costs for the failure of XBRL initiative. Locke and Lowe (2007) remind that there is danger in regulator "push" way of imposing reporting in XBRL format as preparers will face the bulk of costs and technical problems. It is possible that the cascade effect will spread disaffection among

companies (Locke & Lowe, 2007). Whether XBRL is adopted by companies, depends if it is mandatory or not. But with mandates come other problems as explained above.

Adoption of XBRL is not always desired by all stakeholders. Troshani and Rao (2007) revealed that some of their interviewees feared that the adoption of XBRL would mean that many employees in adopting organizations would suddenly become redundant because a lot of time will be saved. On the other hand, it is argued that these employees can be redeployed to more value-adding functions. For example, accountants who do not have to spend time in creating reports can provide high-level consultation services which can then increase the quality and frequency of customer interactions. (Troshani & Rao, 2007.)

Audit companies' involvement in XBRL development is important for the wider adoption of XBRL because in order for XBRL to succeed, there needs to be a widespread adoption of the technology (Locke & Lowe, 2007) and audit companies are part of that critical mass. But before that critical mass can be reached, there must be some early-adopters who implement the innovation before there are any clear benefits in adopting it (Gray & Miller, 2009). It is considered that large accounting and audit firms who adopt XBRL successfully can act as role models which may potentially generate bandwagon effects that accelerate XBRL diffusion (Troshani & Doolin, 2007). Cordery et al. (2011) and Janvrin and No (2012) also state that there needs to be sufficient support from specialists to encourage companies to adopt XBRL and to reduce knowledge barriers that otherwise hinder the adoption of complex technologies. Another factor contributing to adoption is the trading partner influence. Doolin and Troshani (2007) state that the adoption of XBRL internally by companies requires that their auditors also adopt XBRL. Troshani and Doolin (2007) also note that more proactive promotion of XBRL has occurred among the clients of large accounting firms but they also remind that there usually are only a small number of individuals within audit firms who maintain an active involvement with XBRL.

All the parties, like audit companies, who are developing XBRL are doing so by participating in XBRL consortiums. However, not all audit companies are actively involved in all XBRL countries (XBRL International 2012a). Participating in consortiums requires paid membership and physical presence in conferences and meetings which may hinder the participation by some organizations (Locke & Lowe, 2007). In addition, Chang and Järvenpää (2005) provide another explanation to why audit companies may be cautious with their involvement in XBRL development. According to them, the past accounting scandals that led audit firms to give up

their consulting divisions and impacted their role as agents of technology-based change is the reason why they are now careful with the participation (Chang & Järvenpää, 2005). But when organizations are willing to participate, Locke and Lowe (2007) find out that reasons to participate mentioned by their interviewees included the sense of importance related to XBRL work and the feeling that it will make a difference to reporting in the future, interest in solving XBRL issues and the possibility of gaining a reputation as an expert in XBRL for employment purposes.

System developers are also participating in consortiums and the development work of XBRL. They face the challenge of incorporating XBRL functionality into their softwares because if they do not take XBRL into account, they are running the risk of being left out as a future software supplier. On the other hand, by knowing XBRL and incorporating it, they are able to provide support that is needed by reporting companies. (Locke & Lowe, 2007.) In addition, some companies have asked their software consultants to create taxonomy extensions (Janvrin & No, 2012). This is also why software vendors have supported the mandatory requirement of XBRL (Locke & Lowe, 2007). The challenge for system developers is that different report applications are becoming less differentiated because with XBRL the presentation decisions are left to the end-user. At the same time this offers software developers opportunities to develop new value-adding and highly user-customized financial information services. (Chang & Järvenpää, 2005.)

4.3 Implications of XBRL for audit function

Of audit companies' functions, the most discussed area in relation to XBRL is auditing and especially how to assure XBRL-formatted information. In this section it is first discussed, how XBRL documents are currently assured and what kind of guidelines are offered. Then, audit implications and expected new audit procedures are presented. Related to that, new knowledge requirements for auditors and problems in the industry are discussed. Finally, continuous auditing facilitated by XBRL is presented.

4.3.1 Assurance on XBRL documents currently

Auditing XBRL documents is currently not compulsory (Alles & Gray, 2012) and until fall 2012, companies in the U.S. have had a limited liability with their XBRL submissions, meaning that they are not punished as long as they make a good-faith attempt to comply with general rules and regulations for electronic filings (Merrill Compliance Solutions, 2012). However, there is some guidance on how to assure XBRL submissions, if filing companies so

wish, but these instructions are not binding auditors in the same way as normal audit standards. The Canadian Institute of Chartered Accountants (CICA) took the stand in their 2005 white paper that since instance documents are not financial statements, the standards governing audit reports on financial statements do not apply (CICA, 2005). One country where auditors are expected to validate XBRL tags used for financial statements to ensure consistency between filers is the United Arab Emirates. They are leading the XBRL reporting in the Middle East and are planning to make it mandatory in 2013. (Brands, 2012.)

With regards to other countries, researchers are still arguing whether auditing XBRL documents ever becomes mandatory. For example, the SEC has not given any signal that it would plan to require an audit for XBRL submissions (Whitehouse, 2011). Majority still seem to believe that there is a need for assurance because the use of XBRL-based financial information increases (XBRL International, 2006; Plumlee & Plumlee, 2008) and it is in the best interest of the public that documents are assured (Srivastava & Kogan, 2010). Also Lymer and Debreceny (2003) state that annual financial statements and the audit report continue to play an important role in maintaining the quality of the information transfer between corporations and stakeholders. A survey conducted by The Chartered Financial Analysts Institute (CFA, 2008) reveals that 69 percent of the respondents desired for either an integrated audit or a separated audit or a review by an independent auditor. The need for assurance requires in turn changes to auditing standards (Doolin & Troshani, 2007). AICPA's efforts are also seen as a sound basis for developing an auditing standard at some point (Whitehouse, 2011). Already in 2006 XBRL International's assurance working group wrote that the need for guidance and audit standards will grow fast in the short term because companies are moving towards XBRL filings and auditors need standards to be able to deliver assurance on filings (XBRL International, 2006). Despite the need for new binding standards, they have not been developed yet (Bartley et al. 2011). Rather, auditors are relying on guidance provided for agreed-upon procedures (AUP).

Several associations have provided guidance on how to assure reliability of XBRL filings. In 2005 PCAOB (Public Company Accounting Oversight Board) published guidance for assuring XBRL filings under SEC's voluntary filing program "Attest Engagements Regarding XBRL Financial Information Furnished Under the XBRL Voluntary Financial Reporting Program on the EDGAR System" (PCAOB, 2005). In 2009 AICPA issued a Statement of Position (SOP 09-1) "Performing Agreed-Upon Procedures Engagements That Address the Completeness, Accuracy, or Consistency of XBRL-Tagged Data" (AICPA, 2009) and more

recently they published an exposure draft "Proposed principles and criteria for XBRL-formatted information" (AICPA, 2011). Also the Assurance Working Group of XBRL International published a paper in 2006 where they propose an assurance framework for electronic business reporting (XBRL International, 2006).

In the U.S. the limited liability period for companies' XBRL submissions has recently ended and now an increasing number of companies are asking their auditors to verify that their filings are correct. This is done by agreed-upon procedures. (Whitehouse, 2011.) By definition, AUPs are engagements where public accountants carry out procedures on a subject as agreed with the client and specified parties who are intended to receive the report. The important thing is that AUPs are not audits as such because there is no attempt to provide an opinion or any other type of assurance; they are only agreements between two parties. (XBRL International, 2006; Alles & Gray, 2012.)

The issue is further complicated by the fact that audit companies are not the only possible assurance providers. When companies are considering whether they need or want assurance from Big 4 audit companies, they need to take into account the costs, which according to Alles and Gray (2012) are about 25 000$ for limited AUPs. Alles and Gray (2012) state, based on their relative cost framework, that there will only be a role for externally provided assurance on XBRL filings if that cost is reduced or it appears less significant to companies. Authors claim that managers will compare the cost of obtaining external assurance against the cost of obtaining confidence on filings internally. Managers are also reluctant to pay more for external assurance than what the cost is to prepare it. This suggests that other possible ways to acquire confidence on filings is to improve XBRL creation processes and get confidence internally or, if the creation of XBRL documents is outsourced, trust that the filing agent has done everything right. Another alternative for companies is to get confidence from validation tools in the XBRL creation or conversion softwares. (Alles & Gray, 2012.) However, there seems to be a belief among auditors and regulators that auditors will be the ones providing assurance on XBRL-related documents (Plumlee & Plumlee, 2008).

All in all, not having XBRL documents audited creates a paradox. On the other hand XBRL is supposed to increase transparency in reporting and restore investor confidence in financial markets but the quality of those documents, that are praised to be fast consumable and analyzable, is not guaranteed. The role of external auditors in this setting is somewhat unclear (Alles & Gray, 2012). They still audit reporting companies in the usual way and check the

correctness of the paper version of financial statements but for the version that the audience is expected to utilize, XBRL, they take no responsibility for. In addition, a research conducted by Janvrin and No (2012) found that auditors of the early mandate adopters were not interested in auditing XBRL documents or providing assurance on the implementation process. Couple of the companies suggested that this was due to legal liability concerns (Janvrin & No, 2012).

4.3.2 Audit implications and expected new audit procedures

The purpose of an audit is to make sure that financial statements are free from material misstatements (IFAC, 2012). The usual risk of error is always present in financial statements but when those statements are created using XBRL, there are additional risks that auditors need to tackle (CICA, 2005). As already mentioned, some oversight bodies and other organizations have published drafts and white papers about the subject (see e.g. CICA, 2005; XBRL International, 2006; AICPA, 2009 & 2011; PCAOB, 2005). The above mentioned papers generally suggest that additional audit procedures are needed and AICPA (2011) has identified four attributes of XBRL-formatted information that could be used in evaluating the quality of XBRL-formatted information. It should be verified that a correct taxonomy has been used as for example in the U.S. there are taxonomies for different industries. Taxonomy extensions must also be valid. First of AICPA's principles is structure which means that XBRL files should be structured in accordance with the requirements of the entity's reporting environment. Next, the tagging process is of importance. All the relevant data in source documents has to be tagged and nothing else. In AICPA's principles this is called completeness checking. In addition to completeness, the information (dates, amounts, units and relationships) in the instance document must be exactly the same as in the source document. This is called accuracy checking in AICPA's principles. Also, the data must be properly tagged which means that the nature of an item in the source document, for example extraordinary items, must reflect the one in the chosen element. AICPA calls this as checking the mappings. (Plumlee & Plumlee, 2008.)

The above mentioned AICPA's procedures for evaluating the correctness of information partly reflect the four subattributes of integrity in information quality model presented by Bovee et al. (2003) which is discussed in chapter 3. First of all, the "accuracy" checking in AICPA's model is the same as in the paper by Bovee et al (2003) where it is stated that information must be true or error-free with respect to some measured value. Next, Bovee et al.

(2003) talk about completeness of information which means that all the required parts of an entity's information must be presented. This is the same as "completeness" checking in AICPA's model. Third attribute of information in the paper by Bovee et al (2003) is consistency which requires that reported values must have similar attributes across time and space. In AICPA's principles this is close to the "checking of the mapping" where it is ensured that reported items actually reflect the definition given in the taxonomy. When different companies use the same taxonomy across time, it ensures that information is consistent and comparable. The fourth subattribute of integrity in the model by Bovee et al. (2003) is existence which is actually an important attribute used by auditors. In AICPA's proposed new audit procedures there is nothing that refers to this existence issue, but it is natural as auditors consider existence of for example certain balance sheet amounts before XBRL comes into play. Bovee et al. (2003) give examples of violation of existence using hospital databases; there might be records for patients that do not exist, some patient records may be recorded twice or there are fictitious values. It can be considered that the same risks apply for accounts receivable as well. It may be that some reported customer balances do not exist or they are recorded twice or balances include fictitious values.

As with every engagement, there must be suitable criteria and subject matter for XBRL assurance services. XBRL International's assurance working group notice that with XBRL both the subject matter and the criteria, as well as the definition of materiality, have to change. It is suggested that any taxonomy that is acknowledged by XBRL International would qualify as suitable criteria. In plain language it means that when doing assurance, the practitioner takes the taxonomy used into account. The new subject matter, on the other hand, can involve the instance document and/or the underlying data and/or the tagging/coding that accompanies the data. (XBRL International, 2006.)

In addition to associations, some researchers have also showed interest on the subject. Srivastava and Kogan (2010) provide a conceptual framework of assertions when assuring XBRL instance documents. Their paper discusses the current situation where the goal of assurance services is to verify that the XBRL instance document is a true representation of the document filed to SEC. Also Boriz and No (2009) have been active within the assurance field. They spent 63 hours to complete a mock audit were they followed PCAOB's guidelines to verify that UTC's 10-Q XBRL filing was a complete and accurate reflection of UTC's 10-Q normal version. Plumlee and Plumlee (2008) focus in their commentary on important questions that assurance guidance must address, such as methodology and conceptual issues

but like Alles and Gray (2012), they recognize that if XBRL filing becomes the official filing, then many of the suggested assertions and audit tasks, such as those presented by Srivastava and Kogan (2010), become inadequate. All in all, there is no clear consensus among researchers, what kind of new audit procedures are needed. Lymer and Debreceny (2003) even suggest that in the future it may be that varied levels of assurance are provided on different reports.

Another aspect that has been raised by for example CICA (2005) and a couple of researchers (e.g. Srivastava & Kogan, 2010; Plumlee & Plumlee, 2008) is that with XBRL, data level assurance becomes an issue. Currently auditors give their opinion on whether financial statements give true and fair view as a whole, meaning that there can be one line where misstatement is relatively big but not big enough to distort the whole financial statement. With XBRL it is possible for users of financial statements to extract individual elements from financial statements and assume that each line item is accurate in itself. (Srivastava & Kogan, 2010.) Data level assurance is something that the industry must consider as it becomes one possible service opportunity (CICA, 2005) because users need to know the reliability of each data item they access (Elliot, 2002). It is also still unclear how the concept of materiality will be applied if traditional audits on XBRL documents are conducted. It may be that the planning materiality, meaning the tolerable misstatement, has to be allocated to account balances or classes of transactions. (Plumlee & Plumlee, 2008.)

One of the mandated procedures that auditors must do in every engagement is analytics on financial data (ISA, 2012, 268). This is conducted in order to discover irregularities and whether there is a possibility for material misstatements due to error or fraud (Bay et al. 2006). According to Shin (2003) efficiency and effectiveness are increasing because XBRL-formatted data can be retrieved more easily and analyzed with greater accuracy, which also enhances auditors' work (Filipek, 2007) and provides possibilities for more accurate industry benchmarking (Coderre & McCollum, 2004).

However, some researchers investigate this matter further and as can be seen, XBRL doesn't necessarily provide all of these benefits easily. Bay et al. (2006) state that quantitative analytical procedures can be done in two ways; first, it is possible to apply ratio analysis to the consolidated financial statements and the second method is to apply procedures to detailed financial data to identify individual transactions. The problem with the former method is that it does not reveal many errors or frauds because consolidated financial statements are a highly

summarized result of the accounting process. The latter would be more accurate but it is more resource-intensive when it comes to data acquisition and interpretation of results. (Bay et al. 2006.) Some researchers have suggested that XBRL can alleviate this problem. But as noticed by Bay et al. (2006), analytical work should be done at the transaction level and so having XBRL only at the reporting level does not really solve the problem. Also Cohen (2009) suggests that only XBRL GL can be used to create a seamless audit trail where information can always be traced from the most summarized level to its originating document because within XBRL FR there is no standardized way to trace back these transactions. Gray and Miller (2009) further explain that having access to detailed transactions, auditors are able to analyze larger samples and lower materiality levels which leads to the increased probability of discovering problems or fraud. Performance analysis and industry benchmarking are used by auditors to understand an entity and its environment in making risk assessments (Gunn, 2007) but in general, to use analytical procedures to develop comparisons based on industry data would require reliable XBRL-based databases (Plumlee & Plumlee, 2008).

XBRL may require some changes to companies' internal controls as well, and those will be discussed in more detail later, but at this point it should be mentioned that changes in internal controls affect external auditors as well. External auditors can rely on the work done by internal auditor to some degree, but at the end it is the external auditor who gives the audit opinion and that responsibility cannot be shared. This means that the effectiveness of internal controls must be reviewed by the external auditor as well and changes in internal controls should be evaluated in the context of reporting on internal control over financial reporting. (Alles & Gray, 2012.)

As it is not mandatory to audit XBRL documents, it has not yet been possible to examine, what will happen to audit fees. It is suggested that with easier extraction of data and quicker analysis of data, time and cost savings realized by auditors could lead to lower audit fees or more value-added services to the client (Nel & Steenkamp, 2008). More complex testing and analyses can even be expected from auditors (Bizarro & Garcia, 2011). On the other hand, if auditing XBRL documents becomes mandatory, then auditors would have to do more work as they are responsible for the correctness of the filing. Even if providing assurance is not mandatory, Nel and Steenkamp (2008) note that the risk for auditors may be increased because the client can have an unspoken expectation that verifying XBRL mapping is covered by audit procedures. That risk must be taken into consideration when pricing the audit services.

4.3.3 Technology resistance and new knowledge requirements

Auditors providing assurance on XBRL filings are expected to have deep technical knowledge of the XBRL, the subject matter in engagements, and GAAP to be able to carry out the engagement (XBRL International, 2006; Plumlee & Plumlee, 2008). As the real-time economy is changing the way how financial information is received, processed and analyzed, it drives a demand for auditors who possess the required enhanced skills and technical competencies, new attitudes and behavior to provide enhanced assurance (Vasarhelyi et al. 2010). Srivastava and Kogan (2010) argue that intermediate level of expertise is required when checking if XBRL instance documents are complete, meaning that no item is missing or no extra item is presented, the values are the same as in paper documents and that a proper taxonomy has been used. High level of expertise is required in verifying that the representation in the instance document corresponds to that in the paper version, extensions have been made correctly and for a reason, and that elements' relationships in extended taxonomies are appropriate (Srivastava & Kogan, 2010). There is also a contrary view presented by Pinsker (2003). According to him, standardized information makes auditors' job more efficient due to only needing to understand a limited set of rules within GAAP (Pinsker, 2003).

A good example of increased knowledge requirements relates to the size of taxonomies. The 2012 version of the US GAAP taxonomy has about 15 000 concepts of which 1 300 concepts are new ones compared to the previous year (Ernst & Young, 2012b). As can be judged from the huge amount of concepts, a lot of knowledge of the taxonomy and the interrelationships of data is required (Alles & Debreceny, 2012) from the auditors as well. In addition, taxonomy extensions are complicating the picture. Cohen (2004) notes that as taxonomy customization approaches the level of detail of the original filing, it is the auditor who is responsible for ensuring that the reporting company is communicating all the business facts in instance documents correctly. At least in the U.S. audit companies seem to favor the possibility to do extensions as otherwise items that are relevant for specific companies to report would be lost (Plumlee & Plumlee, 2008).

A possible problem with increased knowledge requirements, however, is that auditors are sometimes seen as laggards when it comes to technology development. Observations within this subject have witnessed a very slow and heterogeneous adoption of technology and low level of technical competence among auditors. Additionally, auditing tools have limited

capabilities as they can extract data but they require manual manipulation and are restricted to limited automation. (Vasarhelyi et al. 2010.) Reasons provided to this by the literature include the obsolete and unchanging regulatory statuses, the investment-inhibiting nature of the partnership structure with strict budgets in audit companies and the risk averse nature of accountants (Curtis & Payne, 2008). Auditors today have only a certain degree of data extraction skills but real knowledge of drawing data from ERP systems and data warehouses is required (Vasarhelyi et al. 2010). Zhang et al. (2012) note that data acquisition difficulties have hindered the application of advanced audit technology. XBRL would ease the data extraction problem but, like other companies, audit companies will also incur an initial cost when they implement a system that can read XBRL data (Baldwin et al. 2006). Costs will increase even more as auditors need to be trained (Venkatesh & Armitage, 2012).

The AICPA Assurance Services Executive Committee (Zhang et al. 2012) have recognized some challenges that the audit practice is facing in trying to answer to the growing demand for better assurance. First of all, existing audits are retrospective, compliance-oriented and thus, have not taken into account the new technological developments. Second, audit standards are regulatory driven and they do not promote the evolution of the audit practice. An example of this is that auditors may prefer manual confirmations of balances instead of real-time confirmatory electronic evidence because the former is consistent with current audit standards. Third challenge relates to audit tools that are mainly developed for internal audit purposes, such as fraud detection, but they are not sufficiently grounded in audit assertions. This leads auditors to operate narrowly within the historical framework and it hinders audit innovations. Finally, the authors note that experienced auditors with plenty of business knowledge are not equipped with IT resources. It is possible that financial auditors are technologically challenged due to lack of ERP knowledge and IT skills. (Zhang et al. 2012.)

Even though expertise is required from assurance providers, literature suggests that auditors are not very aware of XBRL and do not understand it properly. In 2003, XBRL had already been discussed in mainstream articles in the U.S. for four years but still a survey conducted by Pinsker (2003) showed that auditors' and accountants' knowledge of XBRL was extremely low. On a scale of 1-7, where 1 was "low" and 7 was "high", the average sample knowledge was only 1,71. Similar results were obtained in South Africa, where all big 4 audit firms were founding members of XBRL consortium. There only 11 percent of chartered accountants that answered the questionnaire had heard of XBRL and were aware of it. More than half of the respondents had never heard of XBRL before. (Nel & Steenkamp, 2008.) A more recent

survey conducted by Venkatesh and Armitage (2012) showed more encouraging results in the U.S. as they found that about 30 percent of respondents, those being accountants and auditors, possess high level of knowledge about XBRL. But still 51 percent of participants suggest that they have no knowledge about XBRL or are aware of XBRL but know only few details. Overall, these results still show limited knowledge of XBRL among accountants and auditors.

4.3.4 Continuous auditing

Usually audits focus on the financial statements published some time after the financial year has been closed. The idea behind continuous auditing is to monitor the company on a regular basis. In continuous auditing control-related monitors are installed in information technology systems and these monitors will then send signals to auditors whenever the automated system notices a deviation from installed audit limits or parameters. (Moeller, 2010, 329.) Du and Roohani (2007) expect that with wider usage of XBRL it is possible that the data coming from the company's system can be wrapped in XML tags. Then, as XML is independent of language, platform and transport, the auditing system will be able to extract data from a variety of places. Also Cohen (2009) notes that XBRL can remove the barriers to make more frequent and detailed reporting possible.

Continuous auditing has attracted a lot of attention over the past three decades following corporate scandals. To restore the auditor's credibility, continuous auditing methodology has been presented. More reliable, relevant and timely data and more frequent audits are demanded by investors and regulators. (Du & Roohani, 2007; Rezaee et al., 2001; Elliot, 2002.) Additionally, official requirements to report on much tighter schedule come from SOX (Moeller, 2010, 331). All these aspects point to the need for continuous auditing and Vasarhelyi et al. (2010) stress that if stakeholders in the changing economy want to use real-time data, then auditors are obligated to provide assurance for that data. In continuous assurance, the system design and error-prevention procedures have to be evaluated (Elliot, 2002). Bizarro and Garcia (2011) note that XBRL GL will likely speed up the implementation of continuous auditing because it renders transactional data that is machine-understandable.

Rezaee et al. (2001) discuss the implications of continuous auditing for auditing processes. They suggest that auditor's knowledge of the client's business and flow of transactions must increase and auditor has to use control risk-oriented audit plan. This is because most of the audit trails are electronically stored. They further suggest that the major benefit of utilizing continuous auditing is the reduction in the cost of performing an audit engagement because

time and costs can be reduced as manual examination of transactions is not needed under real-time accounting system. (Rezaee et al. 2001.) Also Pathak et al. (2005) show that a so-called counting strategy, where audit is done after a certain amount of transactions, is more cost efficient for audit companies than the current periodic strategy where an audit is triggered after a certain amount of time has elapsed.

4.4 XBRL and companies' internal controls

Every time there is a change in technology, it will lead to modifications in processes (Baldwin et al. 2006) and technological advancements have increased the importance placed on internal controls (Rezaee et al. 2001). Most of the research papers that have discussed XBRL and its effect on internal controls state that the implication will be considerable (Baldwin et al. 2006; Srivastava & Kogan, 2010). However, also these papers seem to ignore the difference between XBRL FR and GL. Alles and Gray (2012) remind that if companies integrate XBRL technology into their business processes, then it might have implications on internal controls but even then the implications would not differ from any other controls related to the preparation of financial statements. Thus, there are contradicting opinions on whether XBRL will have an effect on internal controls or not.

As XBRL is still a rather new technology, Moeller (2010, 346) states that effective XBRL controls have not received enough attention from IT auditors or from senior management. He also states that as mandates to file financial statements using XBRL become effective, IT auditors should have a strong role in the conversion. It is generally recognized that additional controls are needed and these controls should ensure that tagging process is working as planned. (Moeller, 346-350; Plumlee & Plumlee, 2008.) Srivastava and Kogan (2010) mention that as XBRL documents are prepared using a software, it is very important to verify the reliability of that software. The lack of interest from IT auditors and management is supported by Janvrin's and No's (2012) study where their respondents disregarded control issues that might impact their reporting processes.

Just like XBRL can benefit external auditors, it can also improve the efficiency of compliance and substantive testing done by internal auditors (Bizarro & Garcia, 2011). Another important aspect of XBRL is that it can be used for management accounting and internal reports as well. If XBRL is taken deeper into the accounting systems, it is possible to exchange data used for internal purposes more frequently and in more detail. XBRL can also be used to consolidate accounting information from disparate systems for external reporting purposes. Especially the

process of gathering information and consolidating it to create financial statements should be constructed properly and verified. When information is sent to authorities, XBRL has also some built-in controls to verify that the information fills the technical requirements. First of all, XBRL software tools will not create an instance document but inform of errors if the document is not semantically correct. XBRL taxonomies also include linkbases that contain business rules which work as another level of validation. (Gray & Miller, 2009.) Despite some built-it abilities that XBRL has, there is still a risk associated with systemic and pervasive errors in the underlying data if there are inappropriate and unauthorized changes made to that data (Gunn, 2007).

As mentioned earlier, checking internal controls relates closely to external auditors' work as well. Auditors can rely on internal controls to reduce the need to perform detailed transaction testing. The trend now, however, is that auditors are performing only formal risk analyses over the control environment and focus only on high-risk internal controls. (Moeller, 2010, 331.) This means that controls related to XBRL will only be tested if they are considered to be high-risk areas. It is probable, however, that the reliability of the processes used to generate XBRL documents is of high importance because the whole integrity of financial information contained in those documents depends on those processes (Boritz & No, 2004).

4.5 Implications of XBRL for advisory services

Research to date about the possible consulting role of audit companies in XBRL implementation has been limited. As mentioned in the part 2.4 (XBRL-related services provided by audit companies), audit companies are in fact incorporating XBRL-related services into their advisory solutions. Some early-adopters have already contracted big 4 audit firms to help with the implementation issues (Pinsker & Li, 2008). A possibility exists to help not only companies in XBRL implementations but also authorities in developing XBRL-based systems (Doolin & Troshani, 2004).

In addition to advisory services related to XBRL implementation, another aspect of XBRL that can help consultants in their work is the possibility to aggregate and analyze data (Baldwin et al. 2006). Analysis of financial data usually involves three tasks; collecting and loading the data into the analytical software, using the software to aggregate, disaggregate, clean and re-categorize the original data and analyze the data and make decisions based on it. With XBRL it is possible to reduce the time used for the first two steps and focus more on the third step. (Gray & Miller, 2009.) Focusing more on the subject means that it is possible to

offer more value-added services for clients in addition to basic reporting (Troshani & Doolin, 2007). Analysis like that is used in transaction services in audit companies. In merger and acquisition services the target company is analyzed throughout (Sherman 2011, 17-18). Collecting data from multiple companies can also help to identify industry norms and thus ease benchmarking. It is also suggested that XBRL will considerably facilitate custom reporting which would otherwise be time-consuming and resource-intensive. (Troshani & Doolin, 2007.)

One real-life example of XBRL's abilities in analytical work is mentioned by Steenkamp and Nel (2012); Morgan Stanley implemented XBRL to improve the quality of financial analysis. They noticed that XBRL offers more time to do value-added analysis by reducing preparation work and it provides a clearer description of reported data which raises the level of confidence in the information. (Steenkamp & Nel, 2012.)

One possible reason for limited research in this area is that software vendors are expected to be the ones delivering solutions and supporting the implementation of XBRL (Doolin & Troshani, 2004) and it can be that companies are relying on their help more than on external party's assistance. But Bartley et al. (2011) expect that there can be a huge demand in general for third-parties who can assist with the preparation and validation of XBRL documents because companies are likely to encounter problems and make errors.

4.6 Summary of important issues from the literature review

In this part a summary of important issues, which are related to XBRL and audit companies, is presented. By gathering the main points it is easier to perceive what aspects of XBRL might be of importance to audit companies.

The intention of the first research question is to find out, why audit companies want to be involved in developing XBRL. Literature thus far provides only a few possible explanations and they are presented in table 1. All the points are derived from Locke and Lowe (2007) where importance of the subject, interest in XBRL and reputational gains are highlighted. It is also noted in the literature that audit companies have an important role in the diffusion of XBRL. On the other hand, Troshani and Doolin (2007) suggest that there are only a small number of individuals within audit companies who maintain an active involvement with XBRL.

Suggested reasons for involvement in XBRL consortiums
● Sense of importance related to XBRL work
● Feeling that XBRL will make a difference in the reporting in the future
● Interest in solving XBRL issues
● Possibility to gain a reputation as an expert
Audit companies' role in XBRL diffusion
● Acting as role models to generate bandwagon effects (Troshani & Doolin, 2007)
● Sufficient support from specialists to reduce knowledge barriers (Janvrin & No, 2012)
● Trading partner influence and being an early adopter (Doolin & Troshani, 2007)
Other aspects
● Only a small number of individuals within audit companies who maintain an active involvement with XBRL (Troshani & Doolin, 2007)

Table 1 Audit companies' involvement in XBRL consortiums and their role in XBRL diffusion

The second research question was set to answer the question, to whom do audit companies think XBRL is mostly developed for and is the value-added of XBRL positive or negative for information process participants. In table 2, the aspects of XBRL that may add value or be challenges for different stakeholders are presented. System developers may be able to get income by incorporating XBRL into the softwares they provide and by offering support in implementation. For reporting companies the creation of financial statements may become faster but only if XBRL is on the transaction level. But currently companies think that XBRL is only a cost. Intermediator companies refer to auditors and XBRL's implications for them are presented in table 3 in more detail. If XBRL was taken to the transaction level, then auditors would be able to utilize its analytical possibilities. Comparability between companies could be utilized but it requires building databases first. Receivers of financial reports clearly benefit from XBRL as it reduces manual work and enables automated analysis of companies. Analysts and investors also avoid manual work and may spend more time on actually analyzing the companies.

The value added of XBRL for different stakeholders
● System developers: Possibility to incorporate XBRL in softwares and to offer support in implementation, validation and extensions --> possibility for higher revenue (Alles & Gray, 2012; Locke & Lowe, 2007; Janvrin & No, 2012)
● Reporting companies: If XBRL is implemented to the software it can speed up the creation of financial statements (Wu & Vasarhelyi, 2003) If it is used as "bolted-on", it is more an extra cost (Locke & Lowe, 2007)
● Intermediator companies (auditors): See Table 3
● Users (analysts, investors, regulators): XBRL speeds up analytical work and leads to better investment decisions (Richardson et al. 2010; Hodge et al. 2004) Manual re-entries not needed --> cost savings (Troshani & Rao, 2007) Not all investors are willing to use the old technology and they stick with old ways to analyse information (Pinsker & Wheeler, 2009; Hodge et al. 2004) Mistakes in filings limiting XBRL's benefits (Bartley et al. 2011)

Table 2 The value-added of XBRL for different stakeholders

The third research question tries to find out, what are the main effects for audit companies in getting involved with XBRL. In table 3, the possible implications of XBRL for auditing based on previous literature are presented. In addition, the most important aspects from other issues, such as continuous auditing and new knowledge requirements, are presented in the table. Literature suggests that there is a need for assurance and currently, without a mandate, assurance is mainly done with agree-upon procedures. Providing assurance of XBRL documents implies new audit procedures and requires more technical skills and understanding which, however, is currently lacking among auditors. Finally, continuous auditing and more frequent reporting is desired by investors and in the literature it is suggested that XBRL will facilitate continuous auditing.

Providing assurance on XBRL documents currently
● Need for assurance on XBRL documents (Plumlee & Plumlee, 2008; CFA, 2008) ● Agreed Upon Procedures as a tool to verify submissions (Alles & Gray, 2012)
Audit implications of XBRL and expected new audit procedures
● New possible procedures: verifying that a correct taxonomy has been used, extensions are justified, structure is correct, tagging is complete and accurate and tags are used correctly (Plumlee & Plumlee, 2008; AICPA, 2011) ● XBRL facilitates analytical procedures if it is on the transaction level (Bay et al. 2006) ● Industry comparisons and benchmarking requires XBRL databases (Plumlee & Plumlee, 2008) ● Changes in internal controls must be reviewed and verified (Alles & Gray, 2012)
New knowledge requirements and technology resistance
● Technical knowledge about XBRL required (Srivastava & Kogan, 2010) but awareness of XBRL among auditors is low (Venkatesh & Armitage, 2012) ● Low level of technical competence among auditors observed (Vasarhelyi et al. 2010)
Continuous auditing
● Relevant, timely and reliable data and more frequent audits are required by investors (Du & Roohani, 2007; Rezaee et al. 2001)

Table 3 Suggested implications of XBRL for audit function

XBRL's effects on companies' internal controls and the role of advisory service providers in relation to XBRL were considerably less discussed in the literature. Table 4 presents suggested implications of XBRL for internal controls. It is suggested that new controls are needed but on the other hand, some are of the opinion that there will not be a huge change in internal controls.

Implications of XBRL on internal controls
● Additional controls needed to verify that tagging process works and that the software is reliable (Plumlee & Plumlee, 2008; Srivastava & Kogan, 2010) ● Contradiction: some suggest that implications on controls are considerable (Baldwin et al. 2006) but others think there is no huge effect (Alles & Gray, 2012) ● Not enough attention from IT auditors or from managers (Moeller 2010) ● Risks related to the underlying data (Gunn, 2007)

Table 4 Suggested implications of XBRL for internal controls

Finally, table 5 presents the role of advisory services within XBRL. The literature suggests that there are new possibilities for consultants to help companies with the implementation of XBRL and preparation of instance documents. Working with authorities is also a possibility. New analytical possibilities and ease of retrieving information enable value-added services for customers.

Implications of XBRL on advisory services
● Possibility to help companies with XBRL implementation (Pinsker & Li, 2008)
● Possibility to help authorities in creating XBRL-based systems (Doolin & Troshani, 2004)
● Fosters faster analytical work and value-added services (Gray & Miller, 2009)
● Possible demand for third-parties who can assist with preparation and validation of XBRL documents (Bartley et al. 2011)

Table 5 Suggested implications of XBRL for advisory services

5. Methodology

In this chapter the research approach and data collection and analysis methods used in this study are discussed. Justifications for the choices made and alternative methods are also presented.

5.1 Type of the study

The objective of this research is to find out why audit companies are involved in developing XBRL around the world. Another purpose is to explore what are the main outcomes of XBRL for audit companies. Also, the value-added of XBRL for information process participants is discussed from audit companies' perspective. Issues related to these research questions have been discussed in the previous literature to some extent, but the whole perspective of audit companies has not been taken into consideration before. To fill this research gap, a multiple case study using a qualitative approach was undertaken.

A qualitative approach was chosen for this study as it can be used to uncover and understand a phenomenon about which only little is known (Strauss & Corbin, 1990, 17). In addition, qualitative data is rich, full and real. When the problem is unstructured in nature, like in this research, qualitative methods are more suitable whereas quantitative methods would be more appropriate in the second stage, when the problem is known and researcher wants to test different hypotheses. (Ghauri & Grønhaug, 2002, 88.)

A specific form of qualitative research, a case study method, is used in this thesis. This is a preferred approach when "how" and "why" questions are presented and the focus is on a current phenomenon in a real-life context. This approach is particularly well-suited to new research areas or to research areas for which existing theory seems inadequate. (Ghauri & Grønhaug, 2002, 172.) Case studies can involve either single or multiple cases and numerous levels of analysis and it is typical for them to combine data collection methods such as interviews and observations. Another character of case studies is that they can be used to accomplish several aims; to provide description, test a theory or generate theory. (Eisenhardt, 1989.) Of Eisenhardt's (1989) case study aims this thesis is closest to providing a description of the subject and not to test or generate a theory. In this thesis the role of theory is to provide a background for understanding a phenomenon about which a little is known and to provide a context for the subject. Compared to studies that aim to discover or build a theory in which there is no well-developed theory to guide the studies, this thesis possesses a more definite theoretical starting point and a more focused research objective. However, also in this case the

researcher has to remain open to the discoveries that can supplement the existing theory (Keating, 1995).

The definition "multiple case study" in this thesis refers to the fact that there was more than one audit company that was involved in the study. Multiple case studies are preferred over single case studies whenever the case in question is not a rare or critical one. In addition, multiple case studies are usable when more general explanations are sought. (Ghauri & Grønhaug, 2002, 179.) By doing a multiple case study it was possible to study XBRL's effects on audit companies on a more general level than what would have been possible if there was only one company in question. In addition to single and multiple case studies, case studies can be classified into different types but the distinction between these types is not necessarily clear-cut. There are for example descriptive case studies in which a researcher provides a description of a practice. Then there are illustrative case studies where possibly innovative practices are illustrated and experimental studies that can be used for example to examine difficulties or benefits of new accounting procedures. This thesis utilizes mostly a so-called exploratory case study method which is used to provide reasons for some accounting practice and to generate ideas for empirical testing at a later stage. (Scapens, 1990.)

5.2 Data collection

The natural way to do qualitative research is through interviews which are considered to be the best data collection methods. There are three types of interviews; structured, unstructured and semi-structured interviews. Structured interviews have standard format and fixed response categories are emphasized. In unstructured interviews, however, the respondent is free to discuss reactions, opinions and behaviors on a particular issue and the questions and answers are often unstructured. Semi-structured interviews are a mix of these two alternatives. The advantage in not having structured interviews is that researcher can ask subsequent questions and enrich the data. These kinds of interviews are considered advantageous in the context of discovery. (Ghauri & Grønhaug, 2002, 101.)

Data for this study was gathered trough semi-structured interviews (see appendix 1 for interview questions). As the nature of those interviews requires, there were pre-determined topics that were discussed during the interviews. First the interviewees were allowed to discuss matters that they considered important within a broader topic after which the discussion moved to more specific topics. When discussing different topics, interviewer asked

more focused questions that related to issues that had been mentioned in the literature. The purpose of this was to find out, what the representatives of audit companies thought about these issues and whether they are of importance for audit companies or not. By asking additional questions it was also possible to better understand the issue before going back to the initial interview structure. Findings from the first four interviews were used to form a basis for the second round of interviews that consisted of different people. The purpose of these second-round interviews was to validate findings from the first round. In the second round, however, also general questions related to the research questions were asked to see if there were any new insights into the topic.

Interviews lasted from 30 minutes up to 1 hour and 45 minutes resulting in total of 6 hours of discussions. Six interviews were done face-to-face and two were done by phone. All the interviews were recorded and transcribed, except for one validation interview. The transcripts from the first round of interviews were coded using Atlas.ti software that allows the researcher to form groups of matters that arose during interviews.

As the focus of this study is on audit companies and their perceptions of the subject, experts in XBRL working in audit companies were approached. A suitable opportunity for interviews was in connection with XBRL Nordic Seminar arranged in Helsinki in summer 2012. In total four interviews were conducted around the seminar. Then, a second set of interviews, in total four, were conducted during fall 2012.

Anonymity was promised for the interviewees so that it would not be possible to recognize respondents or the organizations they represented (see appendix 2 for backgrounds of interviewees). All the interviewees, except for one, came from Big 4 companies representing Finland, Sweden, Holland and the U.K. To get a full picture of XBRL's effects on audit companies, it was important that respondents had different backgrounds and that they hold different positions. First interviewee had previously done auditing and he had passed the chartered accountant's examination but he had later moved to internal auditing and risk services. The second interviewee had purely a technical background and he works within consulting. The third interviewee currently holds a position as a director in tax management and consulting but he also has experience in assurance. Fourth interviewee is also an authorized public accountant and works mainly with internal control issues and financial processes. As can be seen, many interviewees have experience in different functions which means that they have a wide perspective on the subject. In addition, three of them are already

XBRL professionals and they have participated in taxonomy developments in their countries. The second-round interviewees also possessed diverse expertise. One of them mainly deals with computer and network security issues and he has passed the CISA examination. Another has also passed the CISA examination and he is an authorized public accountant who works within information technology and services. Third interviewee works within tax services. The interviewees' positions in their company vary from manager to partner. In addition to audit company representatives, one person with academic background and knowledge in information systems was interviewed.

Similar to other accounting studies that have chosen to use an interview approach (e.g. Janvrin & No, 2012), additional data, such as internal materials from audit companies and presentations in the XBRL Nordic Seminar (see appendix 3 for topics of seminar presentations), was used to supplement the analysis and to make sure that the subject matter is understood properly. In addition, by utilizing internal materials from audit companies it was possible to observe after the initial analysis of data if there were any new aspects that are of importance for audit companies that should be taken into account.

5.3 Data analysis

One way to analyze data in qualitative research is to code it. In coding data can be broken down, conceptualized, put together and presented in a new and understandable manner. In business studies there are two opinions of whether data has to be quantified or not. Some suggest that all data can be classified and measured whereas some are of the opinion that qualitative data can be used in analysis irrespective of whether or not it has been quantified. The main point is, however, that the data can provide new integrative insights due to an understanding of a phenomenon. (Ghauri & Grønhaug, 2002, 180.)

In this research, the interviews from the first round were coded using Atlas.ti software. An open coding approach, in which concepts are identified and developed in terms of their properties and dimensions using analytic process, was utilized. The idea is to ask questions about the data and to make comparisons for similarities and differences between events or other instances of phenomena. After analyzing the data, one is able to label phenomena, discover categories and put concepts that relate to each other under the same category. (Strauss & Corbin, 1990, 61-74.) In this thesis, the researcher first read the transcripts many times to understand the phenomenon and then started to code the interviews so that issues (sentences or groups of sentences) that were close to each other were grouped under the same

label. By coding interviews it was possible to combine issues that were scattered around the answers and to form a coherent picture of the topic. In this thesis, for example, the four background factors that were not specifically asked in the interviews, because they were not mentioned in the previous literature, emerged with the help of coding procedures.

Approach that utilizes coding and reminds of the first steps in grounded theory studies was selected because in general, in grounded theory the researcher does not begin with a theory, then prove it. Instead, an area of study is selected and then what is relevant for that area is allowed to emerge. (Strauss & Corbin, 1990, 23.) As already mentioned, the perspective of audit companies has not been taken into consideration before and so this kind of approach where interviewees are first allowed to freely discuss things they consider important related to some loosely predetermined topics, was considered to be appropriate. This also helped to ensure that new issues that have not been considered in the previous literature were identified from the answers.

After analyzing the answers from the first interviews and forming an overall picture of the subject, the second round of interviews focused on confirming the observations from the first interviews. This was done to increase the reliability of researcher's findings. As already mentioned, also in the second round specific questions related to the research questions were asked to see if there were any new aspects that should be taken into account.

5.4 Reliability and validity

Reliability of the study means that if some other researcher does the same study again, he or she will end up with the same results (Hirsjärvi et al. 2009, 231). In qualitative research the reliability can be improved by providing an accurate description of the methods used and by documenting carefully all the materials and references (Hirsjärvi et al. 2009, 232; Yin, 2009, 45). In this study the reliability is taken into account by reporting the methods and describing how the study was conducted. In addition, background of the interviewees and positions held by them are presented even though the names are not published due to the anonymity promises.

Validity of the study means that the research method is selected so that it is able to measure what is meant to be measured, i.e. that the method is valid for a particular study (Hirsjärvi et al. 2009, 231). Validity, especially in case studies, can be improved by using triangulation approach. Accuracy of the judgments and results can be enhanced by collecting data through

different methods or collecting different kinds of data on the topic. (Ghauri & Grønhaug 2002, 181.) In this study the validity is increased by providing justifications why a qualitative case study approach is appropriate and by utilizing different materials that include previous research from multiple sources, interviews with people who are professionals within the subject matter, internal materials and presentations by audit companies and presentations about the topic held in the XBRL Nordic seminar. Internal materials and presentations by audit companies as well as the presentations held in Nordic seminar are used to understand the subject throughout and to observe if there were any aspects that audit companies consider important and that the researcher should take into account. In addition, a second round of interviews was conducted to validate the findings from the first round.

5.5 Limitations of the study

Like other studies, this study is not without limitations. First, as with all qualitative studies, there is a limited generalizability of results obtained. Second, the amount of interviews conducted can be considered to be low. Nonetheless, low number of observations can be justified in qualitative research as several aspects of the problem can be analyzed and the intention is to do in-depth studies. Providing thick descriptions would not be possible using numerous observations. (Ghauri & Grønhaug, 2002, 88.) Also, with focus on audit companies that are active in XBRL consortiums, there is a limited number of organizations from which to draw conclusions. In this research, all Big 4 audit companies were represented. In addition, the participants interviewed are considered to be experts in this subject as they hold important XBRL-related positions in their companies and have experience from different functions. Given this, the data obtained from this well-informed, yet small, sample is rich in information.

6. Results of the study

In this chapter, findings from the interviews are presented. The chapter starts with introducing the reasons why audit companies want to be involved in developing XBRL. After that, the chapter moves on to present the opinions of audit companies' representatives about the value-added of XBRL to reporting companies, system developers and regulators. Finally, the third research question is discussed. Related to that, first the background factors that need to be considered are presented and then XBRL's effects on audit companies' functions are discussed.

6.1 Audit companies' involvement in the development of XBRL

As mentioned earlier in the theory part, the interesting question of why audit companies want to be involved in developing XBRL has received little attention in the literature thus far. The answers to this question varied from audit companies' natural role as assurance providers and consultant service providers to innovation aspect and organizational risk reducing. One respondent said that it is important to know how to verify information contained in XBRL documents and knowing XBRL is also a prerequisite to providing consultancy services.

"If I look at this matter from auditor's perspective, I would say that the information has to be verified in the future as well and if it is in XBRL format, then we have to have people who know how to verify that information. Because of that we have to have some role." Interviewee B

This same interviewee, as well as another one, also considered the reputation as important. Locke's and Lowe's (2007) interviewees also mentioned the possibility of gaining a reputation as an expert as one reason to participate in consortiums.

"We are partly involved because of the reputation. This whole thing is going to receive attention so of course we want to be involved and definitely not outside. In addition we have a history with this (XBRL). Last time when this was tried in Finland, we were committed to this." Interviewee E

"We can use this (developer status) as a reference in upcoming projects. It will be a lower threshold for companies to get services from us when they know that we have been involved in defining and editing taxonomies and that we know what this is about. But what these services then exactly are, that is not specified yet." Interviewee B

Even though there are consulting and assurance service opportunities, this respondent continued his answer and admitted that his organization was not initially very eager about being involved in the development work group because it is time-consuming and short-time benefits are not clear. In addition, he mentioned that there needs to be somebody in the house that is interested in the technology or otherwise audit companies would not be involved. His opinion was also shared by another interviewee who also added that sometimes it feels that people are reluctant to come to internal XBRL meetings. These statements are clearly in line with those presented by Troshani and Doolin (2007) who note that there are usually only a couple individuals within audit companies who maintain an active involvement with the technology.

"We thought a lot whether we would participate in this development project or not. It demands a monetary investment but most importantly, it demands a lot of time from us. It was a difficult decision because to be involved doesn't necessarily bring anything extra for us at least in the short term. In addition, I think that for audit companies to be involved, it requires that someone in the house is interested in the topic. Otherwise I don't think that the companies would have participated in this." Interviewee B

Also in the theory (Cordery et al. 2011) it is stated that for users to be interested in a particular technology, they need to see and perceive the benefits of it. As, according to this respondent, his organization does not see clear benefits yet, they are not starting a special team for XBRL like some other member firms have done:

"We are preparing ourselves slowly for this and I certainly believe that XBRL is coming; it has only been slow, unfortunately. Now we have trainings which include people from different functions and I'm sure this team will keep in touch also later but I don't think we are starting a special XBRL team like in some other countries until we can actually provide services related to XBRL." Interviewee B

Another interviewee highlighted the importance for audit companies to be involved with innovations. This was quite surprising as according to Vasarhelyi et al. (2010) and Zhang et al. (2012) auditors are known to be somewhat technology resistant people and not very innovative. On the other hand, also Locke and Love (2007) had interviewees who thought that because XBRL will make a difference to the reporting in the future, it is important to be involved in its development.

"I think that as XBRL is part of financial reporting, it's a subject that we are quite involved in. It's a natural port for us in the audit business and assurance industry to be involved in the development. I also think that it is important for us to be involved in innovation and this is obviously innovation in relation to how you distribute financial information, so it's a natural way for the audit profession to be involved." Interviewee D

Other interviewees also talked about the natural fit of XBRL for the audit profession. One of them took the reporting companies' point of view in explaining why XBRL is matched with audit:

"As XBRL occurs after the financial reporting process has more or less come to an end and when audits take place and then it's a question of converting the financial statements into this normally additional format. Hence it is seen for the large firms for the financial and practical reasons as being matched with audit." Interviewee A

One of the interviewees raised the question to a more general level referring to organization's function in the society. He pointed out that XBRL provides possibilities to help auditors to access data in an easier way and that it is possible to reduce risk related to audits. This point is also important from the perspective of audit firms' reputation capital. It is shown in the literature that big audit firms have more to lose if they issue a misleading audit report or deliver lower-than-promised audit quality because they can suffer big losses through lower fees or fewer customers (DeAngelo, 1981; Lennox, 1999). In other words, big audit firms have more valuable reputation to protect and thus it is understandable that they are interested in reducing risk related to audits.

"In a way, in any commercial organization it will always, in some way, come down to make money, save money or reduce risk. If we can for example reduce the risk and that could be done by if you would have the data available in easy to be analyzed format, like XBRL, or looking into the future, XBRL global ledger, you would have all the data you can get instead of having to go through a strange SAP system that you don't know." Interviewee C

This respondent also said that they have set up a special team for XBRL that help other functions in their organization to offer services.

"The general idea is that the XBRL team will help all the functions to, well, create new propositions based on XBRL and in essence make money one way or the other. It could either

be by having new proposals or by improving existing ones or making them cheaper or better. Basically we do both." Interviewee C

It was also discussed in the literature that audit companies' involvement and acting as a role model is important for XBRL's diffusion (Troshani & Doolin, 2007). Considering that audit companies are strongly involved in XBRL consortiums, it was surprising to find out that under voluntary programs at least one of the companies does not encourage their clients to file with XBRL. In another country, there is no proactivity within the audit practice.

"In the U.K. you can voluntarily file annual accounts to the companies house but our advice to the clients is that if they (regulators) are not demanding it, don't follow it." Interviewee A

"In my country the mandate will start next year. But under voluntary period, the statements are not audited; it's just too much work. Nobody would do it." Interviewee C

In summary, there are multiple reasons why audit companies keep spending time and money in participating in XBRL consortiums and developing service offerings in-house as well. The importance to cover assurance part and consultancy possibilities were already suggested by the extensive literature about assuring XBRL documents and as respondents stated, there is a natural fit to audit because at the moment XBRL is only at the end of the reporting process and that is where audit comes into play. In addition to these, new and interesting views were the innovation part and the risk reducing aspects. When it comes to audit companies' role in diffusion it seems that they are not acting as desired role models to enhance the introduction of XBRL.

6.2 Value-added of XBRL for information process participants

The purpose of the second research question is to find out, to whom do representatives of audit companies think XBRL is mainly developed for and is the value-added of XBRL positive or negative for different participants of information supply chain. Figure 5 presents the relevant information process participants for the classification of empirical results. Interviewees' opinions about value-added of XBRL for companies, system developers and regulators are discussed in this chapter whereas XBRL's implications for auditors and information users are discussed in the following chapters (starting from chapter 6.4).

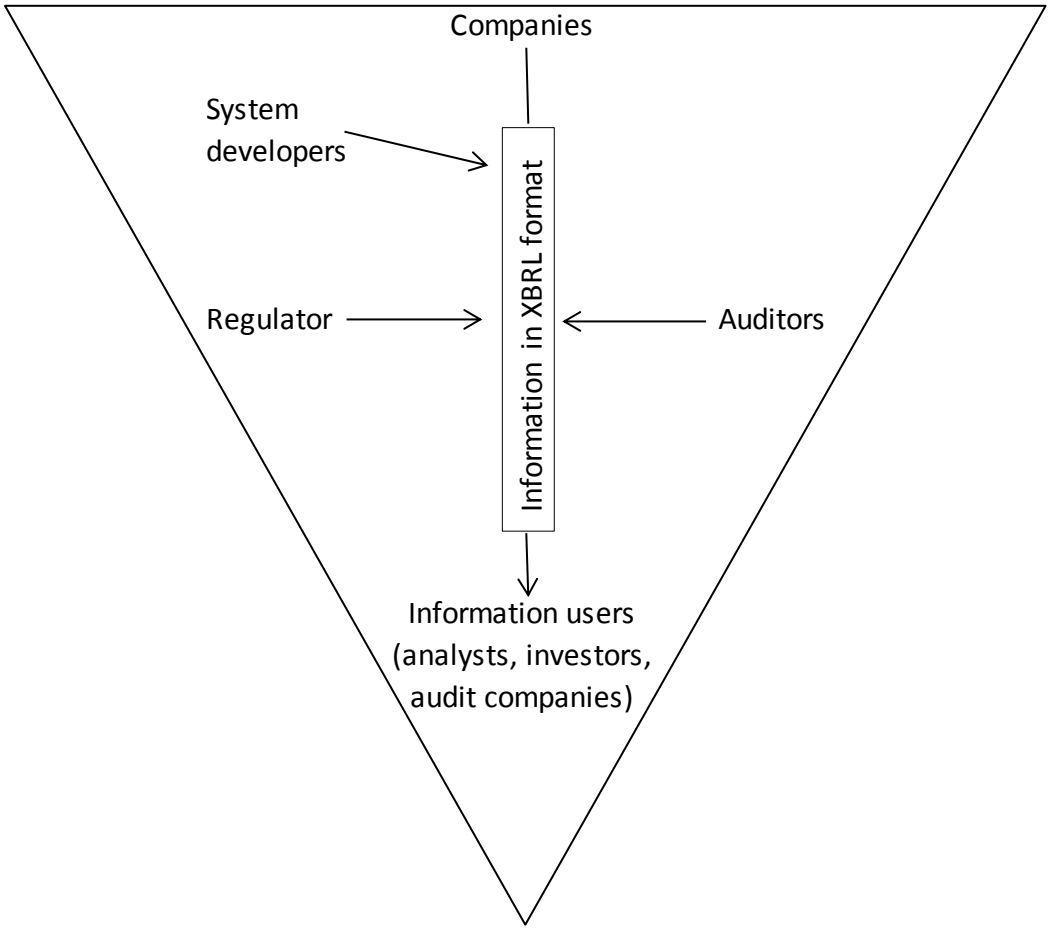

Figure 5: Information process participants for classification of empirical results

In previous literature about XBRL's benefits for reporting companies there are some conflicting opinions. For example, Wu and Vasarhelyi (2003) state that XBRL can provide benefits for reporting companies because it can ease the preparation of financial statements. Other researchers (e.g. Locke & Lowe, 2007) state that these benefits are available only if the technology is taken deeper into the accounting systems. On the other hand, many researchers (e.g. Fisher, 2008; Cohen, 2009) are of the opinion that XBRL is more an extra cost for companies without clear benefits. The general perception among interviewees was that at this point companies see XBRL as an extra requirement and thus there is no real value-added for them:

"If we consider small and medium sized companies, they will surely do it (the filing in XBRL format) in the old fashioned way. They can have an accounting firm to convert their financial statements into XBRL form or then they might have some own software to do it. But maybe for

small and medium-sized companies this is more an additional cost than a benefit." Interviewee B

According to one respondent, filers tend to assume that they do not really have to know XBRL and that everything is being taken care of. This means that some companies may experience surprising difficulties and they have to be prepared for XBRL. This interesting point was something that has not been discussed in the literature so far.

"Filers tend to assume that XBRL is automated and then they run out of time. You have a financial reporting process that's already defined each year and suddenly you are adding extra on, which is the XBRL burden. They have got to find the time. People are getting more aware of the technology but it's kind of selective, they tend to assume that it's been taken care of and then they find out that they have to learn about it. That leads to the issue that you have to build a set of resources to handle XBRL. They need a domain expert, a technical person and someone to manage the whole project from the top. In general, there is a huge shortage of XBRL knowledge among all people around the world." Interviewee A

The timing problems raised by this interviewee indicate that again one of the XBRL's benefits, faster reporting, is jeopardized which may impact auditors' work. If companies are not prepared properly to file XBRL instance documents, it may lead to even longer reporting times so that auditors will receive the financial statements later than before. On the other hand, this may encourage companies to look for assistance from audit companies.

System developers are those that incorporate XBRL into their accounting systems. In the literature it is suggested that system developers could also be the ones who help companies with the introduction of XBRL or with validation and extension issues (Locke & Lowe, 2007; Janvrin & No, 2012) and thus may be able to acquire extra income. One interviewee also recognized this possibility:

"Software houses are going to add extra XBRL capabilities into their programs that can convert numbers into XBRL format and this of course brings them more money." Interviewee F

One interesting aspect that has not received much attention in the literature so far concerning system developers and XBRL is that as a technology it is not easy to implement. Thus it is logical that system developers are asking for compensation for their XBRL-related work.

"Organizations you think would have coped with this, like Microsoft, Oracle and SAP, have been struggling with this. That's related to the fact that XBRL is an immature standard and really difficult and technical standard to be implemented. That's why we have seen decisions by those organizations not to do XBRL enabled products or to bring in an outside piece of software to enable their own product. Another problem is that software vendors are running out of time to implement taxonomies that haven't actually been finished building yet." Interviewee A

For system developers there is a possibility to earn extra income which makes the value-added of XBRL positive for them. But this is only the case if they manage to cope with the difficulties of implementing XBRL into their softwares, which they eventually have to do if they wish to continue as system providers in the future as Locke and Lowe (2007) remind.

Regulators play an important role in the supply chain as well because they are the ones who set rules for reporting and are able to make XBRL mandatory. Previous literature is quite unanimous about the benefits for regulators as XBRL saves them the manual work of number re-entries and allows faster and better analysis of information (Buys, 2008; Gray & Miller, 2009; Jones & Willis, 2003). Also interviewees brought up the fact that XBRL mostly utilizes parties that receive financial information and so the value-added is considered to be positive:

"At the moment as XBRL is not deep in the accounting systems and it is used as a bolted-on solution, I don't see many huge implications for any stakeholder. If this ever succeeds in Finland, the greatest beneficiaries are those organizations that are obligated to collect huge amounts of information every year." Interviewee F

6.3 Background factors

To get an answer to the third research question, what are the main outcomes of XBRL for audit companies, interviewees were asked different questions about XBRL's effects on audit companies' functions. It turned out that there is no straightforward answer to that question. As a result of utilizing Atlas.ti software and coding procedures, it was noticed that the impact of XBRL on different functions depends heavily on different background factors. Not all of these factors were clearly visible in the original transcripts; rather, indications were mainly spread around the answer.

These identified background factors include the history and structure of the audit firm, for what purpose is XBRL used in a given country, whether the use of XBRL for financial

reporting is mandatory or not and to what extent XBRL is integrated in accounting systems. In the literature, the structure and history of an audit firm has not been considered before as one possible influencing factor and the purpose of XBRL reporting has only been mentioned indirectly in few papers. On the other hand, the issue related to the mandatory aspect has been covered in some papers (e.g. Cordery et al. 2011; Buys, 2008). Also, those papers that recognize the difference between XBRL GL and XBRL FR (e.g. Locke & Lowe, 2007; Garbellotto, 2009) have noted that the level of XBRL's integration matters. However, all of these issues are relevant if one is to consider how XBRL will affect audit companies.

6.3.1 Mandatory or not

Some papers (e.g. Cordery et al. 2011; Buys, 2008) have discussed what happens if XBRL reporting is not made mandatory in a given country. Voluntary use does not usually lead to an outcome wished by authorities that companies would start to use XBRL as their reporting format. Also during the interviews a couple of respondents highlighted the issue of how important it is to make XBRL mandatory. For example, in Sweden there is already a fully electronic workflow for financial statements and it is possible to send reports using XBRL (Bolagsverket, 2012) but without a mandate, according to one respondent, they only have a couple of companies reporting in XBRL format. It was also noted by one interviewee that without the mandate, the previous attempt to start using XBRL in Finland failed:

"If I remember correctly, we have tried this XBRL thing here in Finland three times now and every time the initiative has collapsed because authorities have not been involved. But this time I think we will make it because now the authorities are participating in the consortium. We also have a working group that is trying to make this mandatory." Interviewee E

Those two respondents who raised this mandate issue also highlighted that there is no point in developing taxonomies in a given country if there is not a mandate:

"We could both develop a taxonomy, it's not an issue. But it's only really useful and makes sense to do so if the agency is involved, it can be chamber of commerce, tax office or the revenue office. Then the agency can say that this is the only one you are allowed to use. Then it makes sense to have a taxonomy, why bother otherwise." Interviewee C

"Today we have seen that XBRL is a regulatory driven standard and the regulators say; filers you need to file this format. When they don't say that and it's voluntarily, they don't normally get anything. In the U.S. the voluntary filing program worked to some extent but it was only

because it was part of the process in a move towards the mandatory program. In addition, the filers were innovative filers, like technology companies, who wanted to be the first. They liked to be seen as bracing the latest filing techniques. So it was successful because it was incentivized by the mandate that was coming. There are others that aren't and they will fall short without the mandate." Interviewee A

Interestingly, there seems to be a paradox between the above statements and audit companies' current practice. For example, there is no mandate to use XBRL in Finland and Sweden but still audit companies in both countries are strongly involved in taxonomy development. Apparently the benefits in form of reputation and knowledge received from participation outweigh the risk that companies do not actually start to use XBRL as their reporting format.

In the literature it is mentioned that companies might need advice with their filings from outside if XBRL became mandatory (Bartley et al. 2011). Related to this, one respondent talked about new consulting opportunities in relation to XBRL mandates but he interestingly related this to companies' problems with their current processes.

"Quite often we start by having some kind of XBRL mandate. Quite often they (companies) also have existing processes and they may have issues with them but they are able to cope with them. But if companies really needed to change their systems anyway because there is some XBRL mandate coming along, then our consulting division can help them to do it much more efficiently. I think there are more opportunities there." Interviewee C

In validation interviews, one respondent stated that the mandatory aspect is of significance but he also offered another reason why companies may not be interested of XBRL:

"I totally agree with the mandatory aspect. I also think that XBRL starts to be sort of outdated technology, or rather, and old-fashioned way to operate as it was already 10 years ago when we first started to talk about this. It might be that it's not so interesting for companies anymore." Interviewee F

Basically it can be stated that whether XBRL is made mandatory or not makes a difference from audit firms' perspective. If the use of XBRL is mandatory, then consulting people can help with building the new systems and auditors need to start thinking about new ways to provide assurance. Otherwise audit firms will not be so eager to provide assurance and they may even suggest their clients not to use XBRL if it is not mandatory, as mentioned in the chapter 6.1.

6.3.2 History and structure of audit firms

The history and structure of Big 4 firms are presented in the theory part in chapter 2.3. When considering what impacts XBRL has on different functions, it is important to understand the structure of a firm and the history behind it. One respondent who has been working for a couple of Big 4 companies first explained the history of audit firms before answering to any other questions. This indicates that the subject might be of significance even though it has not been mentioned in the literature. The main idea behind his story is that the selling of consulting divisions in the early 2000 has affected the current structure of firms and has driven many audit companies to grow a new subconsulting group.

"In Ernst & Young, for example, consulting and audit used to be together but then they split those two disciplines in half and number of other firms did it as well for different reasons. Deloitte didn't do that. So what tends to happen now in Big 4 firms is that consulting rebuilds itself out of the audit practice after it has been sold off. Deloitte's consulting, on the other hand, handles large, million euro implementations, so for them numbers related to XBRL tend to be quite small because it's currently only a small piece of reporting." Interviewee A

In addition, the same interviewee talked about XBRL mandates from tax authorities in the U.K. and what divisions in each company are involved there:

"As the next big XBRL roll-outs are coming from tax authorities in the U.K., for Deloitte it resides inside the tax practice. For PwC it's still inside the audit practice and for Ernst & Young still inside the audit practice but moved into a subgroup that is called advisory services. That's where they fit tax consultants and they deal with that smaller stuff that traditional consulting won't do. For KPMG it's tax." Interviewee A

It is apparent that the history shaped by restructurings has led to different structures among companies which obviously must be considered when thinking about XBRL's impacts on different functions. Besides the mandate and structure issues, two more influential factors were recognized from the interviews, namely the level of XBRL's integration and the purpose of reporting, which are presented next.

6.3.3 Level of integration

In the theory part, it has been mentioned that XBRL can be used in different ways (Garbellotto, 2009). The respondents also said that there is a big difference whether XBRL is used as "bolted-on" solution or if it will be integrated deeper into the accounting systems. A

couple of the interviewees expect that there will be some sort of intermediate form between these two extremes. Interviewees do not seem to believe that companies would integrate XBRL to their accounting systems, at least in the short term, something that is required for companies to utilize the benefits enabled by XBRL.

"What we assume at the moment while I'm talking is that the system of mapping will come at the end of the process. The issue will be that if tagging occurs before audit takes place, it can replace the traditional filing with the actual true and fair view in financial reporting terms." Interviewee A

"Some kind of intermediate form of these two alternatives (bolted-on vs. integrated) would be to integrate XBRL taxonomy in the consolidation programs so that after consolidation it would convert the data automatically into XBRL form. In this case XBRL wouldn't come from chart of accounts through every transaction but it would still be mechanically converted from ready-made financial statements with the help of computers. I think that is what's going to happen." Interviewee B

From the following statement it can clearly be seen that as XBRL matures and practices related to creation of instance documents change, it will have implications for auditors' work.

"Currently XBRL is mainly at the reporting level. So when the annual report is made, then XBRL comes into play. I don't know any company that would have integrated XBRL deeper. Now they make paper-based report and convert it into XBRL. That will basically switch. They will create it in XBRL format and then make a printable version of it and then the whole issue of auditing those documents comes along. What you will get to in the future is that XBRL will not only be at the reporting level, it will also be used to describe transactions themselves. At the moment of creating a transaction you will already attach XBRL metadata to it. But the global ledger will take some time. I don't see that really working in the next five or ten years. But I see a sort of intermediate format coming quicker. You just need an application to help you to create a document and then either print it or save it as XBRL. So not just first make it on paper and then translate but make it into some intermediate format that is aware of the XBRL part. There are already now applications for that. And then the questions for auditor will be, what am I going to do if they say that they only have this one data set? Is he willing to take a look at that one or does he want to look at the printed version only?" Interviewee C

Currently, as XBRL is a bolted-on solution, it does not have so many effects on for example auditors' work. It seems that agreed-upon procedures are enough for different stakeholders. But as the degree of XBRL's integration changes after some time, as indicated by the previous citation, auditors will need to revise their practices. Also, it was already mentioned in the discussion about XBRL's value-added for regulators that in general, as XBRL is still a bolted-on solution, one interviewee doesn't think that XBRL has notable effects on any function. In the validation interviews another respondent clearly stated that this level of integration aspect is crucial when considering what effects XBRL will have:

"How deep you implement XBRL is absolutely a significant factor. If it was in the transaction level, it would have huge implications. I just don't know if we are able to achieve that or where we are heading with this process in general." Interviewee E

6.3.4 Purpose of reporting

The purpose of XBRL reporting was raised as an important aspect by a couple of interviewees. XBRL can also be used for other purposes than solely reporting financial statements. Some countries, like the U.K. use it for companies' tax filings and they are also moving aggressively towards mandatory COREP, FINREP and SOLVENCY II filings. In the Netherlands the Global Reporting Initiative, GRI, taxonomy for environmental reporting has been developed. In addition, the Dutch have developed a taxonomy for grant requests. According to respondents, how XBRL is used in a specific country will also affect audit companies.

"It depends from the country which functions are affected. If a country imposes a mandate, like for example the U.K. to file a tax return, then that's obviously the focus area in that country. Their tax department is of course strongly involved in that project." Interviewee D

In the Netherlands the XBRL reporting system is similar to what has been planned for Finland as well. They use one taxonomy that includes all the reporting requirements for authorities.

"You have the taxonomy that is the collection of reports and those reports share concepts with each other. The Dutch taxonomy covers particular reporting requirements from tax office, chamber of commerce, bureau of statistics or credit risk reports from commercial banks. Others might be added also. We are investigating other possibilities and topics as well. You can also use taxonomies for grant requests. There is no need to restrict XBRL to the financial domain. We also have sustainability reporting in XBRL." Interviewee C

As it is possible to use XBRL for other purposes than financial reporting, it opens up new possibilities for audit companies. In the Netherlands it has been the responsibility of the consultants to help agencies build grant request and GRI taxonomies.

Discussions also revealed some interesting aspects about the current practice which are in contradiction to how XBRL was planned to be used. Thus, some of the praised benefits of XBRL have not materialized. For example, as it was mentioned, in the U.K. it is mandatory to send tax documents using the inline version of XBRL, iXBRL, but to send statutory accounts to companies house using XBRL is voluntary. Interestingly, they are not made public in XBRL form for the users of financial information, which is in contradiction to one of the greatest benefits of XBRL, the faster way to make information public.

"For reasons of not wanting to impose a reporting burden after financial crisis, the companies house did not impose the XBRL. If you do file the XBRL into the companies house, they will convert it in the pdf and make that publicly available. They won't make XBRL publicly available. It's because it's not a mandate and for some other legislative reasons. If they suddenly made XBRL available, that's public and you know that XBRL can be consumed very quickly so there are lots of legal and other questions." Interviewee A

In the U.S., on the other hand, XBRL filings are currently used in parallel with paper filings. Companies are obligated to file their annual accounts both in XBRL format and paper-based documents. This practice does not seem to lower companies' reporting burden or make reporting faster as has been planned.

"The U.S. SEC filings are now becoming more significant and what we haven't seen yet is any consequences of poor or incorrect filing. You don't want SEC coming and asking you questions or investigating anything. That landscape may change. It hasn't yet, but it's anticipated. Whether the XBRL filing replaces the original filing, that could be on the cards. But the SEC one isn't a replacement yet so that's kind of preventing the jump to more formal assurance." Interviewee A

Based on these wide answers, it is possible to recognize different drivers that are important when considering what effects XBRL will have on reporting in general and through that on audit companies. It has to be considered, what the filing is, what it is been used for, who it is been reported to, how complex it is, what the risk profile of it is and whether it is a replacement or an addition. Of course whether XBRL is bolted-on or integrated deeper is also

a very important aspect. The validation interviews supported these findings and the interviewees in the second round couldn't think of any other factors that should be considered. Rather, they stated that all the key questions are considered.

6.4 XBRL's impact on audit companies' functions

After recognizing and understanding background factors presented in the previous part, it is possible to move on the third research question; what are the main outcomes of XBRL for audit companies. In the literature, the assurance part has received most attention followed by internal auditing and controls. Advisory part has only been mentioned in couple of papers.

To answer the above question, this section has been divided into subsections according to what aspects arose from the interviews. In each section, audit, enterprise risk services and advisory, specific topics related to them will be presented. As mentioned in the methodology part, during interviews more specific questions were asked about topics that interviewees considered important. Consequences of arising supervisory reporting are presented in its own section after XBRL's implications for each function is discussed. In addition, one of the interviewees provided also very valuable insights about the change in impact on different functions and this view will be presented in its own section.

Topics discussed in this section relate closely to what has been presented in the literature as well but interviewees' perceptions in this section provide more comprehensive picture about the subject. The main idea is to introduce matters around XBRL that representatives from audit companies consider important or in an opposite situation, provide explanations for that.

Before going into detail, general answers to the question, which functions are affected by XBRL, are presented. Answers emphasize the role of audit and advisory functions:

"XBRL will affect probably both audit and risk services in some degree, but at the moment I think it will affect more auditing. In internal auditing we perform so many other things such as process audits and governance audits where we don't handle directly financial information. Also consulting services are affected, specifically services related to system introductions where we are strong already." Interviewee B

"I think assurance and mainly external auditors, how are they going to do assurance. The impact will also be in the consulting like parts of our organization." Interviewee C

"If we take the assurance part, it has obviously been the most important for us to cover. Internationally we have done quite a bit of agreed-upon procedure assignments to check and give quality assurance of reports submitted to different regulators. So that's one very important part for us and then also advising our clients." Interviewee D

"I think that our transaction services will greatly benefit from this. They do all kinds of analyses and I can imagine that XBRL will make it more efficient. In general, those people who utilize financial statement information will benefit the most." Interviewee E

Also, the last two answers highlight the general impact of XBRL on auditing, but interestingly they do not see a straight impact on consulting at the moment:

"In my previous job I came across something that always puzzled me. XBRL is primarily a technology, not a reporting format. Why it intrigued me was that XBRL and its implementation I would have associated with consulting, not with audit or assurance. I thought those would come later because you need to put it in place before you audit it. But at the moment as XBRL is bolted-on, the natural fit is audit but it's moving towards tax and supervisory reporting." Interviewee A

"At this point I don't think that XBRL will affect any other functions than audit, at least on a large scale. Of course there can be some small and separate projects but I don't see any substantive or systematic effect on other functions." Interviewee F

6.4.1 Audit

Interviewees had many insights about what implications XBRL will have for audit practice. The praised feature of XBRL, consistent information form, forms the basis for everything. The respondents discussed the easier access to information and new analytical possibilities. Related to that, better comparability of information is discussed. Other topics in this section include interviewees' thoughts about continuous auditing, new audit procedures and auditors' knowledge requirements. Couple of the interviewees also highlighted new challenges for auditors introduced by XBRL and one interviewee had a more doubtful view about XBRL's impact on auditing and his comments are also presented under suitable sections.

Better information form, easier access to information and new analytical possibilities

It became clear from the interviews that respondents appreciate the new analytical opportunities and comparability of information enabled by XBRL. XBRL itself was not seen

as the solution to everything, instead it was considered to be one possible way to achieve the goal which for the auditor is to get access to more information.

Partly related to the audit practice, one respondent shared his vision about building a data engine for their employees. This engine would include all sorts of data and it can do analytical things and queries with the data. It would serve as a basis for new analytical opportunities for auditors and is an indication of how innovative audit companies can be in relation to XBRL. Data engine is still in the idea phase but the idea behind the whole thing is the possibility to have structured data that enables building of this kind of data engine:

"One of the issues with this data engine is how am I going to feed data into this engine before being able to run queries. In my view, it will basically mean fed XBRL data because it always has two things; it has all the data in standardized format and most importantly, it has all the metadata so you know what you are looking at. It's not that easily created but in my view it's possible. But to be able to get there, you need structured and well documented data. And you can do this of course by using comma separated files or you can use any type of metadata. But as XBRL is readily available as we speak, so why not use that? XBRL is not an answer to everything but it fills all the requirements currently." Interviewee C

Easier access to information for auditors highlighted by the interviewees means that as XBRL is a structured information format, auditors are better able to see and understand the whole information produced by ERP systems. This is important because as one interviewee stated, currently the financial information is coming from so many different places in the company that it is difficult for the auditors to know, where they should be looking for specific information. Data extraction, which requires knowledge and care from auditors (Vasarhelyi et al. 2010) can become easier. The risk related to audits can be reduced when information is easier to find. But again, these benefits are available only when XBRL is integrated to the transaction level. With XBRL in the transaction level the creation of financial statements could be simplified, a stage where a lot of mistakes happen.

"The auditor will always have the question, did I enter the right query to find all the fixed material assets or do I also need to look at another excel sheet. Nobody knows and even the company itself doesn't know. We can reduce the risk by having all the data we can get. In essence XBRL will make data much more available and much easier to understand. Also, having the data already done with XBRL you could have another application making the annual statements at the end of the year which basically means limited need for consolidation

and aggregation. When the auditor wants to go through the books, it's much easier because he can just run a query of some risky transactions without having to go through weird accounts in SAP that he is not familiar with. All the data would already be described when the transaction is made. XBRL can make auditors' work much faster and then the question will come; if you can work much faster or you have to do less work, why do companies pay so much for audit? Can't it be much cheaper?" Interviewee C

The same respondent also highlighted XBRL's capabilities of defining metadata and different concepts used in a company. According to him, clearer definitions help the company itself but considering the issue from auditors' aspect, clearer definitions also simplify their work as auditors can better determine whether the nature of a given account really corresponds to its definition in XBRL document. He recognized a common problem related to definitions faced by companies and explained how XBRL can solve or at least alleviate this problem:

"What XBRL will then do in this area, by having a structured way to describe you data and having them connected to a taxonomy, you will know for sure what your data is about. It will also mean that if you have requests from some department saying that I want revenue for whatever purpose, you can give the revenue with clear definition and that will or will not fit that department's needs. What happens now quite often is that we have all sorts of interfaces between applications. Large banks can have thousands of applications running and they are all interfacing data. The problem is that nobody is sure about the definitions used by different applications. They don't know the exact definition of sales in a document but still they use it every year for whatever reporting. What's even worse is that if we discussed sales and you had a different idea of what sales would be than I do, you would basically start with wrong data because we didn't discuss clearly enough of what sales really mean." Interviewee C

Another respondent looked at this matter from customers' point of view and recognized a possibility to provide better assurance through easier access to information and new analytical possibilities. Analytical methods are used in auditing to detect weird relationships between related accounts. In recent history, these analytical methods have been emphasized by audit standard setters (Bay et al. 2006) and according to respondents XBRL will facilitate the use of new analytical methods. It can make auditing more efficient and thus reduce costs.

"The first thing that comes to my mind when thinking of XBRL is the easier way to analyze information and the easier access to information. Maybe we can get better assurance on the financial statements more effectively and faster than today when we use manual work. In

auditing we are moving towards so called data analytics world. With XBRL we may be able to create additional value for the customer through developing new audit tools for analyzing the data in a new manner. It may be possible to formulate many different analyses from which you can detect mistakes. Also for our small customers, that otherwise see this XBRL more as an additional cost than a benefit, we can provide more effective service because the information would be easier to audit for example through analyzing." Interviewee B

Another interviewee stressed auditors' ability to capture more information from the company that can help in detecting fraud and questionable transactions:

"It could possibly be easier also to detect fraud also. If you for example monitor a company throughout the year and they submit their monthly reports in XBRL format on transactional level, if they tag and work with XBRL on that level, it's possible to see fraud. I think in all cases where the auditor has the ability to capture 100 % of data from the company, it's easier for the auditor. It facilitates analytical possibilities for the auditor and it's easier to check thresholds and see transactions that shouldn't be there. To be able to capture electronic data is always good and it enables analysis that could possibly lead to detecting fraudulent events." Interviewee D

Interestingly, one respondent questioned the analytical possibilities of XBRL:

"Currently there are many good and effective tools for auditing. XBRL provides only one extra tool for doing analytical procedures but it doesn't have any capability why it should be ranked higher than the other tools. You can do all the analytical procedures with Excel as well." Interviewee F

According to most of the interviewees, easier access to information and new analytical opportunities can make auditors' work faster and more efficient. In addition, audit risk can be reduced when information is more easily available. Following this progress, the question if audit fees should be lower, arises. Currently audit fees are in high pressure and often they have lower contribution margins than other functions in audit companies so XBRL can alleviate the pressure and make auditing more profitable. On the other hand, companies may be willing to pay even less for audit services if they notice that XBRL makes acquisition and analysis of information much more efficient. It should be noticed, however, that XBRL should be on the transaction level for these benefits to be fully realized.

Comparability of information

Comparability of information between companies has been raised as one of the big benefits of XBRL. It has been predicted in the literature that also audit companies could start to utilize better comparability of information among companies (Gunn, 2007; Plumlee & Plumlee, 2008). Two of the respondents that spoke about comparability of information also considered that it is possible for their companies to utilize that. Benchmarking becomes easier for auditors as well, as they may have more data available and they can see clearer differences with concepts used by companies:

"If we talk about comparing companies in different business fields then probably we wouldn't utilize XBRL for those. We always take advantage of our experiences from certain fields when we get a new customer. But I think that it's in higher level than just data level. But comparability between companies could perhaps be utilized if you think for example some cost relationships that some industries should have. Maybe you could notice some oddities then." Interviewee B

"XBRL makes financial statements more comparable to each other because there is never ever a discussion of let's say sales. Even if you would add a different label to it, it would still through the concepts and references point to IFRS net revenue, for example. It is possible to create an application that downloads all the information from SEC and puts it into a huge file. The effect is that the market transparency would be greatly increased; no retyping errors, no misinterpretation errors, your sales is my sales. This can be done for all companies reporting to SEC, not just for the largest ones. So the market transparency of what these companies are doing is greatly increased. Stakeholders will have much more data at their hands. So benchmarking will also become much easier for you and also done better because you know the definitions." Interviewee C

This same respondent also talked about the fact that now with XBRL also different stakeholders will better understand what they are actually looking for:

"The weird thing is that people are complaining about the comparability of XBRL data from SEC but in a way they just ignored it in the past. If they would have a statement from Microsoft saying sales 100 and a separate document from HP saying sales 50, they would assume it's comparable. Nobody would question what definition did Microsoft or HP use for sales. Now with XBRL is made clear that let's say HP is using US GAAP but Microsoft is not.

So it seems incomparable and it is but the thing is that in the past it was just as incomparable but only did people not know that." Interviewee C

The benefit of having a standardized way to describe financial information for auditors is that they can benchmark companies better for example with the help of an application containing a lot of information. Differences between concepts used in financial statements will be reduced and made more apparent. In addition, easier access to information and new analytical possibilities indicate that the value-added of XBRL for auditors is positive. However, as already mentioned, this is the case only if XBRL is taken to the transaction level. But for information users, the clearer definitions and improved comparability are clearly beneficial.

Continuous auditing

Continuous auditing is one of the most discussed areas within auditing and XBRL. Many papers (e.g. Du & Roohani, 2007; Elliot, 2002) stress the new possibilities enabled by XBRL to do continuous auditing. Three respondents that discussed this matter were skeptical about wide scale introduction of continuous auditing. First, one interviewee does not see a need for continuous auditing:

"Continuous auditing has been discussed for a long time now. I don't think that we are necessarily moving towards it. I don't know how much demand there actually is for continuous auditing. These certain procedures that we now perform seem to be enough for different parties. I don't think that investors or other stakeholders need the information to be verified more often. In addition, audit fees are in such a pressure that we don't have a driver to do more and more. And it would be doing more if we did continuous auditing." Interviewee B

It is interesting that this interviewee pointed to audit fees as a barrier to do continuous auditing. This is in contradiction to the theory where (Rezaee et al. 2001) suggested that continuous auditing would actually decrease audit costs in which case it would be possible to keep the contribution margin at acceptable level. Also the fact that this interviewee does not see a demand for more timely financial information contradicts the current desires by many oversight bodies and stakeholders around the world to get more accurate and timely information and more frequent audits (Du & Roohani, 2007).

Two other interviewees reminded that to be able to do continuous auditing, the information contained in transactions must already be in XBRL format. Even though that is currently not the case, these respondents saw continuous auditing as being possible but not in near future.

"Continuous auditing is more when you implement audit techniques in certain sections. We don't do that. Now as we talk about XBRL it is more at the last phase of accounting when the production of the actual annual report and financial statements is done and submitted to the regulator. In that sense I can't really see continuous auditing. But for companies reporting quarterly, then it might be suitable for continuous auditing. So far we have not seen that XBRL would have been implemented in the transactional level." Interviewee D

"If you can attach XBRL metadata to transactions, you can do something like continuous auditing. Whenever a transaction is made, it's already being looked at by some audit application. Well, you can't have an auditor looking at every transaction but ideally you would have this enterprise bus structure where all transactions are bundled in some infrastructure. So you would have a sales system putting a transaction to the infrastructure saying; I'm going to sell a couple nuclear warheads to Saddam and then the continuous audit application will see this proposed transaction coming by and say, well maybe not, maybe I should flag this. Whether or not the transaction is actually cancelled by the continuous audit application, it anyway flags it to an auditor saying it's a weird one." Interviewee C

One respondent also pointed out that even if XBRL would be on the transaction level, it would not be feasible to use it for continuous auditing:

"XBRL on the transaction level is not realistic at the moment and even if it would be, currently there are many more effective ways to read data straight from the information systems. It will never be feasible to use XBRL for that purpose because reading data in that format is so much slower and inefficient." Interviewee F

According to these answers, one of the prerequisites for continuous audit to work is to have XBRL metadata attached to transactions so that continuous audit applications would be able to recognize strange transactions proposed by applications. Currently XBRL is not integrated deeper which may well be one of the reasons why continuous auditing has not become more common despite the widespread use of XBRL. Another reason contributing to the slow adoption can be the reluctant attitude by audit companies to do continuous auditing.

Audit procedures

Possible new audit procedures have been discussed in the literature and they have been presented in the theory part. But knowing for sure what is going to happen with audit practices is difficult for a couple or reasons. First of all, it is not mandatory currently to audit XBRL documents. Another issue with actually auditing those documents is that there are not any official standards on how to perform audits of XBRL documents. There are only some guidelines provided by different boards. Before any official standards are developed, there must be a requirement to conduct audits for XBRL documents. The respondents were of the opinion that it will possibly become mandatory to audit XBRL documents at some point.

"After a certain time I think XBRL documents must be audited. It also depends on what the legislator says whether they must be audited or not. I think that pretty fast XBRL document will be the master file, i.e. the only one sent. Then it would be a good idea to audit those documents, I mean that's what auditors are for. If you consider for example investors' perspective, they appreciate assured information. There are also different listings and rankings of companies made by magazines and analysts. For them it would be good to have assured information so that they are not giving wrong information accidentally, the information should absolutely be assured." Interviewee B

"In my country there will be an XBRL mandate in couple of years. Then the XBRL document will be the only one sent and auditors will have to give assurance on that. Because the mandate is coming, the association of auditors is having so much work." Interviewee C

"Since it's a full electronic submission of the annual report, the auditor needs to quality assure and audit what is being submitted. I mean that's why we need an auditor, for assuring the consistency of the instance document." Interviewee D

"The SEC does not yet require XBRL filings to be audited. That landscape will probably change. This whole idea of assuring XBRL is about to come to a head. It hasn't come yet and we all have to watch what's going to happen. I think we will see something much more formal guidance. But absolutely in the future XBRL documents must be audited." Interviewee A

Whether XBRL documents must be audited or not depends again on which way XBRL reporting develops. As became evident from the first statement, if XBRL becomes the only document filed, then it would make sense to require assurance on that.

As there is not yet any official guidance or even a requirement to audit XBRL documents, future audit procedures are not yet clear to auditors. Currently only agreed-upon procedures are conducted to provide some level of assurance that XBRL filings are made correctly. These procedures are presented in the following part but first interviewees' perceptions about the future audit procedures are discussed. Interviewees had similar ideas about what audit procedures could be in the future as is presented also in the literature (AICPA, 2011; Srivastava & Kogan, 2010).

In first two respondents' countries XBRL is not currently used so they could only make predictions of how XBRL documents would be audited:

"I think that in the future auditing XBRL documents could be similar to what we do at the moment for information systems. First we verify that the system itself has been set up in a reliable manner, meaning that there are certain processes for user rights and data protection. This is how we verify that the general control environment is reliable." Interviewee B

"I expect that auditors will have to verify that the correct taxonomy has been used, that's for sure. And then in a way the requirements are the same as for the paper version, whether the numbers are correct and is the correct label or name assigned to a certain object." Interviewee C

In the U.K., on the other hand, audit companies have some methods in place to verify XBRL documents as part of their review and creation of statutory accounts which are sent to the tax authority that companies have outsourced to them.

"There is a set of checks that we perform and that our clients are assuming we have performed. The first one is, have we mapped to the correct taxonomy. And then there is another set of checks related to the mappings after the XBRL itself is validated and found to be technically correct. There is consistency checking; is it the same as last year, is it the same as the other entities in the group or our peers. Then there is completeness checking; have I used all the tags in the taxonomy and have I used them correctly. If I haven't, have I created the correct extension or have I built an extension where I shouldn't build. Finally there is accuracy checking; have I mapped apples to apples or apples to oranges, a check for that and the meanings." Interviewee A

Basically interviewees expect that auditing XBRL documents would include the checking if the right taxonomy has been used, are the numbers presented in the financial statements

retrieved correctly from the ERP system, is the mapping done correctly, are the extensions necessary and do labels correspond to the nature of accounts. In addition, internal controls related to the creation of instance documents must be verified.

Agreed-upon procedures

As mentioned in the previous part, agreed-upon procedures are currently conducted to provide some level of assurance that XBRL filings have been made correctly. However, agreed-upon procedures are not auditing in traditional sense where an opinion is given about the true and fair view of the financial statements. Three interviewees talked about these agreed-upon services provided by audit companies. As presented in the theoretical part, AUPs are only agreements between audit companies and clients where the audit company performs procedures to give assurance on whatever the client wants. AUPs were seen by the interviewees as part of auditors' work even though they are more like advisory services in nature.

"What we see now is that there is a type of assurance, or not assurance technically, on XBRL documents. Companies are seeking some sort of third party clarification, assurance or whatever that is, a review of the XBRL filings because as mandates reach a certain point and soft landings or the limited liability provisions come off, then organization are fully liable for the filing in the XBRL format. They wish to know that those filings are accurate and that mappings are accurate. They use agreed-upon procedures as the way to get some comfort that what they file is correct. That takes it outside the assurance process and is really just an agreement between the filer and Big 4 firms checking specific things." Interviewee A

Another respondent clarified the relationship between traditional audits and agreed-upon procedures. Even though AUPs are not audit, it is still auditors' knowledge what is needed to determine whether taxonomy concepts have been used correctly. Methods used in AUPs are similar to what other interviewees predicted will be used for normal XBRL audits in the future.

"Whenever you talk to somebody from audit about AUPs, don't use the word assurance or audit, they will simply bite your head off. It's not what they do. What they in essence do is they express an opinion of the comparability or the paper version and the XBRL version. It could be Google reporting revenue of 1€ and if it's the same as in the paper version, they say great. It doesn't make any sense to have 1€ of revenue for Google but that's not what AUP is

about. It's about are they the same. It will look at comparability, the use of right taxonomy and did they use the right concepts of the taxonomy. That's where the audit knowledge comes into play. They look at every fact in the taxonomy and decide whether the company used the standard taxonomy concepts right or not." Interviewee C

One respondent also mentioned that agreed-upon procedures are suitable currently as the idea is to check whether the XBRL filing corresponds to the paper filing:

"What the auditor now in most cases does, is he will agree upon the presentation of the instance document. In general, agreed-upon procedure is more applicable when the submission is based on a paper version and the auditor doesn't need to sign off the instance document." Interviewee D

When discussing agreed-upon procedures, the interviewees made a clear difference between them and normal audits. AUPs require audit knowledge but the level of assurance is lower. In the future, if XBRL documents become the only ones filed, it might very well be that agreed-upon procedures are not adequate anymore.

Auditors' knowledge requirements

It has been mentioned in the literature that auditors must acquire new skills to be able to audit information in XBRL format (Srivastava & Kogan, 2010; Plumlee & Plumlee, 2008). Also three of the four respondents clearly stated that auditors must understand what XBRL is about and have more technical knowledge than before.

"There are definitely new demands for auditors' knowhow. Currently we only have few filings in XBRL but nevertheless I think that auditors need to be educated and they must understand what the filing really is and what the material is that is being submitted." Interviewee D

Another respondent stated that because auditors will have to check mappings which are driven by technology, they need to have some level of technical knowledge. On the other hand, once auditors possess the technical knowledge, the rest of the checking requires accounting knowledge:

"Auditors do have to understand XBRL because ultimately they are checking the mappings and the need for them and how they are done. That's driven by technology so they need to understand it. But at the end of the day, it's a closed learning, once they understand that then

they are checking a mapping and that is then pure accounting or financial reporting knowledge." Interviewee A

Third respondent pointed out that without moving forward with XBRL and utilizing new possibilities, the profitability in auditing is jeopardized.

"Auditing is moving forward. We talk about this data analytics world that provides new possibilities for auditors. Those who are not willing to move along will not be able to utilize these possibilities which in the long term will not be profitable in auditing. Overall I would say that auditing must move to more technical direction. If we think for example SAP auditors, they must have auditing knowledge, meaning understanding of the accounting processes and bookkeeping, but at the same time they must understand the SAP system to make queries and understand how the system is processing information. Or I don't think it's technical in its true meaning. I think that with XBRL it's the same. It is considered as IT or some technical thing, but you don't have to actually set up systems or connect wires or anything, it's a sort of a program that you must be able to utilize and use." Interviewee B

The fourth respondent on the other hand stated that even though auditors must understand that XBRL will have an effect on their job, they still would not have to understand all the technical aspects as they are taken care of by other functions.

"Auditors are not geeks, they don't want to look at XBRL data. We are looking into creating an application that would basically make their work very easy. It will take all the IT geek stuff out. So it will help, but you still need to know what XBRL is to a certain extent. We will educate auditors and convince them that they need to know that XBRL has an impact on their job one way or the other but they can leave all the technical stuff to somebody else so that they can focus on the subject." Interviewee C

This view that auditors are not very technical people is present in couple of research papers (e.g. Vasarhelyi et al., 2010). Zhang et al. (2012) claim that audit practices have not moved forward because auditors are slow to adopt new technical skills. If other departments, e.g. consulting and IT people, took care of technical things, it could speed up the adoption of XBRL among auditors. However, interviewees are of the opinion that auditors must acquire basic knowledge of XBRL.

Challenges for auditors

As has been discussed in some papers (e.g. Alles & Debreceny, 2012), XBRL introduces new challenges for auditors in addition to the requirement for new technical skills. Two respondents raised visualization of the instance document and extensibility of taxonomies as unresolved problems or difficulties for auditors.

Visualization

The issue of visualization relates closely to the new knowledge requirements for auditors. They need to understand what XBRL is and they also need to understand what taxonomies and instance documents include. Instance documents are sent to authorities but they contain only xml language that the auditor should understand. But the data in the instance document is not easily readable and structured like it is in traditional financial statements, for example in pdf-format. The issue will be whether auditors are willing to check the data in the instance document or do they want to look at the traditional format, the rendered document. What currently happens in audit function is that auditors give opinion on piece of paper, something that is printed out. With XBRL, if they want to see the traditional format, the system rendering the document must be reliable. This aspect was raised by two interviewees but it has not been discussed in the literature so far.

"In a way assurance is connected to visualization. Before people can do something like assurance they need to be able to read the xml-codes. Some say that XBRL data is not readable. It's quite readable but for the auditor it's not so readable. Normal auditor will not be willing to have a look at data in xml format and then the issue comes, how are we going to present this data to an auditor. It means that there must be some application reading the data and presenting it to him. And then the auditor will say that how can I be sure that this application is showing me all the data and isn't making any additions, subtractions or whatever. So that's one of the challenges for auditors, how am I going to give an opinion on a document that I need some application to read? In the XBRL introduction you need an application to make data readable and that's where the issue will lie, how can we trust this application?" Interviewee C

Despite this challenge, some countries have resolved this issue but as one interviewee mentions, the problem is that solutions tend to be country-specific, meaning there is no standard solution. These solutions also tend to bring new challenges.

"There is another level of issues coming in the visualization. XBRL has coped with the visualization needs. For the U.S. what they did was recreate the report of the taxonomy structure. For the U.K. what they did was capture using inline XBRL the view of the original report." Interviewee A

"The Dutch auditors are currently looking into this and I think they are by far the furthest in the world in this area. What they are looking at is trying to create an application of their own that they will verify. It would be made for let's say one of the reports in the Dutch taxonomy and it will give some viewable form on which the auditors can give their opinion. Another thing they are working on is what they call table linkbase. It's a tool to present the data and it would be put in the taxonomy. But for example in the Dutch taxonomy of reports you have set of concepts that is larger than the one they actually use for a particular report. Say there are 100 reportable concepts but for annual statements for small companies they only use 50. So the other 50 concepts are not part of the presentation linkbase and they are not shown even though they would include facts. Then the question will always be for the auditor that now that I'm signing off the complete and full document, how can I be sure that one of those other facts that are not intended to be used are not in the file. The fact that the report has these 100 concepts means that the instance file can have those 100 in it and still be valid even though of those 100, 50 are intended to be used. So what they have done in the Netherlands is that they have added basically additional piece of software that checks that all the facts you are reporting are in the presentation linkbase. The problem is that it's a Dutch invention so it's not XBRL standard. It would work in Finland also but it's still something added to the standard." Interviewee C

For auditors it is always important to understand where the figures come from. Checking numbers straight from the instance document would be the most reliable manner to verify that only the intended facts are included. However, it would not be a suitable way to do checking as it is time-consuming to try to find the numbers that are somewhere among the xml-language. As the interviewees stated, there must be an application in the middle that makes instance documents readable but the reliability of that application must also be verified. Even though XBRL as a technology has many benefits and it can solve many problems, this visualization issue is a good example of the fact that it brings new challenges for different stakeholders. Like visualization, they have not all been covered in literature about XBRL.

Mappings and extensions

It was already mentioned that checking the mappings and extensions and whether they are appropriate will be part of auditors' work. The risk of errors increases when filers think they need an extension to the taxonomy when, in fact, they would not need one and they spend additional time creating that taxonomy (IIA, 2007). One interviewee discussed the controversial nature of extensions. Even though he considered the issue from preparers' point of view, the auditor must also need to understand the difficulties faced by preparers in order to see where possible mistakes can lie.

"Extensibility and the requirement to do it are controversial. It is difficult because you are not just creating and pushing out an instance document, you are actually also having to learn and understand how taxonomy has been built and you need tools to indicate that and other resources. The other interesting part is that the filings are going in and being controlled by a regulator but the extensions do not have any comparability to other extensions, comparability is immediately lost. The result tends to be that those data points aren't used so you are doing this whole process of extending, which is complex, basically for no reason." Interviewee A

This same interviewee also pointed out that the difficulty in mapping drives the extensibility issue. As many filings have contained mapping errors (Bartley et al., 2011; Boritz & No, 2009), it is important that auditors understand the taxonomy and difference between concepts that resemble each other. It all comes down to the issue mentioned in the literature as well (e.g. Burnett et al. 2006), the subjective interpretation of concepts.

"I think one very difficult thing is coping with the concept of mapping. Am I mapping apples to apples, have I done the right decision? And that flows into coping with how you extend and what you extend. So these two are kind of related, the mapping drives the extensibility issue. If you have a look at filings, there are many mistakes in mapping and general accuracy. In the U.S. it's a complex taxonomy with 13 000 concepts and when you try to find a concept it's easy to miss it or get the wrong shade of meaning. It has repeated itself in the U.K. even though the taxonomy is simple and smaller. People still get the mapping wrong. The reason behind is that it's all about dealing with accounting concepts and they can be interpreted and people will interpret the mappings, as well as the guidance that is issued, differently." Interviewee A

The challenge in mappings and extensions for the auditor is that he needs to understand whether extensions are actually required or not. This means that the auditor needs to know the taxonomy quite well to be able to know whether a possible extension was actually needed and to know whether mappings are done correctly. As mentioned by one interviewee, some taxonomy can include up to 13 000 concepts so becoming acquainted with the content requires some time from the auditor.

6.4.2 Enterprise risk services

In addition to auditing, previous research papers have discussed XBRL's effects on companies' internal controls (e.g. Plumlee & Plumlee, 2008; Alles & Gray, 2012) as presented in theoretical part. Interviewees had considerably less thoughts on how XBRL would impact audit companies' procedures related to risk services that they offer than on audit practice. Interviewees discussed two subgroups related to risk services; internal controls related to XBRL filings and risks related to financial institutions' COREP, FINREP and SOLVENCY II reporting. The latter is presented in its own section 6.4.4 Implications of supervisory reporting at the end of this chapter because the subject relates to consulting as well.

Internal controls

Audit companies provide internal audit and risk services but are prohibited to providing those services to the clients they also audit. Some bigger listed companies also have their own internal audit departments so risk services provided by audit companies are not needed by so many companies.

In the literature about XBRL and internal controls, articles (e.g. Plumlee & Plumlee, 2008) have highlighted the importance of new controls. In some articles it has also been stated that internal auditors, mostly those of the company itself, should be strongly involved in the introduction of XBRL in companies (e.g. Moeller, 2010, 346). Quite surprisingly, those three respondents that have more knowledge about internal controls did not consider the subject to be very important. However, they admitted that companies should have controls in place for XBRL and they recognized the need for checking those controls:

"I think companies should have controls around XBRL also. I mean, when you have the mapping process where you tag the aggregated data in XBRL documents, it's important to have controls for that. And when you do changes on one level that lead to changes in another

level, you need controls for that. You should have a quality assurance process for the changes and XBRL coding for instance." Interviewee C

"In the implementation phase when the system is taken into use, the internal auditors could come and see some projects and that the transfer of information has been done correctly so that information can be relied upon. But I don't think it would change so much internal auditing." Interviewee B

Despite the importance of internal controls, two respondents explained why XBRL would not affect internal auditing or risk services offered by their companies. First reason is that checking controls should be part of external auditors' work and controls related to XBRL are just like any other controls. This view is also brought forward by Alles and Gray (2012). Second reason provided is that internal auditors use other than financial information for which XBRL is currently used.

"Checking internal controls would be part of the normal audit procedures to detect weaknesses in controls that are implemented in relation to XBRL and the production of XBRL data. It's nothing really special, it's just part of normal controls that companies have in place already." Interviewee D

"This whole issue really depends on what XBRL is used. Some people are talking about XBRL being utilized in for example corporate responsibility reporting. Then we would include totally different data in XBRL format and at that point I think the internal auditing could utilize it better. As long as it concerns only basic financial statement information, the internal auditing doesn't have such a big role. At the moment I as an internal auditor don't use much financial statement data, we analyze different things and financial statements are only a small part of the whole picture." Interviewee B

One respondent had a more radical view. According to him, as XBRL is bolted-on, it does not have any effect on internal audits or controls because the creation of instance documents is often outsourced:

"At the moment it doesn't require anything, any checks into the internal controls systems and processes. A lot of XBRL that gets created in the U.S. or the U.K. is outsourced so the financial reporting process has finished and the auditor has finished and they take the report and hand it over to somebody else and say: turn this into XBRL. As part of that process and what they pay for, they assume that it has been reviewed and received a certain level of

quality and take some assurance from that. In the case of the U.K., they don't give anybody else to check that, they just take it and file it. That's kind of tax mentality, if you get somebody to do your tax return, you don't give it to an auditor to audit it, you just take it. You are responsible for the fact that it's right, you sign it and you send it." Interviewee A

All in all, respondents clearly stated that XBRL will not affect so much the internal control and risk services that audit companies provide. Firstly, as XBRL is bolted-on, it does not yet have much effect on internal controls and in addition, many companies outsource the creation of their XBRL filings. Secondly, internal auditors use mainly other information than financial statement information which XBRL is currently mostly used for. Finally, as one interviewee pointed out, checking internal controls is part of the external audit process and auditors may rely on the work done by internal auditors only to some degree (Alles & Gray, 2012).

6.4.3 Advisory services

When discussing the possible implications of XBRL for audit firms, one of the things that first came to interviewees mind were consulting services. Interviewees were also asked about possible changes in the work of tax people. Of these two, consulting, especially related to system introductions, were seen as more important. Analytical features of XBRL were also seen to benefit people working with transaction services. However, opposite opinions about XBRL' effects on advisory services were presented and those are also discussed.

New consulting services and benefits from analytical opportunities

In the section 6.1 (Audit companies' involvement in the development of XBRL) some interviewees said that the possibility of providing consulting services were one of the reasons why their organizations are involved in XBRL consortiums. But exactly what kind of services these will be, is presented in this part.

System introductions were seen as one possible service area for audit companies. This aspect has also been considered in previous literature (e.g. Pinsker & Li, 2008) On the other hand, one respondent raised the issue of taxonomy changes as a way to provide consulting services continuously and not just in the beginning which is something that has not received attention in the literature before.

"We can provide services in the area of advisory. We can advise our clients in implementation and setting up the systems and we also help with the filings on ongoing basis. If you think for example filings to companies' registration office, there are changes and there

will be obviously changes in the taxonomy and in the reporting structures and that leads possibly to ongoing consulting services eventually. There are thousands of companies that need assistance in updating their systems or they need assurance whether they did it correctly. I think there are many opportunities for consulting like work. For example, helping organizations file more efficiently and improve their reporting processes. And from our point of view, the good thing about XBRL taxonomies is that they change every year. They change because the legislation changes so taxonomies and applications must follow. So you will need the consultant guy just as well to help you properly update your systems." Interviewee C

As has been mentioned in the literature (Doolin & Troshani, 2004), there are possibilities for audit companies to help also governmental organizations. An example is provided by one of the interviewees:

"One of the things we have been involved is creating a taxonomy for grant requests. Accountants who file those requests want certainty on if they file a document, that it is at least technically correct. What happens sometimes is that they get the form sent back because there was something missing. There are all sorts of rules regarding the data so what we have done for the government agency in question, we have created a taxonomy and we have added what we call a formula that basically covers all these technical consistency checks." Interviewee C

In addition, as was mentioned in relation to the general discussion about XBRL's impacts on audit companies' functions, one respondent mentioned that he believes that their transaction services will greatly benefit from this because they use a lot of financial information and do all kinds of analyses. This point has also been brought up by e.g. Steenkamp and Nel (2012) and Troshani and Doolin (2007). So, for information users the value-added of XBRL is positive.

"People working with transaction services and with consulting overall will greatly benefit from this because they do all kinds of analyses of different companies and of different industries. I'm sure that this will make their work much more efficient. Also the fact that they can better compare companies will be a big thing for them." Interviewee E

On the other hand, this respondent, as well as a couple of other interviewees, stated that there are not that many service opportunities at least at this point:

"I see some small opportunities for our consultancy services but nothing big really. Currently there are still some open questions like how is the auditor going to sign the document if

everything is done electronically and maybe we can provide some assistance there. I think that in general XBRL benefits all parties in the reporting chain but for us I don't see any direct business opportunities." Interviewee E

Also, another interviewee stated that in his organization and country, consulting is not so much affected by XBRL unless it relates to the reporting requirements of financial institutions.

"The reason why XBRL doesn't affect naturally consulting is that the numbers related to implementations are not large enough for consulting practice to be interested. XBRL tends to be quite small, it's not the entire reporting process, rather it only comes at the end of the process. At the moment because XBRL is bolted-on, the solutions tend to be plug and play and relatively straightforward as opposed to the type of financial reporting that consultancy group would be involved. Consulting have the transformation projects or larger implementation projects like COREP and FINREP, they are much larger pieces and not just some half day making of a statement. You have to source all that data from multiple places which is a project outside of XBRL but influenced by it." Interviewee A

Also another respondent pointed out that as XBRL is currently only about converting numbers to another format, companies may not be willing to pay so much for consultancy services or they do not need those services as information system providers will probably add a converting tool in the accounting softwares:

"There can be some small consultancy possibilities but nothing big. If you only have to convert a number to another format I doubt that companies would be willing to pay large sums of money for that. Software programs will do the converting so there is not much room for consultancy services." Interviewee F

The opinions related to new consulting opportunities are somewhat mixed. One interviewee is of the opinion that there are new consulting opportunities for audit companies; technical assistance with taxonomy creation can be offered for government agencies and for financial institutions with their heavy reports. Helping companies with new system introductions and later when taxonomies change, with updating their systems, is also a possibility. Here it must be noted, though, that for regular companies it is more likely that information system providers are the ones providing the most support and that is also why many interviewees do not see service possibilities for their companies. Another reason for mixed answers might be

that the one person who listed different opportunities is one of the few who has actually been involved in providing those services. Less enthusiastic answers by the others may be driven by the fact that in their countries XBRL is not utilized in so many diverse ways and it is not known when the introduction of the new technology will actually happen.

Tax services

Tax services are also offered by audit companies. These can include advising in tax-related questions or filing companies' tax returns for the authorities. For the latter purpose it can be intuitively assumed that knowing XBRL could be important if authorities require tax filings to be sent in that format.

For example in the U.K. the tax authority has replaced the old paper filing with electronic filings. One respondent explained that the tax return is sent in xml, not xbrl, and the tax computation and the statutory accounts are converted into inline xbrl. It has enabled the tax authority to capture a reproduction of the original filings, which is the inline piece, but at the same time the computer system can read the xbrl part of the report. When asked whether the people filing tax returns for their clients need to understand XBRL, the interviewee did see it necessary but not to the same extent as for the auditors:

"It is the accounting people with appropriate GAAP knowledge who perform or review mappings, the tax is just tax. We are not giving the tax people anything about UK GAAP or IFRS, that would be a catastrophe. Tax people do have to understand XBRL but to a lesser extent than accounting people because XBRL is sort of hidden from them. The tax computations are very straightforward and the tools are pre-mapped, and with that it's a set taxonomy. The tools help them to map and what they really do is just push a button." Interviewee A

The answer indicates that even though XBRL is used for tax purposes in the U.K., and their tax department is involved with that, still the knowledge requirements for the actual employees are not very extensive. Also, when another respondent was talking about how his organization is preparing for the introduction of XBRL in his country, the respondents said that all the departments, except for tax, are involved and called to the first meeting. It seems that for audit companies the tax related issues of XBRL are not the first priority.

6.4.4 Implications of supervisory reporting

As mentioned briefly in the theoretical part, XBRL can be used for financial institutions' reporting purposes as well. In the literature about XBRL this supervisory reporting has not received a lot of attention. Basically only Piechocki et al. (2009) have discussed the COREP taxonomy and how the flexibility in that taxonomy has created challenges for information providers and difficulties for information consumers in trying to understand information provided by institutions across borders. This is because there is considerable national variation in the technical parts of taxonomy; in the calculation relationships and in dimensional structures (Piechocki et al. 2009). A couple of the interviewees also stated that this matter is important and they discussed the challenges faced by financial organizations with the new supervisory reporting that comprise of COREP, FINREP and SOLVENCY II reporting requirements. There is a new wave of supervisory reporting coming which will also have implications for audit firms which have not been discussed in previous literature. The impacts were seen to be more on the consulting and risk services side:

"EIOPA (European Insurance and Occupational Pensions Authority) is asking for huge reports and they are going to do it through an XBRL taxonomy. It's a technical description of whatever data companies need to submit. What each insurer should do is to check that the data they are recording in their internal systems is aligned to whatever the EIOPA is asking for. If you don't know what the definition of sales is in your internal systems, how can you then report to EIOPA and say, it's the sales as you have described it. What they really should do is to take the SOLVENCY II taxonomy and put it next to their internal systems and then just compare. If they can't compare the definitions, then it will impact the internal auditor mostly." Interviewee C

"I have already seen that supervisory reporting is coming in the practice of our organization. The U.K. is moving towards mandatory COREP, FINREP and SOLVENCY II reporting quite aggressively. Our XBRL group is not the group affected there but rather consulting and risk groups because wherever that resides, it's been driven out of risk and consulting. This is a very important thing and we'll have to see what's going to happen with that. There are three parts related to those filings: sourcing the data, converting it and the analytics part. The analytics part is purely because of companies' internal need to check and get some sort of analytical comfort or quality assurance of what they are filing and if they got it right because there are quite serious consequences if they fail." Interviewee A

These quotations reveal that for financial institutions it is important to get the filings right and use the correct definitions. At the same time this brings new challenges for whoever is providing the assurance, because these taxonomies can include multidimensional pieces of data which actually relates closely to visualization problems already discussed.

"But there is a new issue that is coming and it's been a long time they have tried to cope with that. This goes back to COREP and FINREP. Suddenly they have to visualize for different reasons multidimensional pieces of data and how do you look at something that has 10 dimensions with a technology that doesn't present those 10 dimensions? They are busy struggling with that." Interviewee A

"Imagine having to do assurance on COREP and FINREP reports with their 15 dimensions which you can't visualize! So mister auditor, would you be willing to sign here on this data set that you haven't been able to visualize? I think the answer will be no. And I don't know what the executives have to sign but anyway, how the hell are they going to sign off something if they can't see it?" Interviewee C

It is interesting that the whole supervisory reporting in XBRL form has not been of interest to researchers even though it clearly creates challenges for multiple stakeholders. It also creates new service possibilities for audit companies' consulting and risk services functions to greater extent than normal companies' reporting in XBRL.

6.4.5 Change in impact on different functions

One of the interviewees, who has been working with XBRL for a long time, discussed how the change in the utilization of XBRL will also affect different functions of audit companies. Basically audit function was the first affected and now it is moving or has already moved toward tax and from there the impact will be more in the consulting and risk services.

"It's interesting to think how XBRL will affect our services. As a distant player I have watched it move. I think that the natural fit is auditing but I think it's changing. The first mandate that we saw was something like the U.S. SEC consolidated financial statements. Consolidated financial statements are part of the reporting process and they are audited and thus there is a natural fit to audit practice. The next large XBRL roll-outs are coming or have come from tax authorities like in the U.K. No real audit implications there anymore, because those statements that are being filed are already audited at that point. But the new wave of reporting is coming in the form of supervisory reporting, not regulatory reporting, and that

affects financial institutions with their COREP and FINREP mandates that are coming through to Europe and insurance institutions and their SOLVENCY II filings. Then it's the consulting group and risk group that are entry points for our organization." Interviewee A

Now, after presenting the findings from the interviews, this thesis moves on to summarize these findings and compare them with previous literature.

7 Contribution of this study for previous research

As noted earlier, not much has been written about XBRL from audit companies' perspective. First, this thesis contributes to the existing literature about XBRL by explaining why audit companies are strongly involved in XBRL consortiums. Then, the value-added of XBRL for different stakeholders of information process from audit companies' point of view is discussed. Finally, a framework based on important aspects and factors that arose from interviews in relation to XBRL's effects on audit companies, is presented.

7.1 Reasons to be involved in developing XBRL

Reasons provided for audit companies' involvement were partially the same as suggested by Locke and Lowe (2007); feeling that XBRL will change financial reporting and the possibility to gain a reputation as one of the developers arose from interviews. It was also stated by interviewees that being involved in XBRL development is natural for audit companies because XBRL is mainly about external reporting. Also from the previous literature it can be concluded that XBRL will have significant effects on financial reporting and thus it is perfectly understandable why audit companies are interested in it. Interest in solving XBRL issues was apparent in two interviewees' answers as they stated that because of their interest in the technology, their organizations are involved.

Another reason for participation mentioned by interviewees was that it is important to be involved in accounting innovations and overall, know XBRL to be able to provide assurance services in the future. A contradiction can be found, however, between this statement and the previous literature where it is mentioned that auditors are slow to adopt new technologies (Vasarhelyi et al. 2010). Observations while doing this research also support the view presented in the literature as all the interviewees who are involved in XBRL development had some technology-related expertise in addition to possible audit background. Some of them also mentioned that auditors in their organizations are not so enthusiastic about the topic and they must be begged to participate in the meetings. Given the rapid development of XBRL and the effects it might have on auditing, auditors should be more active to learn about XBRL and be prepared for it. The blame cannot be placed solely on normal auditors as the oversight bodies themselves have not been very active, which can be noted from the lack of auditing standards on XBRL. On the other hand, this is understandable as instructions concerning agreed-upon procedures seem to be enough in the absence of a mandate that would require auditing XBRL documents. However, this reflects the general compliance-oriented and

regulatory-driven nature of audit environment, which does not allow the industry to respond quickly to accounting innovations (Zhang et al. 2012).

In theory it was also suggested that audit companies play an important role in XBRL's diffusion (Troshani & Doolin, 2007; Janvrin & No, 2012; Doolin & Troshani, 2007). Some expect them to be early adopters and role models so that bandwagon effects can be created. Sufficient support from experts is also important. Offering support was also seen as an important service opportunity by some interviewees but being a role model is not something that audit firms strive for judging from the answers. In contrary, one interviewee mentioned that without short-term benefits, his organization had to think a lot whether to participate at all. Also, another interviewee revealed that as it is not mandatory to report using XBRL, they suggest their clients not to use it. One interviewee even considered XBRL to be somewhat old-fashioned technology. So, even though it has been mentioned in the literature that audit companies are active participants in the development process of XBRL, it must be kept in mind that it is not self-evident that this would be the case in all countries. Audit companies seem to be more interested in the reputation and learning aspects than being a role model just for charity purposes.

In addition to the audit perspective, the possibility to offer consulting services was seen as an important reason to participate in XBRL consortiums, although some saw only minor consulting opportunities. One interviewee raised this participation issue to a more general level by taking into consideration the risk-reducing aspect of XBRL. In the end it always comes down to make money, save money or reduce risk in a commercial organization. It is clear that consultancy services and also agreed-upon services are the way to make extra money as these services have not been offered before. On the other hand, it is possible for audit companies to also save money. This can be done for example in audit or consulting departments where analyzing information can become faster. Risk reduction is also very important for audit companies because they face litigation risks and thus they are devoting considerable attention and resources to reduce and manage risks (Casterella et al. 2010). With XBRL the risk related to audits can possibly be reduced by increasing the sample sizes and with better analytical tools but this benefit is only achieved if XBRL would be taken into the transaction level. Risk reduction is also important from the reputation capital point of view; big audit firms have valuable reputation to protect because if they did their work carelessly or issued a misleading report, they can experience lower audit fees or fewer customers (Lennox, 1999).

Audit companies still have to keep in mind that even though they may think that they are in a good position to provide assurance and consultancy services for their clients, for companies it is possible to acquire these services from other instances as well. Assurance can be acquired from multiple sources in the absence of mandates, and companies can get help in tagging process straight from software vendors (Alles & Gray, 2012). However, none of the interviewees mentioned other stakeholders as possible assurance providers. Instead, they seemed to take it for granted that audit companies will be the ones providing assurance in the future as has been the case with traditional financial statements.

7.2 Value-added of XBRL for information process participants

In this thesis, information process participants discussed include system developers, reporting companies, regulators, auditors and information users that include investors, analysts and people from audit companies who utilize financial information.

System developers are those that incorporate XBRL into the accounting systems and are able to provide services related to the implementation, conversion of documents into XBRL format and help with possible extension issues (Locke & Lowe, 2007; Janvrin & No, 2012). Respondents also recognized this possibility for system developers and in fact, some were strongly of the opinion that system developers are the ones who are doing the conversion and provide support and that is why they did not see many opportunities for audit companies to consult normal firms in relation with XBRL. The value-added of XBRL for system developers can be regarded as positive even though a couple of interviewees reminded that XBRL is a complicated technology to incorporate into the accounting softwares and system developers have struggled with that. This aspect is something that has not been brought forward in the literature so far. On the other hand, technical challenges faced by system developers are most likely reflected in the prices of these new capabilities.

In the previous literature the issue whether XBRL really adds value for reporting companies has mixed answers. Some are of the opinion that benefits can be gained through faster reporting (Wu & Vasarhelyi, 2003) whereas many researchers have shown that companies consider XBRL more as an extra cost than a benefit (Fisher, 2008; Cohen, 2009). Interviewees also thought that at this bolted-on stage XBRL is a cost for companies. Another interesting aspect, that has not been discussed in the literature so far, was also brought forward by one interviewee. He stated that companies are not prepared for XBRL. They think that everything is being taken care of and they are not taking time to familiarize themselves

with XBRL. At some point they will need to find resources for that. All in all, the value-added of XBRL for companies was seen by many as negative.

The interviewees saw regulators and officials who are obligated to gather a lot of information every year as one of the greatest beneficiaries of XBRL. In addition, they highlighted that XBRL is a regulatory driven standard and thus it can be stated that the value-added of XBRL is clearly positive for regulators. Previous articles (e.g. Buys, 2008; Gray & Miller, 2009; Jones & Willis, 2003) that emphasize the benefits for authorities together with interviewees' answers imply that many participants think that XBRL is partly developed for regulatory purposes.

XBRL's effects on auditors are discussed in more detail in the next chapter but considering the value-added aspect of XBRL it can be stated that interviews provided some mixed results. In the literature it is suggested that XBRL could provide easier access to information, improve comparability of information and speed up and improve analytical possibilities (Bay et al. 2006; Plumlee & Plumlee, 2008). Interviewees also considered these things important. Standard information form means easier access to information and improved comparability and makes analyzing information faster because ready-made analytical tools can be constructed. Building huge data engines could also facilitate comparability and analytical methods. In addition, one interviewee pointed out an important aspect that has not received much attention in the literature. He noticed that if all information would be on XBRL format and found from the same place, auditors would know better what information they are actually looking at and they would be sure that all information is there. On the other hand, one interviewee said that the same analytical procedures can be done with Excel as well and thus there is no point in having all the data in XBRL format. In addition, almost all of these benefits are dependent on how deep XBRL is in the accounting system. Now as it is on the reporting level, the benefits are not realizable. So, at the moment it seems auditors are not able to utilize all the potential benefits of XBRL.

Information users are considered to be one of the greatest beneficiaries of XBRL. In fact, the main reasons to force XBRL reporting have been to provide more flexibility, ease of use, timeliness, less error-prone information and more transparency for securities markets (Wu & Vasarhelyi, 2003; Baldwin & Trinkle, 2011; McNamar, 2003). Also the interviewees saw that users of financial information, those being analysts as well as auditors, will greatly benefit from XBRL. Clearly, the value-added of XBRL is considered to be positive for them. It is

interesting to notice, however, that none of the respondents were concerned about the integrity of XBRL data even though it has been discovered in previous studies that for example XBRL filings in the U.S. have contained many errors (Bartley et al. 2011; Boriz & No, 2009).

Based on the interviews it can be stated that XBRL is mostly developed for regulators and information users who also benefit the most from the new technology. Also system developers can benefit from the technology by incorporating new capabilities into their systems and thus experience increased revenues. At the same time for companies this whole process is more a cost than a benefit. As XBRL is not at the transaction level, it means that auditors cannot fully utilize the benefits.

7.3 Effects on audit companies

Next, a framework of XBRL's effects on audit companies' functions is presented in figure 6 where background factors are also considered. Then, important, controversial and less important aspects related to each function are gathered together to illustrate what interviewees thought about specific subjects.

Figure 6: Background factors and issues within functions affected by XBRL

Factors

As mentioned earlier, different background factors arose from interviews that need to be taken into consideration when thinking about XBRL's effects on audit companies. Recognizing these factors has also been one of the main contributions of this thesis. In total four background factors were recognized and those were put under three headings in the figure 6. First, history and structure of an audit firm is considered as one part. Then, external norms include two factors, namely the purpose of the reporting and whether there is a mandate for XBRL reporting or not. These are issues that only the legislator can affect and thus the heading "external" was considered appropriate for these two. The last heading, characteristics of the reporting company, includes an important factor, how deep XBRL is integrated in the accounting systems.

First, history and structure of an audit firm is not something that has been discussed in the previous literature in relation with XBRL. All the other firms except Deloitte sold their consulting functions in the early 2000 so they are basically growing new consulting departments whereas for Deloitte consulting division has remained strong during the years, at least in some countries. Therefore, as one interviewee stated, numbers related to XBRL tend to be too small for Deloitte's consulting division to be interested in the subject unless it is a question of supervisory reporting where lot of changes have to be made in the reporting systems. These restructurings in the past have shaped the current structure of audit firms and so each firm has arranged its services a bit differently. This different structure has to be taken into consideration when thinking about which functions are affected by XBRL.

Purpose of reporting refers to how XBRL is used. It can be used to file financial statements in which case audit people should be strongly involved because at least in the future interviewees think that those statements need to be audited. In addition, XBRL filings may require new audit methods and more technical knowledge from the auditors. XBRL can also be used to file tax returns, like in the U.K. which means that there the people with tax and technical knowledge about XBRL are in the center. In the Netherlands, XBRL for GRI has been developed and there it was the consulting department who helped the agency in question to create the taxonomy. Finally, supervisory reporting requirements, COREP, FINREP and SOLVENCY II filings, were seen as important by a couple of interviewees. If XBRL is used for that purpose, then, according to the interviewees, consulting and risk

services people are involved. In general, how XBRL is used has obviously different impacts on different functions.

Another factor recognized related to external norms was the mandate issue which includes two aspects; the mandate for companies to report financial information using XBRL and the mandate for auditors to audit those documents. If there is no mandate for auditors to audit instance documents, as there currently is not, then companies are not willing to do it voluntarily and new audit procedures are not needed. In that case only the agreed-upon procedures are offered. Also in the absence of a mandate for companies to report with XBRL, at least one audit company recommends its clients not to use it at all. It is also generally recognized in the literature (Cordery et al. 2011; Buys, 2008) that without a mandate companies will not adopt XBRL in which case there is no need for any services. But if there was a mandate, then audit companies could utilize this possibility and start to offer consulting services because companies might be more willing to change their processes. Then, also auditors would need to start educating themselves about XBRL. Related to the mandatory aspect, a contradiction was found; the interviewees do not think it makes sense to, for example, develop a taxonomy if there is no mandate. However, the audit companies are still involved in the development process in countries where there is currently no mandate to use XBRL. The reputation seems to matter more than costs of participating.

XBRL's level of integration was raised by many interviewees as an important factor to consider. Also in the literature articles can be divided in two groups according to the integration level. Some early articles (e.g. Coderre & McCollum, 2004; Burnett et al. 2006) praise the benefits of XBRL but at the same time they take it for granted that XBRL will be integrated deeper into the accounting systems. Instead, other articles are more moderate in describing XBRL's benefits and they recognize that if XBRL is not at the transaction level, then some benefits will not be obtained (Locke & Lowe, 2007). According to the interviews, the level of XBRL's integration is a key issue when thinking about XBRL's effects. It will determine whether auditors are able to utilize new analytical opportunities and easier access to information. Also, to be able to do continuous auditing requires XBRL to be at the transaction level. Level of integration also partly determines whether consulting people are needed in system introductions or not. If systems are completely renewed which could happen if XBRL would be taken into the transactional level and companies would see the benefits from this, then fees for those services are high enough

for consulting to be interested as well. In addition to auditing and advisory, the integration also affects companies' internal controls. Currently as XBRL is used as bolted-on solution, internal controls are not affected by it. On the other hand, if financial statements could be created with a single push of a button, as the scenario for the future is, then there would surely be a new need for internal controls.

Functions

In figure 6 there are three functions presented, audit, advisory and enterprise risk services, and within them important, controversial and less important aspects related to those functions from audit companies' perspective. Important issues include things that interviewees considered something that audit companies need to take into account whereas less important issues were not seen to be so relevant even though they have been partly discussed in the previous literature. Controversial issues are those that interviewees were not of the same opinion. Some of the issues have been discussed in the literature previously but the contribution of this thesis has been to place them under different importance groups which show what audit companies think of these issues.

First of all, interviewees considered the audit function to be the most affected by the introduction of XBRL in the financial reporting chain. When it comes to auditing XBRL documents, the interviewees were of the same opinion as most of the researchers (e.g. Plumlee & Plumlee, 2008) that those documents need to be assured. Interviewees also considered that new audit procedures are needed. The lack of official guidance was also shown in their responses because the respondents could only guess what the new audit procedures will be. Their ideas were similar to what has been suggested by researchers (e.g Plumlee & Plumlee, 2008; Srivastava & Kogan, 2010) and AICPA (2011). Those would include checking that right taxonomy has been used, checking the correctness of mappings and whether it is necessary to create extensions and verifying that companies have controls related to instance document creation in place. As new audit procedures are needed, it also leads to new knowledge requirements for auditors. Like in the literature (Srivastava & Kogan, 2010), also interviewees thought that it is important for auditors to know the technical aspects of XBRL. However, the current practice within audit companies and how they are preparing themselves for XBRL does not seem to support that claim. One firm has set up a special XBRL team but it does not include auditors and another respondent said that auditors are not actively involved in their internal meetings.

Another important issue inside the audit function was the comparability of information. It was seen as useful for auditors as they could do benchmarking better and analyze cost relationships in given industries. Despite promising qualities, XBRL brings also new challenges for auditors. There is a need to make xml language visible for the auditors which requires another layer of software and the validity of it must be verified as well. Another challenge relates to the requirement of checking mappings and extensions. To be able to do that, auditors need to be familiar with taxonomies which can be huge.

Easier access to information and new analytical opportunities are among the controversial issues. Some of the interviewees considered this aspect as important because it can make auditors' work faster and more effective, something that has also been suggested by the literature (Coderre & McCollum, 2004; Filipek, 2007). It was also noted that with new analytical possibilities it can become easier to detect fraud and thus lower the audit risk. Another perspective was offered by a couple of interviewees. They noted that already now there are effective tools to do analytical procedures and XBRL is only an extra tool for doing those and it would not necessarily be more effective than the already existing ones. It should also be noted that to achieve the benefits for analytical work and fraud detection, XBRL should be at the transactional level and that is something that the interviewees did not find likely to happen in the near future.

In the previous literature (e.g. Du & Roohani, 2007; Cohen, 2009) continuous auditing has been considered as one likely outcome of widespread use of XBRL. Contrary to that, interviewees thought that continuous auditing is not likely to take off in the near future as it would require XBRL to be integrated in the transaction level. Thus, it falls under less important issues within audit function. In addition, it was interesting to notice that one interviewee was of the opinion that there is no need for continuous auditing. Another interviewee also pointed out that even if XBRL was taken to the transactional level, there would still be more effective ways to read the data from the information systems.

When moving to the advisory services, it is suggested in the literature that analytical possibilities could also benefit people who utilize financial statement information (Gray & Miller, 2009). It was mentioned by interviewees that audit companies utilize this information as well when they for example analyze the development of a given industry or compare their client firm's performance with other firms. Analytical possibilities and to be able to retrieve

information more easily was considered valuable for advisory services and thus it is placed under important issues.

In the literature it is suggested that within the field of advisory services, audit companies can help companies as well as governmental organizations with implementing XBRL (Pinsker & Li, 2008; Doolin & Troshani, 2004). One aspect that had not been considered in the literature, but came up in the interviews, was the fact that as legislation changes, taxonomies have to follow and thus there are consulting opportunities continuously, and not just in the beginning. However, consulting opportunities for companies are placed under controversial issues because half of the interviewees stated that they do not see big opportunities within this field. First of all, as XBRL is currently used as a bolted-on solution, numbers related to those small projects are not big enough and it does not require much work. In other words, companies are not willing to pay a lot for a service where information is only converted to another format. In addition, one interviewee mentioned that there may not be a need for consulting services as it is likely that software vendors are in a better position to help companies with new system attributes. One possible explanation for these opposite answers is that the one person who highlighted the new consulting opportunities the most has been actively involved with XBRL services. Those respondents who don't see that many opportunities come from a country where XBRL is still in the development phase.

Even if helping normal companies was not seen as a huge money-making opportunity, advising financial institutions was considered more important. This was also something that has not been discussed in the previous literature. Thus, supervisory reporting is under important issues in advisory services. Banks and other financial institutions have huge reporting requirements in form of COREP, FINREP and SOLVENCY II. Gathering information for those reports and converting that to XBRL format may require changes to existing processes which means service opportunities for consultants. It all comes down again to the background factors and for consulting the level of integration seems to be an important aspect. The mandatory aspect matters as well; if companies have to report using XBRL, then there may be some services opportunities for consultants.

XBRL's effects of tax people are under questionable issues even though tax issues and financial reporting are in close connection in many countries. In the U.K. some employees of audit companies actually help companies prepare and file tax reports. But according to one interviewee, preparing tax reports is straightforward and XBRL is made to run in the

background and so it is hidden from the people doing the filings. That is why effects on tax people are among questionable issues.

Internal controls related to XBRL are considered to be important by many researchers and they share the opinion that new controls are needed (Plumlee & Plumlee, 2008). In addition, it is highlighted that IT auditors should take a bigger role in XBRL conversion projects (Moeller, 2010, 346). On the other hand, a milder opinion is presented by Gray and Miller (2012). They state that controls related to XBRL are just like any other controls and it is the responsibility of external auditor to verify that they are working. Of these two viewpoints, the interviewees' answers to the question whether XBRL will have an impact on internal controls or not, were closer to the viewpoint presented by Gray and Miller (2012).

Internal controls are under questionable issues within enterprise risk services function. The main reason for the perceived unimportance is that as XBRL is bolted-on or the creation of instance documents is outsourced, it does not require any checks on internal controls. Also, even if companies have to build new controls, one interviewee reminded that it is still external auditor's responsibility to check those controls. Additionally, other than financial information is utilized more in risk services.

Instead, what respondents considered important related to risk services, was supervisory reporting, which as mentioned, has not been discussed in the previous literature. As one respondent stated, financial institutions' filings are risk-driven and there are serious consequences if those organizations fail with their reporting. Data has to be gathered from multiple sources for those reports and definitions of all the concepts used must be clear. That is why risk service people and internal auditors are needed.

7.4 XBRL and information efficiency

As the whole purpose of XBRL is to provide more accurate, timely and better-defined information it relates closely to the theory of market and information efficiency. Verrecchia (1979) hypothesize related to information efficiency that quasi-profits are more difficult to earn when the number of market participants increases. Also, one attribute of good quality information is that it has to be accessible for it to be of use (Bovee et al. 2003). For this purpose XBRL is quite effective as it makes deriving financial information from all over the world easier and makes it more understandable for more investors, a point highlighted by one of the interviewees as well. Verrecchia (1979) also hypothesizes that providing accounting

information is more valuable for investors of smaller companies. This, however, does not seem to be supported by the XBRL initiative although it has been the objective of authorities. Problem with both of these goals, providing better information and information that is accessible by small and large companies' investors, is that companies are not willing to take XBRL into use because they have more important things to handle. It is logical considering the current economic situation. Also the interviewees were of the opinion that small companies see XBRL more as a cost than a benefit and then it is a question of normal analysis where companies compare their perceived costs to the advantage (Cordery et al. 2011).

Information provided by companies to investors has to be timely for it to be of relevance (Bovee et al. 2003). It is suggested in the literature (e.g. Baldwin & Trinkle, 2011) that as XBRL is incorporated into the accounting systems and the creation of financial statements becomes automated, managers have less time to do accounting tricks to smooth numbers. However, Baldwin and Trinkle (2011) seem to ignore the fact that markets can price securities despite earnings manipulation (Emery, 1974) and that as XBRL is mostly used as a bolted-on solution, it actually doesn't reduce the reporting time. Interviewees also recognized this aspect and they even stated that they do not actually see the XBRL's integration deeper into the accounting systems to happen in next five to ten years that would allow faster reporting.

In addition to being accessible and timely, information has to be understood by users (Bovee et al. 2003). This aspect, on the other hand seems to be supported by XBRL as the data has specific tags behind it that describe where the number comes from and what the definition of it is. This characteristic of XBRL-formatted information was also seen important by interviewees for auditors as well. The final attribute of good quality information mentioned by Bovee et al. (2003) is integrity which means that data has to be free from defects. This feature of information is not currently supported by XBRL because the financial statements in XBRL form are not audited and it has been found out that many filings have contained errors (Bartley et al. 2011). Representatives of audit companies were of the opinion that it is important to audit these documents as the public will surely want to be able to trust XBRL-formatted financial statements as well. The problem, however, may arise because auditors are not eager to learn about XBRL and audit companies in general are not willing to provide assurance before it becomes mandatory.

To conclude, XBRL seems to have the power to provide better information and thus contribute market and information efficiency at least to some degree, but the problem is that companies are not willing to take it into use voluntarily as it does not provide them many benefits. For this to change, it is required that there should be clearer benefits for reporting companies, for example a notable reduction in costs of preparing financial statements which would be facilitated by the XBRL Global Ledger. Thus, of the background factors the mandatory aspect and the level of integration seem to hinder the use of XBRL.

8. Conclusions and suggestions for future research

The main purpose of this thesis was threefold: the first intention was to find out, what are the main underlying reasons for audit companies to be involved in developing XBRL. Next, to whom do audit companies' representatives think that XBRL is mainly developed for and is the value-added of it negative or positive for information process participants, is discussed. The last research question was set to find out what are the main effects for audit companies in getting involved with XBRL.

It is important to research the above mentioned questions because audit companies' perspective in relation to XBRL has not received much attention in the literature so far. In addition, XBRL is said to revolutionize financial reporting and it is a timely topic as the use of it is now spreading from the U.S. and some parts of Asia to Europe as well. Authorities are making reporting in XBRL format mandatory and audit companies have been active in consortiums that develop the technology. Given the importance and topicality of the issue, it seems astonishing that previous studies have not taken the whole perspective of audit companies into account. Thus, a qualitative approach where seven professionals from audit companies were interviewed following a semi-structured form was undertaken to fill this research gap.

In relation to the first research question, for what reasons audit companies are involved in developing XBRL, a couple of interviewees stated that it is important to be involved in accounting innovations. Also, it is suggested in the literature that audit companies should act as role models for companies so that XBRL's diffusion would be faster. Interestingly, there seems to be a paradox with this statement regarding the importance of innovations and what audit companies actually do. For example, without clear short-term benefits, audit companies had to think about their participation in the project a lot. Next, a couple of interviewees admitted that if it was not for their interest, their company would not know about XBRL nor participate in consortiums. In addition, in one country where XBRL is not mandatory, audit company advices their clients not to use it. Lastly, audit companies are not very proactive in educating their auditors about XBRL partly because of the lack of interest which may reflect the professions' general attitude towards technology development. Another possible reason is provided by Chang and Järvenpää (2005) who think audit companies in general are careful not to have an active role in technological development due to past accounting scandals and independence issues. These findings are of importance because they imply, first of all, that

audit companies are not working as role models that would enhance the use of XBRL and secondly that a specific function, audit, is not in general so interested in the technology which may lead into difficulties when the technology is actually taken into use.

In relation to the second research question, the interviewees were of the opinion that XBRL benefits mostly information users and regulators, as was predicted from the previous literature. What was interesting in this part, however, were the challenges and difficulties faced by reporting companies and system developers. One interviewee stated that XBRL is a difficult standard to implement and system developers are running out of time to do it. Then, companies tend to assume that everything has been taken care of but ultimately they also need to find the resources and time to do filings in a new way. These problems, that have not come up in the literature, indicate that regulators who are pushing the use of XBRL should devote more time and support for other participants in the reporting supply chain as well in order for XBRL to succeed.

One of the contributions of this study has been to recognize four background factors that need to be considered before moving on to the question, what are the main effects for audit companies in getting involved with XBRL. First of all, there is already evidence in the previous literature that if reporting in XBRL format is not mandatory, then companies are not using it. From interviews it also became evident that without a mandate XBRL does not affect audit companies either. Secondly, the purpose of reporting, be it filing financial reports, tax reports or supervisory reporting by banks, determines which functions of audit companies are affected. Next, the history and current structure of audit firms have to be considered also because they differ in all companies. It means that similar issues within XBRL are dealt with in different functions. Finally, the level of XBRL's integration, that for example Locke and Lowe (2007) have discussed, also determines greatly whether or not XBRL has impacts on audit companies. Currently, as it is used as a bolted-on approach, it does not have that many effects on audit companies, according to the interviewees. The identification of these background factors is valuable because they form the basis of XBRL's different impacts on audit companies and need to be taken into account in future studies.

Another contribution of this thesis has been to place matters that have been partly discussed in the literature under different importance groups from audit companies' perspective. Of different functions, respondents considered that audit function will be affected by XBRL the most even though opinions about effects differed. Some think that easier access to

information and better analytical opportunities facilitate auditors' work, as mentioned in the literature, whereas some considered that XBRL is only one tool in addition to already existing audit tools and it is not necessarily any better than the existing ones. One thing that was clearly contrary to what was suggested in the theory was that interviewees did not see that XBRL would facilitate continuous auditing and some even stated that there is no need for continuous auditing and that there are more effective tools for that. There were also mixed answers in relation to XBRL's effects on advisory services. One respondent suggested that audit companies could provide continuous consulting services for companies because taxonomies change every year, whereas others did not see many consulting opportunities except for helping financial institutions with their supervisory reporting, something that has not been discussed in the literature about XBRL. Supervisory reporting was also one service possibility for risk services because, as interviewees stated, it is risk-driven reporting where there must be effective internal controls. Otherwise interviewees did not think that XBRL has effects on normal companies' internal controls which was surprising as in the theory the contrary is suggested by some authors.

Considering XBRL's effects on different functions it can be stated that the doubtful comments related to XBRL's benefits for auditing and the importance of financial institutions' XBRL-formatted reporting for advisory and risk services were something that had not been discussed in previous literature. Then, opinions about continuous auditing and the fact that interviewees did not see any effects of XBRL for internal controls were partly contrary to what has been presented in previous studies. These aspects are valuable avenues for future research about XBRL.

All in all, XBRL is capable of influencing audit companies as well but currently as it is used as bolted-on approach, it does not have many effects and also, because of that, companies do not see benefits in using it and thus will not voluntarily report in XBRL format. In addition, the somewhat lazy participation of audit companies in the promotion of XBRL may be one reason why the diffusion has been slower than expected. After all, where XBRL is mandatory, it can improve the quality of information and thus increase the market efficiency thanks to its fast retrieval and understandability. But for XBRL to be even more beneficial for information users there needs to be a more widespread adoption which requires the cooperation of all information process participants.

There are many interesting avenues for future research in the area of XBRL and audit companies. Related to audit function, it would be interesting to study, what kind of new audit procedures are put in place if and when auditing XBRL instance documents becomes mandatory. Also, what will happen to audit fees in such a situation is another interesting question. One could also look into the topic of XBRL and internal controls, and to be more precise, is there a need for new controls and if so, what kind of controls. Then of course the whole topic of XBRL and financial institutions' supervisory reporting is still somewhat under-researched. Another possibility is to investigate the background factors in more detail. For example, what kind of companies are the first voluntary filers of XBRL documents or what kind of companies are the first ones who are willing to incorporate XBRL deeper into their accounting systems.

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Appendices

Appendix 1 – Structure of the interviews

1. What is your position in the company?

2. How have you been involved with XBRL so far?

3.1 In your opinion, why do audit companies want to be involved in developing XBRL?

3.2 What topics or areas of XBRL are of special importance for audit companies?

4. In case XBRL is already used in your country, for what purpose is it used for? / In case XBRL is not yet used, how do you think it will be utilized?

5. To which functions of your company do you believe XBRL will affect (or has affected)?

6.1 What implications will XBRL have for the audit function?

6.2 Do you think there will be a demand for assurance of XBRL documents and if so, how will assurance be provided? Will there be a need for new audit procedures?

6.3 Will there be any new requirements for auditors' knowhow and do they have to understand also the technical aspects of XBRL?

6.4 Does XBRL have effects on current audit practices, for example analytical procedures?

6.5 Do you think that XBRL will facilitate continuous auditing?

7.1 What implications will XBRL have on enterprise risk services (including internal auditing)?

7.2 Do you believe that XBRL will create a need for new internal controls or change in the existing ones?

8.1 What implications will XBRL have on advisory services?

8.2 Do you believe that XBRL will provide new consulting service possibilities for audit companies?

8.3 Do you think that XBRL will have any effects on people that prepare their clients' tax filings?

Appendix 2 – Interviewee's backgrounds

Firm	Person's backround	Position	Date	Duration
Deloitte & Touche	APA, risk services	Director	4.6.2012	30 min
Deloitte & Touche	IT, consulting	Manager	5.6.2012	1h 45 min
Deloitte & Touche	Assurance, tax	Director	6.6.2012	45 min
Ernst & Young	APA, IT risk & assurance	Partner	18.6.2012	30 min
KPMG	CISA	Senior Manager	11.9.2012	50 min
Aalto university	IT systems, financial reporting	Lecturer	8.10.2012	45 min
Ernst & Young	Tax services	Manager	12.10.2012	30 min
PwC	APA, CISA	Partner	31.10.2012	30 min

Appendix 3 – Presentations in the XBRL Nordic Seminar 7.6.2012

Recent developments in XBRL Finland.

A sample of preparer experiences creating XBRL filings under different regimes around the world.

Instance document submission and authentication infrastructure, case Sweden.

XBRL in Estonia.

Denmark's XBRL mandate for financial reporting and work with the coming CORPE/FINREP filings.

The GRI Taxonomy: what it is, how it was made and how it can be used.