Business value of XBRL to the financial report receivers in Finland

Information Systems Science

Master's thesis

Aleksandre Asatiani

2012

AALTO UNIVERSITY SCHOOL OF ECONOMICS   ABSTRACT

Department of Information and Service Economy   XX.XX.2012

Master's thesis

Aleksandre Asatiani

Abstract

Objectives of the Study

The main objective of this study is to find out the factors that may affect the business value of the XBRL standard to the financial report receivers in Finland. The other objective is to explore the role of network effects in creation of the value to the financial report receivers.

The study is exploratory, as the goal is to discover the potential business value of the technological standard that has not been widely implemented in Finland at the moment of writing this paper. This thesis sets the basis for the further studies on the business value of XBRL, if and when the standard is implemented in the case organizations.

Academic background and methodology

Academic background includes the theories of productivity paradox, network effects and various theories on a business value of IT. The theoretical framework is built on the TOE framework and on the model of sources of value creation in e-business. The methodology includes the collection of qualitative data through semi-structured face-to-face interviews with representatives of the case organizations and subsequent cross-case analysis.

Findings and conclusions

Findings confirm the proposition presented in the theoretical part of the thesis. Results also show that the most important environmental factor in the potential business value of XBRL at the moment is "network effects" as EU integration of public organizations deepens. Efficiency and interoperability were two business value components that have a potential of influencing companies to adopt XBRL and yield significant benefits from it. On the other side results reveal smaller significance of the factor of technology usage and the business value component of value-added services.

Keywords

XBRL, financial reporting, business value of IT, open standards, public organizations, network effects

Acknowledgements

Table of contents

List of figures and tables

1 Introduction

In this introductory chapter, main objectives, aims and research problems of this thesis are presented. First, the background of the research project behind the thesis is introduced. Second part explains motives of the research and importance of studying this particular topic. Last two parts go through some background on XBRL, business value of technology and research questions itself.

1.1 Real-time Economy program

The research in the core of this Master's thesis is a part of the Real-Time Economy Program. RTE program is a product of cooperation between Aalto University School of Economics and Tieto Corporation. The main idea behind Real-Time Economy is to create and promote paperless business environment where transactions such as financial reporting and invoicing are performed digitally, are automated and real-time. Activities of the program include research, education and public promotion of the projects undertaken on the program. At the present moment one of the concentrations of Real-Time Economy Program is digitalization of the financial reporting. Therefore XBRL is in a focus of the program as a tool that fulfils the requirements of the goal set by the program. This research study contributes to the RTE program as it discovers the potential benefits of the XBRL standard to the report receivers.

1.2 Importance of the topic

The basic idea behind XBRL is very simple, instead of treating financial information as a block of text like in a PDF document or webpage, it tags all the entries and makes each item of data computer readable, thus allowing consumer to easily use and manipulate the financial data (XBRL International 2011b). Despite of the simplicity XBRL has been, throughout its 13 years of existence, and still remains an attractive and highly interesting research field.

Since year 1998, when XBRL was proposed by Charlie Hoffman to the American Institute of Certified Public Accountants, the number of XBRL-related articles has been increasing steadily

every year, with little exceptions like year 2007 (Roohani & Xianming 2009). Only in the first decade 1998-2008 there have been 114 articles in the major academic journals about the XBRL (Roohani & Xianming 2009).

The attention and research interest towards XBRL grows together with its usage. The latter has had sharp increases in the last 5-7 years. First in April 2005 the Securities and Exchange Commission (SEC) of USA, started encouraging Electronic Data Gathering, Analysis and Retrieval (EDGAR) filers to use XBRL in their financial reports submitted to EDGAR, on the voluntary basis. From 2009 SEC financed the upgrade of EDGAR by $54 million and moved to the next phase making XBRL a mandatory requirement for the filers. (Gray & Miller 2009)

However, the usage growth and XBRL related initiatives have not been limited to USA only. In early 2000s European Union made some moves towards standardization of financial reporting inside the Union (Baldwin, Brown, & Trinkle 2006) and lately Committee of European Securities Regulators (CESR) has been viewing XBRL as a format to be used in Pan-European Access to Financial Information Disclosure by Listed Companies (Committee of European Securities Regulators 2010). Moreover, USA is not even a leader in the adoption of XBRL and nations such as Australia, China and Netherlands have gone further with the technology (Alles 2009).

Finland, being traditionally seen as one of the leaders (Eurostat 2008) or at least competitive players (Eurostat 2011) in adoption of, and investment into the new technologies has lagged behind in the XBRL game. As of year 2011 XBRL has not been used in Finland either voluntarily or mandatorily in any form, on the official level, except some smaller scale experiments in some public organizations such as Statistics Finland and Financial Supervisory Authority. However, as mentioned, Finland is technology oriented country, with both private and public sector open for innovation. Therefore there is a good ground for XBRL to be adopted in the future. This adds yet more importance following research, since it is solely concentrated on the Finnish public sector.

1.3 Research questions

The main goal of the research is to find out potential business value of the XBRL standard to the major financial report receivers in Finland. To guide this research the following research question has been identified:

- What are the factors contributing to the business value of XBRL to the Finnish public organizations receiving financial reports?
  - What is the role of network effects in the creation of business value to financial report receivers from XBRL?

In addition to the main problem, it has been decided to look into the influences of the network effects and network players on the adoption of the technology in case organizations and potential effect on the value the technology brings.

1.4 Terminology

Business Value of IT is defined as an impact of IT on firm performance and an additional value that is created as a result of implementation of technology, which was not possible yield before (Mukhopadhyay Kekre & Kalathur 1995; Melville, Kraemer & Gurbaxani 2004).

Financial report receivers are the users of the data (financial reports) that could cover wide range of organizations and/or individuals. However, when this paper refers to financial report receivers in Finland, regulators are concerned (see fig. 1-1). To be precise it, contains Finnish Tax Administration, Statistics Finland, National Board of Patents and Registration (NBPR) and Financial Supervisory Authority (FSA).

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 ○ Companies, divisions, subsidiaries ○ Governments and governmental units: Oregon, U.S. Army, etc. ○ 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. ○ Aggregators: Collections of information, databases. Edgar Online etc. ○ Statisticians: Industry averages, quartiles etc. Dun and Bradstreet etc. ○ 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 1-1 Financial reporting supply chain roles (Baldwin, Brown & Trinkle 2006)

2 XBRL and financial report receivers

In this chapter, XBRL is defined and explained in further details, and financial report receivers and their connection to XBRL are reviewed. First subchapter tells more details about the history of XBRL, its purpose and potential benefits it promises according to the research done so far. Second sub-chapter looks into the financial report receivers in Finland and also briefly reviews some examples of XBRL usage abroad as well as benefits and challenges of such usage.

2.1 Overview of XBRL

XBRL International, the consortium behind the language, defines it as follows: "*XBRL is a member of the family of languages based on XML, or Extensible Mark-up Language, which is a standard for the electronic exchange of data between businesses and on the internet. Under XML, identifying tags are applied to items of data so that they can be processed efficiently by computer software.*" (XBRL International 2011a). In the literature, eXtensible Business Reporting Language (XBRL) is defined as a standard "for simplifying the exchange of financial statements, performance reports, accounting records, and other business information between software programs" (Hannon 2005). XBRL has been named "a digital language of the business" by the people involved in its development and adoption (Hoffman & Strand 2001). XBRL is a mark-up language based on the XML (eXtensible Markup Language), tailored for the business purposes; including financial reporting and inter-organizational data exchange. XBRL assigns human and machine-readable tags to the company information, which can be imported/exported between different systems in different companies and organizations. Tags are standardized according to the accounting rules and taxonomies developed by the non-profit organization behind the standard, worldwide consortium of accounting firms, and private and public regulators. (Pinsker 2003)

XBRL is being developed by the non-profit consortium XBRL international, which develops universal taxonomies for the language, oversees the standardization and promotes its use. XBRL International has been formed as a consortium of more than 600 major companies, organizations and government agencies from around the world. (XBRL International 2011b)

Being based on XML, XBRL is open, non-proprietary and truly extensible language. This allows information tagged by the language to be freely imported, exported, analysed and further processed regardless the systems that generated the original information. In this respect XBRL is revolutionary, since it liberates the business data from being proprietary and allows efficient and effective use and reuse of the information (Hannon 2005). Tags can be freely added and modified by individual users to suit their need. While this possesses the challenge to standardization of the XBRL it brings numerous benefits of openness and universality.

XBRL taxonomies are dictionaries of the language that are periodically published on the official web-page of XBRL International. Taxonomies assign particular tags to each individual unit. Besides the official taxonomies, as mentioned above, there are independent taxonomies designed to fit a country, an industry or even a company needs. (XBRL International 2011a)

There are numerous research papers that outline major benefits of using XBRL in financial reporting. While in some cases different terminology is used to underline the similar benefits of the technology, all of them can be summarized in following characteristics: accessibility, comparability, usability, relevance, transparency and understandability (Farewell & Pinsker 2005; Baldwin et al. 2006; Vasarhelyi, Chan & Krahel 2010).

All of the benefits discussed here arise from two basic advantages of XBRL compared to the other methods of a financial reporting. First, it is the ability to quickly and effectively manipulate the data using different software. Second, there are benefits related to a fair representation of the data and a reduction of information asymmetry. The summary of the benefits with the descriptions and the corresponding sources are presented in the table 2-1.

Table 2-1 Summary of literature on XBRL benefits

XBRL benefit	Description	Source
Accessibility	XBRL is open standard that can be easily distributed through the Internet. Documents created in XBRL are also compatible with wide range of software contributing further to the accessibility of the information.	Baldwin et al. 2006; Farewell & Pinsker 2005
Accuracy	The decrease of human intervention in the reporting process and ability to access and check information at any time, increases the accuracy of the reports published using XBRL.	Baldwin et al. 2006; Vasarhelyi et al. 2010
Comparability	Comparability derives from the standardized taxonomy that ensures that tagged items from the different reports refer to the same thing, thus making them easily comparable.	Baldwin et al. 2006; Farewell & Pinsker 2005; Vasarhelyi et al. 2010
Usability	XBRL is fully compatible and editable with variety of the software, unlike for example PDFs or HTML document there is no need to manually transfer the data into usable format and it is ready "out-of-the-box".	Farewell & Pinsker 2005
Relevance	The possibility of automatization supporting the timely delivery of the information and selection of the needed data at the moment by the system.	Baldwin et al. 2006; Vasarhelyi et al. 2010
Transparency	Transparency in XBRL means clear definitions of each component of the report, ability to easily and quickly analyse the reports are serving that purpose.	Baldwin et al. 2006; Vasarhelyi et al. 2010
Understandability	XBRL has potential to convert financial reports into information for everybody, not just accountants. The ability to connect elements with each other and administrative footnotes, also easiness to analyse the report with the help of software can enable other stakeholders interested in financial reports, but lacking proper background, to use them in their own benefit with ease.	Vasarhelyi et al. 2010

This research tries to establish connections between the benefits of XBRL that are plenty, with a real business value to the receivers of the reports and factors that affect creation of such value.

2.2 Financial report receivers & XBRL

In the scope of this research the financial report receivers consist of public organizations that are major report receivers and supervisory authority that receives massive reports from the banking sector. As the receivers those groups are regularly receiving financial reports from the companies, many of which are mandatory to the submitters.

Due to the fact that report receiving is an integral part of the operations of the above-mentioned organizations implementation of XBRL has a potential to have a profound effect on them. In the previously published literature there are some examples of such effects from the countries where XBRL has been implemented.

Weber (2003) points out two major benefits that are specific to the regulators receiving financial reports. First of all, XBRL reduces the cost of obtaining and assimilating information from the businesses that submit reports. There is no more demand on the manual work of entering the information. Also the problems of incompatibility among different governmental organizations' information systems are solved by introduction of XBRL. Second, XBRL allows the governmental organizations to make a strong case for standardization since it helps reporting companies to mitigate costs created by reporting without it. Having increasing pressure to not only reduce the costs, but also increase efficiency of financial reporting (Burnett, Friedman & Murthy 2006) organizations are more open to a change once they realize potential benefits.

Echoing to the Weber's (2003) first benefit of mark-up language, Roos (2010) also presents one possible point of a failure for public organizations that can be potentially solved by a wide introduction of XBRL. From the experience of Dutch statistics office, Roos (2010) gives examples of many failed initiatives of digital data exchange. Author cites the differences of digital standards across the organizations as a reason. Since a company has to submit financial reports to the multiple locations regularly (e.g. Tax Administration, Statistics Office), it is extremely important to have an open standard that fits different systems of each organization. XBRL solves this problem.

Roos (2010) also sees an opportunity in XBRL for public organizations looking to increase their efficiency. Due to the fact that financial information submitted to different organizations have at least few overlapping sets of data. This emerges an opportunity to create the single, flexible data format that can be used to send all the required data to all the regulators at once. Having standards would enable specific organizations to retrieve only needed sets of data without additional efforts.

3 Literature review

In this chapter the literature relevant to the subject is reviewed, summarized and synthesized to create basis for the theoretical framework used in this research. The chapter starts with concepts related to and affecting business value and ends with review of definitions and frameworks on business value of IT proposed in the previous literature. This review examines 33 articles, published between 1985 and 2007, in major academic journals, among others: Communications of ACM, Harvard Business Review, Information Systems Research, Journal of Management Information Systems, Management Science, MIS Quarterly, and Strategic Management Journal.

3.1 Business value of technology

In the chapter 3.3 on "productivity paradox" the issues of IT impacted firm performance and its measurement are discussed. This chapter goes beyond the issue of productivity paradox and reviews literature on the business value of IT itself and approaches to measure it.

In past decades the issues of business value of IT was popular topic of a discussion in various research papers. Nevertheless, approaches taken in those researches are different and there are various definitions and measurement methods used in the literature. Melville et al. (2004) analyse and summarize previously published research papers on the business value of IT (including both hardware and software), whereas Cronck & Fitzgerald (1999) do similar analysis, only focusing on business value of information systems (IS) and concentrating on software and service side of IT.

IT business value has experienced evolution over the years, taking roots from the simple effectiveness, using a narrow financial perspective in the context of a single system. Later studies expanded the view to the overall contribution of IT to organization, however still concentrating on financial measures such as ROI. (Cronck & Fitzgerald 1999). Mukhopadhyay et al. (1995) define business value of IT as the "impact of IT on firm performance" and use financial analysis in the study on order to define business value of IT. This approaches failed to consistently

demonstrate business value of IT in all cases, due to the fact that it is difficult in some cases to separate IT contribution and make an isolated measurement (Cronck & Fitzgerald 1999). At the same time studies have emerged that concentrated only on a perceptual value and an intermediate variables leaving out the financial impact (Mukhopadhyay et al. 1995). More recent studies on business value of internet-based technologies, such as e-business, take the *value* (rather than productivity alone) as the core and try to analyze the contribution of each IT generated component to it (Amit & Zott 2001; Zhu, Kraemer, Xu & Dedrick 2004).

Inconsistency in the IT business value research is explained by the fact that most of the studies (including this study) view IT from one particular angle (Cronck & Fitzgerald 1999; Melville et al. 2004). Melville et al. (2004) present a modified model of an IT artifact (table 3-1), proposed by Orlikowski and Iacono (2001) with four conceptualizations of IT, accompanied by corresponding research/measurement methods.

Table 3-1 IT artifact conceptualizations used in IT business value research (Melville et al. 2004)

| **Tool** |
| IT is a tool intended to generate value, whether productivity enhancement, cost reduction, competitive advantage, improved supplier relationships, etc. Specific intention for IT is often unknown. Studies of specific system and implementation contexts enable examination of tool view assumptions. |
| **Proxy** |
| IT is operationalized via proxies such as capital stock denominated in dollars. Wide range of potential proxies exists, but few have been adopted. Adoption of diverse proxies enables triangulation and enhances accumulated knowledge. |
| **Ensemble** |
| Assessment of IT business value generation in rich contexts, often using case or field studies. Organizational structure and co-innovations such as workplace practices may be included as moderators or mediators of value. |
| **Nominal** |
| IT is not conceptualized and appears in name but not in fact. Abstraction enables model precision at the expense of generality. |

*Adapted from Orlikowski and Iacono (2001). Computational conceptualization is not applicable to IT business value research and is omitted from the table.

In this model, first IT is viewed as a tool that is designed to generate value, therefore in research it is viewed as a direct value generator that enhances for example productivity. Proxy view is concentrated more on the perceptual value and usefulness, yet the value is usually measured in monetary terms. Ensemble view covers interaction between humans and technology and is often

used in the case studies. Finally, nominal view has IT in name but not in fact, there IT is viewed as one of the impacts on cost reduction and product differentiation. (Melville et al. 2004)

Cronk and Fitzgerald (1999) summarize different approaches to IT value measurement in a more expanded view on the types of approaches (table 3-2). The basic division is made into two types: quantitative measures (grey on the table) of business value and qualitative measures that include all the other aspects of the business value.

Table 3-2 Summary of "IS business value" evaluation approaches. Adapted from Cronk & Fitzgerald (1999)

Summary of IS business value
Quantitative, organizational level measure
Data envelope analysis
Information economics
Information value approach
Perceived values
Value is benefit of system and system goals
Value related to utility or usefulness
Resource view
Service quality
Alignment with business strategy
Process improvement
Multi-dimensional/business perspective measures

In this case the qualitative evaluation of the IT is seen as more advanced to the basic quantitative measures (e.g. cost benefit analysis) and covers wider range of aspects connected to the business value generated by a technology. Cronk and Fitzgerald (1999) summarize all of these approaches into three complexity levels in the IT business value measurement (table 3-3). The first level evaluates already existing systems in the context of a single company, either quantitatively by using cost-benefit analysis or qualitatively surveying users. The second level analyses the effects of an IS system to the rest of the organization that is not directly involved in the IS system. The

third level of complexity combines first and second levels and evaluates future investments into IS.

Table 3-3 Level of complexity in the measurement of the business value (Cronk & Fitzgerald 1999)

Level of complexity	Focus of measurement	Example of factors considered	Example of measures used
1st	Single system	Immediate sphere of influence of the IS	UIS, cost-benefit, CSF fulfilment
	Organisation	Collective IS costs versus organisational performance	Percentage of total assets versus total general IS expense
2nd	Single system	Context, alignment with business goals, levels of value contribution other than immediate sphere	Qualitative, degree of alignment, measures of power and politics, organisational impact
3rd	Single system	Combination of above factors	Multi-dimensional measures

Cronk & Fitzgerald (1999) go further into the simplification of a research approach of a business value of technology by dividing the approaches into two types (or combination of them). The two approaches are the measurement of value and value for money. The main distinction between the two is whether to involve the money invested into the technology into the equation when measuring the value. First measurement, *value,* looks into the value generated by the technology by measuring looking into the types of benefits and perception of the users. Value for money however, concentrates on the quantitative measures and benchmarks the value generated by technology to the investment. The example of such research approach is ROI calculations or a cost-benefit analysis of the technology. The final stage of approaches is to develop the measures of business value that later can be applied to the IS in question. (Cronk & Fitzgerald 1999)

The framework can also be applied to simplify the construct presented by Melville et al. (2004), where tool view can be categorized as the value for money approaches and ensemble and nominal view as a value research. Proxy view due to the synthesis of thr money measurement with the qualitative effects of IT can be categorized as a combination of two approaches. The construct can be seen in the figure 3-1 below.
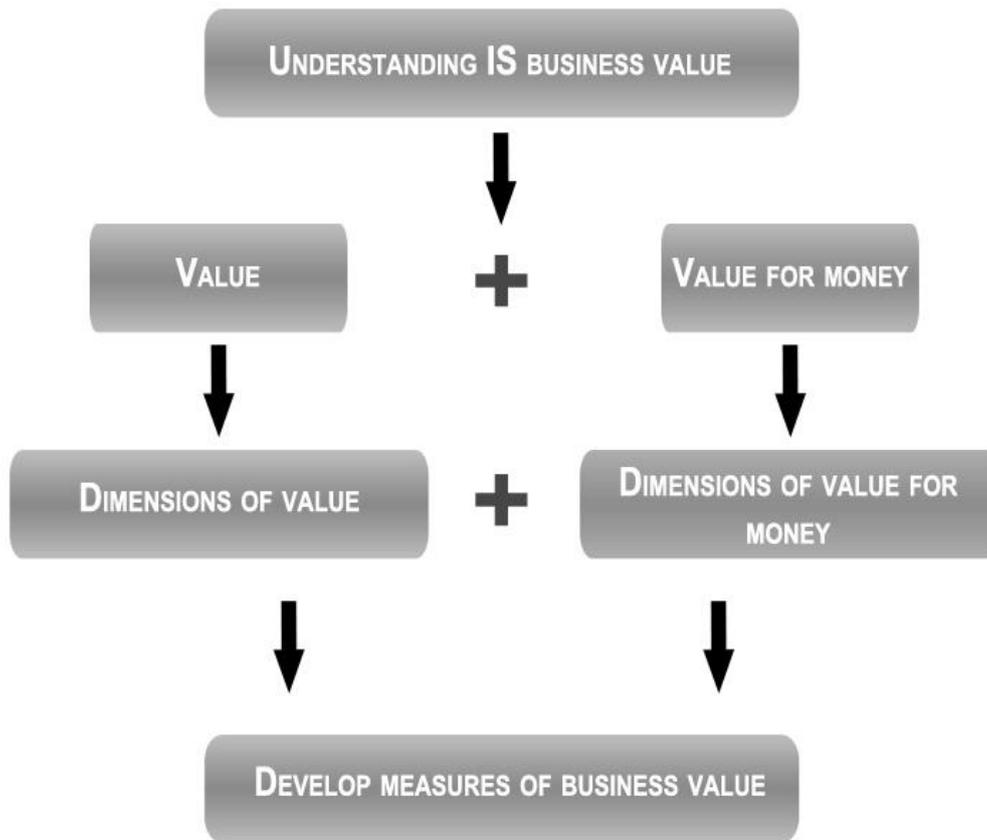
Figure 3-1 Approach to understanding the "IS business value" construct (Cronk & Fitzgerald 1999)

As can be seen from the above discussion the offered methods and approaches to the business value of IT are significantly different from one another. What is more important is that each of the approaches sees IT from a different perspectives and frequently measures different aspects of the value generated by the technology. This research on the XBRL, by approach and methodology used, comes closest to the ensemble view of technology suggested by Melville et al. (2004) and to the second level of complexity (despite the fact that XBRL is not existing system in research subjects) according to the Cronk and Fitzgerald (1999). This study also measures the value (the left path on the figure 3-1) rather than value for money, due to the fact that implementation of XBRL in Finland is still hypothetical, and this is only the background study of the issue.

Despite such a variety in the understanding of IT value and approaches to measure it there are at least two definitions of the concept that try to capture it fully and are derived from the analysis of previously published literature. Melville et al. (2004) define business value of IT as "organizational performance impacts of information technology at both the intermediate process level and organization-wide level, and comprising both efficiency impacts and competitive impacts". Cronk and Fitzegerald (1999) see IS business value as "the sustainable value added to the business by IS, either collectively or by individual systems, considered from an organizational perspective, relative to the resource expenditure required". Amit and Zott (2001) introduce the concept of total value of technology where all value created to the "firm, customer or any other participant in the transaction" counts. The bottom line of the two definitions is that business value generated by IT is a sustainable impact on the processes it is involved in as well as the organization as a whole that should be seen in the context of both organization level and environment it is operating in. Next chapter discusses the proposed frameworks of business value if IT that fit given definitions best.

3.1.1 Frameworks of business value of IT

With such variety of approaches to business value there are also number of frameworks proposed for the research and analysis of it. This chapter however, reviews most relevant frameworks found in literature to this study. Melville et al. (2004) propose IT business value model (figure 3-2) that consists of the three layers where influence of business model happens. In the core of the framework is the focal firm with the performance impacts on IT related processes and organization as a whole. The two external layers are the competitive layer, with industry-wide scope, and macro-level that evaluates the environment of the country in question and effects of it on the business value of IT.
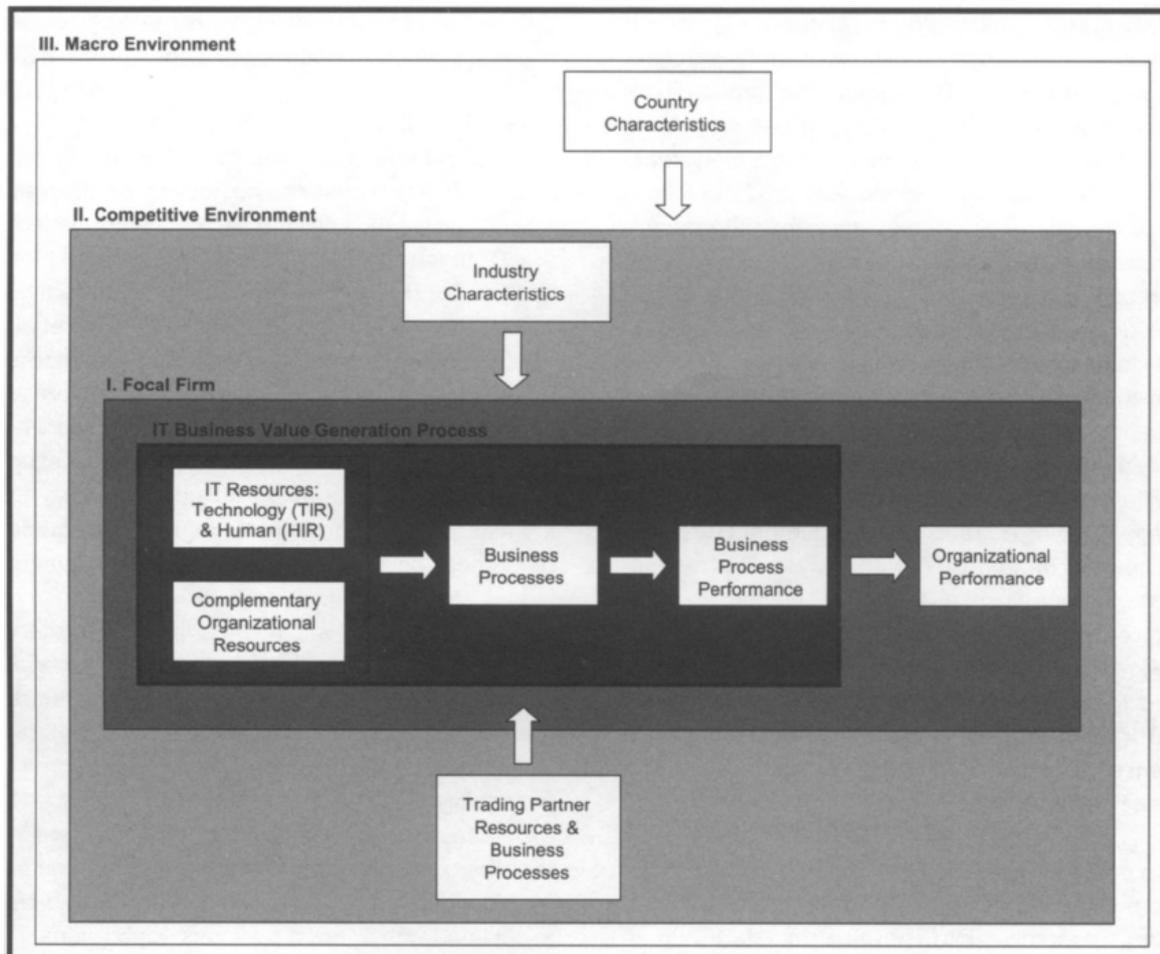
Figure 3-2 IT business value model (Melville et al. 2004)

While the overall idea of Melville's framework is acceptable and fit the definition of business value described above, it is very performance centric and does not capture all components of the business value generated by the technology and does not offer enough flexibility for this study. However, the environmental context given in the model is highly important in the discussion of open-standard, internet-based technologies such as XBRL, due to the factors related to network effects and business value measurement discussed earlier in the literature review. The model found in previous studies that best captures the valuable context of the environmental influence and also offers needed flexibility was Technology-Organization-Environment (TOE) framework.

TOE framework (figure 3-3) was first proposed by the Tornatzky and Fleischer in 1990. The framework identifies three contexts of the firm that influence the process adoption and

implementation of the technological innovation. Technological context usually covers the both implemented and potential technology available both inside and outside of the firm. Organizational contexts concentrates on the company itself (similar to focal firm in Melville et al. (2004) IT business value model model) and covers management structure, human resources, processes performed inside the company etc. Finally, Environmental context fully concentrates on external environment of the company, combining II and III levels of Melville's model, covering industry partners, competitors and macro-environmental factors. (Zhu et al. 2004)
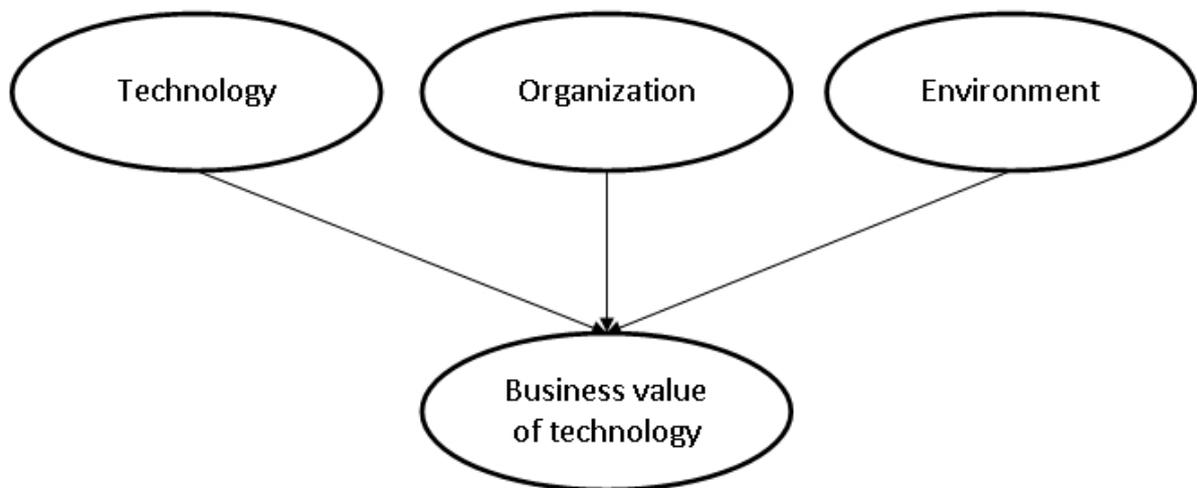
Figure 3-3 Technology-Organization-Environment Framework. Adapted from Zhu et al. (2004)

Existing literature that use TOE framework mainly concentrates on the adoption of the technology (Zhu et al 2004), however due to the flexibility of the model it is possible to fit it to other purposes. For example, Iacovou, Benbasat and Dexter (1995) use TOE framework to measure the impact of EDI on small organizations, Zhu et al. (2004) measure TOE impact on e-business value and Zhu, Kraemer and Xu (2006) expand the view of adoption and use the framework to observe the impacts on e-business assimilation. TOE contexts are also flexible for each research and do not assume constant values behind any of them, for example Iacovou et al. (1995) uses *perceived benefits, organizational readiness* and *external pressure* instead. Model also proves to be suitable for both quantitative (Zhu et al. 2004; 2006) and qualitative (Iacovou et al. 1995) approaches of the study.

3.1.2 Sources of value creation

In the previous chapters business value and factors contributing to it have been in general, abstract, terms. However, technology usually does not produce the value itself, but rather impacts different processes in organization sum of which produces value, as defined in the definition by Melville et al. (2004). Amit and Zott (2001) structured those sources of value creation into the model (figure 3-4) and applied it to the e-business.
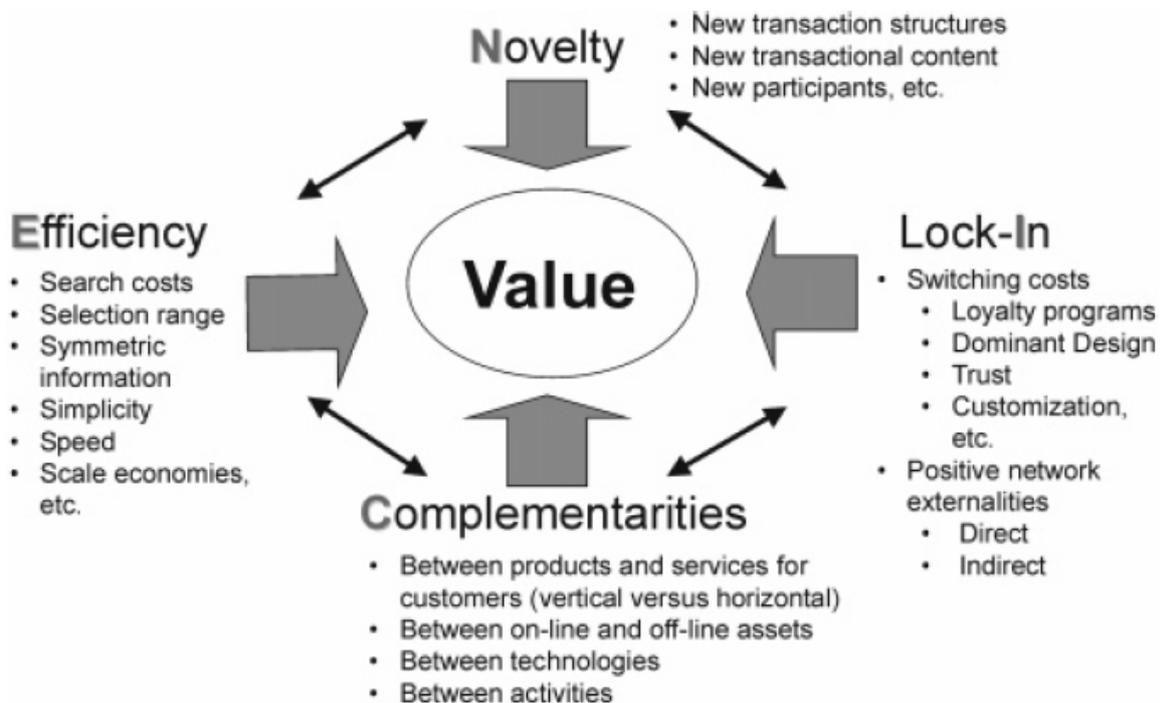
Figure 3-4 Sources of value creation in e-business (Amit & Zott 2001)

Despite having particular purpose of evaluating e-business, abovementioned model is also applicable to the discussion on XBRL value to the organization. Since being XML derivative XBRL shares many commonalities with e-business. In the proposed model there are four major value creation sources for the companies that are connected to the use of technology. The four sources are *efficiency, complementarities, lock-in* and *novelty* (Amit & Zott 2001)*,* each of those are derived from the theories on different value generators discussed in previous chapters of literature review.

Efficiency is one of the major value drivers for business (Amit & Zott 2001). According to Transaction efficiency increases when costs per transaction decrease, hence greater is an effect of technology on transaction cost decrease, greater is efficiency (Amit & Zott 2001). This in terms means getting more output with less input, which echoes with traditional production theory discussed by Brynjolfsson & Hitt (1996) in context of basic value measurement and productivity paradox (see chapter 3.2). Internet-based technologies can increase efficiency of the processes in many ways including reduced information asymmetry, interconnectivity of markets and market players, increased speed of transactions etc. (Amit & Zott 2001)

Complementarity and novelty given in the model can be connected and grouped together into what Brynjolfsson & Hitt (1998) refer to as variety. Complementarity allows organization to create new bundles of the products to increase the value of its offerings. This is made possible if new technology allows organization to connect its online or offline product with another offering thus increasing its attractiveness to the customer. This on the other hand created the value for the company by increasing the revenues. Novelty has the similar effect on the company as it too allows expansion of the range of offerings to the customers. Novelty however means the creation of the new products through new technology rather than bundling of existing ones. (Amit & Zott 2001). As can be seen both of the sources of value serve to increase the variety of offerings and have similar effect on company (increased profitability).

The last component of the model is lock-in of the customer. Lock-in is the direct effect of network externalities (Katz & Shapiro 1985) that produce switching costs and in some cases path dependency effects for the customers making the decision of going to competitor product in the future (Zhu et al. 2004). The first-movers to the market are frequently achieving lock-in effect by establishing critical mass of the users and buyer-seller trust, making it difficult for the competitors to steal the customers (Amit & Zott 2001; Katz & Shaipo 1994). This makes retention of the customers relatively easy to the company that achieves lock-in with its customers, generating value in this way.

3.2 Productivity paradox

One of the central issues in IT business value research is whether or not time, effort and resources invested in technology cause an increase in productivity of the business (Aral, Brynjolfsson & Wu 2006). "Productivity is not everything, however as noted by the economist Paul Krugman in the long run it is almost everything" (Brynjolfsson & Hitt 1998). For the decades in 20th century the theory of production was one of the most widely used to measure productivity of different inputs such as labour, R&D expenditures etc. (Hitt & Brynjolfsson 1996). Production theory is pretty straightforward and easy. It establishes variables and econometric relationship between them. The particular theory measures the expected outputs that can be produced from a certain amount and types of inputs in the context of a given technology and the laws of nature. According to this theory no inputs should be wasted and all of them should be converted into as much output as possible. (Brynjolfsson & Hitt 1996)

However, in the end of 1980s with wide introduction of IT in business and unprecedented investments in the technology it seemed that production theory was no longer valid. Some authors then claimed that the expectation of computer revolution was a rosy picture and optimistic predictions disconnected with reality (Salerno 1985). The phenomenon was called "productivity paradox". Brynjolfsson & Hitt (1996) define "productivity paradox" of information systems as the fact that when "despite enormous improvements in the underlining technology, the benefits of information systems spending have not been found in aggregate output statistics".

First, Brynjolfsson (1993) defined the paradox and analyzed the possible causes of the illusion that IT investments have no positive effect on productivity. Later literature such as Brynjolfsson & Hitt (1996) and Hitt & Brynjolfsson (1996) analyze the data from the companies from the end of 1980s to beginning of 1990s concluding that companies investing more in IT in general get the desired productivity. Brynjolfsson & Hitt (1998), look beyond of the productivity paradox and look into the organizational structure and strategies that can be employed to make a best use of IT.

In more recent study Devaraj & Kohli (2003) introduce new dimensions to the productivity paradox and suggest a link between productivity and usage of the technology. Aral et al. (2006)

accepts the assumption that big IT investments and productivity go hand in hand, but looks into the sequence of those two asking the question: "Which one was first IT or productivity?"

3.2.1 Mismeasurement of productivity

Brynjolfsson (1993) cites mismeasurement as one of the core causes of "productivity paradox". This factor does not actually affect productivity of the company, but it rather hides it from the productivity statistics. Many types of the benefits offered by IT such as increased quality of product/service, speed, responsiveness and also opportunities such as bigger variety offered to the customer are not always well accounted in productivity statistics or bottom-line on a short- or even medium- run.

In order to fully observe the impact of IT on productivity at the firm level, it is important to concentrate on qualitative measures (Dedrick, Gurbaxani & Kraemer 2003). Brynjolfsson & Hitt (1998) point out that output measurement, nowadays, should not be limited to the widgets produced by the factory or individual, but should rather concentrate on the customer value. Therefore, while in the early days of the theory of production a bushel of corn was a good measurement for the customer value offered, today it exceeds the core product or service and includes quality, speed, responsiveness, customer service and variety.

When talking about the service sector the situation with mismeasurement gets worse. Service sector in many cases owns majority of the IT capital and at the same time the role and variety of intangible benefits are far greater (Bosworth & Triplett 2000). Brynjolfsson (1993) provides great example of automatic teller machines (ATM) that are providing enormous value to the customer by being able to work 24 hours a day, be conveniently located and be much faster than bank clerks. However, if bank's productivity is measured by checks written by the branches of the bank, introduction of ATMs did not only *not* improve the situation, but also made it look worse, at least in statistics.

The relevance of the point of mismeasurement is great when talking about the business value of the technology such as XBRL. The technology affects the services of the report receivers, but it might not increase the amount of reports received or ones processed. However, XBRL may have an impact on speed, usability and accessibility of the data etc. as discussed in the chapter 2.

Therefore, when building the theoretical framework for this research, the components of the business value take into consideration those measurements and apply them to the reality of Finnish financial report receivers.

3.2.2 *Mismanagement of productivity and management practices*

The problems with wrong management, organization and management practices are another contributor to the "productivity paradox". Unlike mismeasurement, in this case there are really no productivity benefits from IT, neither are there any expectation of getting them in the future (Brynjolfsson 1993).

Initially, mismanagement covered the problems connected to the mismeasurement effects discussed in the previous subchapter and issues connected to agency theory (Brynjolfsson 1993). However, more recent literature (Brynjolfsson & Hitt 1998; Dedrick et al. 2003; Tallon, Kraemer & Gurbaxani 2000) also adds wrong decision-making and management practices such as strategy and organization into the explanations of the paradox.

In the first part of the problem cited in earlier literature, the main cause of unproductive IT is that the decision makers performing the investment, are acting in their own interests which are not always beneficial for the company (Brynjolfsson 1993). The simple explanation of this situation is the agency theory in action. The theory describes alternative designs of governance to mitigate the conflict between principals (in our case the owners of the company) and agent (managers making decisions). According to the theory an agent always acts in his/her own interests when making the decisions for the company, those decisions however are not always in line with principals interests. (Kochhar 1996)

Another cause of mismanagement as cited by Brynjolfsson (1993) is mismeasurement and "information chaos" caused by the overflow of the information. According to the author mismeasurement not only hides productivity from the manager, but also triggers the decisions that are based on wrong assumptions.

The second part of the issues with wrong management can be summarized in a statement: productivity comes not from working harder, but working smarter (Brynjolfsson & Hitt 1998).

Management practices are seen in literature as one of the cornerstones in the process of increasing the performance of the company by means of IT (figure 3-5).
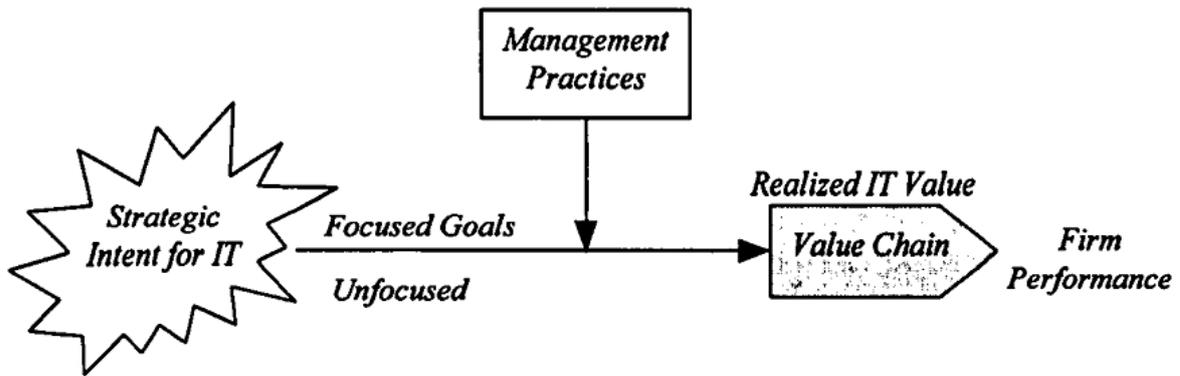
Figure 3-5 Conceptual model of IT business value (Tallon et al. 2000)

There are three major practices that seem to affect productivity positively: strategic alignment of business goals and IT, IT investment evaluation (Tallon et al. 2000) and creating a new organization inside the company (Brynjolfsson & Hitt 1998).

Tallon et al. (2000) found out through the survey of executives from 1500 firms worldwide, that management practices had a positive effect on the IT supporting productivity. First, focusing on the business goals and aligning business strategy with IT proved to be closely connected to the value created by the IT. Second, setting focused goals for IT increases the efficiency of IT investment evaluation, which in turn increases the chances of IT investment success.

The third suggestion to increase productivity of IT is changing the processes and organization. Brynjolfsson & Hitt (1998) based on the observations suggest that coupling decentralization with sufficient IT investments gives approximately 5% increase in productivity compared to the other firms. In earlier studies, Hammer (1990) also pointed out that disappointment with heavy IT investments comes largely because of not updating old ways of doing business and not because of IT itself.

All in all while there is evidence of particular management practices resulting into increased productivity it is difficult to translate them into concrete prescriptive actions. Research still shows only the links between certain management practices and increases on productivity without taking into consideration broader factors. (Dedrick et al. 2003). Yet, in the scope of this research, best practices of technology management in organization can serve as a good basis for the components of evaluation of business value of XBRL.

3.2.3 *Productivity paradox and usage of technology*

Some recent researches on the connection between IT and productivity have been concentrating on the actual usage of technologies introduced to the companies (Devaraj & Kohli 2003; Zhu & Kraemer 2005). In these cases concentration is made on the actual day to day usage of the technology, so called post-adoption usage rather than general adoption of the technology inside the organization (Zhu & Kraemer 2005).

Devaraj and Kohli (2003) found that in analysed healthcare organizations, usage of technology was the "missing link" between the IT investments and the creation of the value. Hence, the actual intensity of usage was the more important factor than the technology itself or the amount of investment. The status of a "missing link" has been confirmed by Zhu and Kraemer (2005) study where results constantly showed the relationship between technology usage and value created.

In this case, the cause of created value was not only the intensity of usage (reducing idle time of technology in use) but also unintended consequences that followed. Frequent usage of technology helped to generate improved ways of usage and novel methods of performing old processes (Zhu & Kraemer 2005), which reinforces the claim that re-engineering of the process while employing new technology improves productivity (Hammer 1990).

XBRL being a new technology for performing financial reporting tasks also suggests the idea that active usage can possibly increase the business value generated by it.

3.3 Network effects

Importance of network effects in the adoption and value of the technology has been a popular research topic for decades. Notably, the topic was widely described in the series of articles by Michael Katz and Carl Shapiro (1985, 1986, 1994). The idea behind the network effects (externalities) is that there are many products, utility of which, to the user, increases with the number of other agents consuming it, hence the value of the product greatly depends on number of people using it (Katz & Shapiro 1985). A good example of such product is telephone, where it has no value if there is a lonely user with nobody to call to. However, the value of phone connection increases exponentially together with the number of users. The value of such network can be estimated using Metcalfe's Law, where network with N users has utility of N*(N-1) to each consumer (Metcalfe 1995).

As a rule, network effects have especially strong influence on the internet-based technologies such as inter-organizational systems based on XML (Zhu, Kraemer, Gurbaxani & Xu 2005). Therefore network effects are very relevant to this research, since XBRL is XML based technology aimed towards the connection of different organizations. It can also be assumed that there are possible ties between the network effects and the business value of XBRL.

In academic literature multiple dimensions and types of network effects have been researched. First, network effects can be categorized into direct and indirect effects (Katz & Shapiro 1994). Second categorization of network externalities is positive and negative (Lai, Wang, Hsieh & Chen 2007). Third, network effects are categorized into vertical and horizontal effects (Zhu et al. 2005).

The telephone example given in the beginning of the chapter is the example of a direct network externality where the utility of the product directly increases with the number of users. Indirect effects are market-mediated and link number of users with complementary products that appear on the market as a result (Lai et al. 2007). The example of such effect is increased number of add-on applications for the popular software platforms (e.g. Apple's iOS). XBRL as a platform

also may have direct (e.g. increased accessibility of data) and indirect network effects, that bring a different perspective on the business value of the standard.

In the studies on open-standard systems, frequently the positive externalities are researched (Lai et al. 2007, Zhu et al. 2005). Positive network externalities have been already described above and they are supported by Metcalfe's Law. However, there is always the possibility of negative network effects. Negative network effects exist when user's utility decreases with the increase in other agents that use the systems (Lai et al. 2007). A negative externality will occur if for example the users using the internet from one location will exceed the allocated bandwidth, then each additional user will only slowdown the network, devaluating the utility of it for the others. While also concentrating on positive effects, this study also looks to potential negative network externalities in the adoption of XBRL for the financial report receivers.

The last method to categorize the network effects are vertical and horizontal peer externalities. These dimensions of the network effects come from the hierarchy of the market. Zhu et al. (2005) refer *trading community influence* to the vertical effects and *peer adoption* to the horizontal. Example of vertical influence would be companies offering special treatment to the suppliers that send their invoices electronically (e.g. faster payments), which, as the network of such companies grow, pressures suppliers to switch to the e-invoicing platform, as well as increases the value of such platform. The peer (horizontal) adoption refers to the usage of the product or technology by the other players in the market (competitors), the example of it is usage of the same electronic money transfer standards by majority of banks, in this case each bank that does not use the standard loses the benefits caused by the positive network externalities (e.g.
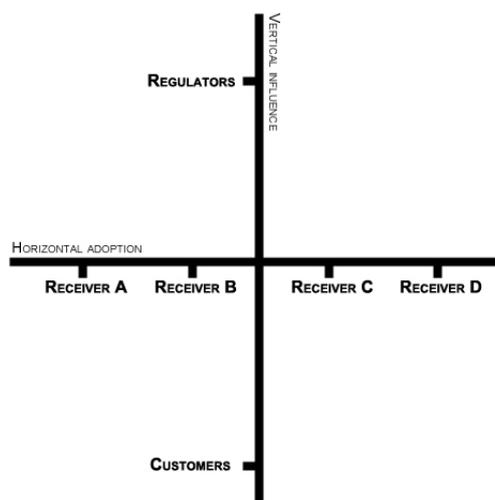
Figure 3-6 Example of vertical and horizontal influence

better customer service).

This categorization of the network effects is especially valuable in the evaluation of inter-organizational open systems in financial reporting since those require involvement of vertical players (e.g. regulators, customers) as well as horizontal peers who interact with the same vertical actors (see figure 3-6).

3.3.1 Network effects and standardization in adoption of inter-organizational systems (IOS)

Lately firms are increasingly deploying inter-organizational system in order to facilitate collaboration; the general trend is to create networked organizations such as value networks to increase productivity. Particularly open-standard, internet-based systems have become popular substituting older EDI systems. (Zhu et al. 2005)

Internet-based systems, being more open, facilitate a generation of bigger communities, which lead to stronger network effects (Bakos 1998). XBRL is an open standard that facilitates the creation of inter-organizational systems; therefore the discussion on IOS adoption network effects is highly relevant.

Previous studies have found a positive relationship between the willingness to adopt the internet-based systems and high network effects (Lai et al. 2007, Zhu et al. 2005). The stronger the positive network externalities are greater the expectations of benefits from the adoption of IOS become (Zhu et al. 2005). High network externalities also facilitate better information sharing and information collection, thus reducing the information asymmetry (Lai et al. 2007).

However, in some cases benefits of strong network externalities are limited to the early adopters and later network effects turn to be negative. For example suppliers competing for the same buyer might find it difficult to reap any benefits from the IOS if it allows buyer to easily access and switch between competitors. (Riggings, Kriebel, & Mukhopadhyay 1994). The potential threat is not limited only to the particular case given in the example and is real to any case involving vertical connections between market actors on a different hierarchical level.

Riggins et al. (1994) make a clear distinction between two types of IOS users: initiators and followers. Initiators usually propose the network to other market players and are as rule relatively big companies with more experience and resources; hence they are the ones who manage to benefit from such systems the most. Katz and Shapiro (1986) refer to the concept as "sponsorship". According to the authors a sponsor is an entity that "is willing to make investments to promote it [technology]". Technologies that have an active sponsor are also more likely to take over the rival options in the long run (Katz & Shapiro 1986), hence the role of the initiators in amplifying network effects cannot be underestimated.

Followers are usually adopting the technology under the pressure of vertical network effects and are forced to meet requirements of partners; therefore their benefit is usually smaller (if not non-existent). Followers are not as committed to IOS and need encouragement. Initiators usually use either subsidies to encourage other players or their market power to mandate new IOS. (Riggins et al. 1994, Wang & Seidmann 1995)

Initiators in the case of XBRL are frequently the regulators, as in the case of SEC in US, who either encourage other market players or mandate the use of the standard with their unique regulatory power. As far as standardization is considered there is always the question of proprietary versus open standard. While open standard systems are considered superior for being flexible, cheap, easy to implement and a social good generator (Gandal 2002, Zhu et al 2005) and thus more attractive to the companies, other study shows that proprietary standards are preferable in corporate world because they allow individual company to get bigger benefit (even if it hinders the growth of the rest of market) (Aggarwal, Dai & Walden 2006).

As can be seen from above discussion network effects are potentially very important in defining the business value of XBRL to the financial report receivers in Finland. As an open technology that connects multiple organizations on both vertical and horizontal level it can be proposed that network effects are very strong in having an impact on all the sides involved. The question of sponsorship is also present, since there are numerous possibilities of introducing XBRL in the country (e.g. government mandated standard, voluntary filling, company/industry initiative). These questions and propositions are discussed in more details in theoretical framework.

4 Theoretical framework

This chapter describes a theoretical framework that has been developed for this study, based on the theory reviewed in the previous chapter. This part of the report discusses, in detail, the each component of the framework and justification for the decisions made.

4.1 Overview of the framework

The goal of this study is to find out the factors that may affect the business value of XBRL to the financial report receivers in Finland. In order to achieve the goal, there is a need to find both internal and external influences that may have an effect on a value creation to report receivers on both micro and macro level and also define what are the sources of the business value to these organizations and how do they interact with different factors.

The previously published literature reviewed in chapter 3 has been use as the basis to create this theoretical framework. The framework tries to capture all the aspects of business value generation from XBRL, but at the same time keeps components of it abstract enough to make them applicable for the broad range of cases as there are two groups of report receivers with a variety of business goals. In order to achieve such an effect, a flexible basis was needed for the framework that would allow freedom of customization without losing its validity. Therefore many decisions made in the construction of this framework were based on this principle.

It was also necessary to build the framework which would fit the research design of the given study, with a qualitative approach and a potentially relatively small amount of data. Also background circumstances of the study were important, where technology, the potential value of which is being studied has not yet been implemented (or even planned to be implemented).

The most important however has been the goal to contribute to the theory. Therefore various existing theoretical concepts have been effectively synthesized into the new framework that tries to bring a new perspective on relatively old research issue (business value of IT).

The core of the proposed theoretical framework is based on the Technology-Organization-Environment framework, and the variation used by Zhu et al. (2004) depicted on figure 3-3. The

TOE framework was chosen because of the mentioned suitability to the business value research and flexibility that allowed other theories to be incorporated in it. The TOE has been modified to a technology usage, an organization and network effects to better serve the purpose of the study. On the side of the business value itself the framework of "sources of value creation of e-business" proposed by Amit and Zott (2001) was used. While value creators and efficiency remained unmodified, novelty and complementarities were united into value-added services in order to better reflect the value creation in XBRL usage. Lock-in from the original model has been transformed to the interoperability in order to capture the wider scope of issues related to the introduction of the open standard in the business environment. Theories of network effects and productivity have been included into the proposed framework and are discussed further in the following sub-chapters of chapter 4. The basic structure of the proposed framework is depicted on figure 4-1.
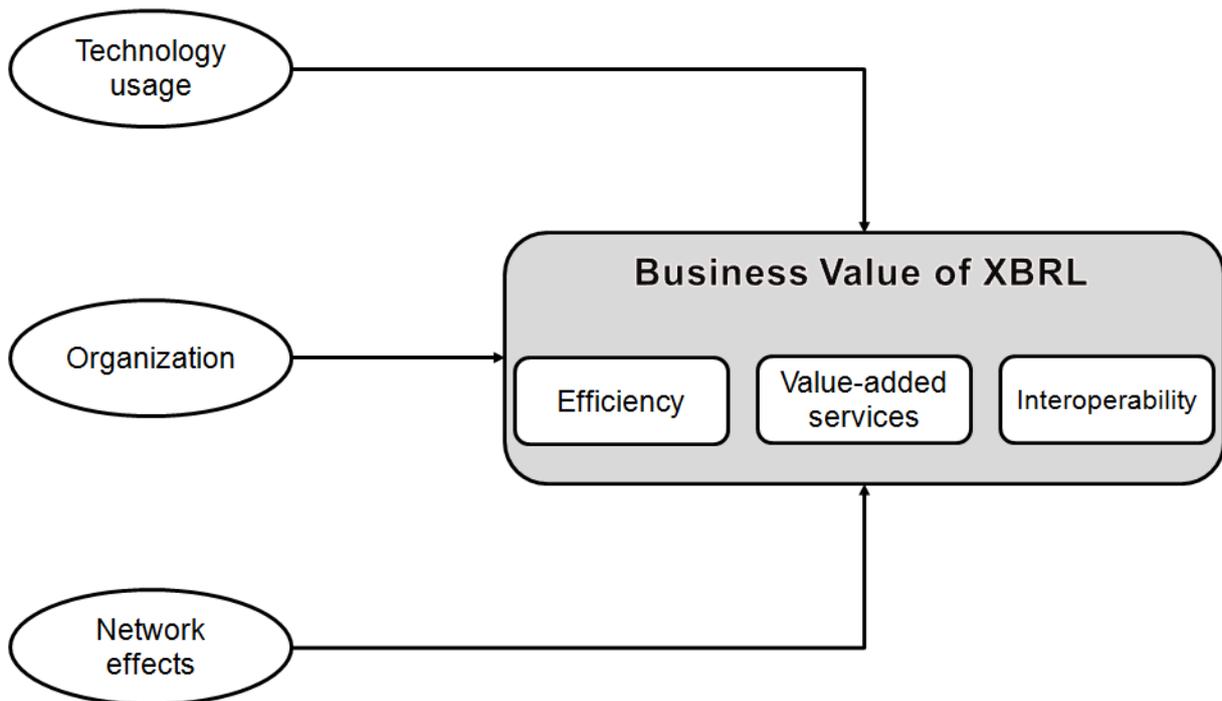
Figure 4-1 Theoretical framework for business value of XBRL to financial report receivers in Finland

4.2 Contexts of business value of XBRL

As has been mentioned in the previous chapter the basis of the theoretical framework (see figure 4-1) is the TOE framework, therefore one of the cores of the study is a context in which technology, in this case XBRL, generates the business value. It is important to note that this part of the framework deals with the effects on business value creators and not with value creators themselves. Since XBRL is not implemented in Finland and given the study deals with a hypothetical future value of this technology, it is impossible to directly derive and measure the value generated by it. However, it is possible to connect characteristics of XBRL to the contexts Finnish report receivers are operating in and then connect those to business value creators, thus predicting the factors affecting the value of new technology to its users.

The framework has been modified in order to suit this particular research, however, there remains 3 contexts as in the original model that cover corresponding environments (technology available, organization and external environment). The only difference in the contexts is that here they concentrate on more detailed and more relevant issues to the business value of IT that have been identified from the literature review. As a result *technology* has been changed to *technology usage* and *environment* has been transformed into *network effects* and *organization* remained unchanged.

4.2.1 Technology usage

Technology usage covers past and current inter-organizational technologies that are implemented in the organization and are used in the different processes throughout the company and partner network. This context includes not only and not so much of a technology itself, but rather the usage patterns, past experience with it and perceptions connected to it. Unlike the traditional technology context of the TOE framework, technology usage concerns only focal firm and its internal environment rather than the technology "out there" in the market. Reason for this decision is that the goal of this study is to find the effects of XBRL on the business value of case organizations and not to compare it to available alternatives and view them as the option.

First, issue is a usage of the technology in the context of how intensive is the use of it and whether usage is connected to the value (in organization's opinion). Here the propositions of Devaraj and Kohli (2003) and Zhu and Kraemer (2005), mentioned in the chapter 3.1.3, is tested, where low usage of the technology is connected to the productivity paradox. In case of Finnish financial report receivers, the usage of current/past inter-organizational technologies and connection of it with the increased productivity are investigated.

Research into the use of current and past technologies also helps to reveal past experience of usage of inter-organization technologies and cooperation with the partners. Management practices that are discussed in deeper details in the *organizational context* can also be discovered in the process. Taking into consideration proposition of Zhu et al. (2005) connected to the path dependence in the adoption of open-standard IOS; it would be possible to draw some conclusions on the likelihood of adoption of the particular technology and its potential success by looking into the past history of the technology usage in the company.

The third contribution of technology usage context into the study results in perception of organization on the usefulness of technology. Here it is possible to employ Technology Acceptance Model (TAM) suggested by Davis (1993). One of the core parts of TAM is the connection between positive experiences of user with the technology and usefulness of the system. This part of technology context can help to predict potential value of XBRL from the past experience of the organization through prism of how tech savvy the company is.

4.2.2 Organization

Organizational context in this framework remains mostly unchanged from the original understanding of it described by Zhu et al. (2004). It is caused by the fact that organization also holds a vital part in the business value creation in this case, and covers similar concepts as in original. However, there are two particularly interesting contexts to be highlighted in this research. Those are management practices connected to technology implementation and usage, and practices of technology impact measurement. As noted by Brynjolfsson (1993) mismanagement and mismeasurement are two of four major reasons of a hidden productivity,

which contributes to the viewpoint that information technology does not contribute to the company's business value.

As mentioned in chapter 4.2.1 exploration of past and current technology usage can reveal some information on management practices when dealing with IT and make some predictions on the future technologies. In addition to that study aims to discover the official policy to towards the implementation and usage of technology, and effects of organization structure and decision making process on IT.

The business value of the information technology is as good as it is measured, therefore measurement practices in the researched companies is an §important part of the organizational context. The methods implemented in the measurement are covered in this part. The scope of the value measurement should also be identified and matched to the views and extents to which value of the IT is measured, as suggested by Melville et al. (2004) and Cronk and Fitzgerald (1999).

4.2.3 Network effects

For the purpose of the theoretical framework, in the context of external environmental factors it was decided to concentrate on network effects. There are several reasons for this decision. First of all, as mentioned in the literature review, network effects are very significant in inter-organizational systems and their importance grows further when dealing with the open-standards (which XBRL is). Second, evaluation of the competitive or regulatory environment is less relevant to the given study due to the fact that part of the case organizations (Tax Administration, Statistics Finland and NBPR) do not have competition due to their nature. Regulatory environment can be reviewed in the context of the network effects and standardization as regulations related to the XBRL in Finland are subject to change if decision on its mandatory implementation is made.

As of the network effects there are various issues to be discussed. First, potential positive and negative effects (both direct and indirect) and their importance, related to new inter-organization technological standard, have to be considered, as seen by the case organizations. Second, the

importance of horizontal peer pressure and vertical influence in the business value generation and willingness to adopt the XBRL has to be investigated.

While it is not possible to talk in details about either positive or negative effects of the XBRL in Finland, due to the fact that it is not here, it is still possible to predict some patterns. In this part of the framework previous experience and future estimations of the companies on adopting new inter-organizational technology are taken into consideration.

Horizontal and vertical influence is an interesting issue. While the vertical introduction of technology where it is standardized by the government would be more effective in terms of adoption speed, the question here is the effect of vertical and horizontal influences on the business value of the technology adoption of which is caused by such influences.

4.3 Business value of XBRL and sources of its creation

The second part of the theoretical framework (figure 4-2) is the business value of the XBRL and the sources of its creation. As mentioned in the overview of the framework (chapter 4.1) the basis of this component in the theory is based on the model developed by Amit and Zott (2001) discussed in the chapter 4.
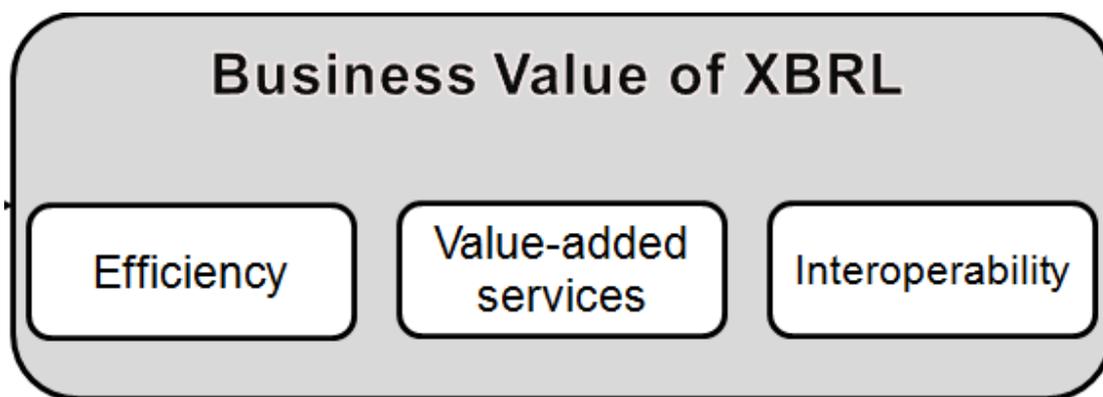
Figure 4-2 Sources of business value creation in XBRL

The original model has been modified and the novelty and complementarities have been grouped into the value-added services similar to the concept of variety suggested by Brynjolfsson & Hitt

(1998) as a source of the business value in the company. The purpose of the model is also different from the study by Amit and Zott (2001) where it is an independent framework that establishes connections between the different value creation sources. In this study as can be seen from figure 4-1, the model is integral part of modified TOE framework where value creation sources are seen under a single umbrella all contributing to the business value of the XBRL. Here the relationship between value creation sources and TOE contexts is established.

This approach of identifying high level value creation sources was adopted, due to the fact that it is impossible to talk or measure the absolute value of the XBRL in the potential markets such as Finland, where the question of adoption is on its early stage. The business value here is seen as the result of positive TOE context effects on the sources of value creation and is not explored itself as such.

4.3.1 Efficiency

As mentioned in the chapter 3.3.2 efficiency is one of the main components of the business value and it is most obvious sign of the value of any technology. Efficiency has been single most important measure in the pre-"productivity paradox" period during the domination of the production theory. Therefore it is impossible not to include this value creation tool in the study about the business value of IT.

In this part efficiency effects from potential benefits of web-based open standard such as XBRL (discussed in chapter 2) are discussed in the TOE contexts. The main expected effects on efficiency from the literature are an increased speed, a lower labour intensity, possibly better quality of reports and a reduced information asymmetry, through suggested XBRL characteristics such as accessibility, comparability, usability, relevance, transparency and understandability.

4.3.2 Value-added services

Amit and Zott (2001) *novelty* and *complementarities* were merged into *value-added services* for the purpose of this model. This is again determined by the fact that this is more high-level background study. Value-added services in this case combines two mentioned components and is

close to the definition of "variety" by Brynjolfsson & Hitt (1998) where it helps to introduce more and better services and products to the customers.

As mentioned in the literature on the productivity paradox discussed in the chapter 3.3 variety could be an important contributor to the business value, yet it can frequently go unmeasured since its effects may not always be connectable directly to the introduction of the technology. This study looks into the companies' attitude towards the value-added services as a value driver and explores factors helping or preventing the companies to introduce the variety of those services after implementing new technologies.

4.3.3 Interoperability

The third component of value creation is the interoperability, which is closely related to the network effects. As has been seen in literature introduction of the open-standard technology magnifies the network effects. Therefore it can be assumed that wide introduction of technology such as the XBRL would result in significant improvements in interoperability of the report receivers.

4.4 Summary of theoretical framework

Summary of the framework items discussed in this chapter have been summarized in the figure 4-3.
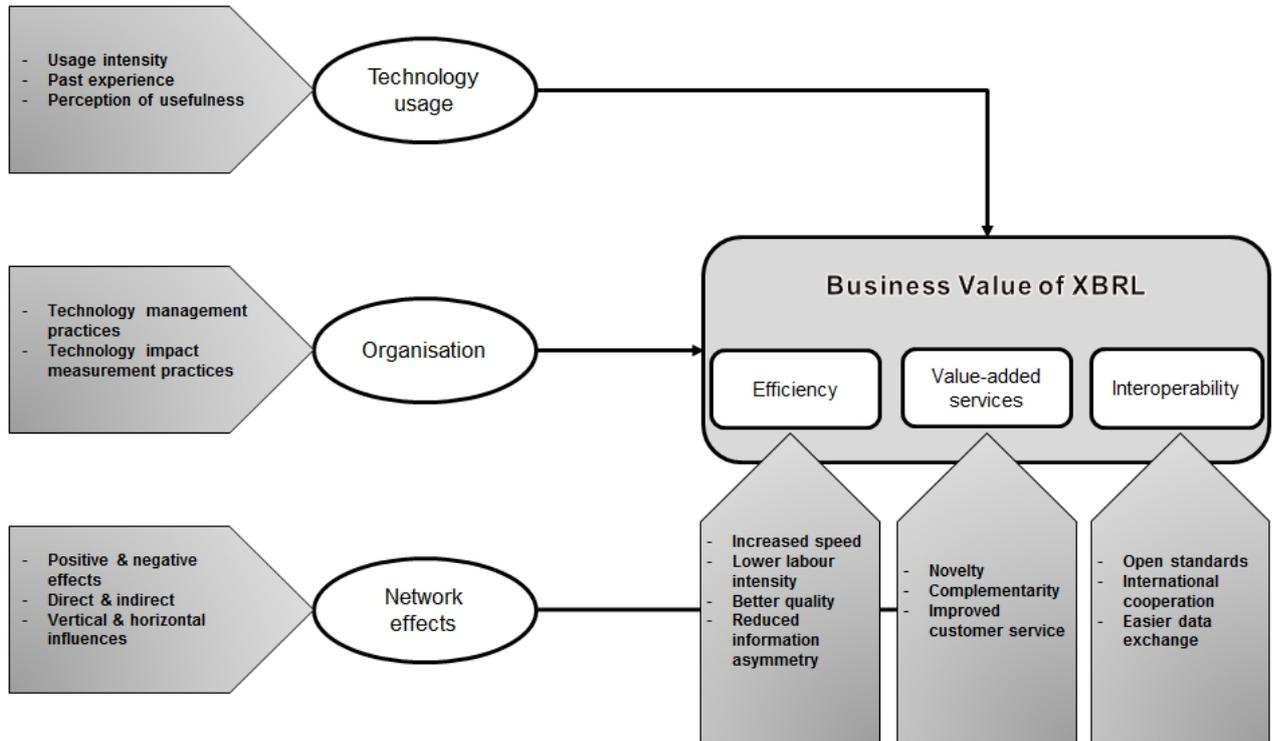
Figure 4-3 Summary of theoretical framework

As can be seen from the figure theoretical framework is divided into six discussion topics for the case companies included in this study. There are three contexts adapted from TOE framework (figure 3-3): *technology usage*, *organisation* and *network effects*, which cover both internal and external factors potentially affecting creation of business value. Remaining three components represent the value creation sources adapted from the model of sources of value creation in e-business (figure 3-4): *efficiency, value-added services* and *interoperability*. The framework seeks to establish connection between affecting contexts and sources of value generation in case of introduction of XBRL to the financial report receivers in Finland.

Additionally, framework includes subtopics for each of the topic where various factors of each topic derived from the previous literature are included. Technology usage discussion includes mainly previous experiences with similar technologies that case organisations have encountered. The main topics of discussion are usage intensity of the technology, experiences of using it and perceptual usefulness of those technologies as described by organisations. Organisation context consists of two main points: management and measurement practices in the context of impact from new technology. Network effects are devoted to the external influences in the six main dimensions introduced by literature on the subject. Direct and indirect, positive and negative effects of the technologies (past, present and future) are discussed as well as the role of influence from the peers and authorities. Network effects are viewed strictly in the context of business value and effects on it.

Efficiency, the basic measurement of productivity and business value, establishes connections between proposed benefits of the technology and actual expectations on productivity resulted by them. Value-added services combine novelty and complementarities, and concentrates on the possibilities drawn from new products and services that may be possible through improved capacity and features from new technology. Interoperability discusses the possible impacts on business value through the prism of open-standard environment, customer retention, switching costs and other network externalities.

The aim of this framework is to offer the flexible model for estimation of factors affecting the business value connected to the potential introduction of new technology. Special emphasis has been made on the fact that no precise numbers or hard facts can be drawn from the research subjects. Yet framework is aimed to be the tool to make sensible predictions and estimation on how different factors would affect value generation if technology was to be introduced.

5 Research Methodology

This chapter discusses the research and data collection approaches and methods used in this study. Chapter also presents justifications for the decisions made related to the research and briefly reviews alternative methods and approaches.

5.1 Type of the study

The purpose of this study is to find out what and how different factors affect the business value of XBRL to the financial report receivers in Finland, therefore first logical step in the process was to review literature on business value of IT and try to construct the approach to tackle the problem. Process-oriented approach was rejected due to difference of studied organizations and concentration of the approach on the existing process itself rather than broader factors affecting the generated value. Therefore more flexible and general approach of analysing value generators' relationship with environmental factors has been chosen, as can be seen from the chapter 4 on theoretical framework. Through the extensive literature review the components of the framework has been defined and combined into comprehensive model for capturing generation of business value from technology.

The study has exploratory character. In this approach to studies problem is more or less understood, however there is not complete clarity and study requires "detective approach" with flexibility, extensive data collection and theorizing (Ghauri & Grønhaug 2005). While the problem is more or less defined in this study, there is no implemented process in place and no previous data exists on the value of XBRL (besides theorized benefits). For these reasons, it was decided to choose qualitative approach throughout the study. Qualitative research "uses text as empirical material (instead of numbers), starts from the notion of social construction of realities under study, is interested in perspectives of participants, in everyday practices and everyday knowledge referring to the issue under the study" (Flick 2007). In the given circumstances it is easier to gather in-depth data, everyday knowledge and perspective of the studied organizations is also a priority, in addition qualitative research offers higher flexibility (Ghauri & Grønhaug 2005), therefore method has been given priority over the quantitative alternative.

Among the research methods offered by the qualitative approach case studies has been chosen as a preferred one. Case method includes in-depth study of the cases under consideration, through the interviews and observations that aims to reconstruct sociological perspective (Hamel, Dufour & Fortin 1993). Ghauri & Grønhaug (2005) state that case studies can be either single or multiple cases, in this case the latter is used in this paper, due to the fact that multiple organizations have a potential to implement an XBRL yet might have different perspective that could be universally considered by others. Case study method was also chosen due to the fact that at this stage the variables studied are very difficult to quantify, and may vary greatly from case to case as no practical experience with technology exists.

5.2 Data collection methods

A vital part of the case study method is the collection of the empirical data to analyse. One of the best ways to gather such data is in-depth, qualitative interview with respondents (Ghauri & Grønhaug 2005).

There are three types of interview structure: structured, semi-structured and unstructured (Ghauri & Grønhaug 2005). In order to harness the power of open-ended answers and flexibility of questions, yet make sure that all relevant topics are discussed, this study uses the semi-structured interviews. Yin (2003) presents a similar method called *focused interview*. The idea behind the method is to have short interviews, lasting an hour at maximum. Focused interviews try to keep open conversation format, allowing respondent to express him/herself and leave space for additional questions that may surface.

However, a preparation of discussion topics and some lead questions is done before the interview, yet the questions and the topics can change the order and the form they are being discussed, in order to allow a respondent to structure his/her own thoughts in the preferable manner and give as much information as possible (Ghauri & Grønhaug 2005). Preparation of the structure is also needed in order to make sure every topic of interest is covered during the limited time (Yin 2003). Semi-structured interviews also allow a reduction of a bias as interview is carefully planned in advanced and improved from interview to interview, in the case any problems found with the structure (Ghauri & Grønhaug 2005).

The method of in-depth interview is suitable for this particular research. As was mentioned above, in order to answer the research questions set in the beginning, it is very important to get a complete picture on the issues to be discussed from the respondents. Subjective, personal opinions are also important as they help to theorize further on the issue. Role of everyday practices and tacit knowledge is highly important, as discussed in the literature review and the theoretical framework, since those have a great potential to affect the process of a business value generation.

All interviews have been audio-recorded and transcribed. This method of recording allows interviewer to concentrate on the respondent, to listen and observe closely his/her expressions and attitudes towards particular topics.

5.3 Respondents

For the purposes of this research the public organizations receiving financial reports have been approached. Four big public report receivers have been identified, Finnish Tax Administration, Statistics Finland, National Board of Patents and Register of Finland (NBPR), and Finnish Financial Supervisory Authority. While selecting the organizations for the data collection interviews the simple principle has been applied. The main criterion was whether the organization was a regular financial report receiver from the Finnish companies. Some of the organizations such as Finnish Tax Administration receive reports directly from all the companies registered in Finland. Others such as Statistics Finland gather secondary data from already submitted reports to Tax Administration and NBPR.

The intention was to interview multiple persons from each organization in order to get full picture on the potential business value from an improved report receiving process to these organizations. The aim was to interview at least one person from the operational unit of the organization and one person with IT expertise for more technical issues surrounding an introduction of new technology. In some cases however it was possible to find a person with a combined knowledge on both topics. The profiles of interviewees can be found in the appendix 2.

5.4 Analysis methods

For the analysis, this study relies on *theoretical propositions*. This particular strategy of the analysis follows a theoretical framework, propositions and research goals that lead to the study in the first place (Yin 2003). The theory and the propositions of the study support the constructions of a data collection plan (Yin 2003), as in the case of this study, therefore it is only logical to use them for the analysis as well.

As a specific analysis technique the *cross-case analysis* is employed in this thesis. The cross-case study is ideal for the situations where multiple cases are involved in the study (Yin 2003). While the subject of this study is a single group of the financial report receivers, the cases of interviewed organizations are quite different, as they reflect the different nature of case subjects. Therefore, the cross-case analysis method is optimal for this study as it helps to present many angles on the single issue and structure various pieces of a data that could be difficult to categorize otherwise.

The cross-case method frequently uses word tables as a tool for organization and presentation of the analysis process. In case of the large number of respondents, some quantitative methods are also employed for an analysis. However, in many cases, the cross-case method requires qualitative tactics in order to achieve desired results. (Yin 2003)

6 Findings

This chapter presents the findings discovered as a result of face-to-face interviews conducted in the empirical part of the research. The interviews have been conducted during the period from December 2011 to March 2012. While following chapters discuss the results of the research in relation to the theoretical framework drawn in the chapter 4, in findings part significant topics of the interviews are summarized and presented in the logical manner.

6.1 Financial report receiving process

The case organizations interviewed have a variety of sources for receiving the reports as well as the methods to accomplish the task. Table 6-1 gives a short summary on the responses given by the interviewees.

Table 6-1 Findings on financial reports receiving process

Process of financial reports receiving	
Tax Administration	It is the core process in the organization. Reports are received from companies and private persons. Around 60% of the reports are received in paper format, which is scanned later. The rest is received electronically through the web-forms and also direct data file transfers from ERP systems. However the appendices to those reports are frequently in paper as well.
Statistics Finland	Financial reports are received from two sources NBPR and Tax Administration. From NBPR reports come in PDF format. From Tax Administration reports are come as data files that could be added to the database. However, incoming data is still not ready for statistics and needs to be processed further
FSA	Data is received from banks. The most common format for receiving the reports is CSV files that can be processed in Excel. The data is sent through email. The other format is XBRL that is especially used for the multidimensional data. However, XBRL is used only for the data transmission after which the data is converted and stored to the database.
NBPR	NBPR collects data from companies. Nowadays, 2/3s of the data is received from Tax Administration, in PDF format. The rest comes directly from companies, which is usually in paper. Paper documents are scanned and stored in PDFs. The data is not processed further and stays as it is.

As can be seen from the table 6-1 Tax Administration and Financial Supervisory Authority are the organizations that mainly receive their data from the original sources, tax paying companies and banks correspondingly. Statistics Finland and the National Board of Patents and Registration however rely on the third parties (such as Tax Administration) when it comes to the financial reporting.

The main reason behind this is the idea of a burden reduction for both the reporting companies and the receiving organizations by dealing with only one report and not collecting the same data multiple times. This however, comes with its set of problems as for example the data collected for the tax purposes is not ready for the statistics use and requires some preparatory work. Another issue is an inability to check and validate the data send by third parties. Sakari Kauppinen from NBPR also mentioned the differences between the company's actual accounting period and the taxation period as a problem. NBPR is interested in the actual accounting period reports, however as it receives reports from Tax Administration the reports such as balance sheet are frequently preliminary and incomplete.

As for the report receiving process itself, the case organizations seem to have multiple formats and methods with different groups with no standardization across the stakeholders. Tax Administration seems to work hard in the field of an automation of the process, taking into consideration that it collects first hand data. While considerable amount of reports are still submitted in paper, according to Olli Sierla, Tax Administration also offers opportunities to report taxes through the web-forms that are then received as CSV files and more advanced method of an automatic transfer of the reports directly from the ERP systems though intermediary service providers.

FSA, another receiver of the first hand data, has well working system of report receiving, albeit the system is quite old and requires the change. The CSV files are sent by banks through the email, after that FSA downloads the attachments and imports them into their databases for the further processing through Visual Basic and Excel. While according to Jaakko Maurunen from FSA, the organization is generally satisfied with the current process, they acknowledge the need for the update. For that reason FSA is one of the pioneers of XBRL in Finland and had been using the standard for some of the reports since 2007.

Statistics Finland and NBPR as mentioned receives financial reports from secondary sources. Statistics Finland, according to the Head of Statistics Ville Tolkki, receives financial reports from Tax Administration as a data files and also receives reports of the similar content from NBPR in PDF. Statistics Finland still needs to prepare the data from Tax Administration for the statistics use. NBPR reports are not processed and are just used for double-check of the information. Statistics Finland also has been working on XBRL for some years. Like in the case of FSA, Statistics Finland is using the standard on the smaller scale for limited categories of the data collected.

According to Sakari Kauppinen NBPR is receiving the financial reporting from Tax Administration, by co-operation that started in 2001 by introduction of the common business ID. All the reports received, including income statements and balance sheets, are PDF documents, some of which are just scanned images. For NBPR this is not a problem per se as the organization is not processing the data received, just selling it further to all the customers that request the data. However, PDF documents affect the ability to check, validate and update the data, and it also affects the customer service as buyers of the information have to rekey the data for the further processing. NBPR also receives some data from companies directly in a paper form. However, those reports are decreasing every year and they will probably disappear in years to come as Tax Administration will provide data on all companies.

All in all, the number one goal of each organization is to eliminate the paper from the process. Johanna Kotipelto of Tax Administration stated that "the efficiency of our inner process is always at stake…, …paper is never reasonable" therefore any bit of digitalization of the process is a step forward. The second goal is to get the structured data, automate the process and minimize the human intervention. For example Ville Tolkki of Statistics Finland said "usually all the errors come with the human intervention. This is the problem with our process, there is too much of human intervention. And then they are costly to treat and edit."

All of the organizations understand that beside changes in the process there has to be technological change that would allow these goals to come true, hence the interest of the case subjects in the XBRL standard.

6.2 Value added services

The value added services are one of the big potential business value generators of an IT technology, according to the literature. Therefore, the question on potential value-added services related to the financial reporting has been asked from the respondents. The short summaries of the answers can be seen from the table 6-2 below.

Table 6-2 Views on value-added services among the case companies

Value-added services	
Tax Administration	The only services offered is the data that is send to organization like NBPR, Statistics Finland, KELA and EU authorities, as well as forecast on national income. Tax administration does not consider offering of the new services related to the data received.
Statistics Finland	Organization publishes public data from statistical reports and also prepares news releases that cover main point from those researches. On the paid side Statistics Finland offers access to more detailed data to interested sides. The service that is currently being developed intensively is research laboratory that aims to provide quality data to researchers.
FSA	FSA publishes statistics based on the data they gather from banking and insurance sector. While organization plans to publish more insights on bank positions and other statistics interesting to the banks, FSA also plans to delegate most of the statistics work to Statistics Finland. FSA does not really consider the introduction of any new services based on the collected data.
NBPR	NBPR considers itself as organization that collects the data, checks that everything is in places and then offers the data to all the interested sides. Organization has no interest in offering new services that is outside this function.

All of the organizations currently offer some services related to selling the data to the different parties. As has been discussed before, for example Tax Administration offers its financial reports to NBPR and Statistics Finland. NBPR in turn sells reports to different organizations and private persons.

However, when it comes to the additional services that would add the value to the current offering, the case organizations were less enthusiastic. According to Sakari Kauppinen from NBPR the role of organization is to collect the reports and offer them to customers as it is. While NBPR looks for the improvements in the quality of the data, new services are not the priority. Johanna Kotipelto of Tax Administration thinks that they "are not aiming to create such services". Jaakko Maurunen also mentioned that FSA has more reactive approach to this and they would offer some tools or consulting on XBRL to their customers if needed, but they did not really look actively for new services.

Only exception here was Statistics Finland, Ville Tolkki mentioned that the organization is actively developing research laboratory service that would offer more data to the interested parties.

At the same time it has to be mentioned that in rest of the conversations all of the organizations desired the improvement in the customer service, through offering higher quality and better structured data in a convenient format. This can be partly considered as an added value service that would be introduced by those organizations if XBRL or XBRL-like standard was to be used widely.

6.3 Technology and organization

In the interviews respondents were asked series of questions on the topics of a present technology in the organizations, IT policies and IT governance practices. The goals set by this part of the interview were to find out, what is the current situation with a technology and its use in the organization, near-future plans on changes in information systems, IT policies and practices during implementation, use and evaluation of the technology.

6.3.1 Current technology

All organizations have considerable experience on working with big IT systems and understand the risks and the benefits of introducing new technologies. As all of the case organizations have existed and have been using at least some IT systems for decades, their IT structures are complex. The main problem can be summarized with the quote by Olli Sierla from Tax Administration:

> "Many public organizations share similar problems that we have like bunch of different legacy systems which are working in their own silos and it is difficult to share information even between our own systems sometimes."

There is more or less similar situation in the other organizations interviewed. During the process, employees in those organizations have to face different systems and interfaces. As Tuula Erkinheimo from Tax Administration has mentioned, for the "staff it would be easier to work if they would only have one interface instead of multiple ones".

FSA relies mostly on Microsoft technology as has been mentioned before; nevertheless employees have to use multiple systems and interfaces in their work. According to Ulla-Maija Sarkkinen from NBPR, the organization also has multiple information systems, most of them custom-developed, with different functions, created at different times. Ville Tolkki from Statistics Finland also mentioned that there are multiple information systems used for the different tasks.

Most of the organizations interviewed have mentioned however that they are planning some kind of changes in their systems in order to update and/or simplify them. According Jaakko Maurunen it is not always possible to make systems simple nowadays, despite that "simpler is better" whenever possible. FSA is planning to move to the newer Microsoft products. The organization is also always looking for the software tools that would ease the process to both them and financial reporters. Olli Sierla mentioned that Tax Administration has decided to move to off-the-shelf ERP software package that would replace current systems and give employees the

ability to do all of their work from the same interface that would consolidate all the data from various silos.

When it comes specifically to financial report receiving and transfer of that data to third parties, all organizations mentioned that they are looking for new technologies that would allow gathering and distributing structured data.

6.3.2 IT policies and evaluation

Most of the organizations interviewed have some written IT policies that are followed during the decision making, planning and implementing stages of the projects. In addition there are IT steering groups, committees or boards that set those policies and approve or reject projects.

According to Jaakko Maurunen, Financial Supervisory Authority has the IT policy that is there to support overall business strategy of the organization. IT policy sets general goals to be achieved and is reviewed every 3 years. In addition to that there is an yearly action plan that gives concrete steps that need to be accomplished during this period. There is also the IT steering group that includes both FSA and Bank of Finland as these two organizations have close relationship. The steering group makes decision on the IT policy, approves the projects and implements them.

Another important role of the IT steering group in FSA is to evaluate the projects. The reports on the projects are sent 6 times a year and the group gathers to evaluate the project. In addition to that sometimes users of the IT systems and project group members responsible for implementation are surveyed in order to find out whether these groups are satisfied with the results.

Olli Sierla described an IT policy, evaluation and decision-making processes in Tax Administration. In the organization there are Business and IT units, the idea is that the business unit comes up with ideas and informs the IT unit about them. The IT unit then has to go through the details with business people, define the priorities and assign the roles, after this the IT develops and executes the project. For the projects there are different policies, readymade

templates and documentation that help project group to implement the project and keep in line with overall goals of Tax Administration.

There are different types of an evaluation of the project in Tax Administration. The first type of projects are the ones that are caused by necessity to update very old systems that are no longer supported or ones that have to be changed due to the legislation. These are the cases when changes have to be made and there are no alternatives, therefore no analyses are done related to the business value of such projects. In other cases, Tax Administration does both pre-implementation evaluation and post-implementation analysis. Usually cost-benefit analysis is done as well as estimations on how many people change will affect and what effects it may have on the processes. In post-implementation analysis effects are measured and compared to initial goals.

According to Ulla-Maija Sarkkinen, NBPR does not yet have written IT policies on decision-making. Projects are reviewed, planned, approved and implemented just like any other project within the groups responsible for the change.

Evaluation of the results from IT project is done through checking "schedule, budget and achieved results". Everything is compared to the initial plan drawn by corresponding management groups and then conclusions are made. Cost-benefit analysis is in early stages of development and the technique is not yet in wide use.

In case of Statistics Finland, according to Ville Tolkki, there are guidelines from central government on what technologies to use. In addition to that as in most other cases Statistics Finland has written ICT strategies that guide planning, implementation and evaluation of IT projects.

All in all, interviewed organizations have solid experience with complex IT systems and firm understanding of risks and benefits that follow the changes. Some of them, for example FSA, try to work closely with users of the systems to achieve better results. It also has to be noted that organizations understand the need for the technological change and update in their systems in order to achieve better productivity and lower their costs.

6.4 Increasing EU influence

In relationship to network pressures related to the IT decision-making, respondents have been asked about external influencers. All the organizations except Tax Administration pointed out that European Union had bigger influence on their decision of standards and technologies of data transfer than other stakeholders in Finland. The reason for that seems to be progressing EU integration and increased data exchange between European colleagues. Also rumours about possible mandate of common standards was named as a reason to look towards European peers more than to the other governmental organizations in Finland.

Ville Tolkki mentioned European Statistics Act that regulated the data exchange among statistics offices around the EU. Also Eurostat played a big role as it obliges members of the Union to send statistical information regularly in the certain format. Statistics Finland was closely following the use of XBRL by other statistics authorities in European Union. In general, experience from other countries seemed important to Statistics Finland and had some influence on their decision-making.

Similar to Eurostat, European Business Register (EBR) had been setting some pressure to NBPR according to Sakari Kauppinen. While there seemed to be less regulatory influence from EBR itself the peer pressure seemed important to NBPR. In fact, Sakari Kauppinen mentioned that there is no pressure at all from any regulatory parties, but at the same time some of their European colleagues already used XBRL and that made the standard interesting to NBPR. EBR also has discussed usage of XBRL for the reporting among its members. And last but not least, customers have been asking for more convenient format for the data exchange. While customers do not have a real bargaining power with NBPR, the organization has been interested in improvements of the customer service.

In case of FSA, Jaakko Maurunen stated that "there are three authorities on the EU level, coordinating and implementing financial supervision: European Securities Market Authority, European Banking Authority and European Insurance and Occupational Pensions Authority". As FSA is monitoring Finnish companies on other markets and has multiple European bodies to work with, the EU cooperation is important to the organization. "We have to now look to Europe

not to Finland and I think that for statistics sector and central banks it is same" – said Jaakko Maurunen during the interview. European Union has some directives and guidelines to guide operations of FSA institutions. However, currently supervisory authorities around the Europe decide between themselves on what formats to use for a data exchange. In general, Jaakko Maurunen mentioned that for Bank of Finland and FSA, IT decisions are more EU-driven rather than Finland-driven as integration inside the Union intensifies.

Only exception among the interviewed organizations was Tax Administration, which still is oriented to Finland when making decisions on standards. However, even in this case it was partial independence from EU. VAT related taxation according to Olli Sierla, was tightly regulated by European directives. However, on the other types of taxation, Tax Administration was not influenced by European Union. Johanna Kotipelto mentioned Finnish government as financier of the Tax Administration has some leverage on IT decisions. Olli Sierla also mentioned that government has power to regulate what standards should be used by the organization.

During the interviews two other important influence groups have been mentioned, customers and accounting firms. While Tax Administration has a monopoly on the tax collection in Finland and customers do not have an alternative, Olli Sierla stated that the organization listens to the feedback given to them and tries to implement it whenever possible. Accounting firms are another very important stakeholder as 60-70% of companies in Finland use their services. Other organizations such as Finnish Entrepreneurs, Chamber of Commerce and NBPR were mentioned as groups who have some influence on Tax Administration's decision-making.

The interviews have clearly shown that in most of the organizations the focus has shifted from Finland to European Union when it comes to the standardization of the data transfer and related technologies. The reasons for this phenomenon are European integration, mutual agreements with other EU members participating in same EU structures and peer pressure where colleagues from other countries encouraging others to switch to new technology by deploying it in their processes.

6.5 Standardization and interoperability

Standardization and interoperability are in the core of the business value of XBRL. Interviewees have been asked questions about the importance of interoperability with their partners and their views on open standards and standardization in general. The summaries of the answers can be seen in table 6-4 below.

Table 6-3 Findings on interoperability and open-standardization

Open-standardization and interoperability	
Tax Administration	Tax Administration sees interoperability as a very important factor in their productivity when it comes to receiving reports, since they need to process the data and make calculation in given time frame. However, when it comes to the partners that receive data from Tax, for them it is less important as they receive the data from multiple sources and Tax is just one of them.
	On open-standardization Johanna Kotipelto stated that it may not be entirely possible in case of Tax, however as a government organization the open-standardization is a desirable format when it comes to new technology. At the same time Olli Sierla thinks that Tax Administration has enough bargaining power to push any format on tax payers (still the their opinions are always considered).
Statistics Finland	The law (both national and EU level) strictly regulates what data can be shared and what not. As of format in EU it is decided by legislation in other cases its mutual agreement.
	Organization tries to promote open standards everywhere, at the same time government recommendations are taken into consideration.
FSA	Interoperability is important on EU level as most of the data exchange (of collected reports) happens there. The exchange process is regulated by EU and mutual agreements
	Open standards are important. As EU integration goes on there is no place for any propriety.
NBPR	Interoperability is more important on international level that is why NBPR is looking into technologies like XBRL that may help to achieve it.
	It does not really matter if standards used are close or open as long as it works for both senders and buyers of the data.

In the part about interoperability the factor of the European Union discussed in the previous chapter seems to be very important. At the same time inside Finland organizations seem to have a feeling that they have an advantage to force their own standards and data formats to others as they have a monopoly on corresponding fields. This however does not mean that organizations would not like to see interoperability with their partners on the data exchange, after all incompatibility with clients and partners affects their productivity too. At the same time it seemed lesser priority compared to the international interoperability in most of the cases.

Tax Administration stands out in this case too, by being more focused on Finland. The reason for such attention to internal interoperability could be the fact that Tax Administration collects the data from the large number of reporters inside Finland and then provides the data to different public organizations such as NBPR and Statistics Finland. However, Olli Sierla believes that interoperability is more important to Tax Administration receiving the reports that to the parties who receive reports from Tax Administration.

Statistics Finland, according to Ville Tolkki, has very strict regulations on receiving and sharing the data on both EU and national level, therefore the organization tries to follow the legislation commanding the rules of the data sharing.

Increasing European focus has been discussed in the previous chapter on increasing EU influence on the interviewed organizations. The regulations and the guidelines from EU, participation in EU-wide structures and peer pressure from European colleagues all contribute to the increased desire to make international data exchange more interoperable.

Question on the open standardization was important as XBRL is a fully open standard maintained by a non-profit consortium. Therefore the attitude towards the open standards is very important in defining the potential business value of XBRL to the organizations that would use it.

The subject of this research concerns the public report receivers in Finland. Therefore it was not surprising to see that the respondents did not have many objections against the open standards in general. In some cases such standards were embraced by an organization's top management, and in some such standards were already used in the processes.

Tax Administration is positive about the open standards according Johanna Kotipelto, at the same time it may not be always possible as some very sensitive data passes through the organization, which is desired only to a very limited use. At the same time Olli Sierla stated that Tax Administration has enough bargaining power to enforce any standards to the report senders and partners. However, Tax Administration still takes into consideration their stakeholders' interests.

Ville Tolkki from Statistics Finland stated that the organization tries to promote open standards everywhere. The organization also tries to follow the recommendations of the government on that issue. Overall, the organization is very supportive of such standards, the early experiments with XBRL is a proof of this.

According to Jaakko Maurunen, he does not see any place for the propriety in the open market and the open standards are very important to FSA. Such standards are important especially, from the point of view of the European cooperation.

For Sakari Kauppinen, the top priority is that a standard is widely used and it is accepted by clients and partners. The openness of a standard or a technology does not really affect the decision of NBPR, as long as it works.

6.6 Most important features of XBRL

In the end of the interviews, interviewees were asked the question about the most appealing features of XBRL to their organizations. In some cases the features have been presented and explained to respondents, in the rest of the cases respondents were already aware of the benefits XBRL promised to its users. The table 6-3 shows most desired features named by the organizations.

Table 6-4 Most important features of XBRL to case organizations

Most important XBRL features	Tax Administration	Statistics Finland	FSA	NBPR
Accessibility	✓			✓
Accuracy	✓	✓	✓	✓
Comparability	✓		✓	
Usability	✓	✓	✓	✓
Relevance		✓	✓	
Understandability	✓		✓	

There was a uniform agreement that two of the XBRL features are important to their organizations, the accuracy and the usability. Those should not come as a surprise as the accuracy and then the further usability of the data are crucial to the work of the public report receivers for both purposes of internal processes and external services.

Accuracy was mentioned by all of the interviewees directly or indirectly. From the quote of Ville Tolkki above it can be seen that errors in the data are very costly to correct. Jaakko Maurunen of FSA also names mistakes as a problem in the process as it requires the organization to contact banks and ask them to correct and send reports again that would need to be rechecked and imported to the database another time. Tax Administration and NBPR also highly value the accuracy as many external parties rely on the raw data offered by those organizations.

Usability of the data is important to all of the organizations. With exception of NBPR all other organizations are processing the data further for different purposes. Jaakko Maurunen mentioned in the interview that it is very important to have the data compatible with Microsoft products as FSA relies on the software provided by the company for processing of the data. Olli Sierla from Tax Administration believes that XBRL would be very valuable as it would allow Tax Administration, NBPR and others to use annual reports without converting them into different formats and standards. Sakari Kauppinen of NBPR mentioned that organizations have "to be able to receive information in the form that is generally used and provide it to clients in usable format."

The rest of the benefits offered by XBRL according to the literature reviewed for this research were not universally attractive and depended on the type of the organization and its processes.

Accessibility was mentioned by two organizations Tax Administration and NBPR. The reason for that seems that those two offer a lot of raw unprocessed data to the third parties; therefore it is very important to make data as accessible as possible. Olli Sierla of Tax Administration stated that one of the major benefits of the XBRL standard will be the ability to easily share information between the organizations. Sakari Kauppinen mentioned that he sees XBRL as a tool that would allow simpler way to share the data through the network.

Comparability has been a preferable feature for Tax Administration and Financial Supervisory Authority. Senior advisor of Tax Administration Johanna Kotipelto mentioned that it is very important to have clear understanding of the meaning behind the numbers and being able to compare reports made by different organizations and ministries with different purposes. It is also important to make data provided by Tax Administration comparable with data from others.

For FSA comparability is important as the organization has to deal with multiple standards of the financial data. According to Jaakko Maurunen, FSA has to deal with three different standards including IFRS that come from the data from different time periods.

Relevance of the information was mentioned by Statistics Finland and indirectly by FSA. The likely reason for that is the fact that these two organizations frequently require some concrete pieces of data for particular processes. For example FSA usually needs to request particular

ratios and reports from the banks depending on banks size and general situation according to Jaakko Maurunen, this process then helps FSA to decide whether an on-site inspection is needed. Statistics Finland receives full reports from Tax Administration and NBPR. However, particular statistical analyses require only particular data. For these purposes the relevance is attractive feature of the XBRL standard to the mentioned organizations.

Understandability has been mentioned in the interviews with Tax Administration and FSA. This feature includes the ability to embed some explanations to the numbers provided in the reports. Jaakko Maurunen mentioned that in some cases it is important to have explanations embedded in the reports for the top managers.

As can be seen from the findings, all of the case organizations see most of the features XBRL has to offer as important to their processes when it comes to the financial report receiving.

6.7 XBRL experiences

As mentioned in the beginning of this paper XBRL is not officially mandated in Finland. There also have been no cases of the wide use of the standard. However, two of the interviewed organizations, FSA and Statistics Finland, have been using XBRL in some of their processes for a few years. While the nature of usage seemed to be in some ways experimental and somewhat limited at this stage, the experiences of the companies have been interesting from the point of view of the research.

FSA has been using XBRL since 2007. FSA launched the project to collect solvency ratios from the banks. The project turned out to be very hard as the technology has not been matured. According to Jaakko Maurunen the other option at the time was the usage of XML, however it lacked some very important features, such as a validation, to work with a financial data. XBRL on the other side offered all the features needed for such data. At the same time Jaakko Maurunen does not see XBRL completely replacing other standards such as XML. The reason for this is that XML is much simpler to implement and work with in many other tasks related to the reporting.

XBRL requires significant investment into the software in order to configure and support it. The biggest problem is that there is a lack of know-how and not enough users of it in Finland when it comes to XBRL. Overall, FSA faced with the problems to find software packages that are easy to use and configure. As Jaakko Maurunen pointed out, it does not really make sense to use software if it cannot be configured by the users and would need an IT person to make even small changes, essential for the operations. Another problem was a lack of support of XBRL by widely used productivity packages such as Microsoft Office. FSA, as mentioned before, is relying on the Microsoft products, therefore support of XBRL here is a top priority. For that reason XBRL is only used for the data transfer and then is converted into a different format, making it impossible to use all the advantages of the standard. Another problem was the need of a consultancy, which was very difficult to get in Finland as XBRL was not adopted here.

All in all, the XBRL so far has been a costly project for FSA with not much return. However, the organization is looking optimistically to the further adoption of the standard as there are promises that XBRL will be widely used in Finland solving majority of the existing problems. It also has to be mentioned that the standard carries some features of the multidimensional analysis that is not currently easily available to the FSA through the technologies used in the other processes.

Another early adopter of XBRL in Finland is Statistics Finland. The organization has been using the standard for the collection of the data from the two groups: an accommodation and a farm statistics. The groups have been chosen for the reason that they used XML already and rely on the smaller number of service providers, so it was easier to implement. The main stimulus to experiment with XBRL has been events in Europe where other countries have been implementing XBRL in their processes.

As in case with FSA, Statistics Finland is facing the problem of low usage of the standard and difficulty to collect large amount of data with it. Also lack of the usage put all the pressure of development and promotion of the standard to the Statistics Finland.

Both organizations are enthusiastic about the standard in general, however at the present moment XBRL does not really bring any benefits to the user organizations. The major reasons are a

limited number of organizations using the standard and a lack of real integration of the technology into the overall structure of the company. Those problems limit the benefits of XBRL that are largely built up on the widespread use and the positive network externalities that follow it.

7 Discussion

In this chapter the results of the empirical part are discussed in the relation to the theoretical framework drawn in the first part of this paper. Collected data makes it possible to discuss each environmental factor contributing to the potential business value of XBRL and the business value itself, shown on the figure 4-1 in the chapter 4.

7.1 Technology usage

In chapter 4 on the theoretical framework, the literature on the technology usage has been reviewed and discussed in the context of usage patterns and its effects on productivity. First, the usage patterns could have revealed "hidden productivity" if systems would not have been used fully by the users. Second, the past technology usage could have helped to find the clues on likelihood of adoption of the open standards in the organization. Third, technology usage would show the overall attitude of the company towards the new technology.

The research have shown that the first part of usage intensively and its connection to the productivity is not an issue as most of the systems in most of the organizations are core part of the work and cannot really be avoided or substituted by something else. The only exception was FSA where there were some databases that carried the information that was "nice to have" in some processes, however according to the interview the information did not have a big impact on the process. Therefore, it can be concluded that in case of mandatory use of XBRL throughout the financial report receiving process, it would not be affected by the lack of usage intensity as long as it would be the only way to do the job.

This however does not mean that the users of the systems are always happy with the software they use to do the work. At least in one case, Olli Sierla mentioned that Tax Administration receives a lot of feedback from the employees asking to change certain features of some certain IT systems. This issue falls outside of the scope of this research though.

Past technology usage intensity may not be a big factor in creation of the business value, however nature of the usage can tell some things about the attitude towards innovative software and standards. As findings show, all of the organizations have an experience with all kinds of

technologies of many different generations. While this might be a sign of reluctance to change the processes inside of the organizations, fortunately there seems to be clear understanding that the technological change needs to happen. Most of the organizations also understand that this kind of change requires patience, as result may not be seen for considerable amount of time. Nevertheless, a new technology should serve organizations needs right and be a substitute worth of trouble caused by the change.

XBRL seems to be in a favourable position as it is a "hot topic" now among European report receivers and while it is not widely mandated in most of the EU, there have been a lot of organizations who tested the technology on a limited scale. XBRL is also an open standard, which was favoured by the organizations researched, as the governmental sector in general, embraces transparency and openness wherever possible. And the most important advantage of XBRL is that it carries the functions needed for successful report receiving and processing, which is lacking in basic XML and older legacy systems.

7.2 Organization

The organization part of framework reviewed IT policies of the organization concerning, planning, implementing and evaluating IT projects. On the one side there are policies on decision-making, planning and implementing the project, which include some pre-implementation analysis of the technology. On the other side there are post-implementation evaluation procedures that help an organization to determine the business value of the accomplished projects.

In most of the cases, except for National Board of Patents and Registration, there have been general IT policies drawing the big picture and yearly action plans or project templates that guide project planning and implementation step by step. In all the organizations however, it was always agreed decisions between business and IT sides of the organization. Usually, the business sets the tasks, which the IT then solves using some IT solutions. The cost-benefit analysis is performed in most of the case organizations; however, in case of mandatory changes caused by legislation or technological reasons, such analysis is not performed. From this it could be concluded that in case of XBRL mandate the organizational factor would play smaller role on the decision-making

stage. Otherwise the cost-benefit analysis can have big influence on the implementation decision and the intensity of the usage in organization if the business side would not be fully convinced in the business value of the standard.

It has to be noted however that there is enough commitment to introduce new standards if they promise to be beneficial on the long run. The examples of it are Statistics Finland and FSA that already use XBRL, although at the moment it seems to bring more problems than solutions.

Most of the organizations are having regular evaluation reports and analyses on accomplished projects where initial goals are benchmarked to the actual results. That creates a good environment to keep track of the success of technology. This fact combined with the deep understanding of features of productivity paradox, creates fertile ground for technologies like XBRL to fully develop and integrate in all of the processes.

7.3 Network effects

In the network effects part of the literature review, two main issues were concerned. First, there are positive and negative network effects that can affect the actual business value of XBRL or at least the perception of it. Second, there are vertical and horizontal influences that affect the decision to adopt the technology and potentially the value of it, if implemented.

The limited Finnish experience with XBRL has confirmed the idea that the standard requires the network to be really valuable. In both cases with Statistics Finland and FSA the main problem was the fact that nobody else used the standard and it was very difficult to get report senders to use it for only limited set of reports. In addition to that it was pointed out that the lack of the network causes the lack of know-how in the area of XBRL. Having the larger network of XBRL users could create the infrastructure for developing the standard and software to operate it, as well as a technological support and a business consultancy. These positive externalities in turn would contribute significantly to the value of XBRL for all the parties involved.

The interview results also hint to the idea that XBRL should be implemented as a network from the very beginning in order to see the real value from it.

Another issue is network pressures that affect the willingness to adopt the technology and benefit from it. As XBRL use is very limited in Finland, there is no real pressure at the moment that comes from national partners, customers or a government. However, when looking internationally, it can be clearly seen that both vertical and horizontal influences from EU push the Finnish financial report receivers to consider XBRL.

As has been described in the chapter 6.4 on the increasing EU influence, findings show that European Union in general has increasing power on national public institutions when it comes to the decisions on standards. First there is the vertical pressure, the continuous discussions about the common European standard for the financial data exchange, increases interest of report receivers in Finland in standards such as XBRL. Some of the European institutions are already giving directives to give reports in a certain format that participants have to comply to. Second there is a vertical influence from EU peers in other countries that adapt certain standard to report the data. For most of the interviewees the interest in XBRL was caused by the colleagues from other countries experimenting with XBRL and planning to implement it on a larger scale.

Besides motivating report receivers to adopt a certain technology, EU pressure also shows the potential to increase productivity of national institutions in the international context. Common standard such as XBRL would make the data exchange between the members much easier and it would alleviate the task of converting of the data from different formats. Wide adoption of XBRL in all the report receiving institution would also push use of the standard on the national level and thus would boost its value to all the parties.

7.4 Efficiency

As mentioned in the multiple occasions before the efficiency is the cornerstone of the business value of IT, as it is one of the most visible effects of the technology. As in many cases organizations interviewed for this research did not profit from report collection and it is seen as an unavoidable cost, the efficiency here is always at a stake.

The biggest enemy of productivity was named to be errors in the collected data and inability to check, validate or update the data in efficient way. XBRL solves most of those problems, which

have been also shown in the chapter on the desired features of the XBRL standard. Accuracy and usability of the data were two features that have been directly or indirectly referred as desirable features that are lacking in the systems used presently.

All in all the efficiency in general is a subject that is discussed in all of the organizations, especially when it comes to such process as report receiving. At the present moment the biggest problems that financial report receivers are facing, can be solved with wide usage of the XBRL standard, which in turn is sure sign of the business value.

7.5 Value-added services

In the literature, value-added services are seen as one of the main contributors to the business value of IT. The value-added services are not always attributed directly to an introduction of a new technology. Nevertheless, they are usually big value creators, besides cost-reductions caused by increased efficiency.

Empirical research has shown however, that the case organizations do not see a new technology such as XBRL as an opportunity to introduce new services to their stakeholders. Most of the interviewers indicated that they are interested in better quality of the data, faster processing times and "better customer service", at the same time they did not think that introduction of any new value-added services was their priority.

On the one hand it is very unfortunate that the case organizations do not see XBRL as a potential creator of the added value to their customers. Missing the value-added services from the equation can affect the amount of the business value that the standard brings to the report receivers. On the other hand such attitude may be caused by the fact that organizations have not used XBRL on the large scale in their core processes, hence it is very difficult to see such services in advance without careful analysis of the technology.

In such case this business value component may surface later on as technology is implemented and used more widely in the daily operations, as well as when customers would have an ability to give a feedback on it.

7.6 Interoperability

Interoperability was mentioned as one of the important features of any technology by most of the report receivers, at least on the international level. The value component of interoperability is very closely related to the network effects, as its value becomes clearer with increased usage of technology by different stakeholders of the organization in question.

As the report receivers, with exception of Tax Administration, do not exchange large amounts of data between partners in Finland, the value component of interoperability may be more important on the international level. However, if we take into consideration the role of European Union in the influence on the report receivers to look into new standards, this can be a very positive sign. Interoperability can become one of the base components of the discussion of XBRL adoption among financial report receivers in Finland.

Positive attitude towards the open standards is a supporting condition in case of interoperability. Such attitude can ensure the full use of the opportunities offered by this business value component.

7.7 Summary of the research task

This last subchapter of the Discussion part goes back to the original theoretical framework built in the chapter 4 and points out most important factors that construct the potential business value of XBRL to the financial report receivers in Finland (see figure 7-1). This chapter also answers the questions asked in the introductory part of the thesis: *What are the factors contributing to the business value of XBRL to the Finnish public organizations receiving financial reports?* and *What is the role of network effects in the creation of business value to financial report receivers from XBRL?*
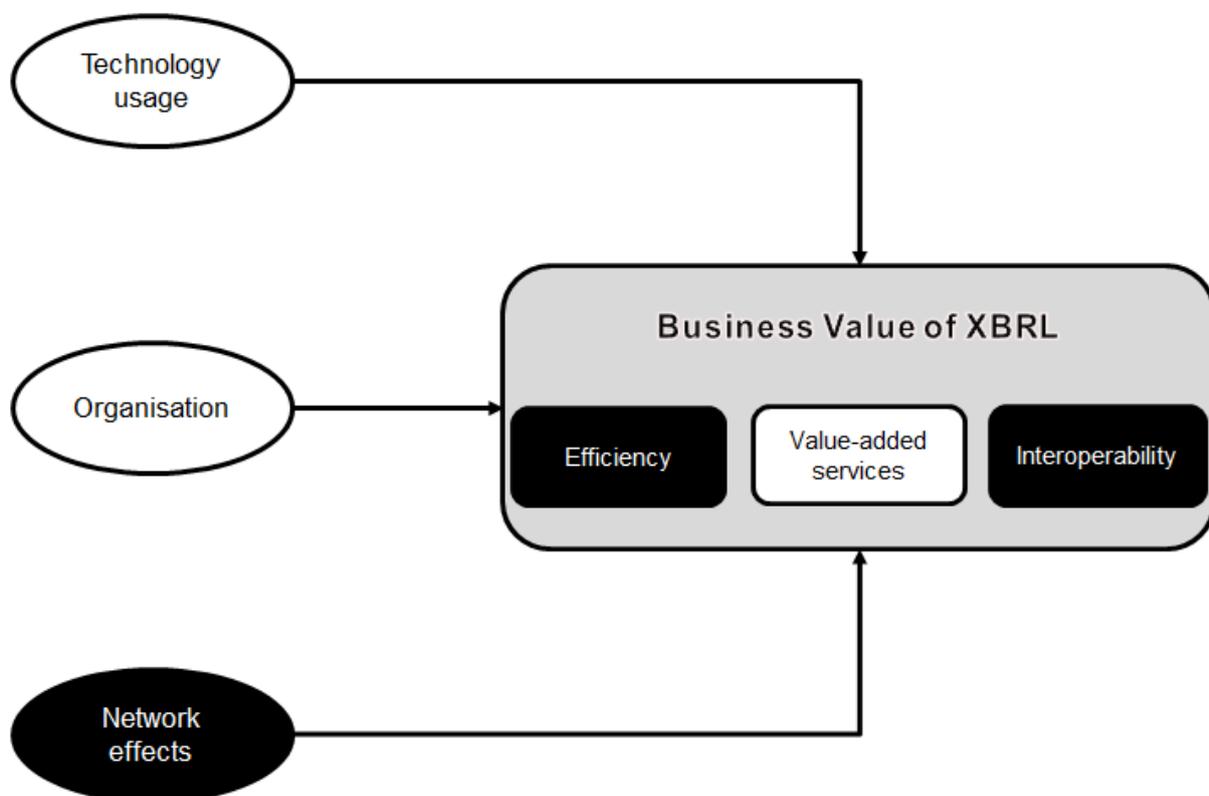

Figure 7-1 Theoretical framework of business value of XBRL with highlighted factors

Overall, all of the environmental factors and components of the business value of XBRL proposed in the concept in the first part of this paper turn out to be valid to some extent. However, the importance of the components and factors has not been equal and some clearly stood out.

From the environmental factors, in the context of the public organizations receiving financial reports, network effects had the biggest influence as it carries more variability than others.

Technology usage turn out to be less important as all of the systems in use have been necessary for the work in the case organizations, therefore lost productivity due to the users avoiding systems is not an issue. The case organizations are also going through the stage where they realise the technological change is needed in order to improve overall productivity and keep up with standards elsewhere. XBRL seems to be in the right place at the right time in the sense that it satisfies current needs of the report receivers and at the same time is open and accepted internationally, alleviating resistance from the decision-makers on that side. In case of the mandate of XBRL either nationally or on the EU level, one should not expect any unexpected barriers from the point of view of previous IT usage by the case organizations. At the same time the organizations have substantial experiences with implementing organization-wide IS systems and standards and seem to have good understanding of the process and the risks.

From an organizational point of view there seems to be clear guidelines and policies on planning and implementing the technology. In case of the top-down mandate of the XBRL standard, which most interviewees mentioned as acceptable solution, there should be no artificial hindrance in implementation or full usage of the technology. This research has not gone through the IT policies of each organization, which could potentially carry some point affecting business value of IT, as it is outside of the scope of this paper.

Network effects proved to be very important environmental factor in the adoption and value of XBRL. The increasingly Europe-centric environment Finnish report receivers are operating pressures them to think about the common standards that are shared by their European colleagues. Those vertical and horizontal pressures can play important role in decision of widespread deployment of XBRL in report receiving and processing operations. Examples of isolated usage of the standard have also shown that XBRL is truly a network technology, which requires significant number of users in order to fully benefit from it.

On the side of the business value components value-added services have much less influence from the point of view of Finnish financial report receivers than it was anticipated in the

framework. According to the findings, mentioned in the chapter 6-2 currently report receivers are not really looking for any new value-added services they can offer to their stakeholders. This however could be caused by the hypothetical nature of this research where technology in question is unfamiliar to the potential users.

Efficiency unsurprisingly was something the case organizations were really looking for. At the moment financial report receivers have some certain problems, such as accuracy and ability to validate reports, which require a solution. As XBRL offers the features that solve mentioned problems, it can be implied that efficiency component would bring considerable business value to the users of the standard.

Interoperability turns out to be another big value contributor, especially when it comes to the European level data exchange. As already mentioned in chapter 7.6 the idea of a common standard and seamless interoperability can be a big plus in favour of XBRL as it is an open standard that can potentially offer compatibility with any software package or information system.

The framework proposed in the chapter 4 of this paper answers the question: "*What are the factors contributing to the business value of XBRL to the Finnish public organizations receiving financial reports?*" Subsequent findings and analysis also give an idea of importance of each factor.

The answer to the question: "*What is the role of network effects in the creation of business value to financial report receivers from XBRL?*" is definite yes. Network effects play a great role in creation of the business value as they push network participants to adapt the certain, common technology faster. Network effects also are extremely important in the case of the XBRL as the business value of the standard can only be yielded only in the wide network of users that have it fully integrated in their processes.

8 Conclusion

The main objective of this study was to find out the factors that may affect the business value of the XBRL standard to the financial report receivers in Finland. The other objective was to explore the role of network effects in creation of the value to the financial report receivers.

The study covered public organizations that receive financial reports on the regular basis from the companies and other organizations. These included four organizations: Tax Administration, Statistics Finland, Financial Supervisory Authority of Finland and National Board of Patents and Registration of Finland.

The study was exploratory, as the goal was to discover the potential business value of the technological standard that has not been widely implemented in Finland at the moment of writing this paper. This thesis sets the basis for the further studies on the business value of XBRL, if and when the standard is implemented in the case organizations.

The implications of this paper are targeted first of all the public report receivers researched and organizations initiating the implementation of XBRL in Finland. The results of the paper give basic overview of the problems currently existing in the financial report receiving process and possible solution the technology may bring. They also present subjective, but nevertheless competent opinions on the potential value of the standard.

Three main theories have been included as the basis of the literature review. First, productivity paradox was reviewed in order to explore the history of development of the production theory and a basic evaluation of a technology. Second, theory of the business value of IT reveals modern understanding of the value that a technology contributes to its users and structures multiple layers of the value that is spread across the organization. Third, network effects have been included to the study as XBRL is a network technology by nature; therefore the theory was extremely relevant to the case.

The theoretical framework has been built based on the Technology-Organization-Environment (TOE) framework proposed by the Tornatzky and Fleischer, and sources of value in e-business by Amit and Zott. Two were combined and modified to suit the needs of the research. The

theoretical framework presented the proposal of background factors that affect the business value of XBRL and components that construct the value.

Empirical data has been collected through 3 one-to-one interviews, 1 group interview and 1 email interview. The goal of data collection was to gather the information from the both business and IT sides of the case organizations.

Findings have supported the proposition given in the theoretical framework and helped to point out importance of each background factor and value component. Results have clearly shown that some of the parts of the proposed framework, such as network effects and interoperability, have very high importance when it comes to the implementation of the new standards. At the same time data analysis revealed the specifics of the public organizations receiving the financial reports, which show that some of the value components have less importance than it is perceived in the literature.

All in all, this paper sums up the factors and components of the business value of XBRL that would potentially contribute to the development of the standard in Finland among the report receivers. The thesis also offers the foundation for the further, more detailed research in the business value of XBRL in Finland.

8.1 Limitations and further research

While this paper has achieved its goal to answer the questions that have been set in the beginning of the study, it has had its limitation.

The research is looking only on the factors and components of the business value on a surface. However, as the technology is not yet implemented in Finland it was not really possible to get deeper view on each component of the framework. It was not also possible to quantify any component in terms of how much value potential does it have to the user. All of the evaluation of importance of each component is based on the interviewees' points of view on particular problems and features that have potential to solve them.

Another limitation in the research is that most of the data have been collected from the senior staff in the case organizations. For the sake of finding out the potential business value, it would also been appropriate to talk with potential users of the technology who are directly involved in the process of receiving the financial reports.

There is also a lot of potential for the further research in this field. First, this study only concerns report receivers in Finland, therefore it would be very interesting to look into the business value of XBRL to the other groups generating and using the reports. Second, it would be interesting in the future to quantify the results of this research when technology is widely implemented among the research subjects. Third potential direction for the research would be to explore possibilities of innovative services that can be offered to or by the financial reports receivers as a result of adoption of XBRL. And last but not least, it would be valuable to conduct study on the business value of XBRL to the financial report receivers in other countries where the standard is already mandated and compare it with the results given in this research.

References

Aggarwal, N., Dai, Q., & Walden, E. A. (2006). Do Markets Prefer Open or Proprietary Standards for XML Standardization? An Event Study. *International Journal of Electronic Commerce, 11*(1), 117-136.

Alles, M. (2009). Editorial to Special Issue: XBRL and the Future of Disclosure. *International Journal of Disclosure and Governance*(6), 184-185.

Amit, R., & Zott, C. (2001). Value Creation in E-Business. *Strategic Management Journal, 22*, 493-520.

Aral, S., Brynjolfsson, E., & Wu, D. J. (2006). Which Came First, IT or Productivity? The Virtuous Cycle of Investment and Use in Enterprise Systems. *Twenty Seventh International Conference on Information Systems*, (pp. 1-22). Milwaukee.

Bakos, J. Y. (1998). The Emerging Role of Electronic Marketplaces on the Internet. *Communications of the ACM, 41*(8), 35-42.

Baldwin, A. A., Brown, C. E., & Trinkle, B. S. (2006). XBRL: An Impacts Framework and Research Challenge. *Journal of Emerging Technologies in Accounting, 3*, 97-116.

Bosworth, B. P., & Triplett, J. E. (2000). *What's New About the New Economy? IT, Economic Growth and Productivity*. Washington D.C.: Brookings Institution.

Brynjolfsson, E. (1993). The Productivity Paradox of Information Technology. *Communications of the ACM, 36*(12), 67-77.

Brynjolfsson, E., & Hitt, L. (1996). Paradox Lost? Firm-Level Evidence on the Returns to Information Systems Spending. *Management Science, 42*(4), 541-558.

Brynjolfsson, E., & Hitt, L. (1998). Beyond the Productivity Paradox. *Communications of the ACM, 41*(8), 49-55.

Burnett, R. D., Friedman, M., & Murthy, U. (2006). Financial Reports: Why You Need XBRL. *Journal of Corporate Accounting & Finance, 17*(5), 33-40.

Committee of European Securities Regulators. (2010). *Development of Pan-European Access to Financial Information Disclosed by Listed Companies*. Paris: Committee of European Securities Regulators.

Cronck, M. C., & Fitzgerald, E. P. (1999). Understanding "IS Business Value": Derivation of Dimensions. *Logistics Information Management, 12*(1/2), 40-49.

Davis, F. D. (1993). User Acceptance of Information Technology: System Characteristics, User Perceptions and Behavioral Impacts. *International Journal of Man-Machine Studies, 38*, 475-487.

Dedrick, J., Gurbaxani, V., & Kraemer, K. L. (2003). Information Technology and Economic Performance: A Critical Review of the Empirical Evidence. *ACM Computing Surveys, 35*(1), 1-28.

Devaraj, S., & Kohli, R. (2003). Impacts of Information Technology: Is Actual Usage the Missing Link? *Management Science, 49*(3), 273-289.

Eurostat. (2008). *Use of Information and Communication Technologies*. Eurostat NewsReleases.

Eurostat. (2011). *Science, Technology and Innovation in Europe*. Eurostat Pocketbooks.

Farewell, S., & Pinsker, R. (2005). XBRL and financial information assurance services. *The CPA Journal, 5*(75), 68-69.

Flick, U. (2007). *Designing Qualitative Research*. Sage Research Methods Online.

Gandal, N. (2002). Compatibility, Standardization & Network Effects: Some Policy Implications. *Oxford Review of Economic Policy*, 1-22.

Ghrauri, P., & Grønhaug, K. (2005). *Research Methods in Business Study. A Practical Guide*. Harlow: Prentice Hall, Europe.

Gray, G. L., & Miller, D. W. (2009). XBRL: Solving Real-World Problems. *International Journal of Disclosure and Governance, 6*(3), 207-223.

Hamel, J., Dufour, S., & Fortin, D. (1993). *Case Study Methods.* SAGE Research Methods Online.

Hammer, M. (1990). Reengineering Work: Don't Automate, Obliterate. *Harvard Business Review*, 104-113.

Hannon, N. (2005). XBRL Fundamentals. *Strategic Finance*.

Hitt, L. M., & Brynjolfsson, E. (1996). Productivity, Business Profitability and Consumer Surplus: Three Different Measures of Information Technology Value. *MIS Quarterly, 20*(2), 121-142.

Hoffman, C., & Strand, C. (2001). *XBRL Essentials.* New York: AICPA.

Iacovou, C. L., Benbasat, I., & Dexter, A. S. (1995). Electronic Data Interchange and Small Organizations: Adoption and Impact of Technology. *MIS Quarterly, 19*(4), 465-485.

Katz, M. L., & Shapiro, C. (1985). Network Externalities, Competition, and Compatibility. *The American Economic Review, 75*(3), 424-440.

Katz, M. L., & Shapiro, C. (1986). Adoption in the Presence of Network Externalities. *Journal of Political Economy, 94*(4), 822-841.

Katz, M. L., & Shapiro, C. (1994). Systems Competition and Network Effects. *Journal of Economic Perspectives, 8*(2), 93-115.

Kochhar, R. (1996). Explaining Firm Capital Structure: The Role of Agency Theory vs. Transaction Cost Economins. *Strategic Management Journal, 17*, 713-728.

Lai, F., Wang, J., Hsieh, C.-T., & Chen, J.-C. V. (2007). On Network Externalities, e-Business Adoption and Information Assymetry. *Industrial Management & Data Systems, 107*(5), 728-746.

Macdonald, J., Ochocki, B., Piechocki, M., & Schmitt, H. (n.d.). *XBRL GL and IFRS Working Together.* Retrieved 10 11, 2011, from XBRL International: http://www.xbrl.org

Melville, N., Kraemer, K., & Gurbaxani, V. (2004). Review: Information Technology and Organizational Performance: An Integrative Model of IT Business Value. *MIS Quarterly, 28*(2), 283-322.

Metcalfe, B. (1995). Metcalfe's Law: A Network Becomes More Valuable as it Reaches More Users. *Infoworld*, 53.

Mukhopadhyay, T., Kekre, S., & Kalathur, S. (1995). Business Value of Information Technology: A Study of Electronic Data Interchange. *MIS Quarterly, 19*(2), 137-156.

Orlikowski, W. J., & Iacono, C. S. (2001). Desparately Seeking the 'IT' in IT Research - A Call to Theorizing the IT Artifact. *Information Systems Research, 12*(2), 121-134.

Penler, P., & Schnitzer, M. (2002). XBRL Kicks Reporting Processes into High Gear. *Bank Technology News, 15*(11), 52-54.

Pinsker, R. (2003). XBRL Awareness in Auditing: A Sleeping Giant? *Managerial Auditing*, 732-736.

Riggings, F. J., Kriebel, C. H., & Mukhopadhyay, T. (1994). The Growth of Interorganizational Systems in Presence of Network Externalities. *Management Science, 40*(8), 984-998.

Roohani, S., & Xianming, Z. (2009). *XBRL Citation Analysis: A Decade of Progress and Puzzle.* Bryant University.

Roos, M. (2010). Using XBRL in a Statistical Context. The Case of Dutch Taxonomy Project. *Journal of Official Staistics, 26*(3), 559-575.

Salerno, L. M. (1985). What Happend to the Computer Revolution? *Harvard Business Review, 63*(6), 129-138.

Tallon, P. P., Kraemer, K. L., & Gurbaxani, V. (2000). Executives' Perceptions of the Business Value of Information Technology: A Process-Oriented Approach. *Journal of Management Information Systems Science, 16*(4), 145-173.

Vasarhelyi, M., Chan, D., & Krahel, J. (2010). *XBRL Consequences to Financial Reporting, Data Analysis, Decision Support, and Others.* Rutgers University.

Wang, T. G., & Seidman, A. (1995). Electronic Data Interchange: Competitive Externalities and Strategic Implementations Policy. *Management Science, 41*(3), 401-418.

Weber, R. A. (2003). XML, XBRL, and the Future of Business and Business Reporting. (S. Roohani, Ed.) *Trust and Data Assurances in Capital Markets: The Role of Technology Solutions*, pp. 3-6.

XBRL International. (2011a). *How XBRL Works?* Retrieved October 3, 2011, from XBRL: http://xbrl.org/how-xbrl-works-1

XBRL International. (2011b). *About XBRL International.* Retrieved October 3, 2011, from XBRL: http://xbrl.org/AboutXBRL

Yin, R. K. (2003). *Case Study Research, Design and Methods, 3rd Edition.* London: Sage Publications, Inc.

Zhu, K., & Kraemer, K. L. (2005). Post-Adoption Variations in Usage and Value of E-Business by Organizations: Cross-Country Evidence from the Retail Industry. *Information Systems Research, 16*(1), 61-84.

Zhu, K., Kraemer, K. L., & Xu, S. (2006). The Process of Innovation Assimilation by Firms in Different Countries: A Technology Diffusion Perspective on E-Business. *Management Science, 52*(10), 1557-1576.

Zhu, K., Kraemer, K. L., Gurbaxani, V., & Xu, S. (2005). *Migration to Open-Standard Interorganizational Systems: Network Effects, Switching Costs and Path Dependency.* Irvine: The Crito Consortium.

Zhu, K., Kraemer, K. L., Xu, S., & Dedrick, J. (2004). Information Technology Payoff in E-Business Environments: An International Perspective on Value Creation of E-Business in the Financial Services Industry. *Journal of Management Information Systems, 21*(1), 17-54.

Appendices

Appendix 1 – Structure of the interviews

Financial reporting:

1. Could you describe the process of receiving financial reports from the client companies? How important is the process in the operations of your organization?
2. What do you value most in the current process (what should definitely remain in place, if process was to be changed)? How would you imagine the ideal process?
3. What are the major problems in the process? In your opinion how can they be improved?
4. Are there any technological (or other) limitations hindering the process? What are they?
5. What are the products or services offered to your clients and/or partners (or other stakeholders) that are based on the received reports?
   a. How do you create the value to the reporting companies?
6. What are the possibilities to introduce new value-added services or increase quality of existing ones?
7. What is the role of the interoperability with your partners/authorities in the financial report receiving field?
8. What type of cooperation does your organization have with partners/authorities in the field of financial reporting?
9. What is your opinion on the open standardization of report receiving process? How would it affect your organization?

Technology usage:

1. What inter-organizational (or intra) systems have been implemented in your organization in recent years? What were the goals set for the system?
2. Could you describe the process of implementation from your perspective? How did it affect you, your productivity or organization?

3. What is your opinion on usage intensity of the system in organisation? To what degree was the potential of the system exploited? Why?

    a. How does your organization encourage the usage of technology by employees?

4. Could you recall any examples of unexpected benefits or hinders caused by system? Did system open any new opportunities?

5. What lessons can you or your organisation learn from this experience that would be useful for the future introduction of new systems?

Organization:

1. Could you describe technology management process in your organization? What is the management structure in IT-related projects?

2. Does your organization have any written management policies related to IT decision-making, implementation and utilization? Could you emphasize main points?

3. How would you describe unwritten management practices in such cases?

4. Please describe the process of evaluation of IT systems? How does organization measure the benefits of the systems? What are the main components of measurement?

Network effects:

1. What is the role of your organization's stakeholders (partners, customers etc.) in the IT related decisions?

2. Could you recall the project or system that was implemented because of the pressure of other market players? Could you describe any collateral projects with your competitors?

3. What is the role of regulatory authorities in implementing new systems and accepting new IT standards? How does your organization co-operate with authorities in such cases?

Appendix 2 – Interviewee profiles

Interviewee Profiles		
Interviewee	**Organization**	**Position**
Johanna Kotipelto	Finnish Tax Administration	Senior Advisor Marketing
Tuula Erkinheimo	Finnish Tax Administration	Senior Advisor Development
Olli Sierla	Finnish Tax Administration	Senior Advisor IT
Ville Tolkki	Statistics Finland	Head of Statistics
Jaakko Mauranen	Finnish Financial Supervisory Authority	IT Manager
Sakari Kauppinen	National Board of Patents and Register	Head of Registration
Ulla-Maija Sarkkinen	National Board of Patents and Register	Head of Development