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Business Value of XBRL to Financial report Generators; A Dynamic View

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Abstract

The main purpose of this research is to study the business value of XBRL from the report senders' perspective. Business value in IT is a complex topic of study. Literatures with diverse conception and results speak for the extent of complexity in IT business value. From productivity paradox to process oriented study and resource based views, researchers used different measures and produced different results. Despite the richness of literatures, a holistic model that provides more complete view, which encompasses important IT business value measures is still lacking. Thus, a holistic model to study IT business value is first developed and then operationalized by using XBRL business value literatures and a pilot study to arrive at framework to study business value of XBRL. The business value framework is based on four dimension of business value; informational, operational, personal and organizational related business value.

This study takes the route of exploratory research aimed at uncovering the details of the XBRL business value framework rather than testing and verifying it. Thus, the results of this study are based on qualitative data collected in two stages; a pilot interview and a focus group discussion with XBRL experts. Focus group provides richer qualitative data and thus, was a preferred method of data collection. The results of study shows that Business value of XBRL is a dynamic concepts that is influenced by internal, external and technological factors that moderates the business value created by it. Further, respondents also agreed on the fact that XBRL creates business value, all four components, for the report senders but with the influence of moderating factors.

The most significant result of this study is incorporation of contextual factor in business value model. Further, it also sets a sound foundation for future research in IT business value. The framework developed can be used to study another technology and with slight modification can be used in other setting. The framework can also be used to evaluate different information technologies and also to make sound IT investment decisions.

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1. Introduction

"XBRL – eXtensible business reporting language" is a financial reporting technology based on XML and potential to offer business value to all the stakeholders involved in financial reporting environment. XBRL is a powerful tool that can transform paper or pdf based financial reporting system into an automated electronic reporting system, capable of delivering financial and non-financial benefits to the both financial report producers and consumers. Finland is on the verge of adopting XBRL for financial reporting. In this context, this study aims to study the business value of XBRL to the reporting companies.

This research is carried out to fulfill the requirement of Master's thesis for Information System Science department of the Aalto University school of Economics. Real Time Economy: "RTE" is the sponsor of this study. RTE is a joint development project between Tieto, Aditro, and Aalto University School of Business. RTE is working towards creating a digital business transaction environment. The main focus has been moving the business transaction from paper based manual system to automated electronic format which offers productivity and environmental benefits. RTE is leading the Finnish consortium of XBRL and is also promoting the use of XBRL in Finland with an objective of digitalizing financial reporting system (Real time economy, 2012).

In the first section of this introductory chapter, background of the study is discussed. The next section presents significance of the study that highlights and justifies the importance of this study. After significance of study, to set the objective of this study, the major research questions are discussed. A short discussion on scope of studies that confines the study area makes up the next section. In the final section of this chapter, some important terminologies are defined.

1.1 Background of the Study

Majority of the business value literatures in IT discuss business value with reference to certain performance measures. Most of the literatures are divided regarding their views on what is the right measure of business value of IT. Not surprisingly, in academic researches, financial performance measures like, Return on Investment (ROI), Net present Value, and Pay Back period get major share of focus. Along with financial performance measures, different productivity measures are also among the most discussed business value measurement variables. "What to measure?" to assess business value of Information technology has not been less puzzling for both researchers and executives. Due over reliance on financial aspects of business value from IT, justifying IT investment is among the most challenging task for the businesses. The first hurdle of choosing the right measure of business value is one of the most puzzling issues in IT-business value measurement. Thus, a framework that presents multi-dimensional and more complete representation of business could be a worthy answer to address this issue. In short, the business value researches in IT have been myopic and draw a close analogy to five blind people describing elephant; incomplete and lacking holistic view.

In this research, framework of IT business value measurement is applied to study XBRL, a reporting technology used to report both financial and non-financial information, in the context of financial reporting environment. XBRL is based on XML that structures company information by associating it with data tags that are standardized throughout the world using taxonomies. Compared to HTML (Hypertext Mark Up language) based reporting system, XML based system presents huge improvement in terms of structured data within the tag. However, most of the XML based reporting systems suffer from the design issue (Pinsker and Li, 2008). For example, company's internal and external reporting requires different XML schema which makes it a tiresome job. XBRL provides standardization in the reporting system and that gives it edge over other XML based reporting system. The other important advantage of XBRL is interoperability throughout different technological applications. XBRL enables reusability of the data which can drive up the efficiency in reporting process. According to Hoffmann and Strand (2001), XBRL has been regarded as the "digital language of business" by its developers. Among the financial reporting technology listed by AICP in 2002, XBRL was listed as number one technology capable of offering great benefits (Pinsker,

2003). In short, XBRL makes more interesting case for study compared to the other available XML and HTML based technologies.

Finland is in the process of moving towards XBRL adoption. Traditionally, Finland has been regarded among the leading European nations in innovation and technological adoptions (Eurostat, 2008). However, in adopting XBRL, Finland has lagged behind other European counterparts like The Netherlands, Belgium, France, Italy, Denmark and Ireland. But still, there lies strong potential for successful adoption of XBRL in Finland. Almost 99% of enterprises in Finland have access to the internet and more than 80% of Enterprises have their own websites (Eurostat, 2008). This sets up good foundation for finish enterprises for XBRL adoption. Further, Finland, along with Sweden, is among the nations to exceed the EU target of spending at least 3% of GDP in R&D (Eurostat, 2011). With such a supportive set up and openness of Finnish enterprise towards technology and innovation XBRL seems to have good future. This research contributes towards the direction of successful XBRL adoption by analyzing the business value concept from the Finnish enterprises.

1.2 Objectives

The purpose of this study can be divided into theoretical and empirical objectives. First, the focus is on developing a clear understanding of business value concept with reference to IT and then to develop a framework to unveil the different component of business value. The empirical objective is to assess the perception of business value of XBRL in Finnish financial reporting environment by applying the business value framework developed in the first part.

Research Questions

- What is the right approach to measures of Business Value of IT?

- What are business value measures of XBRL for the Reporting companies?

- What are the influencing factors in XBRL business value measurement environment?

The objective of this study is to first, synthesize and analyze IT business value literature to build a business value framework that provides right approaches to business value measurement in IT business value. Then, the second objective is to operationalize this framework by conducting exploratory research. Finally, to answer the final research question, the objective is to analyze research data to uncover the contextual factors that affect business value in XBRL.

1.3 Scope

This study employs qualitative method to conduct the research. The results are based on the exploratory study of the business value of XBRL. Further, Business value Analysis consists of cost and benefit side of a Technology analyzed. Both conceptually and analytically, the costs of technology are less complicated and easier to figure out compared to the benefits. Thus, the study solely focuses on the benefits side of XBRL from the perceptual perspective.

Among the two sides of financial reporting environment, the reporting companies that send reports are considered for the study. This study does not consider the report receiver in financial reporting environment. (Pinsker & Li, 2008) are of the opinion that benefits to the report receivers are more visible and predictable in terms of increased efficiency and accessibility when compared to reporting companies that operate environment where XBRL is not required. Since, the report receivers operate on aggregate level and due to the larger scale of operation, when compared to the reporting companies, efficiency in operation is more visible for the report receiver in XBRL environment. Further, XBRL can be explained as a technology that connects users in two different sides: Report senders and reports receiver where the success of technology hugely depends upon the adoption by reporting companies which are the information producers whereas report receivers function as information consumer. Thus, this study focuses on the reporting companies' perspective to the business value of XBRL in Finland. Further, this study is exploratory in nature. The objective is to explore through the idea surrounding the topic with the use of qualitative data. Empirical validation, testing and claims are beyond the scope of this study.

1.4 Structure of the Study

This study is organized into seven different chapters. In this first chapter the main topic, objective and areas of the study is study. The first chapter of this study acts as the background of this study. The second chapter includes the introduction of XBRL and financial reporting environment. The main purpose of this chapter is to increase familiarity of XBRL to the readers. In the third chapter, a thorough review and analysis of IT business value literature is carried out is to set the foundation for framework formulation. Fourth chapter presents the IT business value frameworks developed based on the literature review. Then in the fifth chapter, the research methodology used in this study is discussed. The results of the study are presented in the sixth chapter. This chapter also includes discussion and analysis of the results. Finally, in the last chapter conclusions, managerial and theoretical implications of this study are discussed.

2. Introduction to XBRL

In this chapter, XBRL and Report senders in relation to XBRL is discussed in details. The first part of this chapter presents an overview of XBRL and the concept of XBRL and its significance is discussed. Then, XBRL and information supply chain is discussed briefly to provide insight into how XBRL fits into overall reporting environment. Finally, XBRL is discussed in structural and technological level to provide some insights into how it functions.

2.1 XBRL; A Revolutionary Technology

XBRL (e**X**tensible **B**usiness **R**eporting **L**anguage) is a web-based standardized communication technology used for financial and business reporting. It is a revolutionary internet based standard that enables real time information exchange in information supply chain. XBRL is a "royalty-free, open specification that uses XML data tags to describe business and financial information for public and private companies and other organization. Software AG Whitepaper, (2002) describes "XBRL as a data description language that enables the exchange of understandable, uniform business information."

The idea behind creation of XBRL was to allow the financial and business information to be part of information supply chain that can be used by multiple users and for multiple purposes. XBRL is internet and XML based reporting standards used for business and financial reporting. It is an open standard developed through the collaboration of over 200 corporates, accountants, software vendors, regulators, aggregators/distributions, companies and industrial organization working on the regional, national and international levels under the umbrella organization XBRL international, with an objective of standardizing financial reporting (Willis, 2003). XBRL international is a not-for-profit consortium of over 600 companies and agencies all over the world that work collaboratively to build the consensus-based format for data entry and interchange (XBRL International, 2011b).

On close observation of the definition of XBRL, open standard, extensible, and independent features stand out. It is based on open standard XML which makes it flexible framework for standardization and automation of flow of information in information supply chain (ACT/IAC, 2007). XBRL, as an open standard, which means, unlike other vendor specific XML standards, it is a license and royalty free and fully independent of any proprietary system. Since, XBRL does not rely on any particular third party's vendor applications to establish information sharing between different accounting systems, or for implementation, maintenance, or for adaptation to the evolving information need, it is indeed independent and non-proprietary standard (Wills, 2003). Another important feature of XBRL is its extensible. It can incorporate data handling in multiple languages and accounting standards and is flexible enough to accommodate wide variety of organizational requirement and use. Further, users can add tags as per their requirement which makes it truly extensible standard. Flexibility is another key feature of XBRL which is based on the concept of interoperability; ability to transform information in a format that can be exchanged and reliable extracted across different software formats and web itself. XBRL allows the creation of multiple financial documents that serves multiple purposes and can be shared in information supply chain and can be viewed, analyzed and manipulated according to need without causing any loss to the integrity and interpretation of data.

2.2 Structure of XBRL

XBRL framework basically has three major components; XBRL taxonomy, XBRL document and XBRL tools. XBRL taxonomy is more like a dictionary that defines common reporting language in terms of descriptions and classifications of the words to be used as content in financial reporting documents. These words are known as "Data Tags" and are core to the XBRL standards. It is collection of globally agreed financial reporting semantics; meaning of the terms, metadata; definition of data in terms of types, structure and relationship with other data and business logic; rules and formulas consistent to the basic business concept. Taxonomy works as a guideline for the defining XBRL tags. "XBRL data tags" are the standardized description of the data items, defined in XBRL taxonomy, and tagging financial information will this data tags add meaning to the data which enables different users and application to understand the information in the same meaning and context of specific

information as it is in the financial documents. Though XBRL taxonomies provide standard data definition it allows inclusion of customized data definition for a particular company that adds the flexibility to the use of it. Furthermore, XBRL also supports data tagging and contextual usage of specific data across different companies, industries and geography. XBRL taxonomies are developed by XBRL users' community that includes different organization that participate in business reporting supply chain and have different roles. XBRL taxonomies have been already developed for accounting standards like IFRS (International Financial Reporting Standard) and US GAAP (Generally accepted accounting Principles) and are publicly available (XBRL in Europe, 2005). Figure 2.1 shows the layered view of XBRL and different components.

Component	Role	Provider
XBRL Document	Content	User Community
XBRL Taxonomies	Vocabulary	
XBRL Tools	Infrastructure	Third Party Vendor
XBRL		XBRL International
XML	Syntax	World Wide Web Consortium

Dependency
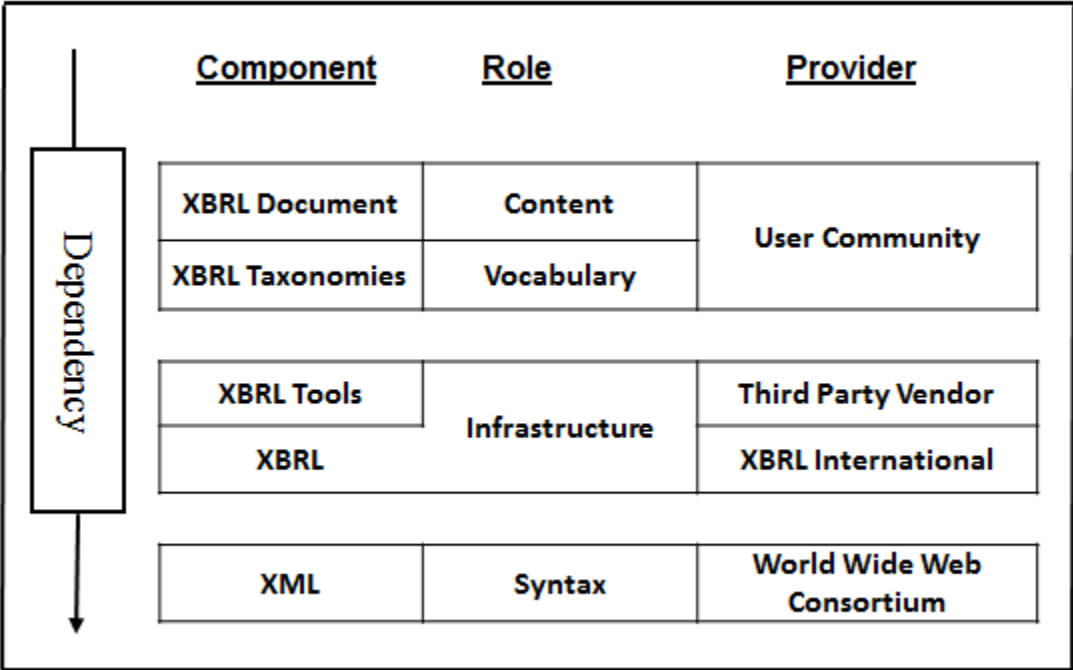
Figure 2.1: Layered View of XBRL Components (ACT/IAC, 2007)

XBRL documents make another vital component of XBRL framework. A financial document is mapped to XBRL taxonomies via data tag to create XBRL document. The data tags maps financial document to the universally agreed taxonomies which standardize it and make it usable for multiple users and purposes in multiple format. Finally, there are XBRL tools provided by third party vendors and XBRL international that shields the complex syntax,

supports the creation and management of XBRL documents and facilitates the interoperability of data between different legacy systems. Further, these tools enable automated data collection, validation, extraction and manipulation of XBRL documents and act as an infrastructure to the XBRL system. (ACT/IAC, 2007)

2.3 XBRL in Business Reporting Environment

Business companies, both public and private, are the primary data producers in financial reporting environment. The primary reporting data are generating from the business operation process. XBRL enables the data collection from different accounting system across the organization. Figure 2.2 depicts the XBRL document creation process.
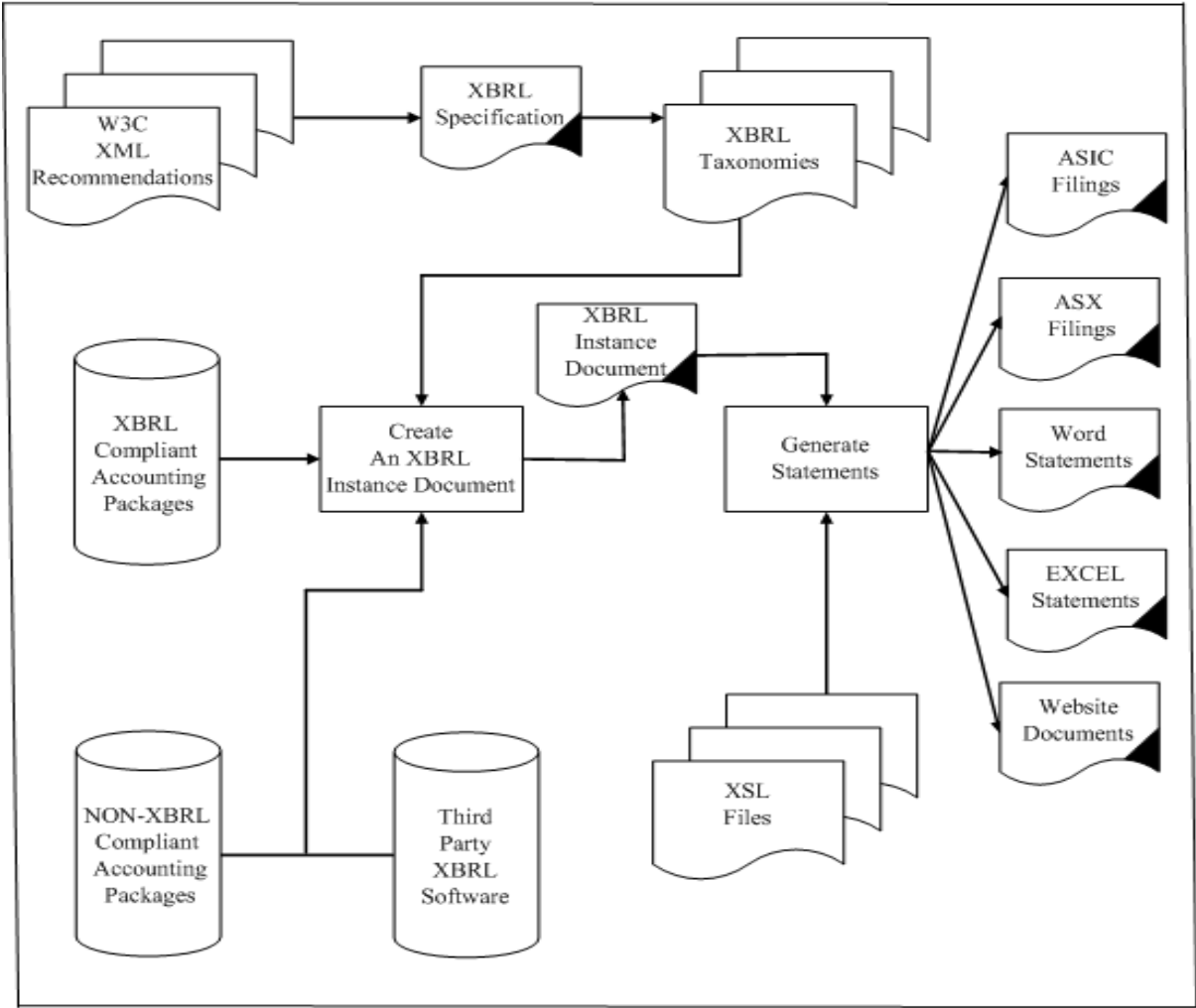
Figure 2.2: XBRL Report Creating Process (Richards & Smith, 2004)

Data collected from both XBRL compliant and non-XBRL compliant accounting packages can be used to create an XBRL instance document. The data from accounting packages are linked to the XBRL taxonomies through third party XBRL software to create XBRL instance document. Using XBRL instance documents, financial reports can be regenerate in multiple formats and also reports to meet the different reporting requirements.
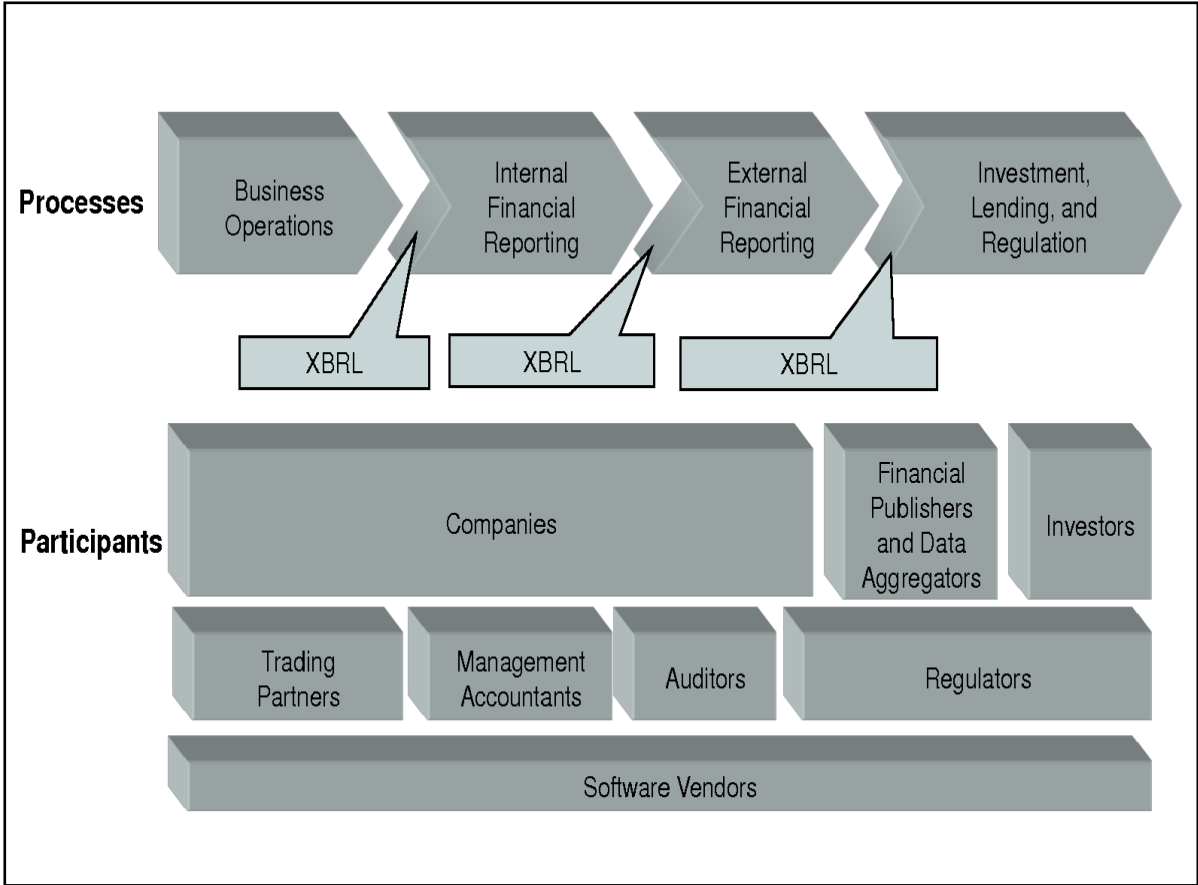
Figure 2.3: XBRL in Business Reporting Environment (FFIEC, 2006)

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In a business reporting environment XBRL enhances smooth flow of information from companies to different users. Figure 2.3 shows a typical business reporting environment with XBRL enabled reporting. XBRL transforms data from business operations into internal and external financing reports, and also to create reports that enables organization to fill the regulatory requirements. In a financial and business reporting chain is composed up of

companies, both public and private, trading partners, management and accountants, external auditors, regulators and government agencies, banks, investors and financial market. From fig 2.3 we can see that in financial reporting environment XBRL acts as a linkage between different stakeholders and thus, enhances smoothing information sharing between different stakeholders

3. Literature review: Business Value and Information Technology

The purpose of this chapter is to lay sound theoretical foundation to carry out the study. Rigorous analysis of literatures in Business value of IT and development of the business value framework are the core to this chapter. The flow of discussion is constructed in a logical order that attempts to follow the development of business value concept in IT literature. First, productivity paradox in information technology and its reasons for occurrences is discussed with reference to the literatures. Once the productivity paradox is discussed, the discussion focuses on productivity measurement as one of the major issue in productivity paradox. Consequently, business value concept is introduced and defined for the further discussion. In later half of the literature review, different approaches, level of analysis is discussed vigorously to set the foundation for the framework building. Finally, process oriented business value is analyzed as the base of business value framework.

3.1 Productivity Paradox in Information Technology

Information technology has been discussed with the reference of its impact in productivity (Brynjolfsson, 1993). The prominent points of discussions are; is information technology a productive investment? Does information technology improve productivity at enterprise, industry, national level? How can be information technology used to achieve productivity improvement? Several studies conducted range from negative relationship or no relationship at all to significantly positive relationship between productivity and IT investments. According to Ataay, A. (2006), empirical studies concerning to IT payoff have conflicting and inconclusive results. Further, Roach (1987) and Loveman (1994), stated that the empirical research on economic impact of IT has failed to reveal a consistent pattern that explains how investment in IT enhances productivity. The lack of consistent findings on how IT enhances productivity clearly implies the complexity of relationship between productivity and IT investment and also raises a valid and intriguing question whether Investment in IT really pays off or not.

Productivity is expressed as the relationship between input and output expressed as ratio of output to input (Tangen, 2002). Mathematically, it expresses the contribution of one unit of input in the output. Productivity also can be measured for various inputs as their individual contribution to output. Productivity is relative term (Tangen, 2002). This implies that productivity is just ratio and does not have any meaning if there is nothing to compare with and usually last year's productivity or industrial average or any other standards are used as a reference to compared against. Productivity improvement occurs in various ways. Ideally, when output is increased without increasing input productivity improvement or higher productivity is achieved. Practically, when higher increment in output is achieved compared to the increment in input, or output grows faster than inputs, or with diminishing inputs output is maintained at same level or increased, or with same level of input output grows productivity improvement is achieved. Productivity is related to resource utilization and thus, with improving resource utilization productivity also improves.

Investment on IT capital and information systems has been perceived to have tremendous ability to deliver value to business in terms of cost reduction due to increased human and non-human effectiveness and enhanced firms' competitiveness (Brynjolfsson & Hitt,1996). However, despite increasing investment towards advancement in information technologies, clear or direct resulting impact in organizational productivity and performance has been difficult to demonstrate and prove. In the context of lack of link between IT investment and productivity, the notion of IT Productivity Paradox was coined. IT productivity paradox can be expressed in one sentence as a state in which IT investment has not delivered significant productivity gain to justify the investment made (Oz, 2005). It is a state of over investment in IT where cost of IT exceeds the benefits from IT in terms of productivity gain. Ataay, A. (2006), mentioned that there have been huge chunk of investment towards advanced information technologies but clear or direct impact of these investments in organizational performance have been difficult to demonstrate and prove.

The notion of productivity paradox was first coined in a simple and proactive study "America's Technology Dilemma: A profile of Information economy" by Steven Roach, chief economist at Morgan Stanley, published in Morgan Stanley's April 22, 1987 economics

Newsletter series (Brynjolfsson & Hitt,1998). In his study Roach, attempted to explain the reason behind the slowing down productivity growth rate since 1973 as He observed that labor productivity in service sector had slower growth rate during the 70's and 80's even the computing power per white collar worker in service sector was growing dramatically. Large number of studies conducted during the decade of 1970s and 1980s showed that investment in IT had no impact or even negative impact in the aggregate productivity statistics (Pilat, 2004). This led economists Robert Solow to famously state "We see computers everywhere but in the productivity statistics" in the New York Times Book review July12, 1987 (Brynjolfsson & Hitt,1998). The base of productivity paradox resides on production theory. Researcher used production theory in their studies to test the correlation between the IT expenditure and productivity and the Productivity paradox was surfaced (Oz, 2005).

IT productivity research has been in abundance and most strikingly the conclusions are conflicting regarding the relationships between IT and productivity. Scharge (1997), mentioned that some researchers are of view that the claim IT positively influences business benefits is "the biggest lie of information age". Further, Oz (2005), also supported the fact that the finding in IT-productivity researches are inconclusive and stated that the most of the studies related with IT productivity concluded that investment in IT does not yield any productivity growth or very low increment. However, there are studies that support the fact that IT contributes positively towards productivity improvement. Studies by Alpar & Kim, (1990); Barua, Kriebel & Mukhopadhyay (1995); Lichtenberg (1995); Brynjolfsson & Hitt, (1996); Hitt & Brynjolfsson (1996); Mahmood & Mann (1993); Mitra & Chaya (1996), have reported positive relationship between IT organizational performance and productivity. They have concluded that IT has a significant impact on organizational performance and productivity.

There are several possible reasons behind such inconclusive findings. The relationship between productivity and investment in Information Technology is discussed in different level of analysis; national economy level, industry level, firm level and process level. With the difference in the level of analysis, different conclusion is probable as the impact of IT at different level of economy is not always the same. Also, the use of data set from different

time horizon tends to affect the results. For example, if the study considers small time horizon the results are likely to be negative as the benefits from IT are still lower than the investment in short run and vice versa.

Bharadwaj, Bharadwaj & Konsynski (1999); Kohli & Devaraj (2003); Mahmood & Mann, (2000), were of opinion that the theoretical and Methodological viewpoint on IT productivity paradox can be used to explain these inconclusive finings regarding the IT productivity. Methodological viewpoint on IT productivity paradox, as explained by Ahituv & Giladi (1993) and Brynjolfsson & Hitt (1998), states that the shortcoming on the research part leading to inconsistent findings regarding the productivity paradox is mainly due to " characteristics of sample used, missmeasurement of input and output , inappropriate measures of firms' performance, time lag due to learning and adjustments and failure to control other industry and firm specific factors that influence firm performance". Clearly the focal point of the methodological view point is related to the measurement issues of firm level variable of IT productivity dynamics.

Further, Bakos (1991) and Hitt & Brynjolfsson (1996), also pointed out the theoretical view point on the existence of productivity paradox and inconclusive results in IT productivity studies. Theoretical view point has emphasis on the market dimension of the industry. It states that though IT investment has contributed towards increased productivity and consumer value at the same time it has also played significant role on eliminating market inefficiencies thus causing firms to lose the monopoly power, lowering the entry barriers to the market and intensifying the market competition; thus, as a resultant effect, IT investment value are not to durable or lasting return to a firm that makes these investment.

To further support theoretical view point Oz (2005), argued when a company adopts new technology it gains economic profit till the user base is small. As the technology is widely adopted the competitive advantage is wiped out and the product prices decreases due to competition and wide productivity gain causing the diminishing profit level. At industrial level profitability from use of technology has a diminishing or has counter balancing trend.

Thus, business value created by information technology, thus, may not be visible when measured at industrial level even though it has created values at firm level. Also, Oz (2005), was of view that a technology matures when it moves from state of novel technology to the norms of industry, and when workers become familiar and comfortable with technology and perceive it as an integral part of the work. Since a mature technology loses innovative edge, productivity gains from adopting it should be out of equations and least or not expected. At times adopting a specific technology may be a just following the rules of game to stay in business rather than looking for some financial benefits. In these circumstances, business value needs to be measured differently.

Another relevant explanation for IT productivity paradox is IT management issue. IT alone cannot produce business benefits. When IT investment is coupled with new strategies and subsequent alignment, new business process, complementary investment and new organization design the benefit realization can be maximizes (Brynjolfsson & Hitt, 1998). To best exploit the IT investment and organization needs to undergo the process of reengineering to place itself in position to exploit maximum benefits. But in the absence of organizational change and complementary investment, an expensive IT system tends to be underutilized with higher cost and lower benefits and thus lowering the productivity. Another issue related with the management aspect is the unwise IT investment. IT investment decisions are often influenced by the vested interest of managers (Brynjolfsson, 1993). This accounts for several factors related to wrong timing of the investment, wrong technological choices, under or over investment in IT and resistance to the change that adversely affects IT productivity scenario. Further, poor management of organizational change also increases the cost of IT investment and thus, makes it an expensive endeavor.

3.2 IT Productivity Paradox and Mismeasurement

One of the major factors contributing IT productivity paradox as cited in methodological viewpoint on IT productivity is related with mismeasurement of input and output of IT system. Brynjolfsson (1993) and Brynjolfsson & Hitt (1998), also cited measurement as one of the major reason for existence of productivity paradox. According to Brynjolfsson (1993),

the main reason for existence of IT productivity paradox is the fallacies in measurement and methodological tool kits as it is due to the mismanagement of IT by its users and developers. Different researcher have adopted for different parameters to represent productivity measurement variable. There is no common understanding regarding what productivity means in evaluating IT investment. Most of the early researches concentrated on labor productivity whereas later studies went on to incorporate financial measures as well. In context of varying understanding of productivity in IT, it is worth mentioning interesting quote by Tangent (2002), "Productivity is frequently discussed by managers but rarely defined, often misunderstood and confused with similar terms, and seldom measured in an appropriate way, leading to the productivity disregarded and even to the contra productive decisions are taken".

Productivity as a termed is used to incorporated diverse measures such as profitability, revenue, market value of firm, and return on investment on individual projects, performance and different mix or combinations of these measures (Oz, 2005). From these diverse concepts, researchers chose different measurement parameter to represent productivity and thus, this contributed to varying conclusions about IT productivity paradox. In most of the researches, rational for selection of certain measure of productivity is an implicit assumption and underlying rationale hardly gets mentioned. As a result, it produces variation in the conclusion of the study as researchers can choose any variable and conclude weather IT investment is productive or not. Oz (2005), in one of his studies "Information technology productivity: in search of a definite observation" presents some instances of previous studies that demonstrates how the conclusion varied because of the differences in approach and choice of measurement variable. In one of the notable example, Navarrete & Pick (2002), concluded that IT has positive impact in net profits and return on assets in Mexican banking industry during the period of 1982-1992 and thus, productivity paradox does not exists. Similarly, studies by Strassman (1990, 1999), measured the relationship between IT and productivity with corporate earning being the measure. Thus, conclusions regarding the impact of IT in productivity, to large extent, depend on what measure of productivity a researcher chooses to employ.

Productivity has been more difficult to measure in the economy dominated by information technology than it was in the industrial economy (Brynjolfsson & Hitt, 1998). In the service economy, productivity measurement in terms of ratio of output to input has measurement complexity at the both input and the output end. The quantitative tools used in productivity measurement are not robust enough to capture the costs and benefits of service systems. The same argument applies to the productivity measurement in information system. In the input side, measuring the cost of technology is complex due to the difficulty associated in assessing the cost of technology. In service economy, information system cross the functional and organizational boundaries and have wide scope of operation. Thus, the estimations of inputs to the information systems become complex and questionable due to high level of complexity arising from organization-wide scope. Estimation of cost of inputs is also major measurement issue in IT productivity. Investment in Information technology comprises of several components; technological infrastructure, training, process design and organizational change (Brynjolfsson & Hitt, 1998). IT spending figures like software expenditure, IT services, and telecommunication are hard and almost impossible to obtain due to lack of proper and consistent records (Oz, 2005). Moreover, value of a technology is dynamic due to ever evolving technological innovation. This makes more powerful technology available in same price or the existing technology cheaper. Hence, valuation of technological can always become debatable. Further, different costs related to IT are both short term and long term in nature which results in contrasting valuation of same technology. For example, Initial investment are huge due to large share of training and development costs which are supposed to be recovered in long term whereas costs like repair and maintenance occurs in long term and are not included in initial assessment. Hence, the time frame considered during the measurement of IT costs has an influence on the IT input costs figure.

Problems at the other end of output measurements are even bigger. Output measurement tools are quite focused only on counting the number of outputs and thus, leaving out the quality of the product out of the question. By this approach of measurement, a technology that produces better quality with reduced number of output would be deemed to be unproductive. In addition to number of outputs, cost saving generated from technology or increased profitability and similar financial measures are popular output measures used in IT-productivity literatures. However, core objective of IT is not always cost cutting instead,

when asked for the purpose of IT investment managers consistently prioritize customer service and quality over cost saving as an objective of IT investment (Brynjolfsson & Hitt, 1998). The majors gain from IT systems are increased quality, product and service diversity, customer service, improved service time and responsiveness but when measuring the output of IT system these crucial benefits are poorly accounted (Brynjolfsson, 1993). Traditional output measures used in IT-productivity literatures fails to capture these important impacts of IT. Further, one can argue, financial measures like profitability is an output of interaction of several product and market related forces and thus, cannot be considered as an output of IT system alone.

3.3 Productivity and Business Value

When IT was introduced during industrial economy, the primary justification for IT investment was simply that it would increase productivity (Macdonald et. al., 1999). During early period of adoption, IT was seen as a mere tool for productivity improvement and cost reduction and hence, ability of IT to have overall performance improvement, products and services development, and business transformation was largely ignored. The benefits from IT were underachieved and consequently unmeasured. This is clearly reflected in the choice of measurement tools for evaluation of IT system. The major interest of IT investment was in gaining labor productivity and consequently, measuring the impact of IT mainly focused on reduction in labor input (Macdonald et. al., 1999). Thus, demonstrating significant productivity improvement was always challenging due to several factors, was explained in the previous section, contributed to the productivity assessment. Lack of proper quantitative tools to measure the value and output produced by Information Technology system was among the major reasons that made it difficult to justify the investment in IT (Brynjolfsson, 1993).The main problem with Productivity, as a IT evaluation tools, was in its traditional approach of relying on the relationship between input and output counts and failure to incorporate non-traditional values (Brynjolfsson, 1993). For example, important benefits of information systems like increased information quality, agile service, customers satisfaction, increased employee job contentment are not captured in traditional productivity measurement tools. The concept of productivity is more suited to the industrial production system or any system where tangible measures form dominating portion of input and output. Most of the

productivity matrices rely on the counting of things such as number of employees, pounds of nails, output per hour employees to mention few (Brynjolfsson & Hitt, 1998). Thus, intangible outputs which form major portion of outputs in information system are not captured by productivity measurement. It is a fair assessment to state that "Productivity was not the right measure of IT performance (Macdonald et. al., 1999)".

Recently, IS/IT literatures have had a shift in the focus from productivity to business value as a measure of IT performance. Business value is a broader concept that seeks to include the overall impact of IT on firm's performance. Concise oxford dictionary defines value as "worth, desirability or utility of a thing". Literally, business value means the worth of IT to a business entity. Thus, conceptually, business value should be based on cost benefit analysis of IT adoption in a business. However there is vast diversity in understanding and defining what benefits should be considered as a measure of business value. Further, the level of analysis also differs considerably from one researcher to another. Thus, there exists lack the consistency in the use of measures to represent business value which is discussed in subsequent section.

Researchers have defined business value in their own unique way. Some of those definitions are noteworthy to mention for the purpose of this study. Tallon, Kraemer and Gurbaxani, (2000), defined business value of IT as "Contribution of IT towards firm performance". Similarly, Mukhopadhyay, Kekre and Kalathur (1995), used impact of IT on firm's performance to defined business value of IT. Cronck and Fitzgerald (1999), provided more comprehensive definition of Information technologies' business value as "the sustainable value added to business by information system", either collectively or individually by different information systems to an organization in relation to expenditure made for it. Even though, there exists differences in business value definitions the common point of emphasizes on IT contribution, IT impact and firm's performance.

Tallon et. al. (2000), proposed a conceptual model of IT business value as depicted in Figure 2.3. Business value as a concept is defined in reference to strategy, business goals,

management practices and firm performance. The model clearly establishes links between strategy, corporate goals and IT systems and defines the business value in context of how well IT supports the strategy and goals. The significance of this concept is the consideration it makes about the business value context; direction of strategy, technology itself and management practices are the determining contextual factors that influences how well an organization can yield business value through operation. The focused and unfocused business goal can provide sound reference to the measurement of intangible business values. In this study, we define business value of Information technology as "the benefits or value added by an information technology or by information system as a whole to an individual process or organizational performance in relation to investment made and goals set for it."
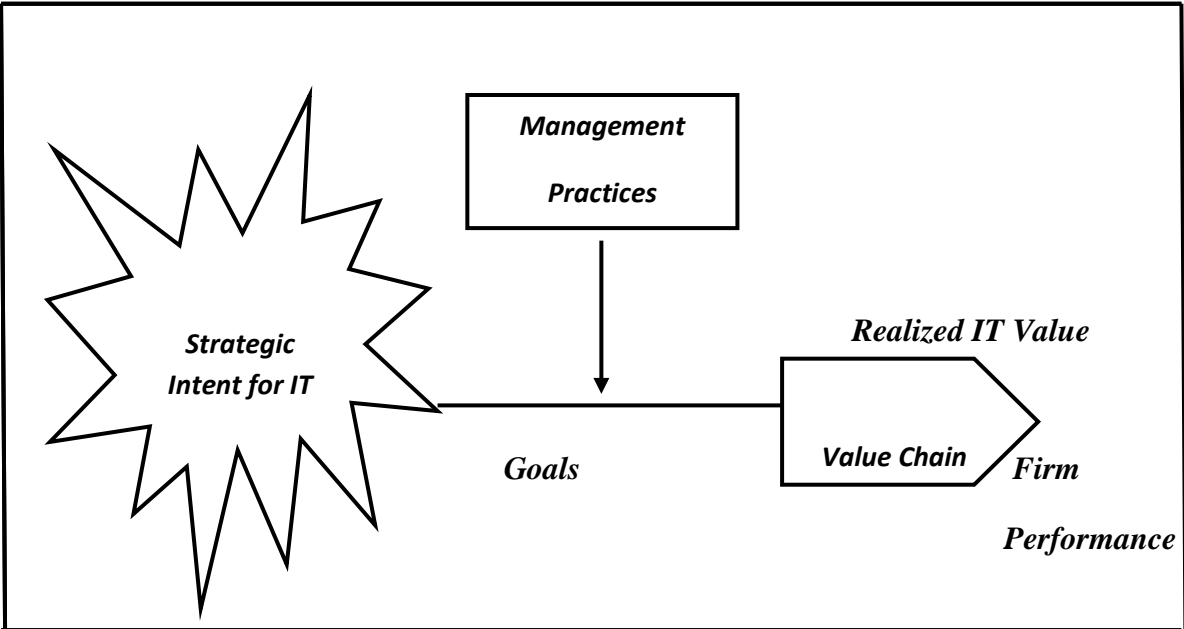
Figure 3.1: Conceptual model of IT business value (Adapted from Tallon et al., (2000))

3.4 Measures of Business value

Usually, business value, as a measurement tool, has been used for studying and evaluating technology's performance in relation to investment made and also used for justifying the IT investment. As a result, financial measures tend to become dominant choice as a measure of

business value. Further, Majority of existing researches in business value of IT is conducted at firm level output or final product based measures (Mooney, Gurbaxani & Kraemer, 1996). When the information system's performances are evaluated at firm level their ability to increase profitability or to reduce costs are among the most interesting measures to the top level management. Not surprisingly, in such circumstance, financial measures tend to be dominant business value analysis of IT. Figure 2 shows the measures chosen by CIFO to evaluate IT investment. Clearly, cost and profit related measures are the most popular choices of business value measures for evaluating IT performance.
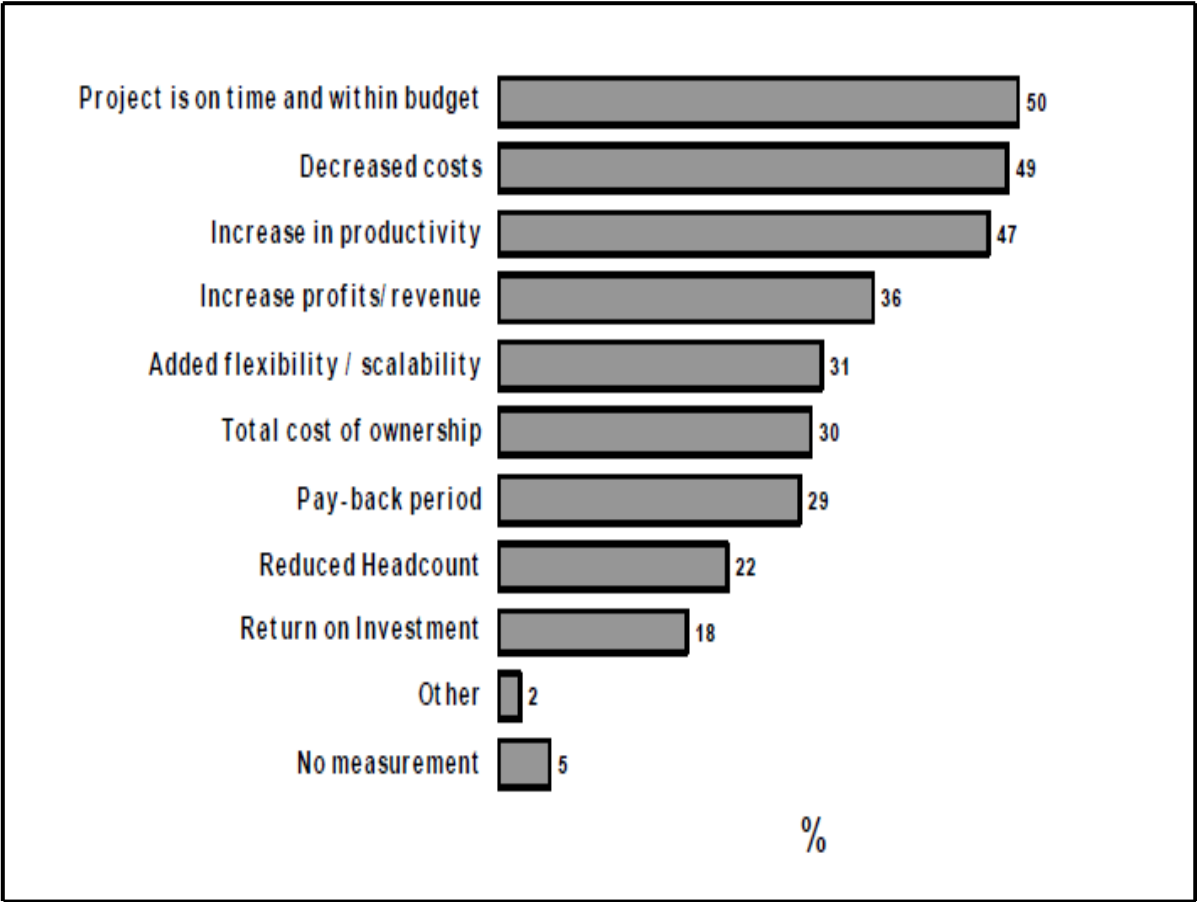
Figure 3.2: Use of Investment Evaluation Methods by CIOs (Silvius, 2006)

Traditionally, assessment of business value of information technology has been based on the evaluation of information systems' performance with respect to the investment made. Performance has been used by researchers to denote both intermediate process level and organizational level performance measures (Melville et. al., 2004). However, the core

measurement issue stays the same; what is the right measure that represents performance? As stated earlier, at firm level financial and market driven measures have been quite popular IT business value measures among the academicians. Researchers like, (Banker & Johnston, 1994) used market share to study the impact of computerized airlines reservation systems. Similarly, (Banker & Kauffman, 1988)studied the impact of automated teller machines (ATMs) in relation to the market share of the bank on the local deposits. Bresnahan (1986), used consumer surplus as welfare gains as measure of IT impacts of main frame computers in Financial Services Sector (FSS) from 1958 to 1972.

Efficiency and effectiveness are also among other popular measures of business value. Mooney et. al. (2001), used efficiency and effectiveness as measure of firm's performance, where efficiency represented the measures related to organization's internal operations whereas effectiveness was more related to "achievement of organizational objectives in relation to the firm's environment". Clearly, the concern of efficiency measures are directed towards the operational measures of IT and effectiveness are more related towards strategic objective of organization as a whole. Bardhan et. al. (2004), in the study "A model to measure the business value of Information Technology: The case project and information work", uses efficiency and effectiveness as measure of Business value. Further, resource based view also examined efficiency and competitive advantage as implication of firm specific resources (Melville, Kraemer & Gurbaxani, 2004).

Adding to this diversity of business value measures, Hitt & Brynjolfsson (1996), advocated the use of "productivity, business profitability and consumers surplus" as three different measures of business value of information system. In their discussion, Hitt & Brynjolfsson (1996), emphasized evaluation of IT investment as a central issue in business value discussion and thus, derive the three measures of business value: productivity from the theory of production, business profitability from theories of competitive advantage and consumer surplus from theory of consumer. The use of these three measures of business value is based on three key notions. First, IT should improve the operations and thus, yield productivity. Second, IT should contribute to increased firms' profitability and finally, use of IT provides consumer surplus from decreased price of products and services or increased the purchases in

same price. Similarly, Bharadwaj, Bharadwaj, & Konsynski (1999), used "Tobin's q" as a measure of firm's performance as an impact of information technology. Tobin's q is a market driven financial measures of firm's performance.

Business Processes	Dimension of IT Business Value		
	Automational	Informational	Transformational
Operational	Labor Costs Reliability Throughput Inventory Costs Efficiency	Utilization Wastage Operational Flexibility Responsiveness Quality	Product and Services Innovation Cycle Time Customer Relationships
Management	Administrative expenses Control Reporting Routinization	Effectiveness Decision Quality Resource Usage Empowerment Creativity	Competitive flexibility Competitive Capability Organizational Form

Table 3.1: Dimension of IT business value (Mooney et al., 2001)

Mooney et. al. (2001), provided some examples of measures that are used in process level analysis of business value of IT. They described process as either operational or management process. Operational processes are related to the fundamental activities of firm's function whereas management functions are concerned with the administrative responsibilities. Similarly, they defined the dimension of IT business value dimension as a scope of IT adoption; automation, informational and transformational. The business value measures for each process type are different depending upon the dimension as presented in figure 2.3.

However, in the process level analysis, the choice of business value measurement tools can be process specific or sometimes also technology specific. For example, Mukhopadhyay, Kekre & Kalathur (1995), in their study "Business value of information Technology; A study of Electronic data interchange" studied the business value of EDI in inventory handling in Chrysler used process specific measures like inventory cost, obsolete inventory cost, transportation cost and premium freight as a measure of business value of EDI.

3.5 Differences in Business Value Measures

From the above discussion, we can clearly see that the measures of business value considered by researchers differ considerably from one researcher to another. The majority of early literatures were focused on single system of evaluation of IT using the financial measures (Hamilton & Chervany, 1981a, 1981b). The technology under consideration, time horizon of study, and level of analysis are some of the major factors that influenced the choice of the measures selected. Symons (1991), explained that the decision to choose a certain measures of business value is influenced by the content of the information system under consideration and the context surrounding the information systems. There exists diversity in conceptual, theoretical, and analytical approaches, empirical methodologies and level of analysis that researchers have adopted (Brynjolfsson, 1993). After reviewing 202 literatures in IT business value, Melville et. al. (2004), observed that the major differences in the finding exists due to the differences in approach to the study, differences in construct chosen and the differences in level of analysis. Further, Cronck & Fitzgerald (1999), presented three different level of complexity in measurement of business value that can provide a potential explanation to the differences in choice of business value measures as presented in figure 2.4.

Level of Complexity	Focus of Measurement	Example of Factors considered	Example of Measured Used
1 st	Single System	Immediate sphere of influence of the Information System	UIS, Cost benefit, CSF fulfillment
	Organization	Collective IS costs versus organizational performance	Percentage of total assets versus total general IS expenses
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, Organizational Impact
3rd	Single system	Combination of above factors	Multi-dimensional measures

Table 3.2: Levels of complexity in the measurement of "IS business value"
(Cronck & Fitzgerald, 1999)

According to Cronk & Fitzgerald (1999), the first level of complexity in measurement of business value is primarily focused on determining the appropriate measure for the existing information system rather than evaluating future investment in information system. Thus the focus for this single system of measurement is on quantitative measures like cost-benefit analysis and qualitative measures like users satisfaction. At firm level, the first level of complexity in business value measurement is concerned with the measures of the collective performance of IT and thus, aggregate financial measures are used. Further, the second level of complexity occurs when measuring the value of single system in relation to the context of IS system and border issues that influence the creation and realization of business value. To address this complexity, more sophisticated qualitative metrics are used. The first level of complexity provides the current value of existing information system whereas the second level of complexity addresses rationale behind the value measurement consideration and the factors influencing those measures. At the third level of complexity, the concern is in justification of IT investment considering cost, benefits and risks associated with the investment

3.6 Approaches to Business Value Measurement in IT

Business value of IT can be analyzed at macro level such as national level and industrial level and also at micro level such as firm level, process level and activity level. At macro level the business value of IT is measurement issues are more concerned about the contribution of IT towards GDP and industrial productivity. Thus, the aggregate measures are popular tools of business value measurement. This study focuses in analyzing business value of IT at micro level, i.e. from the perspective of organization adopting IT. At micro level, business value of IT is a complex concept. It can be quite diverse concept ranging from a mere investment evaluation tools to source to performance evaluation criteria based on strategic and other intangible benefits. Further, at micro level there are several approaches to business value measurement; production function approach, variance approach, resource based view and process oriented view that can influence the choice of business value measures in micro level.

Production function approach is among the one of the earliest and among the most widely discussed approach in IT business value literatures. Foundation of this approach resides in the uses the relationship between production inputs like labor, IT and other capital to outputs using mathematical functions derived from micro economics (Melville, Kraemer & Gurbaxani, 2004). The use of this approach is better suited in production and operational technology where the major benefits from the use of IT occur in tangible form. However, this approach is not robust enough to incorporate other intangible values of IT.

Another alternative approach to the measurement of business value of IT is variance approach. The main emphasis of variance approach is in the relationship between IT investments and organization performance and hence, it focuses mainly on aggregate firm level business value measures like revenues or profits, reduced costs, market shares and others (Silvius, 2006). He further argued that the focus of this approach is on 'what' is the relationship between IT investment and different organization performance measures. Business value is measured in terms of impact of IT at firm level. The market driven performance measures tends to dominate the discussion of IT business value.

Resource based view (RBV) of business value of IT examines the relationship of IT and competitive advantage it can offer. Management and strategy literature forms the basic foundation of resources based view that explores the relationship between the resources and sustained competitiveness (Rumelt, Schendel & Teece, 1991). RBV assumes that the firms attain competitive advantage by assembling recourses and thus, resources form the basic unit of analysis (Acosta Colomo-Palacios & Loukis, 2011). IT resources; IT infrastructures and IT human resources combined with other complementary organizational resources and firm's ability to utilize these resources are the major factors affecting organizational performance and ability to gain competitive advantage. In RBV, a firm that applies IT to generate business value is termed as focal firm. When a focal firm applies IT to create business value, the approach of IT application is shaped by external, related to industrial characteristics, like competitiveness, regulation, technological change, speed and others (Melville et. al., 2004). As shown in figure 3.3 when IT and complementary resources are applied to the business processes, which first yields business process performance and then, ultimately organizational performance. This process demonstrates overall process of IT business value creation and business environment influencing it.

Resource based view approaches business value of IT in terms of necessary and sufficient conditions that enables organization to attain and sustain competitive advantage using resources available to firm (Melville, Kraemer & Gurbaxani, 2004)). In RBV, IT is regarded as a one of the vital resource and source of sustainable competitive advantage. The relationship between IT and competitive advantage is based on the notion that resources that are difficult to imitate and firm specific are valuable and source of efficiency (Teece et. al., 1997). If this resource is also rare, difficult to access for others firm, it can be source of temporary competitive advantage (Barney, 1991). He argued further, if the resources are also "imperfectly imitable", i.e. what factors lead to the success is not clear to the potential competitor, and no close substitutes of resources are available, the competitive advantage is sustainable.
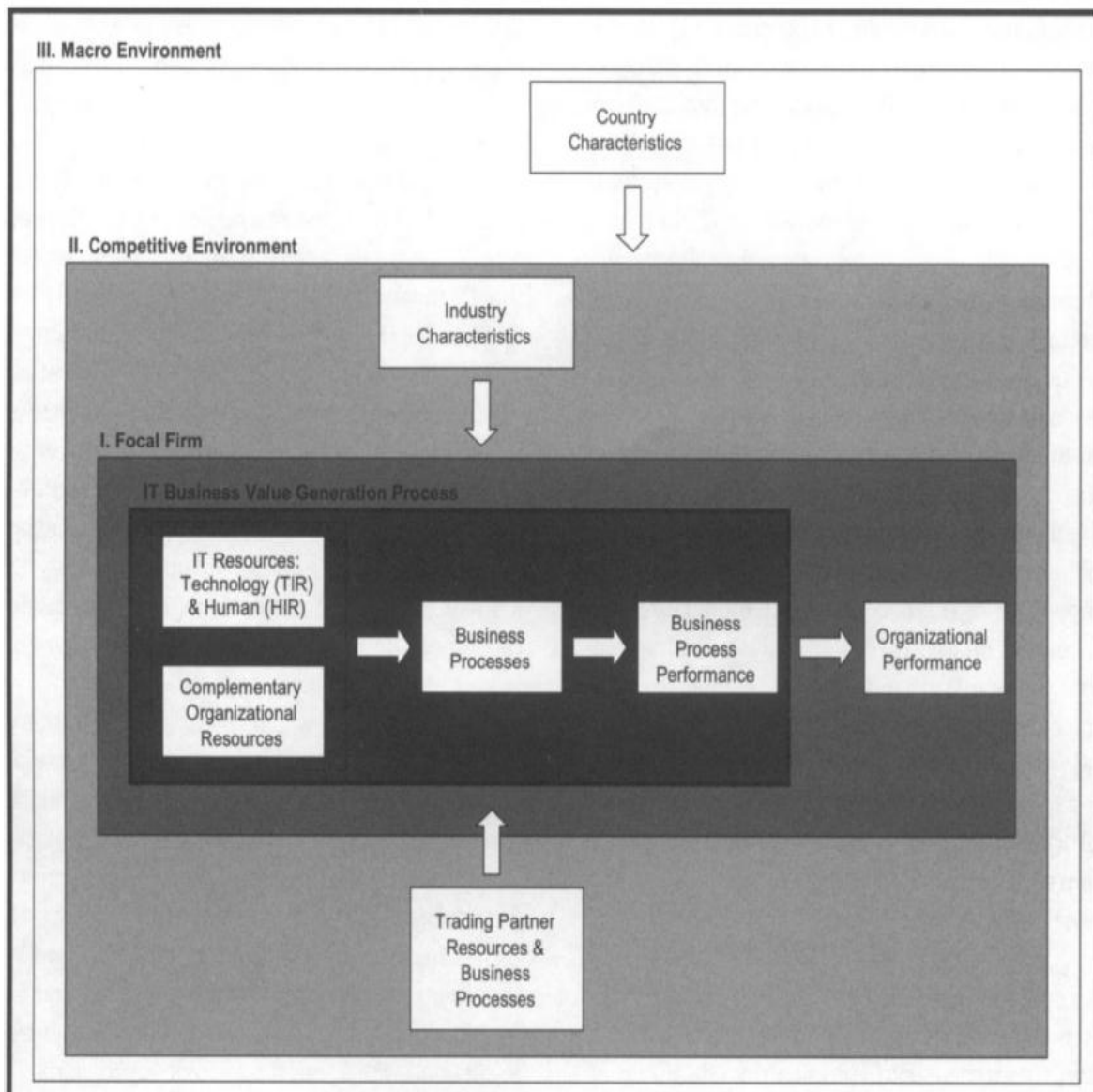
Figure 3.3: IT business Value Model (Melville et al. 2004)

However, Acosta, Colomo-Palacios & Loukis (2011), were of opinion that "Examining the relationship between resources and capabilities associated with different processes within the firm and its overall performance can lead to a misleading conclusion." This process of attributing firm's performance to the resource and capabilities could be more ideal for evaluating the strategic impact than resources or IT itself, since the measures of firm's performance is more market driven and competition based measured. RVB may be proved instrumental for creating sustainable IT business value, however it is not cleared how the business value created can be measured or how the IT can be evaluated.

3.7 Process Oriented Approach of IT Business Value

Discussion of business value of IT using process oriented approach begins with defining the organizational process. Process, in a business organization, can be defined as a collection of similar activities in a sequence designed to produce a common output. Davenport (1993, p.5), defined process as a "specific ordering of work activities across time and place, with a clear beginning, an end, and clearly identified inputs and outputs: a structure for action. Intermediate organizational processes include Operational processes, related to the value chain activities and management processes related to information processing, control, coordination and communication (Mooney et. al., 2001). Operational process includes all the primary activities related to organization's value chain like inbound and outbound logistics, production and operations processes. Management process: management level associated with administration, communication, allocation of resources, resource utilization, communication, coordination and control, related with decision making, not related to core activities.

Process level analysis of business value is based on the idea of measuring business value at process level rather than the firm level. Tallon et. al. (2000), explained the focus of process oriented view in terms of on "how IT affects critical business activities within the corporation's value system." Measuring business value of a technology at process level has an edge over aggregate measures as the business value is generated and measured at the same level. Muhhopadhyay et. al. (1995), were of the view that "Studies attempting to relate IT expenditure directly to firm level output variables ignore the web of intermediate processes, where the first order effects exist". Thus, one can conclude that process level analysis provides insight in to the IT value creation process. Mooney et. al (2001), also expressed similar idea; "Studying the impact of IT at intermediate business process level has potential to generate significant insight into how the value from IT is created". Process level approach of business value of IT focuses on the business value measures that are internal to the organizational process and less influenced by the market or industry driven measures.

Firm level and macro level measurement of business value of IT suffers more from the aggregation effect. Business value create by technologies are bundled together and aggregated

to arrive at firm level measures. When the business values are aggregated, the way business value is created or distorted and are difficult to analyze. Further, intangible aspects of business value are almost invisible at higher level of measurement as financial and productivity measures tend to become more interesting due their appealing and numeric visibility compared to the intangible measures. Even though financial measures are very popular business value measures at firm level, there are two clear arguments against financial measures. First, financial performance of a technology in terms of ROI and NPV as business value measure is flawed in itself. Financial performance of a technology is directly related to firm's revenue and profitability. Profitability is a composite outcome of right strategy, favorable market condition and application or right technology. Mooney et. al. (2001), argued that Information technology itself cannot be held accountable for organizational profitability and thus linking Technology business value directly to the revenue and profitability is unrealistic abstraction. Firm's financial performance depends upon choice of viable strategy, based on quality of business environment assessment, selection of right technology to execute the strategy and compatibility of technology, and other execution and management related practices. So, it is unfair to attribute financial success and failure on technology. Second, in addition to visible and tangible benefits like cost reduction and productivity, there are other intangible benefits of IT like effectiveness, improved decision making, better communication to mention some. Quantifying these intangible benefits with proper approximation is missing from the business value reports.

Further, at aggregate level of analysis, findings regarding the business value of IT are inconsistent and contradictory; conclusion ranging from negative impact, to insignificant to significant ROI. An organization is an aggregation of different business processes that functions toward producing final products and services. Technologies are deployed at business process level. "Firms derive business value from IT through its impacts on intermediate business processes" (Mooney et. al., 2001). Hence, measuring business value at process level yields more insight into business value offered by a technology as business value is measured at the same level as the technology operates and generates impact.

Process centric perspective of business value stresses that the prime objective of IT is to improve the performance of individual business process or linkages between business processes which in turn contributes towards firm's overall performance (Tallon et. al., 2000). Thus, the major focus of process centric approaches is in measuring process level benefits and business value. Measuring business value at process level can generate more generalizable results (Mooney et. al., 2001). Since, the business value analysis is conducted at the same level as the technology is applied and operates, validation of business value assessment should be more enhanced by the process level analysis. Further, business value measures are less affected from aggregate biases, market forces and are more process and technology dependent. The results from process level studies are more generalizable with few control variables defined. Thus, it can be fairly concluded that process level analysis provides with more generalizable and consistent view on IT business value analysis at micro level.

4. Framework for Measures of IT Business Value

The objective of this study is to analyze business value measures of XBRL. Thus, the first objective is to build a framework that will guide the further study of business value of XBRL. As discussed in previous section, at process level of analysis the linkage between IT and business performance is more clearly established and better understanding of business value can be achieved. Thus, building business value framework that resides on foundation of process level measurement is the first step. However, the framework should also be able to provide more holistic and complete view on the business value of IT. So, combining multi-level business value measures is the key proposition. In short, the business value framework used in this study is intended to serve the purpose of constructing the conceptual model that comprises of different components of business value measures and provides with more holistic and complete view. Due to the higher complexity in benefit measurement in information technology, compared to its cost side, the business value framework formulated focuses on measuring the benefit side of business value.

Measurement is a central issue in business value of IT and the measurement starts with building the measures. Thus, we focus on building the measures for business value of IT. Measures of business value convey vital information about the Information technology and its performance. Measures are core tools for the assessment of technologies' performance and how it has been managed. Further, measures also represent the interest and expectations of organization from the technology. Moreover, measures of business value are discussed as an indicator of business value on the basis of which the business value measurement tools are to be developed. Thus, this study takes approach of identifying the measures of business value of IT to answer what is the business value of IT. Until recent, measurement of business value has been much discussed in relation to tangible and objective measures like financial and productivity measures. The lack of model that includes multidimensional tangible and intangible measure of business value provides the impetus for the development of a framework that provides better representation of business value. The inspiration for a multidimensional and more complete model for business value measurement framework comes from the criteria model by Joel Palmius, (2007). In his paper "Criteria for measuring

and comparing information system" Palmius (2007), presented criteria model that facilitates the comparison of information system on the based on criteria like organizational, individual, information, technology, and systemic. The detailed model is shown in figure 3.4. Though the criteria model presents some measures of business value, the organization of measures are not suitable for building a model for the measurement purpose and also includes technological attributes as the basis of technological evaluation.
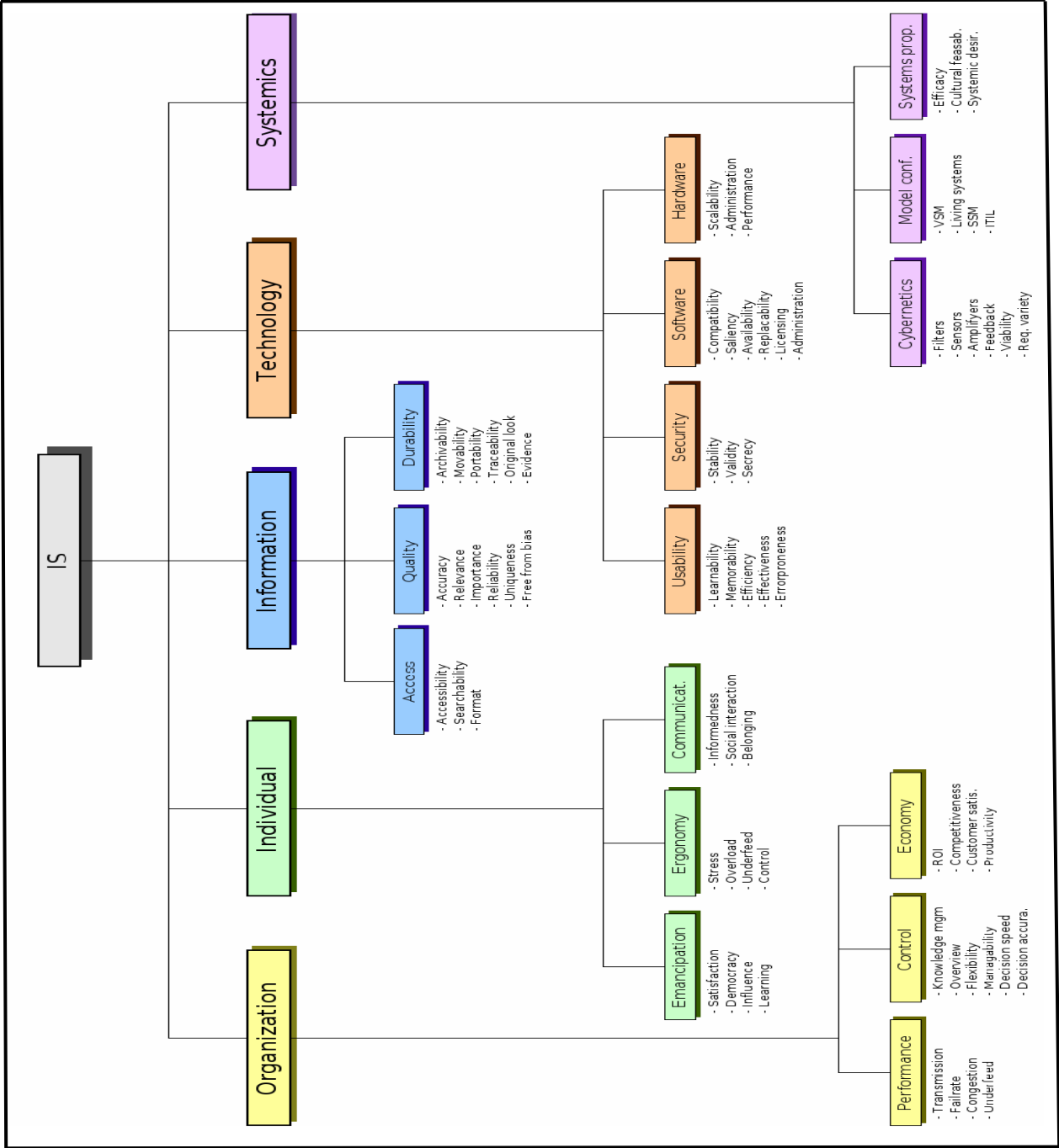
Figure 4.1: Criteria Model of Business Value of IT (Palmius, 2007)

Based on the criteria model, the basic conceptual framework of business value measurement is constructed for this study, as shown in figure 3.5. The business value measurement framework provides the conceptual foundation for the empirical analysis of business value of IT. Total Business value of IT can be summed as operational, personnel, informational and organizational business value that a technology delivers to the business organization. These four dimensions can be viewed as components or dimensions of business value. The strength of this model lies in the fact that it provides multiple perspective views to the business value concept. Both tangible and intangible benefits, financial and non-financial, and multi-level measures are incorporated in this model.
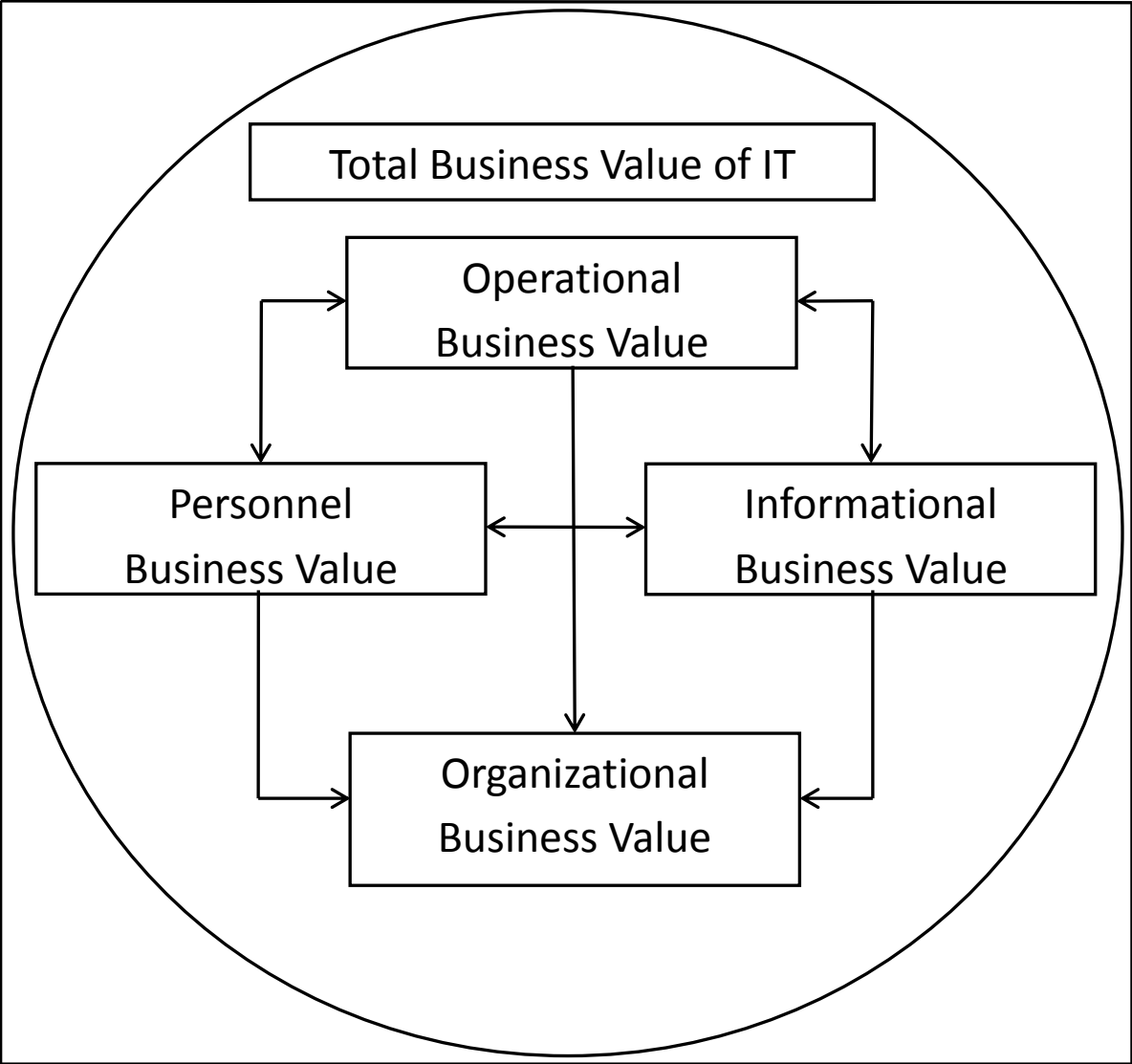
Fig 4.2: Conceptual Framework for IT business Value Measures

The business value measurement framework, "Total business value of IT", combines business value measures at activity, process and firm level. The model is conceptualized with the view of developing measurement tools and metrics for IT business value measurement at micro level. Thus, it leaves out the business value and productivity measures and issues that are more prevalent at industry and economy level. Further, the foundation of this model is based on combination of both tangible and intangible aspects of business value of IT. Intangible business values are often left out from the business value model as the impacts of intangible nature are difficult to measure and show in the report. Perceptual measurement tools can come quite handy in incorporating intangible business values in the business value measurement spectrum. Perceptual measurement is based on surveying the perception of the people involved in the technology and that particular process. It provides strong method of incorporating intangible business value of technology in terms of perceived value. On the flipside, perceptual measurement of business value of technology alone may not be sufficient to provide an objective view of value being created by a technology, due to high level of subjectivity involved (Tallon et. al., 2000). Respondents are likely to exaggerate the facts and manipulate the information on their will. The credibility of data reported is likely to be questionable.

Notably, objective data alone also do not represent the true business value as there are important qualitative dimensions to the business value that goes missing. Quantitative measures, based on objective data, fail to take into considerations important intangible benefits that have indirect and qualitative influence on business value. Thus, measurement of business value of IT is not limited to the financial metrics only but may also include range of perceptual measures and usage metrics (Tallon et. al., 2000). When both qualitative and quantitative measures are used to complement each other, a better understanding of business value can be achieved as it can demonstrate both the tangible and intangible aspect of business value. Thus, the application of total business value framework is based on both the objective data and perceptual data that provide insight to the intangible and qualitative aspects of business value. In the remaining of this section, different dimensions of business value as shown in the model, is discussed in the context of business value measurement of XBRL. The discussion follows the activity-process level business value measures to firm level business value measures.

4.1 Operational Business Value

In this model, operational business values represents the basic level business value that an organization derives from the technology at actual floor level of technology operations. Operational business values are results of the direct impact from basic use of Information technology at basic level. Since the business value is generated directly from the use of technology, measures of this business values are more technology and process centric. In other words, the choices of measures of business values can vary according to the technology being studied or on the type of process in which it is applied to. Further, these benefits are the direct outcome of operation of technology and thus, are mostly quantifiable if not tangible.

Operational business value measures mostly comprise productivity and efficiency measures and are easier to demonstrate in the report. Process productivity, operational cost reduction, number of outputs from the process, throughput time, delivery speed, lead time reduction, inventory cost reduction, number of ordered processed, and number of customers severed are among the popular measures of operational business value. Operational business value measures are more concerned with the output generated from the process itself. Notably, when the operational process is related with service creation quality of output becomes more important and the operational business value measures should be able to capture the importance of the quality and other intangible aspect of service output. Thus, it can be argued operational business value measures can be more quantitative for the process that produces tangible outputs and both quantitative and may be both qualitative for the service oriented processes.

As discussed in literature review section, there are clear evidences that operational business value has been among the most used IT business value measures. Melvile et. al. (2004), mentions cost reductions and inventory reductions as measures of business value. Mooney et al. (2004), also listed throughput time, inventory cost, labor cost as operational business value measures that originate from automational effect of IT. Similarly, Mukhopadhyay et al. (1995), used cost saving parameters of inventory control system, like inventory holding cost, obsolete inventory cost, transportation cost, premium freight costs and information handling

costs, to study the business value of EDI. Shang et. al. (2000), opted for cost reduction, cycle time reduction, productivity improvement, quality improvement and customer services improvement as measures of operational benefit of ERP system.

4.2 Informational Business Value

Informational Business values, as a component of total business value of IT, are the direct benefits that arise from the impact of IT use on the quality of information and communication processes. At basic level, both automation and improved information and communication are at core of information systems benefits that set the foundation for other types of business value. Unlike operational business value, information based business values are intangible in nature and are more difficult to quantify. Informational business values are direct derivative of the impact of technology on information quality, which is intangible in nature. Thus, informational business value measures are mostly intangible.

Informational business value can be direct as well indirect. The direct business values are the positive outcomes that are directly related to information quality. Improved information quality in terms of improved accuracy, ease of access, reusability, ease to comparability, transparency, improved information security, and information retrievabilty are direct benefits that can be achieved from the information system. These direct benefits translate into more indirect informational business value in terms of better information availability, efficiency in information analysis, faster decision making, improved decision making, better planning and controlling, and improved internal and external communication. These benefits are further reflected as increased efficiency and effectiveness in decision making, communication, planning and controlling functions. Thus, one can argue about multi-level measures within informational business value and would require further empirical investigation.

Measuring informational business value can be tricky due to its intangible nature. Reduced time for information processing, reduction of decision errors, improved decision speed, improved communication speed, reduced efforts in error correction and data formatting are

some measures that can be presented in more or less numeric terms. However, improved decision quality, better planning and controlling are intangible and difficult to measures. Like other intangible business value, despite of difficulties associated with measurement, these values can be measured using the perceptual measurement tools.

Literature in IT business value has been recognizing informational business as one of the major business value of IT. However, the concrete framework depicting as one of the major component of business value is not in abundance. Mooney et. al. (2001), argued that information quality, decision making are the major measures of informational business value of IT. Keen (1981), in his "Value Analysis: Justifying Decision Support Systems", employed fast response of unexpected situation, improved communication, and time saving as measures, among other different measures, of benefits of decision supports system benefits. Similarly, Macada et. al. (2012), used measures like faster and easier access to information, information accuracy, and information formatting to measure informational benefits of IT system.

4.3 Personnel Business Value

In IT business value research, personnel business values are the most left out or ignored as the measures of business value. There can be no denying that IT has ability to deliver different benefits to the individuals and contributes towards creating better working experience. However, due to the difficulties in quantifying it and high subjectivity in assessment, these benefits are often left out from the business value measurement and analysis. One of the noble contributions of this study is the recognition of personnel business value of IT, benefits that IT provides to the Human resource working with IT, as an important dimension of business value. Even though it is hard to demonstrate in paper, the impacts are more likely to be indirect and visible in other form of benefits.

There are few literatures in IT business value that has recognized some aspect of personnel Business value of IT. Increased job productivity, employees' increased job satisfaction, improved job content, reduction of work related stressed, and better control over job are some

of the key benefits that an individual can derive from IT. These benefits are highly likely to be reflected in terms of satisfied and motivated work force, better job performance, employee retention, flexible work force, and efficient allocation of human resources.

Personnel business value may not be directly visible but still can influence the overall performance of technology. Even though these personnel business values are indirect, the cost implication of these values can also be quite significant. IT can increase productivity of the workforce and thus, provide with surplus of working hours that can be allocated to the other jobs or more important tasks. Additionally, the reallocation of human resources also generates human resources related cost savings. However, cost saving from better work force redistribution is often hidden and unanalyzed in business value studies. Further, with application of IT, even less meaningful job of re-keying data and manual checking for errors can be changes into more interesting job like analysis of the data. With the improved job content, more interesting and meaningful, employees can derive higher job satisfaction which makes it easier to retain the employees. This ultimately has impact on improving the employees' well-being and also turnover rates, which has sizeable cost implications. However, these are the cost saving in terms of opportunity cost saving and are hard to see and demonstrate. Thus, when evaluating business value of technology, personnel business value measurement is important dimension despite of difficulties associated with the measurement of these values. A technology that delivers

4.4 Organizational Business Value

In total business value framework, organizational Business values are highest level benefits that can be achieved from the information system. These are the organizational level business value that are most influenced by external environmental factors like industrial, competitive, market and economy related and other macro level variables. These business value measures are of more interest to the top level management due to their impact on firm's financial and strategic positioning. These measures are easy to see and are more directly related to the business goal of organization and thus, quite popular among top level management. Business value created at this level also can be seen as aggregation of different business value that reflects in organizational performance as a whole.

As explained in technological productivity paradox, business value of technology, at organizational level, has some pitfalls in terms of conceptualization and application. Outcomes at organizational levels are composite of strategic, organizational and several market related factors and hence, measuring business value at this level may be flawed conceptually. However, the business value of technology at different level when combined with organizational performance variables can paint a complete and more meaningful picture of total business value. Further, some information technology applications have ability to influence revenue generating side of the business and thus, have detrimental effect on organizational performance variables. With higher and longer use of technology, business value it creates at different level should be translated into organizational performance to be considered to be successful. But considerable complexity exists as the business value at organizational level are compounded results of various technology, strategy and market factors. This could be also a major issue when business value is measured only in terms of financial performance variable and also builds strong case against the use of only financial variables. However, for the technology that is closer to consumer end and is of strategic importance, organizational business value measures, despite the complexities, could be effective tools for business value measurement. Thus, combining these financial measures, other measures like customer satisfaction, improved product/service design, improved stakeholders' relationship could form more robust organizational business value measures.

The current literatures highlight financial and organizational performance measures as a measure of business value of firm level. Literatures clearly indicate that, in practice, the technology investments are evaluated in terms of their financial viability; financial measures like profitability, return on investment, return on assets and other financial ratios are among widely used measures in this category. Hitt et. al. (1996), used business profitability, along with productivity and consumer surplus, as one of the important dimension of business value of IT. Melville et. al. (2004), in his Resource based view analysis emphasize competitive advantage as one of the measure of business value as firms seek sustainable competitive advantage through information technology. On the flip side, avoiding competitive disadvantage and staying in competition can be another important business value of technology. Similarly, Shang et. al. (2000), listed "support business growth, support business alliance, build business innovations, build cost leadership, generate product differentiation

and building external linkages with customers and suppliers" as strategic business value of ERP systems. These strategic benefits can be broadly summed in terms of competitive advantage and profitability as a measure.

4.5 Framework for XBRL Business Value Measures

The total business value framework is operationalized for the study of business value of XBRL to the reporting companies. The existing literature that discusses different aspects of business value of XBRL serves as the foundation of model construction. These literatures are fundamental to frame the different components of business value of XBRL.

Abundance of literatures in XBRL has advocated the creation of operational business value with the use of XBRL. ACT/IAC white Paper (2007), presented instances where Dutch Tax Authority expected to save 400 million euros per year in cost saving through consolidations of reports. Cost saving has been among the important business values reported from the use of XBRL Pinsker & Li (2008); Kloeden (2005); XBRL in Europe (2005); Cunningham (2004); Jones and Willis, (2003). Time saving in the financial report preparation is another major business value of XBRL Pinsker & Li (2008); Cunningham (2004). ACT/IAC white Paper (2007), also highlighted the case of time saving, with the use of XBRL, where FFIEC achieve improvement in processing time from weeks to hours.

In XBRL and related literatures, improved accessibility, accuracy, better and faster decision making, improved external and internal communication, data timeliness, transparency and security are among the most highlighted informational benefit of XBRL. In case of XBRL Accuracy XBRL in Europe (2005); Corkern et. al (2012); AG whitepaper (2002); Cunningham, (2004), reliability Vasarhelyi et. al. (2010); XBRL in Europe (2005); Baldwin et. al. (2006), accessibility Pinsker & Li, (2008); Kloeden, (2005); XBRL in Europe (2005); Cunningham (2004); Vasarhelyi et. al. (2010); Willis (2003), transparency Willis (2003); Vasarhelyi et. al (2010); Cunningham (2004); XBRL in Europe (2005); Baldwin et. al, (2006); Wright et. al. (2010), are the major informational benefits of XBRL. Further,

improved decision making (Cunningham, 2004), improved information sharing and exchange Jones and Willis (2003); Baldwin et. al. (2006), are also among the informational business value.

Not much has been discussed about the business value created by XBR at personnel level. Some literatures have indicated for improved productivity of employees which improves human resource utilization. Pinsker & Li (2008), mentioned that as a result of employees improved productivity, surplus employee working hours can be assigned for analytical job. It can be logically deduced that such a movement towards more meaningful job results in better job satisfaction, improved job content with the meaning full job. Further, once the data is keyed in the system, the data can be manipulated into different format and for different use. Thus, this removes the tedious job of error correction and rekeying of data. We can also deduce that XBRL creates business value with reduced work stress.

At Organizational level, Pinsker and Li (2008), mentioned competitive advantage for the first mover advantage, as business value of XBRL. However, this value tends to diminish as the use of technology becomes normal. Thus, for the purpose of this study we complement competitive advantage with avoiding competitive disadvantage as a business value of technology. Baldwin et. al. (2006), also highlighted easier regulatory compliance i.e. external communication as benefit of XBRL. Thus, improved external communication with markets and other stake holders and faster review by regulators can be one measure of business value at Organizational level One of the most important dimensions of organizational business value, in the literatures, profitability is not discussed as a business value of XBRL. However, in this study we will also set to test whether the report senders consider it as a measure of business value of XBRL.

The literatures in XBRL business value are analyzed with the view of operationalizing "Total Business Value Framework". The measures developed in this step are shown in table 4.1. In the later part of the study, a pilot interview with one of the Information system executive from

Finnish reporting company will be conducted. The result of this pilot interview will be used to improve the operationalized framework.

Operational	Informational
Cost Saving	Improved Accessibility
Time Saving	Improved decision making
	Accuracy
	Transparency
	Improved Information Sharing
Personnel	**Organizational**
Job Satisfaction	Profitability
Improved job content	Competitive advantage
Stress reduction	Avoidance of Competitive disadvantage
Efficient Human resource allocation	Easier regulatory compliance

Table 4.1: Measures of XBRL Business Value

5. Research Methodology

This chapter discusses research methodology used in this study. After synthesizing literature and developing XBRL business value framework, the next stage of the study involves carrying out the actual research. The main objective of this study is to explore the framework developed, which is rather untested, and thus, demands for study of exploratory nature. An exploratory study is an ideal choice when there is little or no information exists regarding the problem in hand and when there exists some theories and facts but substantial information are needed for developing viable framework (Sekaran, 2003). The use of total business value framework in studying business value of XBRL for the financial report sender is a relatively less researched topic. Further, even though there are some related to XBRL business value, a tested and viable framework for business value measures or satisfactory framework is lacking. This circumstance clearly indicates and justifies exploratory research. Further, there are not much studies and established theories in this area which further pushes for exploratory research. Hence, this study is based on exploratory study that is based on collection and analysis of qualitative data that are gathered primarily through the semi-structured research design.

This study is carried out in two distinct phases; first a semi-structured pilot interview and a Focus group discussion. The rationale behind two stage study design is due to the need of first to fully operationalizing XBRL business value framework with primary interview data from the actual user, so that it can be later used to carry out the further study. This clearly offers advantages in terms of increased reliability of framework and also provides some ground work for designing the later part of the study. The idea of having semi-structured interview was to have flexibility in interview so that the discussion flows freely and provides additional insight. In the framework testing part, the idea was to include opinion and perception of Finnish company. Thus, a respondent from Finnish company with XBRL experience was desirable. However, in Finland, XBRL is not yet in use. To find a Finnish respondent with sufficient working knowledge of XBRL was in fact quite challenging. Tiina Tammenpää, Senior Analyst, Group Accounting/ treasury controlling at Stora Enso was chosen as

respondent for the first round frame work testing interview. She had some background from the involvement in Finnish XBRL consortium and thus, was ideal choice for this study.

Once the pilot interview was conducted, the XBRL business value framework was further operationalized using data gathered from pilot interview. The fully operationalized framework served the basis of focus group discussion conducted during the second phase of the study. The rationale for conducting focus group discussion was to bring experts together and generate qualitative data from the free flowing interaction between the experts. Focus group discussion provides a flexible and free flowing way of collecting data that is based on respondents' impressions, interpretations and opinions. Focus group provides an extensive amount of information that generates from free flowing interactions among the expert which otherwise is difficult to obtained from the segregated interview. Information is built upon ideas brought to the discussions as the interaction proceeds forward and respondents come up with their views and opinions and also contribute towards information building based on other's opinion. This increases the richness of qualitative data. Thus, focus group discussion was preferred method to interview method.

Respondents were chosen from the member of XBRL European consortium. The detailed profile of respondents is shown in table 5.1. The respondents chosen were experts in the field with several year of significant involvement in XBRL and XBRL related solutions. Further, respondents had macro level view and had experience related to XBRL implementation in both report senders and report receivers side. Thus, information gathered from focused group discussion was of high quality and based on expertise in related filed. To add some objectivity in the data collected, Respondents in the focus group were asked to provide rating of business value measures of XBRL in the scale of 1-7, where seven meant strong agreement, one meant strong disagreement, and four meant not sure.

Focused Group Discussion	
Respondent	**Descriptions**
Anne Leslie-Bini	Head of International Development at Invoke
Poul Kjaer	Chairman of XBRL Denmark
Slawek Skrzypek	Business Development Director- Business Intelligence at FQS Poland (Fujitsu Group)
Michal Piechocki	Board member of XBRL international

Table 5.1: FGD Respondents' profiles

The qualitative data collected from the interview and focused group discussion is analyzed using grounded theory approach. In grounded theory approach the data analysis process is aimed at identifying the core elements of the given phenomena and arriving at the main principals that explain the given phenomena (Denscombe, 2003)Grounded theory approach suits the objective of this study; to explore the business value measures in XBRL. Further, the best attribute of grounded theory lies on the way data is interpreted rather than the way it is collected (Turner, 1983). This allows flexibility in analysis and allows researcher to integrate his own understanding and interpretation of the information that can lead to new findings. Thus, ground theory approach was chosen as data analysis method.

6. Research Results and Discussion

In this section of study we discuss the major findings and results of the study. First the results from various stage of data collection are presented and in the later half the results are analyzed together. We start with the results from the pilot interview where the result of framework testing is discussed. After presenting results, the interview data is analyzed to generate an operationalized business value framework for XBRL. Then, the results of focus group discussion, with the experts from various European XBRL representatives, are presented. Finally, the results are analyzed and discussed in the last part of this chapter.

6.1 Pilot Interview: Operationalizing Business Value Framework

In the first stage of data collection, an interview was conducted with the view of getting more operational details of XBRL to test and validate the framework. As mentioned earlier a semi-structured phone interview was conducted with Tiina tammenpaa. The scope of discussion was centered external reporting and management reporting at group or corporate level to get the firm level view.

Before looking into the business value aspect in external reporting, the focus was on gauging the scale of external reporting in Stora Enso; how large was external reporting process? According to Tiina, external reporting in Stora Enso OYJ is regarded mainly as a means of complying with statutory reporting requirements. In the words of Tiina, external reporting is mainly "tools for communicating with market" about how the company is doing. Reports for external reporting are prepared on quarterly basis. Preparing external report is a huge task, which requires collecting information from more than 200 entities that work together under Stora Enso Group. Once the data are collected and reports are prepared, the next step is to add the management's views and message that the company wants to communicate to the market. Thus, the external reporting consist of financial information in terms of interim releases and non-financial part as text that is intended to communicates future development of the company to the market. The report preparing task involves significant resource commitment

as it involves about 650-700 people working extensively for about a month to prepare interim release each time. These people cross the departmental boundaries and come together from different departments like accounting, finance and communication. Even though, these people are involved in some other assignment simultaneously, one can conclude that there is significant time and cost associated with external reporting in Stora Enso Group.

Talking about the business value of XBRL, Tiina was of the opinion that the major business value from the XBRL use in Stora Enso would be the harmonization of the system. As the report preparation involves data collection from 200 different entities that are scattered globally that use different formats and system of reporting. She believes that the ability of system like XBRL to consolidate and synchronize different system used in big companies like Stora Enso offers a very big benefit. She continued, "XBRL can act as a common language for the communication between different systems standardizes reporting process and thus plays crucial roles in report consolidation at group level". This ultimately has huge implications in terms of significant cost and time saving from the external reporting process as the feeding out data link between different systems is a massive task that consumes significant amount of time. She emphasized, "Connecting different system automatically through common standard has potential of saving time and money significantly".

On informational business value, she added that data accuracy is another major aspect of business value from XBRL as it increases the reliability of data. Along with reliability, data accuracy brings up several values as it eliminates tedious job of error checking and correcting. Further, the reusability of data eliminates bothersome job of rekeying data as the same information can be used for preparing multiple reports. As per rough estimation, She stated, " before , basically people used 90% of their time to key the data and to make data consistent and 10% analyzing the data and with the use of XBRL, the idea is to flip that around so that you could use 10 % of time to draft data and 90% time to analyze data.". She added that people working in the reporting process are more interested in analyzing data rather than keying data. Thus, the use of XBRL can be attributed to increase job satisfaction among the employees at it eases off the work related pressure and improves the job content.

For Stora Enso, even though profitability provides a financial angle of looking into the business value of XBRL, it can be traced mainly to the cost saving generated. Thus, cost saving generated from the technology is quite interesting measure. Further, in the communication side XBRL makes it easier and faster to send information to regulators in nicer and cleaner format of report to the regulator. She also mentioned that the XBRL reports prepared for external reporting are used for managerial reporting. Thus, one can conclude that XBRL positively enhances the internal control. Regarding the competitive advantage Tiina was not that convinced weather the XBRL can provide competitive edge over other companies when every company is using it. However, she mentioned that in external reporting there is some sort of competition regarding who is the fastest in external reporting. Thus, it can be of more of prestige issue than the competitive advantage. To sum up, she firmly believed that the different business value of XBRL comes to the picture as companies adopt it and the awareness also increases with the use. She draws an analogy with the business value of e-invoicing stating that "You don't really miss it before you have it".

6.2 Discussion and Analysis of Interview Data

The Pilot interview supported the most of the measures of business value proposed in the basic framework presented in previous chapter. In this round of interview, data supported further operationalized and detailed business value measures. The major finding in this pilot interview was the emergence of cost saving as a vital business value and its preference over profitability. Respondent was of view of that the cost saving generated are of more interest to the case company. Further, cost saving could be traced back to the cost saving from reduced work force, reduced cost of communication and reduced report consolidation cost. Efficiency in terms of time saving was traced to the time saving due to reduced report preparation and report validation time. The data also supported that XBRL helps to improve communication with better and cleaner data and assists in faster decision making.

Another important finding is related to the organizational business value. Respondent was of the view that XBRL may provide competitive advantage at initial stage, for first movers, but at later stage would be crucial to avoid competitive disadvantage as it becomes industrial

norms. She also emphasized on XBRL contribution towards unifying heterogeneous system; a strategic goal of Stora Enso and thus, indicated for strategic business value. Further, she also cited for the prestige or credibility issue in terms of being open towards the new technology and being the first one in industry to submit the financial reports. Analyzing interview data also revealed the fact that eased report preparation and validation can have significant contribution towards adherence of reporting regulations and improved relationship with stakeholders. Since, the reports prepared for financial reporting are also used for internal purpose; it was deductive that XBRL can contribute towards internal control.

The interview data indicated for the positive results towards the occurrence of personnel business value from the use of XBRL. Analytically, In addition to the basic measures, interview data also suggested that removal of data rekeying and manual validation of reports also provides better work load management and improved control over the work as the reliability of the task increases. The majority of discussion on informational business value was centered on the data accuracy and resultant information consistency across the corporation. Respondent also agreed that XBRL helps to improve information accessibility and transparency. Analytically, accessibility can be further divided into faster retrieval and easier access to the information duo to information integrity

The results of this pilot interview and analytical revision of the basic framework were integrated to get a fully operationalized framework. The operationalized framework, as shown in table 6.1, was used to carry out rest of the study.

Measures of Informational Business value
Faster retrieval of information
Easier access to the information
Improved accuracy of information
Improved information consistency across corporation
Enhanced information transparency
Enhanced information security
Measures of Operational Business value
Cost saving from reduced work force required in reporting process
Cost saving from reduced cost of communication
Cost saving from reduced cost to consolidate reports
Reduced report preparation time
Reduced time required for report validation
Improved communication
Faster Analysis and decision making
Measures of Personnel Business Value (for employees)
Reduced stress related to Error checking
Reduced stress related to re-keying data and report validation
Allows involvement in more meaningful job e.g. analysis of reports
Reduced work over load (better work load management)
Better Job control
Measures of organizational Business Value
Organizational Profitability
Strategic advantage
Competitive advantage over other firms
Avoid competitive disadvantage.
Adherence to government rules (reporting related)
Organizational learning
Credibility and prestige building
Better operational and management control
Improved relationship with other Stakeholders

Table 6.1: Business Value Measures for XBRL

6.3 Focus Group Discussion

The main objective of this focus group discussion was to extract data on business value of XBRL based on the experience of experts from different part of Europe. Respondents were from the XBRL software providers, who were also in XBRL international. The idea was to get the macro level perspective on the business value of XBRL. When asked what the general business value are, respondents mentioned transparency, increase in speed of data processing, increase data accuracy, higher data quality after validation, interoperability and reduced cost of capital.

Michal highlighted an example referring to the study made by Singaporean university that showed that decreased cost of capital acquisition for companies using XBRL as these companies tend to get covered by analyst. Anne also was of the idea that small companies, who otherwise would not get coverage from analysts, can get covered by analyst with XBRL use. This in turn increases access to the capital market and reduces the cost of capital acquisition. In the following section, the main highlights of focus group discussion are presented.

6.3.1 Informational Business Value

There was unanimous agreement that the use of XBRL increase the data accuracy. Poul mentioned that in USA there have been instances where the increase in data accuracy has increased from about 70 to 100%. Data accessibility was interpreted from both internal and external perspective. For example, if one considers data from the regulators and other public organization, the question of accessibility depends on the data governance issue. It depends upon type of governance model a country has adopted and again the governance model can differ for the different type of information. Anne was of view that the accessibility of external information it is contingent to governance model in a particular country and type of information as some information are freely available, where as some information costs some money while some information are not available at all. But when one considers data accessibility and retrievibility of internal information, it is again dependent on the stage of

XBRL maturity and the way it has been used. XBRL is a standard that is maturing itself. Anne emphasized that the XBRL as a technology is still maturing and evolving itself while allowing users to focus on data rather than the data standard. Even though it may be debatable for time being, but once with increase maturity of technology and optimum use, the accessibility and retrievability of the information improves.

The information exchanged at XBRL instance document level are enveloped with the code that has an encrypted message which ensures data security, However, the respondents were not particular convinced weather the use of XBRL increases the information security as it falls more in the domain of data governance model that is enforced and XBRL is just a component of it. Respondents agreed that XBRL when used properly can enhance transparency of information. However, it is again the desire of organization and the level of transparency that regulators wish to enforce that determines the overall transparency achieved from XBRL. Again, here, XBRL acts as a tool within bigger framework. Michal added on with an example, "in USA financial reporting domain, a company has been reporting incorrectly for three years in a row which was not identified before, was identified when XBRL was used for financial reporting". He further added that the use of XBRL increase control over the data and thus is instrumental in enforcing transparency and the benefits of this nature may be more visible and measurable as the standard evolves.

The table below shows how the different respondents rated different components of information business value. The increased information security as informational business value did not appear to be convincing for the respondents. However, regarding other aspects of informational business value they showed strong agreement.

	Measures of Informational Business value of XBRL	Michal	Anne	Poul	Slawek
1	XBRL enables Faster retrieval of information	6	7	6	7
2	XBRL enables easier access to the information	6	6	6	6
3	XBRL improves accuracy of information	7	3	6	6
4	XBRL improves information consistency across corporation	4	6	6	7
5	XBRL enhances information transparency	6	6	6	7
7	XBRL enhances information security	2	3	4	6

Table 6.2: Informational business value rated by respondent in the scale of 1-7

6.3.2 Operational Business Value

The discussion on operational business value from XBRL was focused on multiple dimensions like cost, productivity, and efficiency. Respondents agreed on the fact that the use of XBRL reduces the cost of report preparation. However, there was a discussion that the magnitude of cost reduced depends upon how XBRL is used. XBRL could be used for simple purpose of just to comply to the regulatory requirements or for a bigger purpose of improving overall communication process. Again, if the regulatory requirements demands deeper application of XBRL, that could result in firms generating higher cost saving. Further, there are costs related to different XBRL solutions that also need to be considered when one is considering the cost saving generated. Slawek mentioned an interesting XBRL cost equation. "If the regulator requires file submitter to submit the reports in excel format in web based platform, it incurs no cost in the reporter side. However, the cost of converting excel file into XBRL document and validating it incurs significant cost on the regulators side". So clearly, the cost related to the XBRL depends upon the regulatory requirements. He presented one case related to Poland where National bank of Poland, a regulator decided that the file submitters need to have XBRL instance files and also is concerned about what kind of tools the filers and submitters use. In this case filers need to have some kind of solutions, other than the basic, that will incur some cost to file submitters.

Again on cost related implication of XBRL, Michal mentioned a case where E-bay was able to significantly Shortened the report preparation time and which ultimately reflected in "10-15%" time saving and some cost saving. He continued, however, the saving generated from XBRL again depends upon what approach the file submitters take on use of XBRL. The benefit of XBRL depends upon approach whether a firm is adopting XBRL to prepare reports or is using to outsource the whole reporting process or is using a mixed model. So, not only the benefits but also the cost related to XBRL depends upon the approach undertaken by firms. Further, the relationship between the XBRL and the productivity was explained at national level. Poul shared Danish experience of XBRL. Government of Denmark views XBRL as an important tool that could boost the productivity and competitiveness of national economy. The emphasis on XBRL was part of Danish government to digitalize the communication around business, government and public and XBRL is part of it. However, there was no specific relationship specified between productivity and XBRL in firm level. One of the possible explanations could be that the business value measures were discussed in significant depth such that the productivity measures were already covered and there was no need to have a separate measure.

The multipurpose use of data and more integrated application of XBRL is the foundation on achieving operational business value. Anne was of the view that the operational business value from XBRL would be higher if the technology is used with the long term perspective rather than just the tools for compliance, further, the cross functional application of XBRL and more integrated use would garner higher operational values because the XBRL data can be used for multiple purposes. Agreeing with Anne, Slawek added that the major operational benefits of XBRL come from the notion that once created reports can be reused for other purposes. Anne further continued, the reuse of data can enhance the communication within the organization and extending the use of XBRL for interacting with business partners can provide additional communicational value. Also, XBRL, as a maturing technology, has been mainly viewed as compliance tools. However, as the technology matures it will support movement toward different reuse of data as more high quality tools from open standard as well as commercial standard would be available. Thus, it is more likely a firm would derive more operational value can be if XBRL is implemented from longer time horizon.

Michal added the other use of XBRL could be to consolidation of financial reports, to improve internal control, or just to comply with regulatory requirements and the ability of firm is down to how they want to use it. Also, the XBRL meta-data can be sourced automatically into the organization's decision making and business intelligence system. This would result in improved the business decision making process. In general, respondents agreed that the use of XBRL has ability to reduce report preparation and validation time and different costs associated with reporting process. The rating provided by respondents on different measures of operational business value is shown in table 6.3. Even though there is some missing data, there was quite good agreement on occurrence of operational business value measure. However, one cannot ignore the dependency and conditionality associated with these measures of business value.

	Measures of Operational Business value of XBRL	Michal	Anne	Poul	Slawek
1	XBRL enhances cost saving by reducing work force required in reporting process	5	6	6	5
2	XBRL enhances cost saving by reducing cost of communication	6	5	6	7
3	XBRL enhances cost saving by reducing cost to consolidate reports	4	5	6	6
4	XBRL reduces report preparation time	6	6	5	5
5	XBRL reduces time required for report validation	7	6		7
7	XBRL enhances improved communication	6	7		6
8	XBRL enhances faster Analysis and decision making	7	7	5	7

Table 6.3: Operational business value rated by respondent in the scale of 1-7

6.3.3 Personnel Business Value

Respondents agreed that XBRL also delivers business value to the people working in the reporting process. However, there is a downside too. In the early days of XBRL adoption, people may have hard time mapping the data to the taxonomy. Before the reporting process is

automated for certain clients, there are substantial efforts required in data mapping. Anne stated that the mapping from source system against the taxonomy that is already in the reporting process may take up to "160, 200,300 days". Again, the similar efforts may require if there are changes in taxonomy. But once the mapping is done, XBRL software acts as a black box that takes data and adds it to the reporting templates to generate XBRL instance reports that are shipped off to the regulators and thus, reduces efforts and time required for preparing reports. The amount of effort required in the starting phase of XBRL may even generate some resistance to change. However, there are benefits that people working with XBRL can actually gain.

Anne elaborated on different values employee can garner from the use of XBRL. The major business value comes from the reduction in manual data keying and rekeying. She continued, as XBRL reduces the amount of manual efforts in reporting process, the impact would be visible in day to day job content of the employees as they don't need to do all those manual keying and rekeying and thus get involved in higher value added activities. This improved efficiency in reporting process may also be reflected on downsizing of the reporting department. Further, Michal also mentioned that XBRL expands the reporting related knowledge base in the employees which could help them move to other steps.

Another major, value added is related to the task of error checking and validating report. Again Anne stated that" some information derived from the software shows that a data point is modified may be 6-10 times before submission". This would means considerable efforts in terms of finding out the data point that causes problems and repetitive procedure of correcting it. Further, Michal also presented instances where there were mistakes in reports and reporting templates. One example was of Peru where, during the preparation of taxonomy," it was learned that the entire banking supervision procedure in the book were incorrect, not precise enough". There was similar instance in Europe where the data was described incorrectly or sometimes missing and sometimes not precise enough. XBRL uncovers this sort of deficiency in reporting and thus, enables people working in reporting to create a report that are not rejected.

Respondents also showed favorable rating towards the statements that highlights personnel business value of XBRL. There was strong agreement regarding the reduction of stress related with the error checking. However, the value in terms of increased job control had weak agreement.

	Measures of Personnel Business value of XBRL	Michal	Anne	Poul	Slawek
1	For employees, XBRL reduces stress related to Error checking	7	7	5	7
2	For employees, XBRL reduces stress related to re-keying data and report validation	7	7	5	6
3	For employees, XBRL allows involvement in more meaningful job e.g. analysis of reports	7	7	5	5
4	For employees, XBRL reduces the work over load (better work load management)	5	7	5	5
5	For employees, XBRL enhances better control over the job	5	6	5	5

Table 6.4: Personnel business value rated by respondent in the scale of 1-7

6.3.4 Organizational Business value

The direct relationship between XBRL and business value and profit was excluded from the discussion as the majority of the profitability aspect was discussed in terms of various cost reduction that can be achieved from XBRL. Further, the pilot interview also suggested that the direct source of profitability can be traced back to the cost saving achieved in the reporting process. Respondents agreed on the fact that XBRL enables organization to adhere to the government regulations and makes the process easier and faster. However, it again depends upon the fact that how are the regulatory requirements; weather it requires XBRL instance document or not. But, XBRL ensures that the reports are prepared in correct format, validated according to business rule such that reports are accepted, and not rejected, when submitted.

Respondents were of the view that the relationship between XBRL and strategic advantage depend upon how the strategic advantages are defined, what dimension of strategic advantages are of interest to the company. Further, how the XBRL is used, whether a company takes a proactive approach or not, how well XBRL is integrated in reporting systems also determines the level of strategic advantage that report filers can achieve. Respondents were also of the view that the use of XBRL provides competitive advantage and in some case only enables avoiding competitive disadvantage. Anne mentioned that if a company is adopting XBRL even if it is not in mandate, the companies might find themselves in some advantageous position where they have a good story to tell to the market.

Respondents also agreed on the fact that XBRL helps to build organizational prestige and credibility. Anne stated that the use of XBRL can be for image building and to be perceived as a proactive company which could be desirable from PR perspective. Further, she presented an instance where a report filer emphasizes extensive use of XBRL for credibility building. In an effort towards building reputation as a transparent Goldman Sach uses additional 85% personalized extensions to already rich US GAP taxonomy; a taxonomy that has 16000 elements already.

The stakeholder relationship aspect of business value was among the trickiest discussion among the different business value measures. All the respondents were of the idea that the stakeholder relationship aspect was a dynamic view that involved several different types of stakeholders with different motives and interests. To add, Michal opined that the impact of XBRL on relationship with XBRL depends upon what group of stakeholders are under consideration, whether they are using XBRL or not. However, the relationship with the investor and financial market was one dimension were respondents agreed that XBRL would provide small and medium size business with an exposure to financial market and investors that otherwise would not existed without XBRL. Expressing similar idea, Anne also added, "There are more companies, for example, otherwise will not get any analysts for coverage, get it from XBRL". Respondents also supported the idea that XBRL assists in operational and managerial control. XBRL generates meta-data that can be used for both external reporting

and internal managerial purpose. Michal stated that the XBRL data and meta-data description for internal purpose as well.

The majority of organizational learning dimensions were again related to the understanding the reporting process and eliminating the error. Supporting the idea of employee learning, Michal added that the "the use of XBRL broadens the employees' knowledge of reporting systems and regulations". Also, the transparency and defined data and business rules allow minimizing the errors in terms of reporting wrong items or in wrong format. He continued that the XBRL data can be used for business intelligence purpose as well. It is evident that BI system with XBRL fed data can be an important part of organizational learning.

	Measures of Organizational Business value of XBRL	Michal	Anne	Poul	Slawek
1	XBRL enhances Organizational Profitability	4	4	6	6
2	XBRL enhances strategic advantage	6	5	6	6
3	XBRL enhances competitive advantage over other firms	3	5	6	7
4	XBRL helps to avoid competitive disadvantage.	3	6	6	4
5	XBRL facilitates adherence to government rules	6	7	6	6
6	XBRL facilitates Organizational learning	4	6	6	4
7	XBRL enhance the credibility and prestige of the organization	5	6	6	5
8	XBRL improves information for operational and management control	6	7	6	6
9	XBRL helps to improve relationship with other Stakeholders	5	5	6	7

Table 6.5: Organizational business value rated by respondent in the scale of 1-7

6.4 Discussion and Analysis

The focus group discussion and the pilot interview were preliminarily focused on the business value measures of XBRL. However, the discussion stretched towards other important dimensions of XBRL business value; Source of XBRL business value, XBRL business value moderating factors and interaction of moderating factors and business value measures. In this section, in addition to business value measures of XBRL we discussed the additional dimensions.

6.4.1 XBRL business Value Source

During the focus group discussion, respondents made clear distinction between the business value measures and source of the business value. Analyzing the qualitative data gathered, XBRL business value can be tracked to the fundamental XBRL capabilities like interoperability, Meta data and data tagging capabilities, and data encryption. Interoperability was singled out as a major source of XBRL business value to the reporting companies. In the discussion interoperability is discussed in terms of ability of XBRL to operate between the different reporting systems and standards as a connecting system. In case of Stora Enso, Tiina emphasized that XBRL enables to standardize the reporting procedures that spans across 200 subsidiaries that uses different reporting standards. XBRL can act as a common language that connects all this system. This is also consistent with Stora Enso's strategy of unifying the heterogeneous system across different business units. To sum up harmonization of the reporting system and streamlined reporting process is a major source of business value of XBRL. Further, interoperability also means capability that enables conversion of data from one reporting standard to another without loss of meaning. This has huge implication on data analysis, comparison and decision making. Thus, it can be firmly concluded that interoperability capability of XBRL act as an important source of business value.

In addition to interoperability feature of XBRL, metadata and data tags used in XBRL were another important source of XBRL business value. Respondents in the focus group interview were convinced that the major business value of XBRL comes from the reuse of data to

produce multiple formats of reports that can be used for various external and internal purposes. Slawek stated, "The fact that the same data, after entering for the first time, can be reused with templates to generate reports for different stakeholders in different formats is the most valued feature by reporting companies". If we track reuse of data, it originates from XBRL metadata that describes data and business rules used in reporting process. Several aspects of XBRL business value, like increased accuracy, data consistency, ease validation to mention few, comes from the reuse of data. Thus, metadata and data tagging capability can be labeled as another important source of XBRL business value. During focus group discussion XBRL data encryption and envelopment features were mentioned as a feature that ensures secured information exchange and thus, contributes towards information security. In the context of XBRL and information security, Michal stated, "In most practical cases the XBRL instance document level codes are enveloped within a short message or any other means that will be transmitted, secured and encrypted". Thus, XBRL encryption can be mention as source of XBRL business values. The business value sources are listed and described in table. 6.6

Source of Business value	Description
Interoperability	Standardization; common language; harmonization; streamlining reporting process
Meta data and data tagging	Reusable data; Multi-format report generation
Data encryption	Secure data Transmission

Table 6.6: Sources of XBRL business value

Further analysis clearly indicates that the impact of XBRL capabilities on different business value measures can be categorized as direct and indirect. Informational business value measures are more directly related to the capabilities of XBRL that acts as a source. In most of the other business values the business value creation is more indirect. For example, XBRL

data tagging enables reuse of data that supports multiple report generation which ultimately shows up in terms of ease of compliance, reduced cost and increased efficiency.

6.4.2 XBRL business Value moderators

Among the major findings, shedding light upon the business value dynamics of XBRL is a crucial aspect of this study. Business value measurement in information technology involves fair share complexity due to the multi-dimensional nature. To further complicate the issue, XBRL business value is subjected to the influence of contingency variables which adds dynamism and complexity to the concept of business value. These contingency variable acts as moderator to the business value of XBRL and thus, are capable enough to significantly influence the business value derived from the technology. Based on the discussion these variables can be categorized as internal, external and technology related.

As per the results of this study we define the internal variables affecting business value of XBRL as the factors that are within the scope of organizational boundary and within the controlling wish of organization. Respondents mentioned that the derived business value of XBRL is influenced by the size of the organization. The derived values from XBRL are higher for bigger companies and thus, high costs, and advanced XBRL based tools and solutions are easy to justify. Further, for larger corporation the major business value may be related to the use of XBRL in unifying the heterogeneous external reporting processes placed across various business units. For smaller companies getting coverage, from market analysis could be the bigger gain.

Moreover, the approach taken for XBRL adoption also determines the business value that can be derived from it. XBRL can be adopted on bolt-on approach, where the XBRL is used as just an additional tab in reporting system. In this case, benefits are not fully exploited and XBRL is limited to simple use. The business value derived tends to be on the lower side. XBRL also can be used to outsource reporting task. Outsourcing the reporting function may only yield value in terms of strategic flexibility as the reporting company is able to offload the function that they don't think as critical or significant value driver. In such case, instead of

financial value, XBRL may incur substantial costs in exchange of strategic flexibility. However, if XBRL is integrated in a cross functional mode and used to maximum, even though the initial efforts and costs are quite significant, the derived business value are likely to be on the higher spectrum. Other internal variable indicated in the result is the level of application of XBRL: weather use of XBRL is limited to the adoption of standard only or is it extended to the further use of XBRL based analytical tools and solutions. In the words of Michal, how deep is the level of application also determines what business value a reporting company can garner. Lastly, the internal variable also included the organizational learning element; i.e. the business value an organization derive from XBRL is time dependent as the organization starts to discover different utilities of technology. Further, as the effect of learning curve organization tends to be more efficient with the technology use and gain improved business value from the technology. The internal variables that affect XBRL business value are summarized in table 6.7.

Variables	Description
Scope of operation	Global VS local; Small VS Medium VS large
Approach of adoption	Bolt-on VS outsourcing VS integration; Full integrated VS stand-alone (departmental)
Equipness with XBRL tools	level of application of XBRL tools and solutions
Organizational learning cycle	Time dimension of technology adoption and development

Table 6.7: Internal moderators of XBRL business value

External variables, based on the research data, are defined as the factors or variables in the reporting environment that lies outside the organizational boundaries and are not under willing influence of the reporting company. The reporting organization needs to adapt to these variables and attempt to maximize business value within the given circumstances. Thus, these external variables determine overall dynamics of external reporting environment and ultimately business value of XBRL.

The overall data governance framework, the regulatory reporting requirements are primary external variable related to the rules and regulations guiding over all reporting environment. The data governance framework guides the overall availability of external data and the information security structure within the reporting structure in place. Similarly, the regulatory requirement may demand mandatory adoption of XBRL. It may also influence the reporting format that organization can use; for example either XBRL instance document or as an excel sheet. Further, regulator requirement also specifies how and what information need to be reported. Another important external variable is related to the stakeholders, their role in the reporting environment and their level of preparedness with XBRL application.

The number of clients on stakeholder's side and number of XBRL adopters in the industry are some other important external moderating variables. The stakeholders and other XBRL adopter related variables majorly influence the XBRL business value measures. The definition of stakeholders in terms of their motivation and interest, stakeholders' level of preparedness with XBRL, number of report senders, and number of XBRL adopters in industries are some external factors that influence XBRL business value. A clearer picture emerges in subsequent discussion where these moderators are discussed in relation to the individual business value dimensions. External variables that influence XBRL business value is presented in the table 6.8.

Variables	Description
Data Governance framework	data availability , transparency measures, security standard
Regulatory reporting requirement	What data should be reported, how and in what format
Stakeholders' preparedness with XBRL	Level of XBRL implementation; tools and application
Other Report senders to Stakeholders	Number of report senders in the side of stakeholders
Other XBRL adopters	Number of XBRL adopters in the industry

Table 6.8: External moderators of XBRL business value

The final category of moderating variables is related to the technology itself; XBRL capabilities and development. This is another piece of value adding findings that tries to incorporate technology development cycle into the business value model. Technology also follows a development cycle and the business value on offer from a technology depends upon the capabilities that a technology can offer. Analytically one can observe that technological variables directly influence the business value sources, in terms of what technology can do, and thus ultimately influence business value derived from it. Respondents mentioned the fact that XBRL as a standard and as a technology itself is maturing. Anne mentioned that the business value derived from XBRL would be different as the technology would reach the maturity. With the maturity of technology, more XBRL analytical applications and software would be available. Further, different use of XBRL would be possible with growth of the technology. Thus, it can be fairly concluded that XBRL development and maturity is among a variable that influences the business value derived from it.

Variables	Description
Level of technological maturity	Richness of taxonomy; tools availability; newer areas of application

Table 6.9: Technological moderators of XBRL business value

6.4.3 A dynamic model; variables and business value interaction

Analytically, the information gathered during the two round of data collection can be summed up to build an interactive dynamic model that includes three major dimensions; business value source, Business value moderator and business value measures. Further, the respondents in the data collection rounds were clearly referring to the moderation of business value by different factors which clearly hinted towards the dynamism in XBRL business value. Most notably, in case of organizational business value measures, the most of the answers started

with "business value depends" which clearly infers to the business value model that is links measures with the moderating factors.
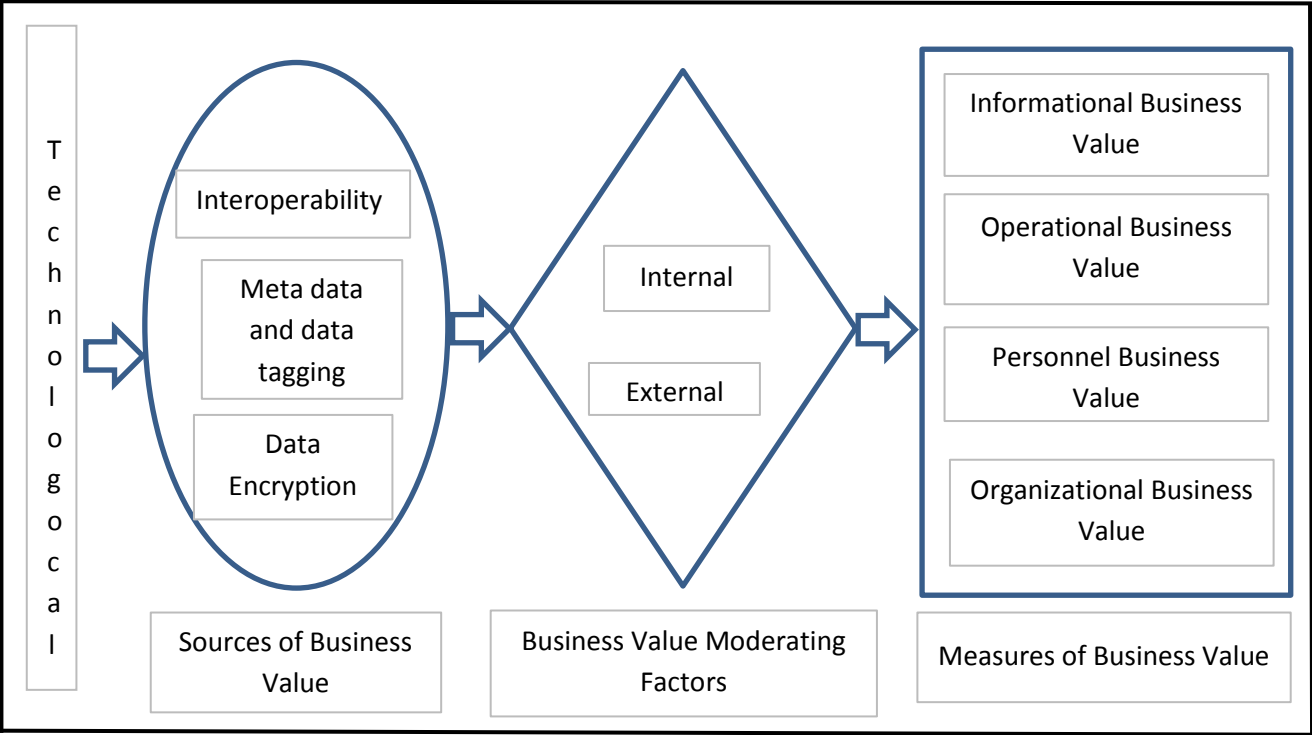

Fig 6.1: Dynamic Model of XBRL Business Value

If we look into the moderator the technological variables seems to have generic effect over the business value of XBRL. Analytically, this relationship is quite intuitive as technology related moderating variables directly influence the sources of business value i.e. features and capabilities of the technology. Most of the personnel and Operational and informational business value measures are affected by internal moderating business value variable. Measures related to accessing external data and information security are also influenced by the data governance framework which lies outside the organization boundary. Further, measures like transparency are also clearly influenced by external variables. Operational business value measures and personnel business value measures clearly lies in the domain of internal moderating variables. The organizational ability to garner operational and personnel business value clearly depends upon the capability of the technology; "what it can do" and use of technology; "how organization uses that technology".

Organizational business value measures are the business value components that are more exposed to the external moderation factors. However, measures like strategic advantage and improved operational control are still subjected to much of the influence from the internal moderating variables. The business value measures in organizational components are at the highest level connected to the overall organizational performance and stake holders. Thus, business value gained in this dimension depends a lot on the state of external variables and to some extent on internal variables.

7. Conclusions and Implications

This is the final chapter of this study where we conclude the study. This study is an exploratory effort that seeks to analyze theory, devise a framework to study business value of IT, collect interview data to test the framework with XBRL report senders. Thus, the results are drawn on the basis of qualitative, interview data, and are exploratory in nature. Considering the objectives, this study has lived up to expectations by achieving the desired objectives.

This study can be viewed as three distinct parts; each contributing in the direction of fulfilling the set objectives. In the first half of this study, the rigorous analysis of theory reveals the fact that the business value measures in information technology should be multi-dimensional construct to provide a holistic view. In next subsequent part the framework is tested with first pilot interview and then focused group discussion with experts in the field of XBRL. Finally, results are analyzed and discussed. The first major contribution comes from the framework for studying the business value of IT. The total business value framework puts together the measures of business value to provide more complete and robust view. Further, the results of the study shows that XBRL scores positively on all four business value measures for the reporting company. The expert opinion based results clearly supports the idea that the four component business value model. Further, the results also show that, in case of XBRL, the business value is a dynamic model affected by the internal, external and technological moderating factors. Even though some measures and factors, delineated in this study, may be specific to XBRL, at construct level the model is generalizable.

7.1 Theoretical Implications

The strength of this study lies in model building on the basis of sound analysis of business value literatures. Integrated business value framework is formulated and tested with XBRL from the perspective of reporting companies. The first major contribution comes from the business value framework formulated in this study. The integrated business value framework provides clear business value model that incorporates business value measures at individual,

process and organization level. The fact that it present integrated view to business value has a strong academic implication as it is successfully build on the strength of process level view, resource based view and production function approach. This framework brings strength of these major approaches into one integrated model. This could act as a step forward in developing more comprehensive definition and measures of IT business value. Further, the framework also considers both financial and non-financial measures of business value. Recognition of Personnel business value measures, business value to the people using technology, as an important component of overall business value is also an important contribution of this study.

Another major strength of this integrated framework is its ability to represent business value in different settings. Even though, different variables and measures that are in the model are XBRL related, this model can be used for other technology and processes with the slight modification. The business value measures are categorized in a way that separates them on the basis of associated dimensions like technology, information quality, process, organization policy related. The components of the business value measurement model are generic in nature and thus, it can be used in studying business value for other technologies and processes. The major finding of this study yields a model, for companies using XBRL to external reporting processes, where business value sources and business value moderating variables are added to the integrated business value model. This provided a dynamic view of business value measurement model.

The dynamic view of business value model has a potential of contributing significantly in IT business value research. This study clearly found out that the business value of XBRL comes from its technical capabilities and features that defines and limits what it can do. These features directly and indirectly contribute towards value creation and the value creation from a technology is moderated by external and internal variables. This provides more complete modeling of business value of IT. Further, dynamic model also considers the contextual difference in evaluating business value of different technologies. It also helps to explain the difference in business value gained from the same technology in different setting.

Most of the past and current literatures in IT business value have only listed the factors and reasons for productivity paradox. However, there is lack of model that seeks to incorporate those finding into business value measurement model. The moderating variables in the dynamic business value measurement model, incorporates those factors attempts to include these variables that sets the context of productivity paradox.

7.2 Managerial Implications

In addition to the theoretical implications, this study provides some managerial implication; i.e. results relevant to the business organization. First, it provides solid framework that enriches mangers' understanding of the business value from IT as incorporates financial and non-financial and tangible and non-tangible benefits from the technology. Further, the business value measurement framework provides multiple level of technology evaluation that might be of interest to different level of managers like operation managers; operational business value, HR managers; personnel business value, IT managers; Informational business value and financial and other senior level managers; organizational business value measures.

The business value framework developed in this study can aid in selecting right technology as it can also be used to evaluate multiple competing technologies in relevant dimensions rather than just relying on financial measures. This would assist in better decision making in terms of selection of right technology that provides optimum value to the organization at multiple level. Also, justifying investment decision in certain technology would be easier for IT managers as they would be able to show that the technology delivers business value on different dimensions rather than just relying on financial measures. Using the total business value framework, integrated business value measures, to make technology investment decision would more likely result in reduced resistance from the employees. Since the benefits for the people actually working with the technology are considered and included in decision making, it increases likeliness of employees accepting the technology as the value of technology to the employees can be demonstrated.

Further, the dynamic view can enhance managerial understanding of the business value environment and variables that affects the derived business value. This has an important implication as it helps to explain why the business value derived from some technology are not optimum or why the same technology provides different business value in different setting.

The results of this study shows that XBRL rates positively on different dimensions of business value measures. Based on these results, further confirmatory study can be conducted and the results can be useful in positioning the technology rightly and promoting the technology to different stakeholders.

7.3 Future Research Areas

One of the major limitations of this research is that the results are derived from exploratory study. The qualitative data used in the study is not sufficient to generate a confirmatory conclusion. However, it explores idea based on expert opinion and presents some interesting research avenues in the field of IT business value study. The framework developed and research results can be tested further for the confirmatory results.

The potential research areas that arise for the results of this study are interesting. One can use the business value framework with four components to conduct a survey among the XBRL users to conduct confirmatory test that these measures, measures suggested by this study, represents XBRL business value. Moreover, business value in XBRL involves different stakeholders like tax authorities, National statistics, auditors, market analysis and so on. Each of the stakeholders has different needs that are addressed by XBRL. The total business value framework developed in this study can be used to study the XBRL business value for different stakeholders. A separate study for each stakeholders, study for report receivers, study that combines all stakeholders are some variant of XBRL Stakeholders' business value study where the total business value framework can be applied. XBRL business value can

also be studied under a controlled setting where moderating factors can be used as control variables to study XBRL business value in particular context.

An important result of this study is a dynamic view of XBRL business value with moderating factors. However, effects of these moderating factors are based on the expert opinion. One can Study the effects of moderating variables on XBRL business value. A confirmatory study that tests and verifies the presences of external, internal and technological moderating factors in XBRL business value environment could be another research possibility. Furthermore, an interesting study can be conducted to see how each moderating factors related to the business value measures. A step forward in the same direction would be a study that depicts relationship between the moderating factors and business value measures, one to one or one to many, with the relative strength of the relationships. Methods like structural equation modeling comes handy for such study designed.

The foundation of the business value framework developed and dynamic view is based on categorization of different variables and factors. These categorizations are based on literature, interview data and analytical reasoning. However, one can test the validity of this categorization using measures like "Cohen's Kappa" that looks at agreement index among expert opinion on the categorization.

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