

MSc Thesis

Implementation of XBRL Based Reporting System

Developing a framework for the process of XBRL adoption and implementation by using the case study in the Netherlands and in Indonesia

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Implementation of XBRL Based Reporting System

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ABSTRACT

Numerous studies on XBRL (eXtensible Business Reporting Language) have been conducted in the past two decades. However, the research on the dynamic issues during XBRL adoption and implementation stages are still left unaddressed. The aim of this study is to develop a framework of factors that influence the process of XBRL adoption and implementation by conducting case studies in Indonesia and in the Netherlands. The Netherlands' effort to implement XBRL based reporting system has been recognized as one of the first nation-wide implementation and has been awarded as the European best practice. On the other hand, XBRL implementations in Indonesia are conducted independently by different institutions to address reporting issues in their respective authorities. This study adopts the Technical, Organizational, and Environmental (TOE) model of IT adoption to classify the factors influencing XBRL adoption and implementation. The framework developed in this research is beneficial for further XBRL study as part of the socio-technical aspects of inter-organizational system implementation; it also can be used by XBRL practitioners as a guideline in designing XBRL implementation approach. Room for further research of qualitative and quantitative studies to validate the generalizability of the developed framework is also delineated.

Keywords: Inter-organizational information system sharing, XBRL, TOE, business reporting platform

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EXECUTIVE SUMMARY

Due to a large amount of data involved in the exchange of information between organizations, the machine to machine data exchange is inevitable. Despite the common practice in considering the physical data as legally binding documents, the digital information exchange mechanism has continuously improved to meet business requirements and to enhance business efficiency. The question being how confident we are on the reliability of the data produced and how efficient the end-to-end process of data exchange is. XBRL (extensible business reporting language), was initially emerge due to the dissatisfaction on the available accounting reports' procedure. XML, the preceding technology in information exchange is able to address two fundamental issues on web-based business reporting, i.e., the resource discovery problem and the attribute recognition problem. However, it fails to address the standard mechanism for report consistency. This issue is handled by XBRL by reducing the variation in schematic and semantic data, and improving the interconnection of data originated from various sources.

Since the initial development of XBRL in the year of 2000, the search of XBRL on the scholarly databases, such as google scholar, results in 2.420 titles of literature. Furthermore, there is a need to do the mapping of XBRL research attention to recognize the trend of the future research and to be aware of the existing research gap. The research by Müller-Wickop, Nüttgens & Schultz (2012) provided three clusters of XBRL research attentions, namely the *quality issue (characteristic based issues and processing issues)*, *uncertainty issues (uncertain software support, uncertain future development, and standardization issues)*, and *adoption efforts (infrastructure issues and knowledge issues)*. Müller-Wickop, Nüttgens & Schultz (2012) show there is a lack of research attention in *the standardization issue* despite a high number occurrences of this topic in the literature.

This master thesis addresses *the process of XBRL implementation* which also covers *the standardization issue* (taxonomy development and the interaction between stakeholders). It figures out what are the factors influencing the dynamic process of XBRL adoption and implementation. The objective of this research is to develop a framework of factors that influence the process of XBRL adoption and implementation in a nation-wide level. The Netherlands and Indonesia were chosen as the study cases due to the contrasting approach of the implementation in both countries. The Netherlands' SBR has been a nation-wide scale project since its initial adoption in 2004, while the institutions in Indonesia started to implement XBRL in 2012 in order to solve the business reporting issues in their respective authorities. The gap of experiences and the difference in implementation approaches provide a wide range of insight, especially concerning the factors influencing the implementation process. Therefore, research question is formulated as: *"How to analyse the factors that influence the implementation process of an XBRL reporting system on a nation-wide level?"*

The nature of this research is an exploratory analysis to find the existence of factors in each stage of adoption and implementation process. The data collection process comprises the desk research and the case study interviews. We conducted ten sessions of interviews during the data collection process. The respondents range from the strategic level to the technical level. The triangulation of data, researchers, and respondents were applied to improve the goodness of measures. Moreover, the content validity, the criterion validity, and the stability and consistency of measured data were also taken into consideration

during the process of data collection and analysis. The Technological, Organizational, and Environmental (TOE) model of IT adoption is used as the baseline to classify the results of the research. Figure 1 illustrates the design of this research starting from literature review to the development of the framework.

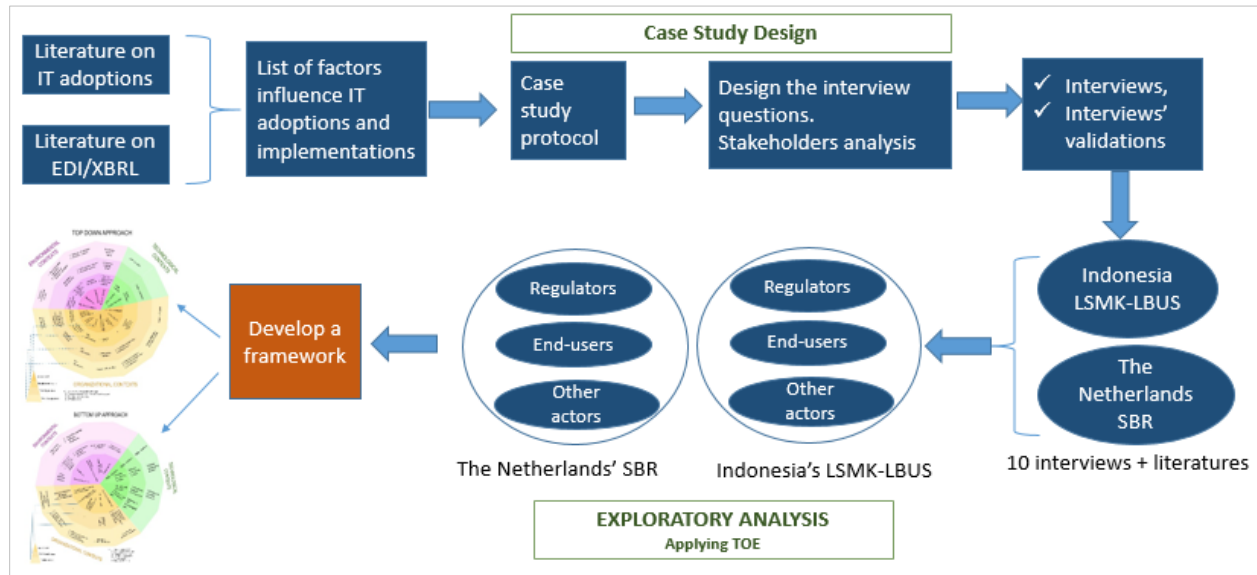


Figure 1: The design of the research

The following table concludes the result of the case study, i.e., the list of factors influencing the process of XBRL adoption and implementation. Some of them were identified from this research, while several others have already been discussed in the existing literature.

Table 1: The factors that influence the process of XBRL adoption and implementation

The factors	Addition/Existing
Technological contexts	
1. XBRL validator	Addition
2. A reliable system that is able to process XBRL instance files	Addition
3. Supporting software	Existing
4. Stable interfaces	Addition
5. XBRL features that support the sustainability	Addition
6. Technological gap between requirement and existing technology	Addition
Organizational contexts	
1. Project's governance	Addition
2. Centralized infrastructure and system development	Addition
3. Organizational readiness. (1) clear goal and strategy, (2) management support, (3) financial capability, (4) human competence, (5) technical capacity, (6) infrastructure	Existing
4. Taxonomy development procedure	Addition
5. Communication strategy	Existing
6. Future agenda	Addition
7. Innovation champion	Existing
Environmental contexts	
1. Shared visions	Addition
2. Regulations	Existing
3. The competence of software developers and business consultant	Addition
4. Support from XBRL community	Existing
5. Cultural aspects	Addition

Furthermore, we developed a framework that presents the relationship between the general stages of XBRL implementation with the factors influencing each stage (Figure 2 and Figure 3).

TOP DOWN APPROACH

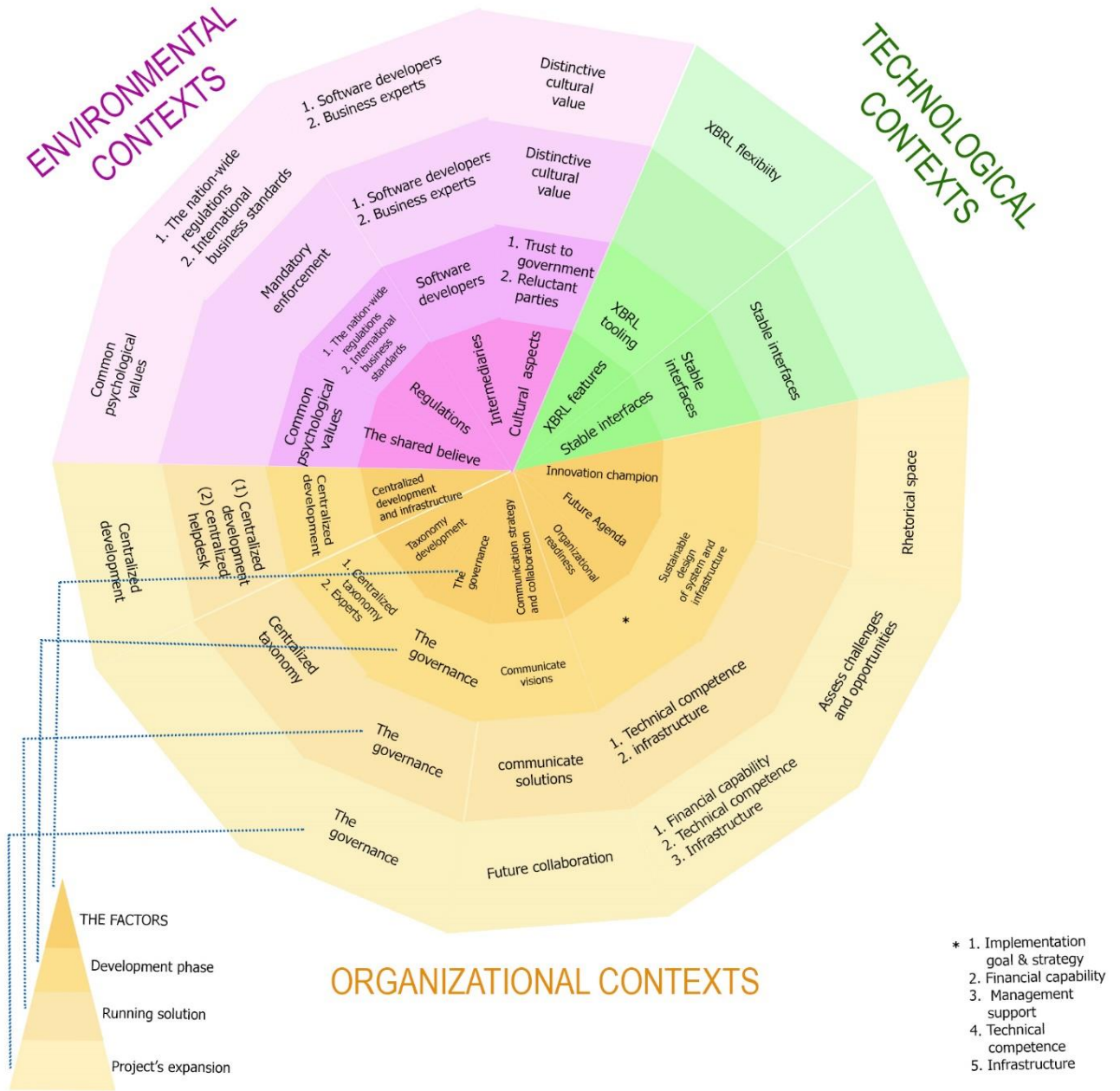


Figure 2: Conceptual model of factors influencing XBRL implementation - top down approach

BOTTOM UP APPROACH

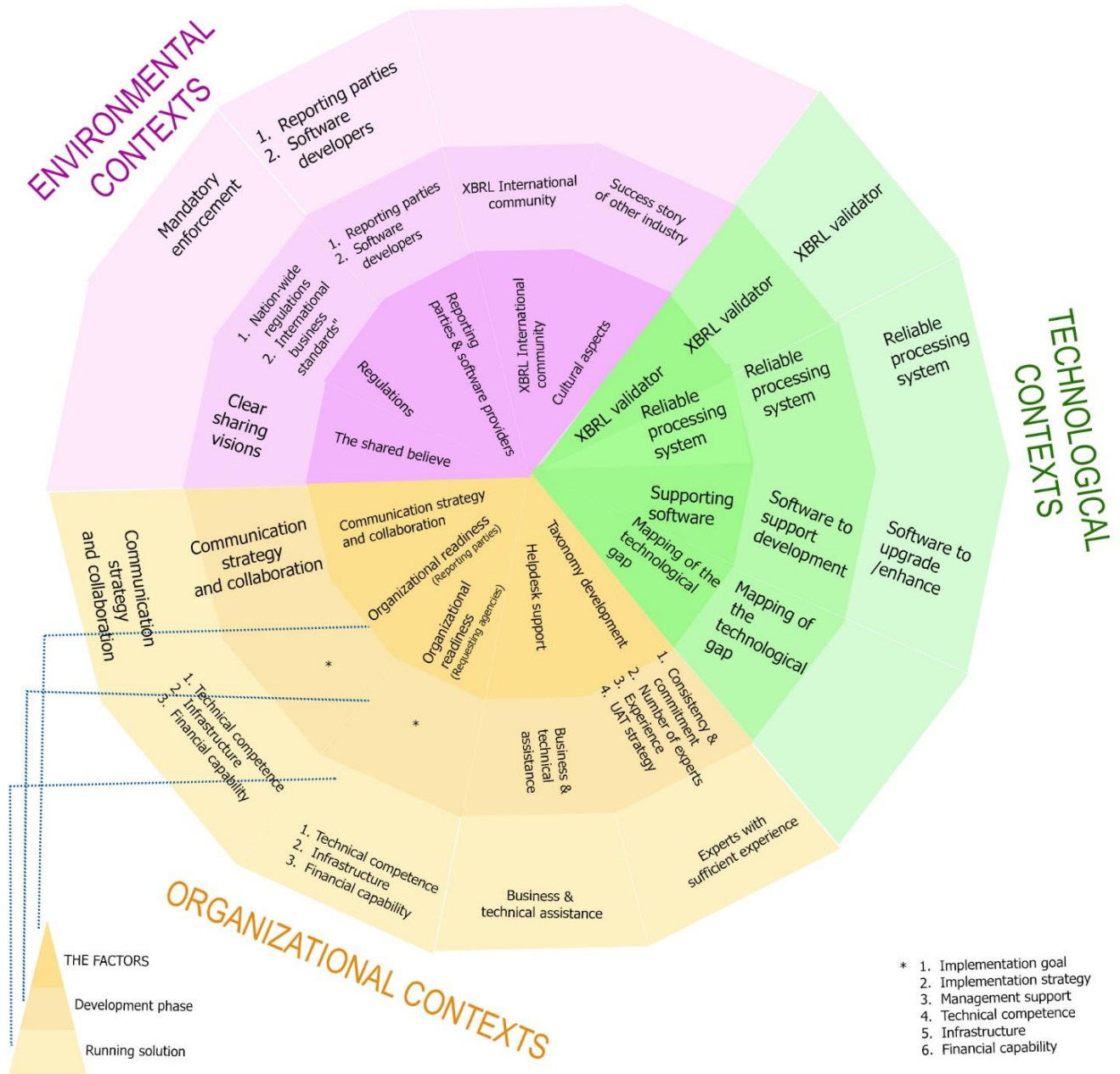


Figure 3: Conceptual model of factors influencing XBRL implementation - bottom-up approach

The framework is presented in two different approaches of XBRL implementation, i.e., top-down approach and bottom-up approach. Both models describe the relationship between the general phases of implementation (development phase, running solution, and project's expansion), with the factors influencing each stage. We provide separate tables as a complement to the model. The tables explain (1) *the what*, i.e., what specific component of factor is appear in each stage, and (2) *the how*, i.e., how to explain the role of *the same factor* which might appears in more than one stage of implementation. The list of factors are clustered in the Technological, Organizational, and Environmental contexts and presented in three layers of XBRL adoption and implementation stages.

Research contribution

In terms of the academic study, this research confirms the empirical results with the finding from the previous studies. It also adds a number of *new factors* which have not been recognized in the existing academic literature. Furthermore, it proposes a tool which can be used by researchers to conduct multiple case study comparisons to discover specific patterns of XBRL implementation. In terms of practical application, it provides a tool for XBRL practitioners who would like to enter the process of implementing XBRL in their administrative processes. It presents the existence of the mandatory components required to develop an XBRL-based reporting system, and the required conditions to support the technical development.

Reflections and recommendations

In addition to the role of XBRL in reports' standardization which leads to the efficiency of process and the improvement in data quality, we contemplate that the benefits of XBRL is far beyond what is commonly discussed. We argue that an appropriate implementation of XBRL might lead to the improvement in the sustainability of a nation. We also contemplate the identification of the three clusters of the dominant factors, namely (1) the factors which functioned as *the core part the system*, (2) the factors which functioned as *the structural foundation of project management*, and (3) the factors which has *the highest influential power* toward other factors. However, more case study research is required in order to strengthen the validity of the clustering. Moreover, we provide it here as the part of project's reflections that can also trigger the future research.

Align with the above explanation, the first recommendation of XBRL implementation at nation-wide level is to formulate the standardization of reports' formats (data level), data exchange (information processes level), and technology. Next, there is a need to define a clear project's governance which regulate the administrative aspects of coordination and collaboration amongst stakeholders. Moreover, starting the implementation with the biggest requesting party (i.e., the institutions which demand reports from huge number of customers) will be beneficial for the long term project expansions. The reason is because the formulation of the most complicated needs for infrastructure, and the most complex structure of the taxonomy would have been defined in this very first project. Furthermore, since the competence of software developers plays a crucial role in system development and maintenance, there is a need to map the gap between system's requirements with the available technology in the market. The gap should be taken into consideration in the designing project's schedule and the implementation strategy.

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CHAPTER 1: INTRODUCTION

The exchange of information is a fundamental activity in organizations, hence there is a need to develop a proper information system sharing within internal organization and across organizational boundaries (Barrett & Konsynski, 1982). Im, Robey, & Wareham (2008) define Inter-organizational information systems (IOS) as the systems which provide the pool of information resources, such as common databases, that extend beyond organizational borders and facilitate information system exchange to support the business. Maxwell & Yang (2011) State that information sharing is a critical strategic activity to support the decision making. The challenge for the information technology practitioners is to develop a business relationship that contribute to organization's strategic advantages (Bensaou & Venkatraman, 1993).

Inter-organizational information systems (IOS) has been recognized as an important area of Management and Information System research, and numerous factors that influence IOS adoption have been identified (Corbière & Rowe, 2011). Many companies found that the values and the significant benefits of IOS, such as cost efficiency, internal efficiency, and inter-organizational efficiency, have become significant sources of competitive advantages (Johnston & Vitale, 1988). Moreover, the quality of the IOS has been proven to have a positive relationship with the company's performance (Hartono, Li, Na, & Simpson, 2010).

Initially, most of the research on IOS were focused on particular technologies, such as electronic data interchange (Im, Robey, & Wareham, 2008). Electronic data interchange (EDI) was recognized as an earliest de facto standard for IOS (Im, Robey, & Wareham, 2008). Subsequently, the research were expanded to various emerging technologies such as supply chain management, e-commerce, and XML-based standard (Im, Robey, & Wareham, 2008). In the supply chain field, the use of IOS has significantly improved the internal initiatives inside the firm as well as the initiatives of the entire participating firms (Humphreys, Lai, & Sculli, 2001). In the internet era, the internet-based IOS (IIOS) has been widely adopted by implementing open standards technology such as XML (Lai, Lai, & Tong, 2011).

XBRL technology, as the evolving extensions of XML (extensible markup language), can be seen as a part of electronic data interchange (EDI) field with the specialization in internet-based business information exchange using structured formats of data (Bergeron, 2003). In comparison with other EDI standard-based technologies, XBRL has the superiority in terms of data processing speed, production cost, efficiency and effectiveness, and accuracy and reliability (Asadi, 2013). The development of XBRL has created new perspectives on inter-organizational data exchange due to the optimization of financial communication and data exploitation (Georgel, Petronel, & Vasile, 2009). XBRL can be adopted in an inter-organizational system (IOS) as well as in an internal reporting system, even though the determinants for internal adoption are different with the determinants for inter-organizational adoption (Henderson, Sheetz, & Trinkle, 2012). This research investigates XBRL implementation in case studies in the Netherlands and Indonesia to explore the factors influencing XBRL adoption and implementation in both cases.

1.1. Problem statement

Despite many success stories of XBRL projects, several issues emerge in the implementation process such as quality issue, adoption effort, standardization issue, knowledge issue, and uncertainty issue (Rao &

Troshani, 2007). Furthermore, the success factors of XBRL project implementation could be unique in each country, and influenced by different aspects, for example, legal aspect, political situation, economic condition, infrastructure, and technology constraint (Felden, 2011). Various published studies on XBRL implementations are limited to a single country such as the study of XBRL implementation in the Netherlands (Bharosa, Hulstijn, Janssen, Wijk, & Winne, 2011), Germany (Felden, 2011), Saudi Arabia (Rawashdeh & Selamat, 2013), UK (Dunne, Helliard, Lymer, & Mousad, 2013), China (Seng, Wang, & Wen, 2014) (Liu, Luo, O'Farrell, Sia, & Teo, 2014), and India (Shubham Goswami, 2015). Other studies focus on a particular area, such as the role of XBRL in enhancing reporting objectives and business intelligence (Stantial, 2007), XBRL role in increasing information transparency and efficiency (Chen, 2012), the role of XBRL in enhancing corporate governance (Ghani, Muhammad, & Said, 2014), and the effect of XBRL on audit fees (Richardson, Shan, & Troshani, 2015).

Müller-Wickop, Nüttgens & Schultz (2012) conducted a research to provide an overview of XBRL research from various disciplines. They highlighted the potential areas for future research based on the gap between *the actual research attention* and *the issues/impact discussed in the literature*. Figure 4 illustrates two contrasting dimensions in XBRL research, namely *the research attention* (the research being conducted) and *the relevance of impacts and issues* (Müller-Wickop, Nüttgens, & Schultz, 2012).

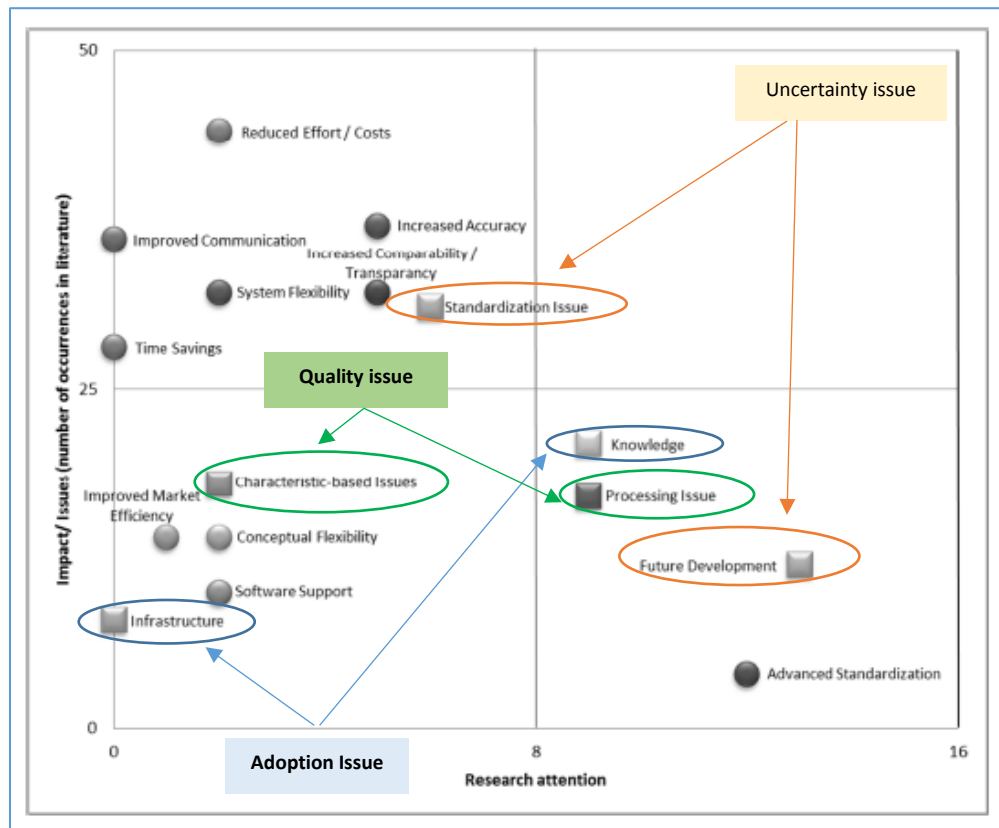


Figure 4: XBRL research attention (Müller-Wickop, Nüttgens, & Schultz, 2012)

It shows that some recognized impacts (the dots) and issues (the rectangles) receive little attention on dedicated XBRL research despite a high number of occurrences in the literature. Müller-Wickop, Nüttgens, & Schultz (2012) classified XBRL *issues/impact* into three categories namely *quality issues*, *uncertainty*

issues, and adoption efforts. The quality issues consist of *characteristic based issues* and *processing issues*; the uncertainty issues consist of *uncertain software support, uncertain future development, and standardization issues*; the adoption efforts consist of *infrastructure issues* and *knowledge issues*.

Figure 4 shows that *infrastructure issue* receives zero research attention (i.e., no dedicated research has been conducted) even though this topic has been mentioned by numerous different authors in the literature (Müller-Wickop, Nüttgens, & Schultz, 2012). Moreover, a significant amount of dedicated research have been conducted to address *knowledge issue* (Müller-Wickop, Nüttgens, & Schultz, 2012). Figure 4 depicts that despite a high number of occurrences of *standardization issue* in the literature, dedicated research attention on this topic is relatively low. This figure also shows a considerably high number of research focus on *the future development* of XBRL.

Research gap: the process of XBRL adoption and implementation

The paper by Müller-Wickop, Nüttgens, & Schultz (2012) does not discuss *the research on the process of XBRL adoption or implementation* which might be influenced by various contextual issues, such as the technology; or influenced by non-contextual issues, such as economic structure, market pressures, and culture. We perceive it as a potential research gap in XBRL research.

We found that several XBRL research were actually performed to address *the comparative study* of XBRL adoption and implementation, however, there is a lack of literature discuss *the process of XBRL adoption and implementation*. Chen (2012) conducted *a comparative study* of XBRL implementations in the Netherlands, Australia, United States, and Singapore. It emphasizes the importance of goals and strategic alignment to achieve information transparency (Chen, 2012). A study by Mengwei, Ruitao, Xi, & Zhanxia (2012) investigated different aspects of XBRL disclosure regulations *by comparing* companies in China and America. Pagan (2011) made a *comparative analysis* of XBRL implementation in banking supervision project in the United States and the European Union. Unfortunately, the study which purposely designed to investigate the relationship between the stages of XBRL implementation and the factors influencing each stage is hardly to find. Based on this situation, this study was designed to take part in filling the gap of XBRL research about the dynamic process of XBRL adoption and implementation. The factors influencing XBRL implementation are investigated on phase-to-phase basis. Hence, the discussion on this research flows dynamically following the stages of the implementation. This research also addresses the standardization issue, which *deals with XBRL taxonomy development and the interaction between stakeholders* (Müller-Wickop, Nüttgens, & Schultz, 2012, p. 14).

Why Indonesia and the Netherlands?

This study provides an exploratory analysis of factors influencing the process of XBRL adoption and implementation in the Netherlands Standard Business Reporting (SBR) ¹ and Indonesia LSMK-LBUS². The Netherlands' effort to implement SBR is one of the first implementations of XBRL at the nation-wide level which involves several government agencies and business communities (Chen, 2012). SBR, which was started in 2004, was initiated as a nation-wide public-private partnership that needs an agreement with

¹ The nation-wide XBRL-based digital reporting platform of the Netherlands.

² An XBRL-based financial system & monetary stability report – specific for Islamic banks in Indonesia.

various involved parties (government agencies and private companies) on how to standardize the financial and non-financial reports (Nitchman, XBRL International, 2015). On the other hand, in contrast with the Netherlands that initiated XBRL project as a nation-wide program, the implementations of XBRL-based reporting system in Indonesia are conducted independently by different institutions based on their area of authority. Among these are the Central Bank of Indonesia (Bank Indonesia), the Financial Supervision Authority of Indonesia (OJK), and the Indonesia Stock Exchange (IDX). LSMK-LBUS has been implemented by Bank Indonesia in 2015 to address the reporting issue in the Central Bank (Bank Indonesia XART, 2015). The difference in the implementation approach, project's scope, and the gap in the level of experience between both cases provide important lessons for the future implementation of XBRL.

1.2. Research objective

The aims of this research is *to develop a framework of factors that influence the process of XBRL adoption and implementation*, by conducting case studies in the Netherlands and in Indonesia. This research presents a thorough discussion on the supporting factors, barriers, milestones, and issues within the stages of implementation. The exploratory analysis of the factors influencing XBRL implementation process is presented in two clusters, i.e., Indonesia's case (LSMK-LBUS) and the Netherlands' case (SBR). The main deliverable of the research are the clusters of factors influencing XBRL adoption and implementation process in both cases, and a framework of factors that influence the implementation stages in order to yield the tools for process analysis. The designed tool is beneficial for the academic purposes as well as for XBRL practitioners. Academic researcher can use the proposed model as a tool to discover a general pattern of factors influencing XBRL implementation based on a number of case study, whereas XBRL practitioners can use this tool as a guideline in designing a strategy to adopt and implement XBRL-based technology to solve the reporting issues in their organizations.

1.3. Research question

The following research question has been formulated to address the research objectives.

RQ: How to analyse the factors that influence the implementation process of an XBRL reporting system on a nation-wide level?

To answer the main question and to structure the discussion in this report, we need to formulate the sub-questions. Firstly, we have to understand *the domain description* of the study; i.e., XBRL technology as an application of the concept of Inter-organizational information system sharing (IOS). Therefore, the first sub-question (SQ1) is formed as follows.

SQ1. What is the concept of XBRL as the application of the Inter-organizational information system (IOS)?

- 1. What is the concept of Inter-organizational information system (IOS)*
- 2. What is XBRL and how is XBRL being implemented in business reporting fields?*
- 3. How to differentiate the evolution of EDI, XML, and XBRL?*

Secondly, we need to understand *the theoretical framework in the study*; i.e., the theory of IT adoption that will be used as an established framework to classify the factors influencing XBRL implementation. Therefore, the second sub-question (SQ2) is formed as follows.

SQ2. What are the theory of IT adoption models that can support the analysis of factors that influence XBRL implementation?

The deliverable of this part is a chosen model to analyze the case studies. Thirdly, we need to understand the *preliminary research on factors influencing IT adoptions and implementations*. The factors are derived from a deeper analysis of literature review. Therefore, the third sub-question (SQ3) is formed as follows.

SQ3. What are the factors influencing IT adoptions and implementations based on the preliminary studies?

The answer to this question is a list of factors that influence IT adoptions and implementations in various cases based on preliminary research. This findings are to be used as the reference on the analytical part of this research by contrasting them with the findings from the empirical part. Next, we need to specifically find the factors influencing XBRL implementation in the Netherlands' SBR and in Indonesia's LSMK-LBUS. This is the empirical part of the study. Therefore, we need to conduct case studies in both countries by doing the literature review and conducting the interviews with the key persons involved in the project. Consequently, the fourth and the fifth sub-question are:

SQ4. What are the factors influencing XBRL implementation in the Netherlands' SBR?

SQ5. What are the factors influencing XBRL implementation in Indonesia's LSMK-LBUS?

Next, we start the analytical part of this research by developing a framework of factors that influence the process of XBRL adoption and implementation to answer the sixth sub-question:

SQ6. How to design the framework of factors that influence the process of XBRL adoption and implementation in the nation-wide level?

1.4. Research design

Figure 5 illustrates the schematic and highly visualized representation of steps conducted to achieve the research objectives.

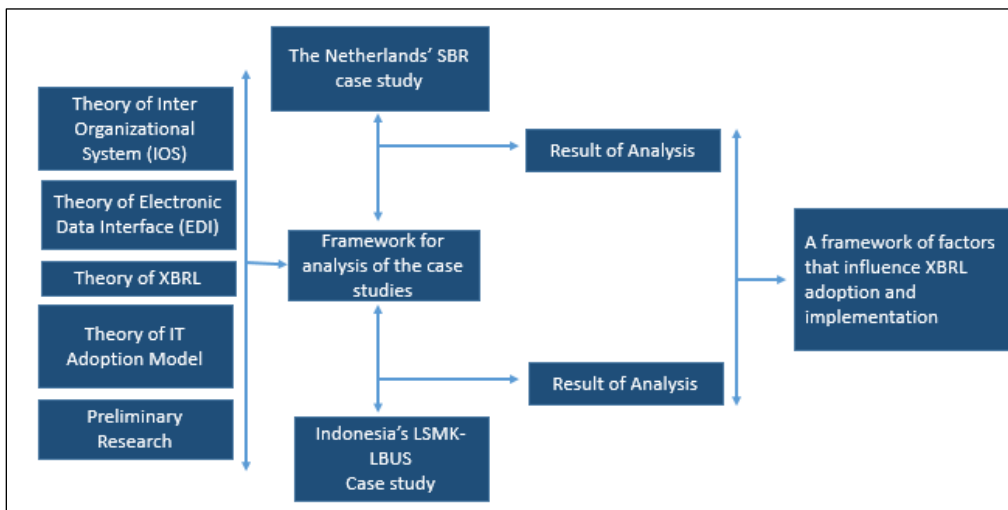


Figure 5: Research framework

The research framework covers the theory of IT adoption models, the theory of Inter Organizational System (IOS), the concept of Electronic Data Interface (EDI), the concept of XBRL based reporting platform, and the preliminary research on XBRL implementation.

Firstly, we explore the literature on IOS, Electronic Data Interface (EDI), and XBRL. The results of the literature review will provide an insight on the development of the IOS concept, EDI, and how XBRL takes part in it. Secondly, we investigate the existing IT adoption models and choose one of them as a baseline to build a theoretical model of this research. This model will be used to categorize the important factors obtained from the case study. Next, we build a case study protocol as a guideline in conducting the case study. Finally, the proposed framework is developed based on the result of the case study.

1.4.1. Methodology

This research applies an established framework of IT adoption model to classify the factors influencing the implementation of XBRL technology in both countries. The case study is selected as the research method based on three important considerations, namely the type of research question, the focus on contemporary events, and the lack of control on behavioral events (Yin, 2009).

Yin explains that the 'how' or 'why' questions are usually lead to the use of experiments, histories, and case studies as the appropriate research methodology. Applying Yin's (2009) conception, survey or archives searching cannot be considered as suitable research methods because this study needs the extraction of complex information from the key people involved in the project. Moreover, the experimental research also cannot be used as the research method because this research does not require any control on particular behavioral events. In addition to that, the historical method would not be likely to be used since there is a need to focus on contemporary events, which is XBRL implementation in a particular country within a specific time. The nature of the main question in this research is the exploratory question that needs to deal with series of analysis within a specific time frame, hence, a comprehensive explanation along with empirical data analysis is required to present the determinants of XBRL implementation in both cases. Based on the above discussion, we consider the case study as the most appropriate research method.

Firstly, desk research was performed to answer the first sub-question. We conducted a literature review to explain the topic of the research, i.e., XBRL technology, as the application of the Inter-organizational information system (IOS). The desk research was also applicable to answer the second and the third sub-question. We presented the available models that explain factors influencing technology adoption and the comparison between models. We conducted a deep analysis of preliminary research about technology adoption, especially XBRL technology, to answer the second sub-question. To answer sub-question three, we investigated the literature that discusses factors influencing IT adoptions and implementations in various cases. The list of factors were classified based on an established model of IT adoption.

To answer the fourth and fifth sub-questions, a comprehensive case study protocol is required. The interviews were conducted with the key persons involved in the planning stage, implementation stage, and evaluation stage of XBRL projects in the Netherlands and in Indonesia. Finally, this report propose a framework of factors that influence the adoption and the implementation of XBRL based on the results of

the case study, as the answer to the sixth sub-question. In order to validate the proposed model, we sent back the final interpretation to the respondents for comments and feedback. In addition, we also applied the various types of research triangulation, research validity, and research reliability during the process of coding and analysis. Table 2 illustrates sub research questions along with the research methodology to address them. The last column provides the information about the relevant chapter in this report that present the answer of each sub-question.

Table 2: Research Methodology

Sub Research Questions		Research Method	Sources	Data collection methods	Deliverable(s)	Ch #
Theoretical Part						
SQ 1	<i>What is the concept of XBRL as the application of the Inter-organizational information system (IOS)?</i>	Desk research, literature review	Documents (journals, books, website, news)	Literature review on IOS, EDI, XML, and XBRL	The review of IOS, EDI, XML, and XBRL	2
SQ 2	<i>What are the theory of IT adoption models that can support the analysis of factors that influence XBRL implementation?</i>	Desk research, literature review	Documents (journals, books, website, news)	Literature review on IT adoption theories and models	Theoretical framework of IT adoption theories and models	3
SQ 3	<i>What are the factors influencing IT adoptions and implementations based on the preliminary studies?</i>	Desk research, literature review	Documents (journals, books, website, news)	Literature review on factors influencing IT adoptions and implementation	List of factors that influence IT adoptions and implementations based on preliminary research.	3
Empirical Part						
SQ 4 & 5	<i>What are the factors influencing XBRL implementation in the Netherlands' SBR? What are the factors influencing XBRL implementation in Indonesia's LSMK-LBUS?</i>	Interviews, literature review	Individuals; Documents (journals, books, website, news)	<ul style="list-style-type: none"> - Interviews with the key persons of SBR and LSMK - Data coding - Reconfirmation of interview results - Data analysis 	List of factors influencing XBRL adoption and implementation: (a) in the Netherlands' case study, and (b) in Indonesia's case study	5,6
Analytical Part						
SQ 6	<i>How to design the framework of factors that influence the process of XBRL adoption and implementation in the nation-wide level?</i>	Desk research, literature review	Individuals; Documents (journals, books, website, news)	<ul style="list-style-type: none"> - Qualitative analysis - Develop a framework 	- Proposed framework	7
RQ	<i>Answer main RQ</i>	Desk research, literature review	Research's results	<ul style="list-style-type: none"> - Presenting conclusions, reflections, limitation, and recommendation 	- Conclusion that answer the main RQ, reflections, limitations, and recommendations	8

1.4.2. Research flow diagram

Figure 6 illustrates the steps of the research flow. The purpose of validation process (after interviews) is to reconfirm the interpretation of the interviews with the respondents for comments, feedback and additional input (if necessary). It starts with the formulation of thesis definition which comprises the research objectives, research question, and the design of the research. Next, literature review on the theoretical aspects of IOS, EDI, XML, and XBRL are conducted. After that, the literature review and desk research are performed to investigate the factors that influence the adoption and implementation of technology, includes XBRL.

The results of the literature review are required for two main purposes: (1) to design the case study protocol, (2) to perform case study analysis. The case study interviews are conducted with the respondents from the Netherlands' SBR and Indonesia's LSMK-LBUS. The results of the interviews and the conclusions of the literature reviews are the baseline for conducting the exploratory analysis. Finally, we develop a framework of factors that influence the adoption and implementation of XBRL based on the interviews' result and the literature review.

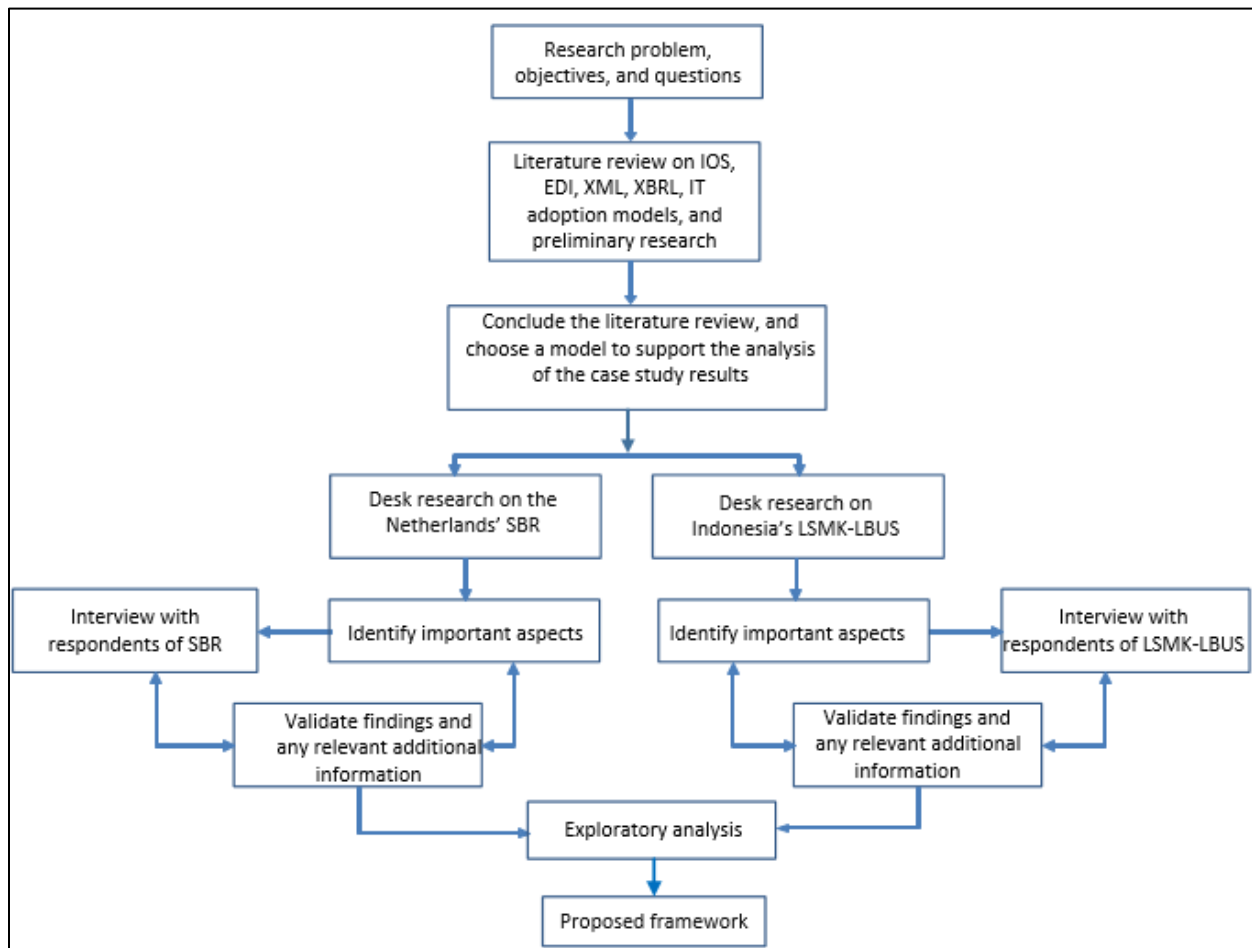


Figure 6: Research flow diagram

CHAPTER 2: DOMAIN DESCRIPTION - THE APPLICATION OF XBRL IN IOS CONCEPT

The purpose of this chapter is to answer sub question 1, *what is the concept of XBRL as the application of the Inter-organizational information system (IOS)?* It consists of the following sub-questions:

- *What is the concept of Inter-organizational information system (IOS)?*
- *What is XBRL and how is XBRL being implemented in business reporting fields?*
- *How to differentiate the evolution of EDI, XML, and XBRL?*

This chapter provides an explanation about the focus area of this research, i.e., XBRL technology. The conclusions of this chapter contribute to the establishment of the theoretical foundation of this research by presenting the development of the IOS concept, the evolution of Electronic data interface (EDI), and the emergence of XML and XBRL to support the IOS. The comprehension on the differences between EDI, XML, and XBRL will help us appreciate the differences between the factors influencing the adoption and the implementation of respective technology. It will eventually provides important insight in answering the main research question *“How to analyse the factors that influence the implementation process of an XBRL reporting system on a nation-wide level?”*

This chapter proceeds as follows:

- Section 2.1 begins with a brief discussion of the IOS. It is followed by the explanation of EDI which has evolved since 1990s as the earliest de facto standard of IOS (Im, Robey, & Wareham, 2008). XML, the internet-based IOS (IIOS) (Lai, Lai, & Tong, 2011), is discussed afterwards.
- Section 2.2 describes XBRL technology which is the extension of XML-based format. It explains the technical and non-technical aspects of XBRL technology in the financial reports platform. The discussion includes XBRL stakeholders which play fundamental roles in the diffusion of XBRL knowledge and innovations (Dunne, Helliari, Lymer, & Mousad, 2013).
- Section 2.3 presents the brief comparison of EDI, XML, and XBRL.
- Section 0 provides the conclusions of this chapter by describing the summary of the XBRL concept as the application of the Inter-organizational information system (IOS).

2.1 Inter-organizational information system (IOS)

This section discusses the theories of inter-organizational system in the field of information system sharing. Section 2.1.1 explores the general concept of inter-organizational information system; section 2.1.2 elaborates EDI as the earliest de facto standard of IOS; and section 2.1.3 presents the comparison of EDIFACT (as one of the EDI standard), with XML (as the internet-based IOS).

2.1.1. What is IOS?

The growing cooperation among public and private organizations involves abundance of data and leads to the need of an information exchange and sharing system (Feltz, Hitzelberger, & Otjacques, 2007). Barrett & Konsynski (1982) defined IOS as the information exchange system that transverse through the organizational boundaries which is beneficial to all of the involved participants. The incentives could be in

the form of production/marketing enhancement and cost efficiency (Barrett & Konsynski, 1982). Im, Robey, & Wareham (2008) defined IOS as the systems which provide the pool of information resources that extend beyond organizational borders and facilitate information system exchange to support the business. IOS also deals with the dissemination of information to ensure that the information delivered to intended audience without interfering unrelated parties (Brobst, Cohen, Grant, Malone, & Turbak, 1987).

The sharing of information among organizations not only minimizes the paper-based process, but also shorten the processes, and improves formulation and implementation of policy (Landsbergen Jr & Wolken Jr, 2001). In the study on the elements of smart governance initiatives, Scholl & Scholl (2014) explained that one of the important principles to support the development of smart governance models is a *shared, timely, and actionable* information sharing system. In addition to that, 'the system also provides for transparency, accountability, and stakeholders participation' (Scholl & Scholl, 2014, p. 169). Furthermore, the sharing of information among public agencies and private organizations usually involves sensitive and substantial information, so that the various aspects of organizational, legal, and technical issues have to be taken into considerations (Feltz, Hitzelberger, & Otjacques, 2007).

Various studies on inter-organizational information system sharing address the benefit of IOS. Among these are the ability to create the competitive advantage through cost efficiency, internal efficiency, and inter-organizational efficiency (Johnston & Vitale, 1988), (Ives & Learmonth, 1984); the ability to facilitate collaboration between agencies and professionals in the governments (Burke, Kwon, & Pardo, 2009); and the positive relationship of IOS with IT-enabled collaborative decision making (Cheng, Lai, Lun, & Wong, 2015). Some other studies focus on the challenges of the IOS, such as the impact of institutional arrangements towards inter-organizational information integration (Cruz, Gil-Garcia, & Luna-Reyes, 2007); the performance of inter-organizational information integration in a time-critical information systems (Horan & Schooley, 2007); and the challenges of information sharing systems in financial market regulations (Bloniarz, Pardo, & Sayogo, 2014).

2.1.2. Electronic data interface (EDI), the earliest de facto standard of IOS

From the technical perspectives, electronic data interface (EDI) has been perceived as the earliest de facto standard for IOS (Im, Robey, & Wareham, 2008). EDI is a technology that enables direct exchange of data between computers by using predefined formats to establish inter-organizational systems that support data sharing and decision making process (Kekre & Mukhopadhyay, 1992). The main aims of EDI is to exchange the information without human interventions (Nurmilaakso, 2008). The documents that traditionally need a few days to be transmitted and received, now take only a couple of seconds in transmission and confirmation. The transformation from traditional process into electronic communication contributes to significant improvement in efficiency (Crum, Premkumar, & Ramamurthy, 1997).

Furthermore, the combination of the type of IOS, the type of business, and the organizational structures have the significant impact in IOS adoption and implementation (Steinfeld, 2014). For example, various research show that EDI-based adoption is more common in the large businesses instead of in the small businesses because EDI was initially being perceived as the privilege of big firms which have the ability to

make a huge investment (Chau & Kuan, 2001). Another example is, the open and shared IOS hubs should not be implemented among competing companies which prefer proprietary IOS (Steinfeld, 2014).

Pfeiffer (1992) defines EDI as ‘tools which permit the automatic exchange of data between remote applications in situations where these belong to different organizations’ (Jiménez-Martínez & Polo-Redondo, 2001, p. 385). The main difference between EDI and other forms of electronic communications models, such as email and fax, lies upon *the highly structured of data* (Hansen & Hill, 1989). Pfeiffer (1992) states four mandatory features of IOSs to be classified as EDI. Those features are being summarized by Benbasat, Dexter, & Lacovou (1995) as follows: there are at least two organizations involved, data processing in all of involved organizations are supported by independent application systems, there is an agreement concerning data coding and communication formats, and there is a communication link to accomplish the process.

The transmission of information between two partners involved in EDI process is automatic and asynchronous inside the predefined network (Lee M. K., 1998). The simplified version of EDI process is illustrated in Figure 7. It explicates the transfer of highly structured documents through Value Area Networks (VAN) or Private Communication Networks (PCN). Eventually, the internet replaced the role of VAN or PCN as the main communication platform (Lu & Wu, 2004).

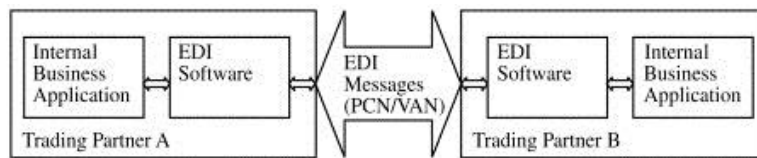


Figure 7: Typical EDI model (Lee M. K., 1998)

Several standards have been established to support the point to point communication protocol. Among these are ANSI ASC X12, the standard for inter-industry electronic exchange; UN/EDIFACT, the e-commerce European standard; HIPAA, the USA standard for healthcare; ODETTE, the standard for automotive industry in Europe; RosettaNet, the industry-wide and open e-business process standard; SWIFT, the worldwide financial messaging network standard; Tradacoms, the UK retail sector standard; and VDA, the standard for German automotive industry (EDI Basics, 2015).

In addition to its classic superiority in saving labor and paper work, numerous research have shown empirical evidence on EDI's excellence in other aspects. Among these are the quality improvement and inventory reduction (Kekre & Mukhopadhyay, 1992); improvement in communication infrastructure between organizations that lead to the strengthen of the economy of a country (Hoogeweegen, Streng, & Wagenaar, 1998); improvement in the speed of data processing, enhancement in accuracy of data, cost reduction, and improvement in security, tracking, and control (Lim & Palvia, 2001); and improvement of healthcare interoperability by using SOA and exchange data agent (Batra, Mukherjee, & Sachdeva, 2015).

However, in spite of the arguments in favor of EDI, there appears several major impediments in EDI adoption. Among these are: the requirement for committed support from all participating entities (Crum, Premkumar, & Ramamurthy, 1997), see also (Lee M. K., 1998); the need for a clear assessment on the

return on investment (Hoogeweegen, Streng, & Wagenaar, 1998); the dependence upon the characteristic of industry, tasks, and partner relation (Lee & Lim, 2003); and the difficulties in estimating the costs and benefits (Jime´nez-Marti´nez & Polo-Redondo, 2004).

2.1.3. EDI-based and XML-based

There are two common methods of EDI: the first method is the creation of business documents that comply with a certain standards that also define the specific data location, such as ANSI X12 and EDIFACT; the second method is the creation of business documents using free form formats, such as XML (Open Text, 2014). The former method is known as EDI standard based and the latter method is called XML based (Nurmilaakso, 2008).

A number of research have been conducted to compare these two standards. Chou, Lu, & Tsai (2001) performed a study that compares a traditional EDI with the XML/EDI framework which was designed to accelerate EDI adoption in all kind of business size. Kotinurmi, Laesvuori, & Nurmilaakso (2006) described that EDIFACT specify the rule on business document representation while XML-based documents do not deal with that issue. Nurmilaakso (2008) explained the inclination of the use of XML-based business framework in the new market economies, especially in cross-industry-process business; and EDI-based model are more common in the older type of market, particularly in cross-industry-document business. Goswami & Kundu (2013) show that XML technique on transporting data overcomes some common issues in traditional EDI-based framework, i.e., restricted business rule and expensive cost of implementation.

The strength of XML is in its flexibility and network externalities (Graham, Pollock, Smart, & Williams, 2003). In addition, XML offers lower costs of integration with higher access of control comparing with EDI standards based (Markus, Steinfield, & Wigand, 2005; Nitchman, XBRL International, 2015). Despite these comparison and debates, both of the methods are currently exist and evolve with their respective pros and cons (Open Text, 2014).

As the nature of XML technology that enable the store and transport of data without restricted business rules, this technology can be extended for different purposes. The most famous example is eXtensible Business Reporting Language (XBRL). XBRL, or frequently referred as ‘barcodes for reporting,’ is an open technology standard for business and financial information exchange that extends XML by tagging each individual item of data and convert it into computer readable format for interactive information processing (XBRL International, 2011). The main purpose of XBRL is to enable the preparation, publication, interchange, and analysis of report statements in more effective and efficient ways (Jones, 2003).

2.2 XBRL

This section discusses XBRL as the extension of XML technology for business reports. It proceeds as follows: section 2.2.1 explores the business aspects of XBRL; section 2.2.2 discusses the technical aspects of XBRL; and section 2.2.3 presents the analysis of XBRL stakeholders, which comprises the description of the actors, their roles, their interests, and their opportunities and challenges in XBRL implementation.

2.2.1. XBRL, bar codes for reporting

The first generation of XBRL was developed in 1998 by Charles Hoffman, a CPA (Certified Public Accountants), with the main purpose not only to solve the data sharing issue in financial statement reporting but also to invent a new method that simplifies the way people prepare, validate, consume and analyze data (Kernan, 2009). XBRL emerges as the result of accountants' dissatisfactions on the available financial reporting procedures which complicates the management and the auditing processes (Chang & Jarvenpaa, 2005). XBRL facilitates more efficient reporting processes by allowing people to publish the report accurately, to test the report against the sets of business and logical rules, to consume the report with sophisticated pre-defined definitions, and to process the report with various alternative languages and styles (XBRL International, 2011).

In the former study on web-based business reports, there were three fundamental issues to be addressed for an effective financial information sharing on the web: to discover the source of the information, to recognize the attributes of the information, and to standardize reports' mechanism for consistency (Debreceeny & Gray, 2001). XML solves the first two problems by providing tag methodology, however it fails to address the report consistency problem since all of the parties could expand and create their own customized tags (Debreceeny & Gray, 2001). The third problem is addressed by XBRL which provides the data framework standard not only to reduce the variation in schematic and semantic of data, but also to improve interoperability of data from various sources (Wu & Zhu, 2011).

The use of XBRL is beneficial for many parties such as the financial publishers and data aggregators, independent software vendors, analysts, investors, and regulators (Sift Media, 2001). An international non-profit organization (XBRL International), which consists of approximately 600 public and private organizations has been established to consistently support the enhancement of reporting and analysis to meet global business practice (XBRL International, 2011). Furthermore, the accounting rules vary in different countries and each country has its own idiosyncrasies and generally accepted accounting practices (GAAP). The international consortium and its working groups focus on the development of XBRL technical specification meanwhile each country separately develops the country-specific taxonomies that fit their accounting practices (Eierle, Ojala, & Penttinen, 2014).

XBRL standard has been continuously implemented by a lot of big financial agencies and institutions such as the Federal Reserve (FED), the Securities and Exchange Commissions (SEC), the European Central Bank (ECB), the European Banking Authority (EBA), the European Insurance and Occupational Pensions Authority (EIOPA), the Deutsche Bundesbank, Companies House and HM Revenue Customs (UK), the Australian Prudential Regulation Authority (APRA), and many other financial entities in China, USA, Europe and Canada (Castro, Santos, & Velasco, 2015). The U.S. SEC has implemented GAAP (Generally Accepted Accounting Principles) taxonomy and instructs reporting companies to submit the financial report based on XBRL and GAAP (Wu & Zhu, 2011). In several countries in Asia, XBRL format has been considered as a standard way of financial reports (Singerová, 2015). Meanwhile, in Africa XBRL has been founded in 2006 with the current focus on business consultancy and enterprise support (Singerová, 2015).

In order to establish the global standard for XBRL taxonomies, the International Financial Reporting Standards (IFRS) taxonomy was created to address the difference in country's accounting principles

(Bonsón, Cortijo, & Escobar, 2009). IFRS facilitates the common ground to establish global dictionary that can assess the comparability of financial information from various countries (Bonsón, Cortijo, & Escobar, 2009).

2.2.2. The technical aspect of XBRL

What XBRL basically does is transforming the conventional business reports (such as in words, PDF, or Excel format) into a computer readable format (Markelevich, Shaw, & Weihs, 2010). In a traditional financial reporting process at the company without XBRL standard, each division supplies the financial report into, for example, an Accounting Information System (AIS) which then produces different types of output (PDF, CSV, or Excel). The generated reports are then being submitted to different institutions such as business register, tax office, or other regulatory agencies (Eierle, Ojala, & Penttinen, 2014). Subsequently, the authorized parties will manually convert and transfer the submitted information into their software for further analyses (Eierle, Ojala, & Penttinen, 2014).

Several issues emerge during the whole process, such as a human error in data input and manual extraction, data redundancy, time constraint, software compatibility, and data interpretation (Eierle, Ojala, & Penttinen, 2014). XBRL technology addresses these issues along with other beneficial enhancements such as providing authoritative definitions (data taxonomy), allowing the creation of business rules, supporting multilingual concept definitions, and possible collaboration with a wide range of software tools (XBRL International, 2011). The XBRL framework defines the specification for machine-readable financial reports that consist of two major components: XBRL taxonomies or dictionaries that define the logical model and financial definition of each reporting items, and XBRL instance documents that quantify facts based on multiple XBRL elements (Chowdhuri, Etudo, Redmond, & Yoon, 2014).

XBRL framework consists of four main components namely XML standard, XBRL specifications, XBRL taxonomy, and instance documents (Müller-Wickop, Nüttgens, & Schultz, 2012).

1. XML standard and syntax

The XML standard and syntax allow the semantic meaning expression and information modeling in XBRL (Rawashdeh & Selamat, 2013). The syntax defines the association of financial information with conceptual information (Pinsker, 2003).

2. XBRL specifications

XBRL specifications constitute the rules and technology that defines how XBRL works by allowing multiple instance documents of different taxonomies to be processed by the same software tools (Doolin & Troshani, 2007a). XBRL enables unique tag identification for each individual reporting element and allows a computer to recognize, process, and exchange the information across various platforms (Bevacqua & Mende, 2010).

3. XBRL taxonomy

Taxonomy contains the metadata that corresponds with a particular XBRL entity in the instance documents (Wu & Zhu, 2011). It organizes 'tags', which are established based on accounting standards (Doolin & Troshani, 2005). Tag is also known as the electronic description of a narrative or numerical information (Dunne, Helliard, Lymer, & Mousad, 2013). XBRL taxonomy, by using the provided metadata, manages the elements and elements' relationships which support data validation (Chang & Jarvenpaa, 2005). Metadata manages the organization of the digital

information (Bonsón, Cortijo, & Escobar, 2009). Figure 8 shows the separation XBRL taxonomy and XBRL entity (Müller-Wickop, Nüttgens, & Schultz, 2012). Each unit of XBRL fact consists of XBRL taxonomy and XBRL entity. XBRL taxonomy manages the narratives of data (which consists of the identifier, reference, definition, presentation, and calculation of data) as well as the languages to explain the narratives.

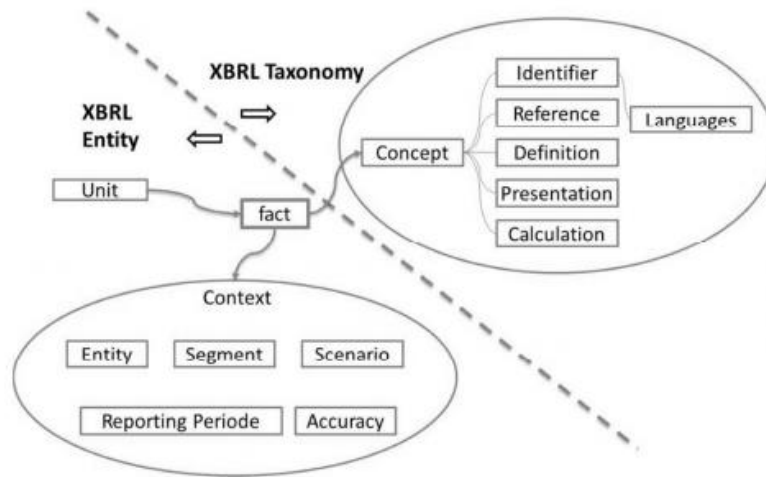


Figure 8: XBRL Taxonomy and Instance Document (Müller-Wickop, Nüttgens, & Schultz, 2012)

4. XBRL entity (instance documents)

XBRL entity (Figure 8) contains the actual data representation and conceptual information based on the associated taxonomy (XBRL Education, 2008). XBRL entity (XBRL instance documents) are basically the financial statements which are formatted with tags (Doolin & Troshani, 2005). The context of instance document consists of the accuracy, the entity, the segment, the scenario, and the reporting period of actual data (Müller-Wickop, Nüttgens, & Schultz, 2012).

XBRL is merely an open standard language, not a process (Bergeron, 2003). 'As an open standard based, XBRL is independent of any hardware or software' (Asadi, 2013, p. 1775). However, it needs supporting software in the data exchange processes. There are two types of software needed by XBRL users: tools to produce instance documents, and tools to consume instance documents (Doolin & Troshani, 2005). The former software is needed for the development of XBRL taxonomy creator and the latter one is needed to consume the instance documents submitted by the financial publishers (AICPA XBRL implementation task force, 2003).

2.2.3. XBRL Stakeholders

'XBRL stakeholder is any individual or group of individuals who can or is affected by XBRL' (Doolin & Troshani, 2007b, p. 180). Figure 9 illustrates the basic XBRL concepts and the stakeholders. It describes the basic relationship between stakeholders and XBRL components. In the real implementation, the stakeholders that submit the data or consume the reports are not limited to the entities in the figure. It might include more institutions such as financial institutions, government institutions, and auditors (Chang & Jarvenpaa, 2005).

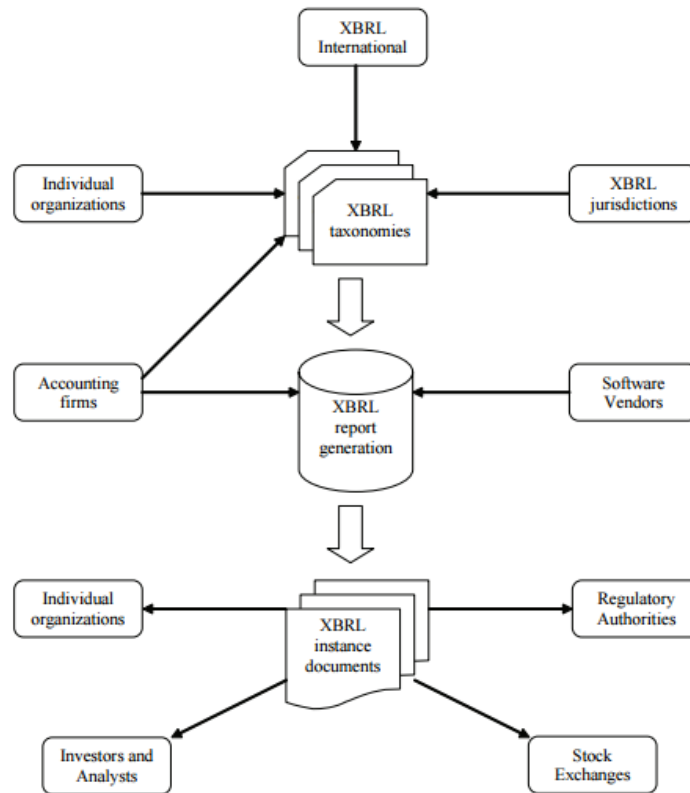


Figure 9: Basic XBRL concepts and its stakeholders (Rao & Troshani, 2007)

The first entity is XBRL International, a non-profit consortium which develops XBRL standards to support global business reporting process (XBRL International, 2011). It recently consists of 22 active jurisdictions all over the world (Andone & Enachia, 2015). XBRL international consortium encourages the development of XBRL taxonomies in regional jurisdictions by providing education and training (Kernan, 2008). The next actors are XBRL jurisdictions and individual organizations which constantly update and improve XBRL taxonomies to fit respective business rules (Rao & Troshani, 2007). The reporting entities; such as financial publishers, firms, and individuals, are obliged to prepare and report the financial statements based on country's regulations (Chang & Jarvenpaa, 2005). The output of the processes are to be consumed by other stakeholders (i.e., the requesting agencies) such as financial regulators, government institutions, auditors, investors, and analysts (Chang & Jarvenpaa, 2005).

Stakeholders play fundamental roles in the diffusion of XBRL knowledge and innovations (Dunne, Helliari, Lymer, & Mousad, 2013). The collaboration between stakeholders is fundamental to ensure the success of XBRL (Dunne, Helliari, Lymer, & Mousad, 2013). Chang & Jarvenpaa (2005) identify some challenges related with stakeholder participation in XBRL implementation: the inherent conflicts among stakeholders, a lack of motivation to contribute, and internal influx due to political factors. Based on a literature review, we present the stakeholders that involved directly and indirectly in XBRL adoption and implementation (Table 3). The brief descriptions of actors along with the roles, interests, opportunities, and challenges are given to help analyzing the attitudes of the actors.

Table 3: XBRL stakeholders

Actors	Roles	Entities	Interests	Opportunities /challenges
XBRL Internationals	An international non-profit organization that support international XBRL specifications (XBRL International, 2011)	XBRL International	To coordinate the effort of local jurisdictions in developing XBRL specifications (Rao & Troshani, 2007), (Doolin & Troshani, 2007b)	Opportunities Define improved XBRL standards and taxonomy
XBRL jurisdictions	Non-profit organizations based on countries or region, with the main role to promote XBRL to institutions/firms in their jurisdictions (Doolin & Troshani, 2007b)	XBRL jurisdictions all over the world	To promote XBRL to institutions/firms to Increase the awareness on XBRL benefits (Doolin & Troshani, 2007b)	Opportunities Design the strategic directions of XBRL implementations (Doolin & Troshani, 2007b)
Requesting agencies	Have the significant role in the development of system and taxonomy, and imposing rules (Doolin & Troshani, 2007b)	Government, Accounting firms	Using XBRL to facilitate information exchange in more efficient way (Chang & Jarvenpaa, 2005)	Opportunities - Transform the reporting process, enhance the relationship between regulators and financial publishers (Chang & Jarvenpaa, 2005) - Contribute to XBRL diffusion (Doolin & Troshani, 2007b) Challenges - Address the post adoption issues (Doolin & Troshani, 2007b)
Information providers (reporting parties)	Have a role to prepare and report the financial statements based on the standards and regulations (Chang & Jarvenpaa, 2005)	Individual tax payer, Financial services firms, Banks	To produce financial reports with better quality, higher processing speed and lower error rate (Doolin & Troshani, 2007b)	Opportunities - Broaden the reporting services and extend the audience (Chang & Jarvenpaa, 2005) Challenges - Heavily dependent on XBRL supporting tools and software (Doolin & Troshani, 2007b)
System development organizations	Have a major role in creating the applications that support the financial reporting marketplace (Chang & Jarvenpaa, 2005)	Government consultants, software vendors,	- New source of revenue, new source of business knowledge (Chang & Jarvenpaa, 2005)	Opportunities - Creating economies of scale for XBRL supporting tools and solutions (Doolin & Troshani, 2007b)

Actors	Roles	Entities	Interests	Opportunities /challenges
		application providers	- Delivering practical solutions to support XBRL implementation (Doolin & Troshani, 2007b)	Challenges - Competitive atmosphere might limit the collaborative opportunities (Chang & Jarvenpaa, 2005)
Users of corporate reports	The users of corporate reports that consume XBRL report for the analytical purposes. They play significant roles in improving the value added services of the reports by optimizing the analytical process.	Auditors, investors, analysts	- XBRL enable the users to assess higher quality financial reports (Doolin & Troshani, 2007b) - XBRL offering the potential to Increase revenue (Doolin & Troshani, 2007b)	Opportunities - Improving the value added services to their clients by utilizing XBRL ability to improve basic reporting (Doolin & Troshani, 2007b)
Educational institutions	Tertiary education institutions that contribute to knowledge dissemination and XBRL awareness (Doolin & Troshani, 2007b)	Universities	Participate in knowledge development (Doolin & Troshani, 2007b)	Opportunities - Bridging the gap of knowledge between XBRL users and potential users (Doolin & Troshani, 2007b)

2.3 The comparison of EDI, XML, XBRL

The following table (Table 4) concludes the comparison between EDI standard based and XML based. It also presents the comparison with XBRL as the extension of the XML-based message exchange. We will use the information from this table in chapter 7 to analyze how the evolution of the features of XBRL (as the extension of XML) contributes to the differences in the factors influencing the application of EDI-based message exchange and the application of XBRL-based reporting system.

Table 4: The comparison of EDI, XML, and XBRL

	EDI standard based	XML based	XBRL
Data format and rules	The files follow a predefined schematic standard (Nurmilaakso, Kotinurmi, & Laesvuori, 2006)	Free form of data presentation (Nurmilaakso, Kotinurmi, & Laesvuori, 2006), (Goswami & Kundu, 2013)	The files follow framework of standards for data exchange (Hoffman, n.d.)
File location	EDI standard files (such as ANSI, EDI FACT) have to comply with specific rule of location (Open Text, 2014)	XML files do not restricted by a specific location but identified by tags (Open Text, 2014). 'Automation of information location' (Debreceeny & Gray, 2001, p. 47)	The information in the tags define the data location (Wu & Zhu, 2011)
File size	Relatively smaller than XML based file (Open Text, 2014)	Relatively larger than EDI standard based file due to the size of the tagging (Open Text, 2014)	Following XML-based file size with the addition in the formula and validation method (XBRL International, 2011)
Storage	Minimal storage requirement	Relatively larger storage requirement	Relatively larger storage requirement
Readability	Less readable for human comparing with XML based file (Open Text, 2014)	Machine-readable and human-readable (Open Text, 2014)	Machine-readable (XBRL International, 2011)

Table 5: The comparison of XML and XBRL

	XML based	XBRL
Formula	No default support for computation/formula (XBRL International, 2011)	Support computation/formula (XBRL International, 2011)
Semantics expressions	Only articulates syntax (Debreceeny & Gray, 2001)	Provides semantics meaning in a standard format (Wu & Zhu, 2011)
Validation	No validation method (Hoffman, n.d.)	XML + validation mechanism (Hoffman, n.d.)
Data presentation	Mixing of concept definition and model (Hoffman, n.d.)	Atomic approach: separation of concept definition (relations) and the model (Hoffman, n.d.)
Presentation of data hierarchy	Support presentation of data hierarchy (Hoffman, n.d.)	Support the presentation of more than one hierarchy in a relation (Hoffman, n.d.)
Extensibility	Extensible in every direction (Hoffman, n.d.)	Predictable extensibility (Hoffman, n.d.)

2.4 The conclusions of the literature

To answer sub question 1, *what is the concept of XBRL as the application of the Inter-organizational information system (IOS)*, the following arguments are presented to support the explanation from previous sub sections: (1) the development of XBRL creates new perspectives on inter-organizational data exchange due to the optimization of financial communication and data exploitation; (2) XBRL can be adopted in an inter-organizational system as well as in an internal reporting system even though the determinants for internal adoption are different with the determinants for inter-organizational adoption; (3) XBRL enhances the effectiveness and efficiency of internal and inter-organizational information exchange; (4) the application of IOS concept by XBRL technology can be implemented in regulatory and governmental reporting, internal business reporting, inter-organizational business reporting, and as a means of communication to the investors.

EDI-based standard (as the earliest de facto standard of IOSs), and XML (as the free-form formats of IOS) are currently evolve with their respective pros and cons. The presence of XML, as the latest innovation, does not necessarily lead to the abandonment of EDI. Many big companies in the world are still using EDI for various reasons, for instance the file size and storage concerns (EDI Basics, 2015), the capability of performing validation before translation (EDIdEv, n.d.), and the widespread adoption of EDI (Covalentworks, 2015). On the other hand, the flexibility of XML has enable the emergence of XBRL, the framework of agreement which is built on top of XML with various powerful additional features (such as business rules, formula, and validation). The differences in the feature of EDI and XBRL are lead to the differences in the factors influencing their adoption and implementation. Figure 10 shows the evolution of EDI to XML and XBRL, based on the case study results. The brief discussion of the evolution of factors that influence the application of EDI and XBRL is presented in chapter 7.

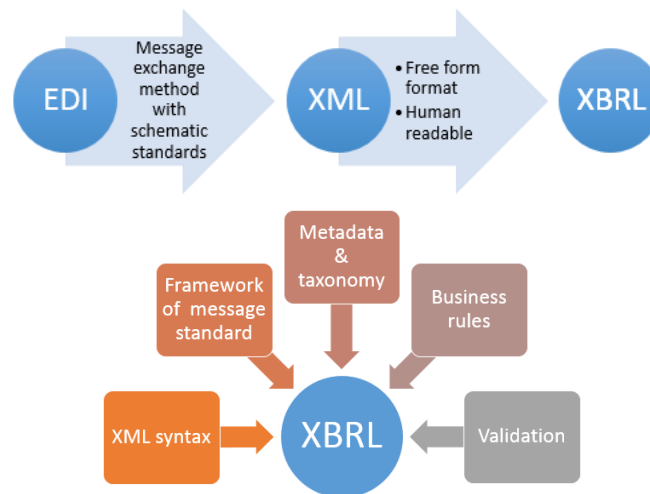


Figure 10: The evolution of EDI towards XML and XBRL

This chapter also discusses the actors involved in the XBRL-based reporting system implementation. For example, XBRL jurisdictions, with the main role to promote XBRL to institutions/firms in their jurisdictions; the requesting agencies, with the significant role in supervising the development of the system and imposing rules for mandatory enforcement; and the information providers (reporting parties) with the

substantial role in submitting the reliable reports that comply with legal regulations and XBRL standards. A number of literature explain that stakeholders play significant part in the dissemination of knowledge and innovations, and their collaborations are fundamental in the process of XBRL adoption and implementation. Furthermore, the recognition of the differences in the stakeholders' roles, interests, opportunities, and challenges are substantial in designing the proper communication strategy during the process of XBRL adoption and implementation.

In conclusion, this chapter covers the comprehensive discussion of EDI, XML, and XBRL technology; their role in inter-organizational systems; the potential implementation of XBRL in business reporting activities; and the actors involved in XBRL implementation process. The above discussions are the fundamental baseline for the remaining chapters of this report. Furthermore, the next chapter will investigate and compare the available models on IT adoption. The chosen model will be used as the framework to categorize the findings from the empirical result of this research. The next chapter also investigates the scholarly articles to find the factors that influence technology adoption and implementation based on the preliminary studies

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CHAPTER 3: LITERATURE REVIEW ON IT ADOPTION MODELS

The purpose of this chapter is to answer sub question 2 and 3:

- SQ2. *What are the theory of IT adoption models that can support the analysis of factors that influence XBRL implementation?* It will be presented in section 3.1.
- SQ3. *What are the factors influencing IT adoptions and implementations based on the preliminary studies?* It will be presented in section 3.2.

This chapter investigates the existing studies of XBRL implementations to discover the factors that play significant role in each case. All of the factors will be classified and analyzed by using one of the IT adoption models. Consequently, we need to choose a particular IT adoption model beforehand. The chosen model will be used as a guideline in the classification of factors influencing XBRL adoption and implementation. This chapter plays significant contribution in this study based on the following considerations:

1. It provides the rational in choosing one particular model to be used as the tool to classify the factors influencing IT adoption and implementation.
2. The finding factors that affect IT adoption and implementation from the preliminary studies will provide the insights about the current academic perspective of IT adoption, includes the application of XBRL for business reports.

The structure of this chapter is as follows:

- Section 3.1 discusses the existing theories and models of IT adoption. It comprises the comparisons of the models and the rational in choosing one of the models to support the analysis of the case study.
- Section 3.2 presents the list of factors influencing IT adoption and implementation. The list of factors is derived from the scholarly literature of IT adoption and implementation in various cases. The factors are classified based on one of the established models that has been chosen. The findings from literature study will be used as one of the baseline to construct the case study protocol.
- Section **Error! Reference source not found.** presents the conclusion of the chapter.

3.1. The theory of IT adoption models

The aim of this section is to answer sub-question 2 of this research: *What are the theory of IT adoption models that can support the analysis of factors that influence XBRL implementation?* This section proceeds as follows: section 3.1.1 presents the comparison of existing IT adoption models and theories, section 3.1.2 discusses the answer to sub-question two of this research, i.e., the rationale of choosing a particular IT adoption model to classify the factors influencing XBRL adoption and implementation.

3.1.1. The comparison of existing technology adoption models

Technology adoption has become one of the largest areas of study in the field of information system research which aims to understand, predict, and explain the factors affecting the adoption of a technology (Date, Gangwar, & Raoot, 2014). Most of the studies on technology adoption covers the area of

technology research and development, technology diffusion, and technology adoption and implementation (Dedrick & West, 2004).

The level of adoption can be observed at the individual or micro level, and at the collective or macro level (Dedrick & West, 2004). The success of technology adoption at the individual level is important because it will speed up the involvement of an individual in a rapidly changing world where technology is being perceived as the center of the activities (Bridges to Technology Corp, 2005). The most popular theory explaining the diffusion of innovation at the micro level is Roger’s Innovation Diffusion Theory, which has a significant influence to subsequent theories of IT diffusion (Aizstrauta, Eroles, & Gintersa, 2015). This theory explains the category of innovation’s adopters which relies heavily on personality traits (Rogers, 1962).

At the collective level, a nation’s ability to adapt with the most suitable technology has been empirically proven capable of affecting crucial aspects of the country, such as the cost of producing good and service, which eventually leads to the increase in per capita income (Comin & Hobijn, 2008). Comin & Hobijn (2008) built the model of technology diffusion and adoption and found an empirical relationship between the lag of technology adoption and the level of productivity in technology-associated capital. Hence, the proper adoption of technology is an essential means to enhance the competitiveness of a country’s economy. At the firm level, there is a general consensus that a proper IT adoption will deliver significant impact on the productivity of the firm (Martins & Oliveira, 2011). Hence, exercising the suitability of company’s business processes with the chosen technology is a strategic issue. Furthermore, the adoption of a particular technology can generate impact to the environmental condition, economic structure, social situation, and sustainability, hence the assessment of technology adoption is needed by many stakeholders such as investors, developers, customers, and government (Barkane & Ginters, 2011).

Numerous theories and models have been introduced to explain technology adoption. Moreover, various studies have been presented not only to review the nature, the strength, and the weaknesses of each model but also to provide a recommendation for the most suitable area of application. The following are the comparison of the existing IT adoption models in terms of the level of analysis, the main features of the models, and the limitations of models. The more detail explanation of each model can be found in **Appendix B**.

Table 6: The comparison of established models in technology adoption

	Level of analysis	Main focus	Limitations
IDT	- Individual level and organizational level (Martins & Oliveira, 2011)	- Behavioral theories with the focus on the diffusion of innovation (Hossain & Quaddus, 2011) - Can easily be combined with other models to better understand IT adoption decision (Arpaci, Ozkan, Turetken, & Yardimci, 2012)	- The application of IDT at organizational level only possible if it is/ combined with another model such as TAM or TOE (Arpaci, Ozkan, Turetken, & Yardimci, 2012) - Deals mostly with voluntary adoption (Hossain & Quaddus, 2011)
TRA	Individual level (Ajzen & Fishbein, 1975), (Bagozzi, Davis, & Warshaw,	- The focus is <i>internal psychological variables</i> for individual decisions	- Limited focus on controllable and uncontrollable environmental variables, and there is a need to define precisely the salient beliefs that influence attitude

	Level of analysis	Main focus	Limitations
	1989), (Hossain & Quaddus, 2011)	<ul style="list-style-type: none"> - Mediates the impact of external variable on user behavior (Bagozzi, Davis, & Warshaw, 1989) - Reflects the relationship between adoption intention, attitudes, perceptions, and beliefs (Hossain & Quaddus, 2011) 	and subjective norm (Bagozzi, Davis, & Warshaw, 1989)
ECT, ECM	Individual level (Oliver, 1980)	<ul style="list-style-type: none"> - Able to predict IT continuance based on actual experience (Bhattacharjee & Premkumar, 2008) 	<ul style="list-style-type: none"> - Relies heavily on the level of individual satisfaction to predict future behavior (Bhattacharjee & Premkumar, 2008) - Lack of attention in external factors - Focus on prediction of behavior on the exploitation stage, and lack of focus on possibility of failure on development and testing stage (Aiztrauta, Eroles, & Gintersa, 2015)
TAM, TAM 2, TAM 3	Individual level (Martins & Oliveira, 2011), (Arpaci, Ozkan, Turetken, & Yardimci, 2012), and organizational level (Date, Gangwar, & Raoot, 2014)	<ul style="list-style-type: none"> - Behavioral theories (Hossain & Quaddus, 2011) with focus on beliefs, attitudes, and behavior (Bhattacharjee & Premkumar, 2008) - Provides a room for intervention of individual behavior via external variables (Bagozzi, Davis, & Warshaw, 1989) - Reflects mutual relationship between adoption intention and attitudes, perceptions, and beliefs (Hossain & Quaddus, 2011) 	<ul style="list-style-type: none"> - Does not include subjective norm as direct determinant of behavior while it might affect compliance (Bagozzi, Davis, & Warshaw, 1989) - Pays more focus on initial adoption rather than continuous adoption (Bhattacharjee & Premkumar, 2008) - Deals mostly with the voluntary adoption (Hossain & Quaddus, 2011) - Does not take into account the qualitative, emotional, and cultural components (Ward, 2013) - Focus on prediction of behavior on the exploitation stage, and lack of focus on possibility of failure on development and testing stage (Aiztrauta, Eroles, & Gintersa, 2015)
TOE	Organizational level (Martins & Oliveira, 2011), (Date, Gangwar, & Raoot, 2014)	<ul style="list-style-type: none"> - Provides theoretical perspective of contextual factors (Fleischer & Tornatzky, 1990) - Presents variables that assess project complexity from theoretical aspects and practical aspects (Bakker, Bosch-Rekveltd, Jongkind, Mooi, & Verbraeck, 2011) - Supports the assessment to investigate the dynamic of project complexity (Bakker, Bosch-Rekveltd, Jongkind, Mooi, & Verbraeck, 2011) - includes environmental context in the analysis (Martins & Oliveira, 2011) - provides a solid theoretical foundation, consistent empirical basis, and the potential of application 	<ul style="list-style-type: none"> - Some predictors are more suitable for large organizations instead of for small and medium enterprises (Awa, Emecheta, & Ukoha, 2012).

	Level of analysis	Main focus	Limitations
		for IS adoption (Martins & Oliveira, 2011) <ul style="list-style-type: none"> - Free from industry and firm-size restrictions (Gangwar, Date, & Raoot, 2014) - 'Provides a substantial theoretical perspective to study contextual factors' (Lin, 2014, p. 81) 	
TPB	Individual level (Martins & Oliveira, 2011), (Arpaci, Ozkan, Turetken, & Yardimci, 2012)	<ul style="list-style-type: none"> - Reflects the relationship between adoption intention and attitudes, perceptions, and beliefs (Hossain & Quaddus, 2011) - Behavioral theories (Hossain & Quaddus, 2011) 	<ul style="list-style-type: none"> - Deals mostly with voluntary adoption (Hossain & Quaddus, 2011) - Lack of attention to external factors
UTAUT	Individual level (Martins & Oliveira, 2011), (Davis, Davis, Morris, & Venkatesh, 2003), (Arpaci, Ozkan, Turetken, & Yardimci, 2012)	<ul style="list-style-type: none"> - Illustrates facilitating conditions as the direct determinant of <i>use behavior</i>, while the direct determinants of <i>usage intention</i> are performance expectancy, effort expectancy, and social influence (Davis, Davis, Morris, & Venkatesh, 2003) 	<ul style="list-style-type: none"> - Deal mostly with the voluntary adoption (Hossain & Quaddus, 2011) - Focus on prediction of behavior on the exploitation stage, and lack of focus on possibility of failure on development and testing stage (Aizstrauta, Eroles, & Gintersa, 2015) - Cannot predict the sustainability of a new technology (Barkane, Ginters, & Vincent, 2010).
IASAM	Individual and organizational level (Aizstrauta, Celmina, Gintersa, & Mazza, 2013)	<ul style="list-style-type: none"> - Integrates socio-economic and socio-technical aspect of technology (Aizstrauta, Celmina, Gintersa, & Mazza, 2013) - Addresses technology acceptance issue and sustainability issue (Barkane & Ginters, 2011) - <i>Takes into account technical, social, financial, and sustainability assessment</i> (Barkane, Ginters, & Vincent, 2010, p. 357). - Assessment of failure possibility of a new technology since the development phase (Aizstrauta, Celmina, Gintersa, & Mazza, 2013) - Covers not only the internal determinants but also external factors such as asset management, quality of product, user acceptance, and development of society demand (Aizstrauta, Celmina, Gintersa, & Mazza, 2013) 	<ul style="list-style-type: none"> - A complex model with the challenge in the integration of UTAUT method (potential user's survey) with IASAM evaluation (Aizstrauta, Eroles, & Gintersa, 2015) - Need relatively more time since it includes survey in data collections

3.1.2. Why TOE?

Table 6 explains the comparison of IT adoption models from several aspects: the adoption level, the main characteristics, and the limitations. Four of them are suitable to be used as the model to explain IT adoption at the organizational level, namely IDT, TAM, IASAM, and TOE.

The application of IDT at an organizational level is only possible if it is combined with another model such as TAM or TOE (Arapaci, Ozkan, Turetken, & Yardimci, 2012). TAM deals mostly with voluntary adoption (Hossain & Quaddus, 2011), whereas the choice of XBRL might be involuntary from the employee perspective. TAM also does not take into account the qualitative, emotional, and cultural components (Ward, 2013). Furthermore, TAM has a limited focus on environmental factors such as social and cultural components (Bagozzi, Davis, & Warshaw, 1989), (Ward, 2013).

IASAM combines individual psychological aspects with socio-technical factors (Barkane, Ginters, & Vincent, 2010, p. 357) (Aizstrauta, Celmina, Gintersa, & Mazza, 2013). It covers the initial adoption stage and continuous usage of technology (Aizstrauta, Celmina, Gintersa, & Mazza, 2013), and addresses internal determinants of individual behavior as well as external determinants and sustainability issues (Barkane & Ginters, 2011), (Aizstrauta, Celmina, Gintersa, & Mazza, 2013). The model also takes wide range of external factors into consideration, namely political situations, financial capability of investors and users, and social and economic aspects (Barkane & Ginters, 2011). However, the main purpose of IASAM is to address the technology acceptance issue, i.e., to make sure that a particular technology has the lowest possibility of failure in the stage of development, implementation, maintenance, and post-implementation (Barkane, Ginters, & Vincent, 2010), (Barkane & Ginters, 2011), (Aizstrauta, Celmina, Gintersa, & Mazza, 2013), (Aizstrauta, Eroles, & Gintersa, 2015). The ultimate goal of the model is to estimate the sustainability of a particular technology starting from the development stage (Barkane & Ginters, 2011). The model emphasizes the ability in making predictions on the future trends (Barkane, Ginters, & Vincent, 2010), especially the possibility of failure.

Based on above explanation, IDT, TAM, and IASAM are unlikely to be used as the model in this study because the main objective of this research is to assess the process of implementation instead of making prediction of the future trends or to make sure that a particular technology has the lowest possibility of failure in the stages of development and acceptance. Therefore, we consider TOE as the most proper model to be used to classify the factors influencing the process of XBRL implementations based on the following considerations:

1. Theoretical aspects:
 - a. TOE provides a solid theoretical foundation, consistent empirical basis, and the potential of application for information system adoption (Martins & Oliveira, 2011).
 - b. This framework classifies variables that assess project complexity from theoretical aspects and practical aspects (Bakker, Bosch-Rekveltdt, Jongkind, Mooi, & Verbraeck, 2011).
 - c. 'TOE has substantial theoretical perspectives to study contextual factors' (Lin, 2014, p. 81).
2. Practical aspects:
 - a. Martins & Oliveira (2011) present a comparison between IDT, TOE, TAM, TPB, and UTAUT, and find that IDT and TOE are applicable at the organizational level, whereas the remaining models are only applicable for the technology adoption analysis at individual level

- b. The model is applicable to large organizations (Gangwar, Date, & Raoot, 2014)
- c. Environmental factors are explicitly included in the analysis (Fleischer & Tornatzky, 1990). The environmental factors enable the framework to cover wide range of elements outside the technical and organizational contexts such as political conditions, culture and norms, relevant local contents, economic conditions, industry pressure, and government regulations.
- d. TOE framework supports the assessment to investigate the dynamic of project complexity (Bakker, Bosch-Rekvelde, Jongkind, Mooi, & Verbraeck, 2011).

Table 7: Why TOE

Theoretical aspects	
1.	solid theoretical foundation
2.	consistent empirical basis
3.	Provides theoretical perspectives to study contextual factors
4.	Including environmental contexts in the analysis
Practical aspects	
1.	The most relevant model to assess organizational level adoption
2.	Free from industry-size and firm-size restrictions
3.	Includes environmental contexts in the analysis
4	Able to investigate the dynamic of project complexity

In order to make it more specific, the use of TOE model for this research is based on the following considerations:

1. The relevance of this model to assess the IT adoption and implementation in organizational level. In this research the adoption and implementation of XBRL is for public and private organization instead of for individual adoption. Out of 11 observed models, only four of them are (confirmed by the preliminary research) suitable for organizational level assessments, i.e., IDT, TAM, IASAM, and TOE. We do not choose IDT, TAM, and IASAM, because their focus is making the prediction of IT adoption instead of providing the assessment during the process of implementation, which is the main goal of this research.
2. TOE model does not only deals with voluntary adoption, as the nature of most of the models (such as TRA, TPB, TAM, ECM, UTAUT, and IASAM), but also deals with the involuntary adoption for individuals in the organizations. The choice of XBRL might be involuntary option from the employee perspective in particular organization since the decision is made by the management level.
3. TOE addresses the special focus for external factors that might influence the adoption of a technology. For the case of XBRL adoption and implementation, various factors beyond the internal and technical aspects (such as socio-technical issues, culture, government regulations, and the changes in international standards for reporting practices) might contribute to the process of adoption and implementation.
4. TOE model is not limited by the size of the organizations. This aspect is very important because of the potential adoption and implementation of XBRL technology by large organizations, especially the government agencies.
5. A lot of research on IT adoption models were conducted by applying TOE framework in the analysis due to solid theoretical foundation and consistent empirical basis of TOE (Martins &

Oliveira, 2011). We can easily found plentiful scholarly articles on IT adoption that apply this model. Consequently, it helps us to conveniently identify and extract numerous factors influencing IT adoption from preliminary research.

3.2. The preliminary research on IT adoptions and implementations

This section provides the answer for sub-question 3: *What are the factors influencing IT adoptions and implementations based on the preliminary studies?* From the perspective of this thesis we need to know the preliminary research on IT adoption and implementation in order to provide the insights on the current academic perspectives of the factors influencing the adoption and implementation of various technology, includes XBRL.

It is important to know the factors influencing XBRL adoptions and implementations because they have policy impacts towards regulators and technology innovators in formulating effective adoption and implementation strategies (Doolin & Troshani, 2005). The reasons to support or challenge XBRL adoptions and implementations might vary; they reflect the diversity of organizations or companies' culture (Li & Pinsker, 2008). Doolin & Troshani (2005) identify several challenges of XBRL implementations namely the complexity of data management, the motivation of initial adopters, and the coordination among stakeholders. Rao & Troshani (2007) found that the drivers and the inhibitors of XBRL adoption are related to government policies, 'wait and see' culture, resources availability, and the stability of the technology. From the legal perspectives, XBRL specifications (technical aspect) need to comply with the regulations (legal aspect), hence the regulators need to get involved in the implementation process (Chang & Jarvenpaa, 2005). Li & Pinsker (2008) suggest that the diverse reason of XBRL adoption imply that there is no *best practice* organizational adoption of XBRL.

The following table presents the list of factors influencing IT adoptions and implementations from the literatures of various IT adoption and implementation topics, such as XBRL technology, EDI, ERP, open source platform, e-commerce, cloud computing, supply chain, cloud computing, and mobile reservation. The factors are classified into three contexts of TOE, i.e., technological context, organizational context, and environmental context. We will use this table during the analytical part of this research (chapter 7), to analyze the findings from the empirical studies (chapter 5 and 6).

Table 8: Factors influencing IT adoption and implementation based on the existing literature

List of factors		#	Literatures	Types of the technology
A. Micro Level (Organizational/firm level)				
<i>Technological contexts</i>				
1	Relative advantages			
	- Perceived direct benefits	12	(Rao & Troshani, 2007) , (Doolin & Troshani, 2007a), (Doolin & Troshani, 2007a), (Rawashdeh & Selamat, 2013), (Andone & Enachia, 2015), (Corbière & Rowe, 2011), (Henderson, Sheetz, & Trinkle, 2012), (Chau & Kuan, 2001), (Lai, Lin, & Teo, 2009), (Day & Rahayu, 2015), (Thomas, Espadanala, & Oliveira, 2014), (Lin, 2014)	XBRL, EDI, e-Proc, E-commerce, Cloud computing, e-supply

List of factors		#	Literatures	Types of the technology
	- Perceived indirect benefits	3	(Rao & Troshani, 2007), (Corbière & Rowe, 2011), (Chau & Kuan, 2001), (Lai, Lin, & Teo, 2009)	EDI, e-Proc
	- Perceived cost	9	(Doolin & Troshani, 2007a), (Andone & Enachia, 2015), (Barrett & Konsynski, 1982), (Rao & Troshani, 2007), (Dedrick & West, 2004), (Lai, Lin, & Teo, 2009), (Day & Rahayu, 2015), (Lian, Wang, & Yen, 2014), (Lin, 2014)	XBRL, EDI, open source, e-Proc, e-Commerce, cloud computing, e-Supply
2	Perceived risk	1	(Corbière & Rowe, 2011)	EDI
3	Perceived knowledge	2	(Dunne, Helliar, Lymer, & Mousad, 2013), (Rawashdeh & Selamat, 2013)	XBRL
4	Complexity	3	(Doolin & Troshani, 2007a), (Rao & Troshani, 2007), (Henderson, Sheetz, & Trinkle, 2012)	XBRL
5	Technical usability			
	- Reliability	2	(Bjarn-Andersen & Nygaard-Andersen, 1994), (Dedrick & West, 2004)	EDI, Open source
	- Compatibility	9	(Dedrick & West, 2004), (Jang & Pan, 2008), (Day & Rahayu, 2015), (Lian, Wang, & Yen, 2014), (Li, Li, Wang, & Zhang, 2016), (Thomas, Espadanala, & Oliveira, 2014), (Henderson, Sheetz, & Trinkle, 2012), (Rawashdeh & Selamat, 2013), (Rao & Troshani, 2007)	XBRL, Open source, ERP, e-Commerce, cloud computing, e-reservation, cloud computing
	- Organizational impact	1	(Bjarn-Andersen & Nygaard-Andersen, 1994)	EDI
	- User friendliness	1	(Bjarn-Andersen & Nygaard-Andersen, 1994)	EDI
6	Business support			
	- Functional coverage	1	(Bjarn-Andersen & Nygaard-Andersen, 1994)	EDI
	- Business partner coverage	1	(Bjarn-Andersen & Nygaard-Andersen, 1994)	EDI
7	Implementation cost			
	Cost of integration, cost of training, cost of procurement	1	(Bjarn-Andersen & Nygaard-Andersen, 1994)	EDI
8	Readiness of technology			
	- XBRL readiness as an innovation	1	(Rao & Troshani, 2007)	XBRL
9	Supporting software			
	- Supporting software tools	1	(Doolin & Troshani, 2005)	XBRL
	- Supporting software solution	1	(Rao & Troshani, 2007)	XBRL
10	Trial-ability	3	(Doolin & Troshani, 2007a), (Rao & Troshani, 2007), (Dedrick & West, 2004)	XBRL, open source
11	Stability of XBRL specification	2	(Doolin & Troshani, 2005), (Doolin & Troshani, 2007a)	XBRL
12	Observability	1	(Rao & Troshani, 2007)	XBRL
13	Data security	1	(Lian, Wang, & Yen, 2014)	Cloud computing
Organizational contexts				
1	Company size	7	(Corbière & Rowe, 2011), (Jang & Pan, 2008), (Lai, Lin, & Teo, 2009), (Thomas, Espadanala, & Oliveira, 2014), (Lin, 2014), (Richardson, Shan, & Troshani, 2015), (Li, Li, Wang, & Zhang, 2016)	XBRL, EDI, ERP, e-Proc, cloud computing, e-Supply, e-Reservation

List of factors		#	Literatures	Types of the technology
2	Organizational readiness	6	(Doolin & Troshani, 2007a), (Rao & Troshani, 2007), (Benbasat, Dexter, & Lacovou, 1995), (Day & Rahayu, 2015), (Thomas, Espadanala, & Oliveira, 2014), (Jang & Pan, 2008)	XBRL, EDI, e-Commerce, cloud computing, ERP
3	Innovation champion	1	(Doolin & Troshani, 2007a)	XBRL
4	Human competence			
	- XBRL education and training	1	(Rao & Troshani, 2007)	XBRL
	- Employee's knowledge on XBRL		(Doolin & Troshani, 2005)	XBRL
	- Global human competence	4	(Dedrick & West, 2004), (Li, Li, Wang, & Zhang, 2016), (Arifin & Frmanzah, 2015), (Chau & Kuan, 2001)	Open source, e-reservation, common IT firms, EDI
5	Financial capability	4	(Corbière & Rowe, 2011), (Benbasat, Dexter, & Lacovou, 1995), (Dedrick & West, 2004), (Chau & Kuan, 2001)	EDI, open source
6	Technical capability		(Corbière & Rowe, 2011)	EDI
7	Absorptive capability	5	(Guimaraes & Harrington, 2005), (Henderson, Sheetz, & Trinkle, 2012), (Park, Suh, & Yang, 2007), (Lin, 2014), (Arifin & Frmanzah, 2015)	XBRL, USA IS manager, ERP, e-Supply, common IT firms
8	Top management support			
	- Implementation goal	1	(Chen, 2012)	XBRL
	- Management attitude	5	(Rao & Troshani, 2007), (Lai, Lin, & Teo, 2009), (Thomas, Espadanala, & Oliveira, 2014), (Lian, Wang, & Yen, 2014), (Lin, 2014)	XBRL, e-Proc, cloud computing, e-Supply
	- Top management leadership	2	(Felden, 2011), (Arifin & Frmanzah, 2015)	XBRL, Common IT firms
	- CEO IT Innovativeness and experience	2	(Day & Rahayu, 2015), (Lian, Wang, & Yen, 2014)	e-commerce, cloud computing
9	Implementation strategy XBRL			
	- Pilot project	1	(Chen, 2012)	XBRL
	- Stakeholder involvement	1	(Chen, 2012)	XBRL
	- Phase-in implementation	1	(Chen, 2012)	XBRL
10	Degree of understanding XBRL language	1	(Andone & Enachia, 2015)	XBRL
11	Resources	3	(Doolin & Troshani, 2005), (Rao & Troshani, 2007), (Lian, Wang, & Yen, 2014)	XBRL, cloud computing
12	IT Innovativeness	1	(Dedrick & West, 2004)	Open source
13	Strategic importance of IT	1	(Dedrick & West, 2004)	Open source
14	Perceived barriers	1	(Jang & Pan, 2008)	ERP
15	Corporate culture			
	- Organizational value and norms	1	(Guimaraes & Harrington, 2005),	USA IS manager
	- Information sharing culture	1	(Lai, Lin, & Teo, 2009)	e-Proc
Environmental contexts				
1	Critical mass and market/competitor influence			
	- Market conditions	2	(Doolin & Troshani, 2007a); (Rao & Troshani, 2007)	XBRL
	- Competitive pressure	2	(Bjarn-Andersen & Nygaard-Andersen, 1994), (Benbasat, Dexter, & Lacovou, 1995)	EDI
	- Reluctant to adopt XBRL	1	(Doolin & Troshani, 2007a)	XBRL

	List of factors	#	Literatures	Types of the technology
	- Others critical mass pressures	5	(Li, Li, Wang, & Zhang, 2016), (Chau & Kuan, 2001), (Jang & Pan, 2008), (Lian, Wang, & Yen, 2014), (Lin, 2014)	e-Reservation, EDI, ERP, cloud computing, e-Supply
	- Network influence	5	(Benbasat, Dexter, & Lacovou, 1995), (Lai, Lin, & Teo, 2009), (Doolin & Troshani, 2007a), (Rawashdeh & Selamat, 2013), (Felden, 2011)	XBRL, EDI, e-Proc
	- Normative pressures	1	(Henderson, Sheetz, & Trinkle, 2012)	XBRL
2	Inter organizational dependency	1	(Bjarn-Andersen & Nygaard-Andersen, 1994)	EDI
3	Value added network	1	(Bjarn-Andersen & Nygaard-Andersen, 1994)	EDI
4	Government policy and engagement	5	(Rao & Troshani, 2007), (Chau & Kuan, 2001), (Jang & Pan, 2008), (Lian, Wang, & Yen, 2014), (Dunne, Helliari, Lymer, & Mousad, 2013)	XBRL, EDI, ERP, cloud computing
5	Incentive scheme (Mandatory reporting)	2	(Chen, 2012); (Andone & Enachia, 2015)	XBRL
6	Political support	1	(Chen, 2012)	XBRL
7	Available information			
	- Training and education	1	(Doolin & Troshani, 2007a)	XBRL
	- Available technology supports	1	(Dedrick & West, 2004)	Open source
8	Available support on XBRL components			
	- Availability of appropriate taxonomies	1	(Doolin & Troshani, 2007a)	XBRL
	- International harmonization of accounting standard	1	(Doolin & Troshani, 2007a)	XBRL
9	Culture	1	(Rao & Troshani, 2007)	XBRL
10	Successful adoption of other organizations	1	(Rao & Troshani, 2007)	XBRL
B. Macro Level (Country level)				
1	Guidance from XBRL International	1	(Dunne, Helliari, Lymer, & Mousad, 2013)	XBRL
2	Local adoption strategy			
	Local awareness on XBRL benefits	1	(Doolin & Troshani, 2005)	XBRL
3	Success story of another local adopters	1	(Doolin & Troshani, 2005)	XBRL
4	Adoption of International Accounting Standard (IAS)	1	(Doolin & Troshani, 2005)	XBRL
5	Funding and investment	1	(Doolin & Troshani, 2005)	XBRL
6	Resources for promotion of adoption	1	(Doolin & Troshani, 2005)	XBRL

3.3. The conclusions of the literature

The first part of this chapter explains the comparison of existing IT adoption models and theories, and the rationale in choosing TOE as the model to support the analysis of the case study. Out of 11 observed models, only IDT, TAM, IASAM, and TOE are applicable for organizational-level assessment. While IDT, TAM, and IASAM are more focused on making prediction of IT adoption, TOE on the other hand also gives rooms for the discussion of the process of the implementation. Implementation stages of the technology refers to the dynamic process during the installation and the development of innovation to optimize the benefits of the innovation (Thompson, 1965). The implementation stages consist of two dominant categories: *the factors*, that identify the determinants of success and failure; and *the process*, that

describes how the projects running over time (Myers, 1994). Since the empirical parts of this research address both the factors and the process of XBRL implementation in both case studies, the TOE framework is considered as the proper candidate.

The main assumption in TOE framework is that the technology adoption in an organization is strongly affected by the match between internal and external factors, hence the management need to consider the external factors in the decision making process. The use of TOE model in this research helps us to classify and categorize the factors influencing XBRL adoption and implementation in both cases. Clustering the factors to several categories is beneficial for the analytical process. For example, we will be able to identify which category is the most dominant in influencing XBRL implementation in particular situation.

Furthermore, the clustering of the factors can stimulate the analysis of the potential relationship among factors in a particular category. It can also encourage the investigation of the differences in the factors that affect one country/case in comparison with the factors that affect other countries/cases, for example why do some factors/categories found in the Netherlands, but do not appear in Indonesia. Eventually, the classification of factors aids the analytical process in finding the lessons learned during the adoption and the implementation of XBRL in the Netherlands and Indonesia.

The second part of this chapter provides the list of factors influencing IT adoption and implementation based on the scholarly journals. One of the important remarks that we encountered is the potential of the classification of the factors into contextual and non-contextual aspects. We consider that some of the factors listed in Table 8 might applicable in all cases of XBRL adoption and implementation, whereas some others might be dependent on specific conditions. The more detail discussion about the contextual and non-contextual factors will be provided in chapter 7. Among the non-contextual factors are the stability of XBRL specification, the supporting technology, and the international regulation on financial reporting; the example of contextual factors are organizational readiness, financial capability, management support, and corporate culture. The understanding on the differences between the contextual and non-contextual factors that influence XBRL adoption and implementation could help XBRL practitioners in designing a proper strategy of adoption and implementation. Furthermore, the knowledge concerning the factors that influence IT adoption and implementation based on the existing studies will be used as one of the baselines in designing the case study protocol.

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CHAPTER 4: RESEARCH METHODOLOGY

This chapter explains the research methodology by briefly introducing the steps and procedures that have been conducted. This chapter plays important contribution to this thesis by providing the outline on how all of the relevant steps had been performed to answer the research question. This chapter is structured as follows:

- Section 4.1 explains the initial phase of the case study design.
- Section 4.2 describes the coding and analysis as part of the data collection process.
- Section 4.3 elaborates the triangulation, validity, and reliability as part of the goodness of measures.
- Section 4.3 closes this chapter with the explanation about the cross case study analysis as the analytical part of the research.

4.1. The case study design

The following figure shows the case study design, data collection, and data analysis. It is adapted from the qualitative study by Diehl, Kuettner, & Schubert (2013) about enterprise collaboration system. There are three main phases of the research process, namely the case study design, data collection, and analysis.

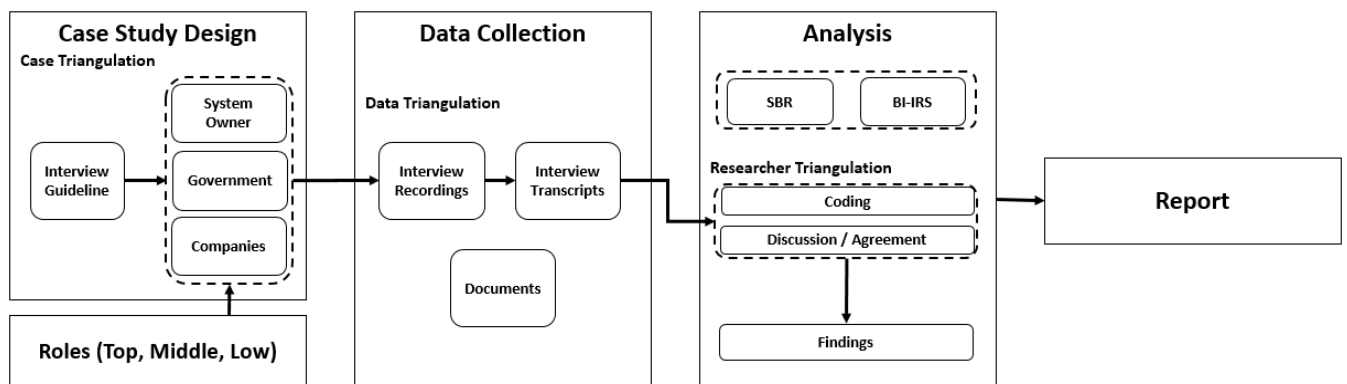


Figure 11: Case Study Design, adapted from (Diehl, Kuettner, & Schubert, 2013)

In the first phase, *the case study design phase*, we classified three clusters of respondents for each of the case study i.e., the system owner, requesting agencies, and the companies (information providers). The selected respondents are from various levels of position in the organization, ranging from the strategic level to the technical level. Consequently, there are different types of interview questions for different types of respondents. The main purpose of the interview is to confirm the findings from the literature and to enrich the understanding based on the actual condition. The interview questions are designed to be open and flexible, and the topics discussed during the interviews are not limited to the findings from the literature. The purpose of open-ended questions are to ensure that all of important concerns of the respondents can be discovered even though it was never mentioned in any preliminary studies. Consequently, a factor found in one case study might not be found in another case, and vice versa. We let the respondents narrate their experiences and insights during the project, instead of guiding them with

pre-defined possibilities. By doing so, we believe that the interview results reflect all of the main concerns of the respondents regarding the project.

The next phase is *data collection*. We conducted several number of interviews for each case study. Table 9 shows the list of respondents for the case studies.

Table 9: List of respondents for case study interviews

Interviewee	Institution	Current position	Date of Interview
THE NETHERLANDS			
1	The Netherlands Thauris	SBR consultant, Thauris	15 April 2016
2	The Netherlands Logius	Advisor of SBR International	14 June 2016
3	Tax and Custom Administrations	Data Auditor	16 June 2016
4	Tax and Custom Administrations	Leader of SBR project in Tax and Custom Administration	21 June 2016
INDONESIA			
5	The Central Bank of Indonesia	Director of Department of Information System (IS) Management	2 May 2016
6	The Central Bank of Indonesia	Information Architect in Information Management Strategy and Policy Division (SKMI), Department of IS Management	5 April 2016
7	The Central Bank of Indonesia	Head of Strategy and Transformation Division, Department of IS Management	30 April 2016
8	The Central Bank of Indonesia	System analyst in Information Management Strategy and Policy Division (SKMI), Department of IS Management	30 March 2016
9	Asian Development Bank (ADB)	XBRL Team Leader for Integrated Financial Reporting Project in OJK (Indonesia financial service authority)	11 May 2016
10	Bank Syariah Mandiri	Head of Accounting Group	25 April 2016
11	Bank Syariah Mandiri	Accounting System Development Specialist, Accounting group	25 April 2016
12	Bank Syariah Mandiri	Head of Department Reconciliation & Monitoring, Accounting group	25 April 2016
13	Bank Syariah Mandiri	Financial Control Specialist, Accounting group	25 April 2016
14	Bank Syariah Mandiri	Accounting System Development Specialist, Accounting group	25 April 2016

For the Netherlands' case study we conducted face to face interview sessions, while for the Indonesia case study we conducted email interviews. The interviews were recorded and transcribed. We translated the email interview from Indonesian language to English. For each of the interview session, we provided the original script and the summary of the interview. The original scripts were used for the coding process. The final phase of the research is the analysis. The detail process of the coding and the analysis will be explained in the next part.

4.2. The data collection and analysis

The summary of the interview's transcript was created for each individual interviewee. The process of creating summary for each individual interviews is known as *reduction technique*, to help the researchers getting a clear picture on the main issues (Maimbo and Pervan, 2005). The summary of the individual interviews was sent back to each of respondents for feedback and comments. Subsequently, a single document which consists of the summary from all of the participants was also provided to help the analysis. This document was sent back to each respondent for feedback or comments to improve the research's validity.

During the coding process, the data was broken up into meaningful pieces and was eventually be reconstructed to provide the reflection of the reality (Baškarada, 2014). The combination of the interviews' transcript, the relevant documents, and researchers' notes were used as the main source of information. The coding process is an iterative and incremental process. In this research the coding process was conducted by two researchers (Reni Sulastri and Dhata Praditya), to increase the validity of the data coding. Some of the available coding techniques as explain by Baškarada (2014) were applied, among others:

- *key word in context analysis (KWIC)*, using keywords to map the specific code
- *the word count analysis techniques*, assume the most frequently used keyword as the significant contexts
- *classical content analysis*, identify the most common concepts
- *taxonomic analysis*, possible multi interpretation of the same keyword

Last, there were discussions among researchers, and each finding was tested and compared. This activity is useful to ensure the quality of findings. For example, focusing the discussion to the most relevant factors, clustering factors into a proper category, avoiding misinterpretation between researchers, and maintaining the accuracy of semantic or syntactic meaning.

Furthermore, one of the main differences between the qualitative research and the quantitative research is in terms of the goal. The goal of the qualitative research is to provide *analytical generalization* instead of *statistical generalization*, which is the goal of the quantitative research (Baškarada, 2014). Hence, in the qualitative research the empirical case study results are to be compared with previously developed theory (Yin, 2009). Various interpretations by multiple respondents were taken into account and the findings were classified/clustered based on the patterns found. All of the meaningful patterns found during the coding stages were analyzed and interpreted during the analysis process.

4.3. The goodness of measures

Triangulation

Yin (2009) introduces four types of triangulation during the data collection to ensure the validity of the research: data triangulation, researcher triangulation, theory triangulation, and methods' triangulation. In this research, we apply:

1. Data triangulation. Data was collected from multiple sources for each case study, i.e., from the primary source of data via multiple interviews, and from the secondary source of data such as legal documents, reports, and guidelines.

2. Researchers' triangulation. The investigator triangulation was taking a place in the data processing, specifically in interpreting the findings and during the coding. Two researchers were involve in the data collection and analysis.
3. Triangulation of perspectives from multiple respondents
The issue to be addressed includes the convergence level of the data and various perspectives of multiple respondents (Maimbo & Pervan, 2005). The same questions might be applied to different respondents in order the get the rich perspective of information and to increase the reliability of the data.

Validity

Validity shows how well a technique measures a particular concept. Several procedures had been performed to ensure the sufficient level of validity for this research.

1. Content Validity

Sekaran & Bougie (2001) explains that one of the ways to measure the content validity of the instrument is by having the assessment or judgement by a group of researchers. In this research, the instrument, for instance the set of interview questions and the summary of the interviews, were designed and evaluated by two researchers. In addition to that, the summary of the interviews were sent back to the respondents for comments or adjustments.

2. Criterion validity

Criterion validity is the degree to which the results of a measure agree with an independent external standard (Sekaran & Bougie, 2001). In order to confirm with the criterion validity, some of the similar questions were being asked to different group of respondents, and we expected different focus of answers from each group. For example, we asked two different groups of respondents (i.e., managerial level and technical level) about the impact of the shift of function in banking supervision authority from Indonesia Central Bank to Indonesia Financial Service of Authority. The managerial level pointed the impact in terms of the business reporting procedures, while the technical level personnel highlighted the issue on the changes of number and types of reports to be submitted. In addition to that, we also asked the same questions from two different perspectives, i.e., from the perspective of requesting party and from the perspective of reporting party. As a result, we obtained various insights (e.q, from different types of respondents, managerial vs technical, and regulator vs reporting entities) for the same question.

3. Construct validity

Construct validity is used to confirm whether the results of the measurement fit the theories used to design the test (Sekaran & Bougie, 2001). The convergent validity will show that different measurements measuring the same concept are highly correlated, while discriminant validity will show that different uncorrelated measurements will have negative correlation. However, this case study does not aims to measure the relationship and correlation between measurements.

Reliability

Reliability shows the stability and consistency of the measurements across time and instruments (Sekaran & Bougie, 2001). One of the strategies to improve the level of the stability is by conducting double-layer translation during the data analysis. The interview questions to be sent to the Indonesian respondents

were translated from English to Indonesian Language. As a result, we received the answers of the question in Bahasa Indonesia. After that, we translated the answers to English and use the script of the interview (in English) and summary of the interview (in English) for the coding process. In the middle of the coding and analysis, sometimes there was a need to translate back the script and summary to Bahasa Indonesia in order to check whether there was a change in the meaning because of the translation process. Occasionally, we encountered this issue (the difference of meaning after the translation), and we need to confirm it back to the respondents. This activity consumed significant amount of time and effort. However, we were sure that this double-layer translation process improve the reliability of this research.

4.4. Develop and propose a framework

The results of the case study for the Netherlands and Indonesia are presented in chapter 5 and chapter 6 respectively. Based on the empirical findings from chapter 5 and 6, the analytical part of the research is elaborated in chapter 7. The main deliverable of this research is a framework of factors that influence the process of XBRL adoption and implementation in a nation-wide level. We developed two main components of the framework based on the results of the case studies, (1) *the general stages* of XBRL adoption and implementation, and (2) *the list of factors* that influence each stage of adoption and implementation. The phases of XBRL adoption and implementation process are presented, along with the rational in clustering the phases into general stages of adoption and implementation.

Furthermore, the list of factors that influence each stage of XBRL adoption and implementation are mapped into correspondent stages. The logical thinking based on the case study results were applied in the mapping process. Finally, the visual representation of the developed framework is presented. It visually shows the relationship between *the general stages* of XBRL implementation with *the factors* that influence each stage. This framework is accompanied by the tables that explain two fundamental aspects of the framework: (1) *the what*, i.e., the factors that influence each stage of XBRL implementation, and (2) *the how*, i.e., how each factor contribute to each stage of XBRL adoption and implementation process. In the analytical part of this report, we will explain how the developed framework contribute to the academic research of XBRL study and to the practical application of XBRL implementation.

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CHAPTER 5: THE NETHERLANDS CASE STUDY

The purpose of this chapter is to answer sub question 4, the factors influencing XBRL implementation in the case study in the Netherlands, by analysing the implementation of the Netherlands' Standard Business Reporting (SBR). The output of this chapter comprises the main characteristics of the system, stakeholders' analysis, implementation stages, and the matrix shows the relationship between the implementation stages and the factors that influence each stage.

This chapter plays significant contribution as the empirical part of this research. The results from the empirical part will be used as the input to the analytical part of this research to answer the main research question: *How to analyse the factors that influence the implementation process of an XBRL reporting system on a nation-wide level.* The remaining of this chapter is as follows:

- Section 5.1 describes the general idea of the Netherlands' SBR.
- Section 5.2 presents the case study analysis that comprises the stakeholders' analysis (sub section 5.2.1), the main characteristic of the Netherlands SBR (sub section 5.2.2), the implementation stages and the timelines of the key events (sub section 5.2.3).
- Section 5.3 elaborates the factors influencing implementation of the Netherlands SBR.
- Section 5.4 concludes this chapter with the matrix that shows the relationship between the stages of implementations and the factors influencing respective stages.

The following table (Table 10) presents the list of respondents interviewed in the case study.

Table 10: List of respondents for the Netherlands SBR

Interviewee	Organization	Position	Time of interview
1	Logius ³	Advisor of SBR International	14 June 2016
2	Thauris ⁴	SBR consultant	15 April 2016
3	Tax and Custom Administrations	Data Auditor	16 June 2016
4	Tax and Custom Administrations	Leader of SBR project in Tax and Custom Administration	21 June 2016

In addition to the above respondents, we use the information from the journals and literature, and from a book titled 'Challenging the chain' (Bharosa, Wijk, Winne, & Janssen, 2015), which describes the journey of the Netherlands SBR.

5.1. Introduction to the Netherlands SBR

At the European Union (EU) level, there are currently 13 active XBRL jurisdictions⁵ out of 22 jurisdictions all over the world (Andone & Enachia, 2015). Andone & Enachia (2015) explained the following factors as

³ A single service center under the Ministry of Interior and Kingdom Relations, to handle SBR operational and maintenance

⁴ One of the companies hired by Logius in SBR program

⁵ XBRL Jurisdiction is non-profit organization based on countries or region, with the main role to promote XBRL to institutions/firms (XBRL International, 2011)

the driving forces of the shift from traditional reporting methods into XBRL technology in the EU: (1) the mandatory requirement to provide XBRL format reports, (2) the awareness on the cost and benefit of the implementation, (3) the degree of knowledge of XBRL language, and (4) the compatibility with different software products. XBRL Netherlands is one of 13 active jurisdictions in the EU (Andone & Enachia, 2015).

SBR is an example of XBRL implementation for financial reporting with the aim to achieve a cost reduction in financial reporting activities (OECD, 2009). The early focus of SBR in the Netherlands was the financial reporting domain (Bharosa, Hulstijn, Janssen, Wijk, & Winne, 2011; Chen, 2012; Hameleers & Kuipers, 2011). It means there are rooms for a wider area of application in the future in addition to the financial reporting area (Bharosa, Hulstijn, Janssen, Wijk, & Winne, 2011). The primary purpose of SBR is to improve efficiency by minimizing the administrative burdens of financial reports (Chen, 2012; Hameleers & Kuipers, 2011). Furthermore, this goal has been expanded by including the standardization of data, the standardization of processes, and centralization of technology in addition to the reduction of administrative workloads (Hameleers & Kuipers, 2011; Lucassen & Geijtenbeek, 2012). SBR aims to replace the paper-based filings (Lucassen & Geijtenbeek, 2012), and enables the government and businesses to have ‘unequivocal, cost-effective, secure, and adaptable method’ for information exchange (European Commission, 2007, p. 1).

5.1.1. XBRL-based projects in the Netherlands

Based on the interviews’ results, we recognized three main XBRL-based program in the Netherlands, as shown in Table 11.

Table 11: XBRL-based reporting program in the Netherlands

	XBRL program	Requesting agencies	XBRL taxonomy
1	Public private partnership SBR	Various government agencies in the Netherlands	SBR National Taxonomy or Multi Domain Taxonomy (NT)
2	SBR banks	ABN, Rabobank, and ING	The Netherlands SBR Banks’ Taxonomy (BT)
3	DNB’s XBRL project ⁶	Dutch National Bank	DNB Taxonomy by referring to EU based taxonomies ⁷

The focus of this case study is the public private partnership SBR, instead of SBR banks or DNB’s XBRL, by considering the diversity of issue that might emerge in the public private partnership SBR program due to the involvement of various government agencies and private parties. Moreover, the SBR program covers various domain of implementation and not limited to the financial and monetary sectors only.

In the year of 2015, XBRL International website posted an interview with Rob Kuipers, SBR National Director. Kuipers described SBR program as a *public-private partnership* which needs agreements with all of the involved parties in the Netherlands on how to standardize the financial and non-financial reporting (Nitchman, 2015). He explains that one of the important points is that the Netherlands deliberately chooses to nationally standardize the data definition level, the taxonomy level, and the technical process

⁶ The first implementation target for the DNB’s XBRL is 1st of October 2016 (Roelin, 2016).

⁷ Developed by the European Banking Authority and the European Insurance and Occupational Pensions Authority (Advisor, 2016)

level. Kuipers stated that this process requires experts from the government, universities, and private institutions. Consequently, the public-private partnership is mandatory.

5.1.2. The technical aspects of SBR

From the technical perspective, SBR is implemented on top of XBRL technology so that the companies are able to generate an automatic government report from their system by using pre-defined formats (Eierle, Ojala, & Penttinen, 2014).

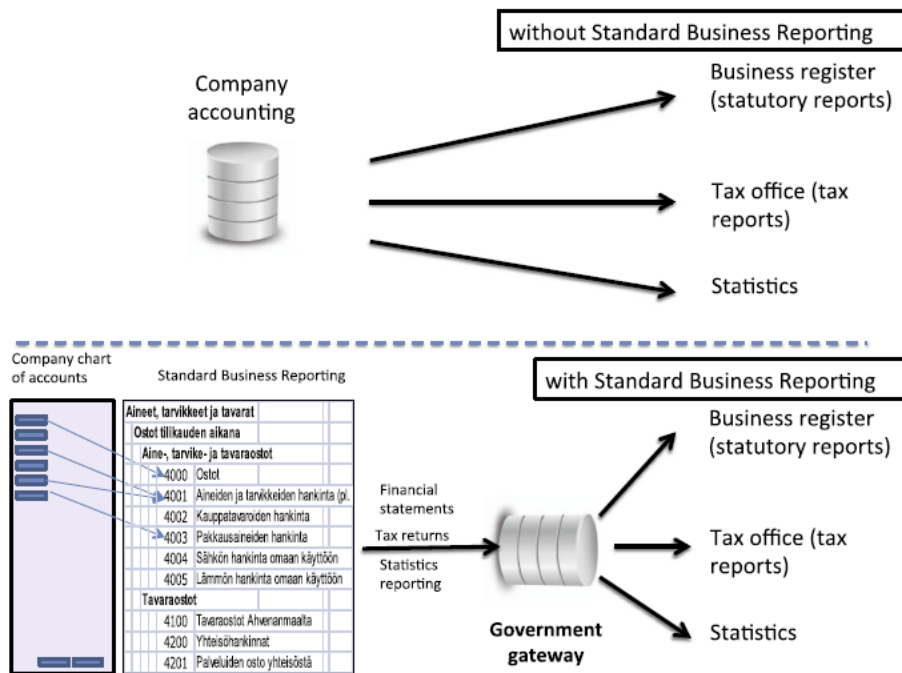


Figure 12: The concept of Standard Business Reporting (SBR) (Eierle, Ojala, & Penttinen, 2014)

Figure 12 depicts the changes in the reporting process after the implementation of SBR. By using SBR, companies do not have to re-submit forms using different formats and different interfaces to different institutions, so it reduces the risk of data redundancy, data quality, and human error (Eierle, Ojala, & Penttinen, 2014). Based on the case study interviews, we found that there is a common misperception about the technical concept of SBR, in which many people assume that SBR is the ‘once-only reporting system’, i.e., the businesses only need to send their report one time, and after that the government system will handle everything. APPENDIX C provides the explanation about the differences between *report-once concept* (the common perception about SBR) and *set-up-once concept* (what SBR is really about).

5.2. Case study analysis

5.2.1. Stakeholders Analysis

Figure 13 describes a visual representation of the relationship among the main stakeholders of SBR. It shows the interdependencies between the stakeholders. We identify four main categories of stakeholders and differentiate them using different colors:

- Public agencies, i.e., the government bodies, SBR steering committee, and candidate domains.

- Private organizations, i.e., software providers and business consultants.
- Public/private organizations, i.e., information providers which may range from the individual entrepreneurs, multi national companies, or the government institutions that also have to submit reports to the requesting agencies.
- Share service center (SSC) as the centralized service center for the government.

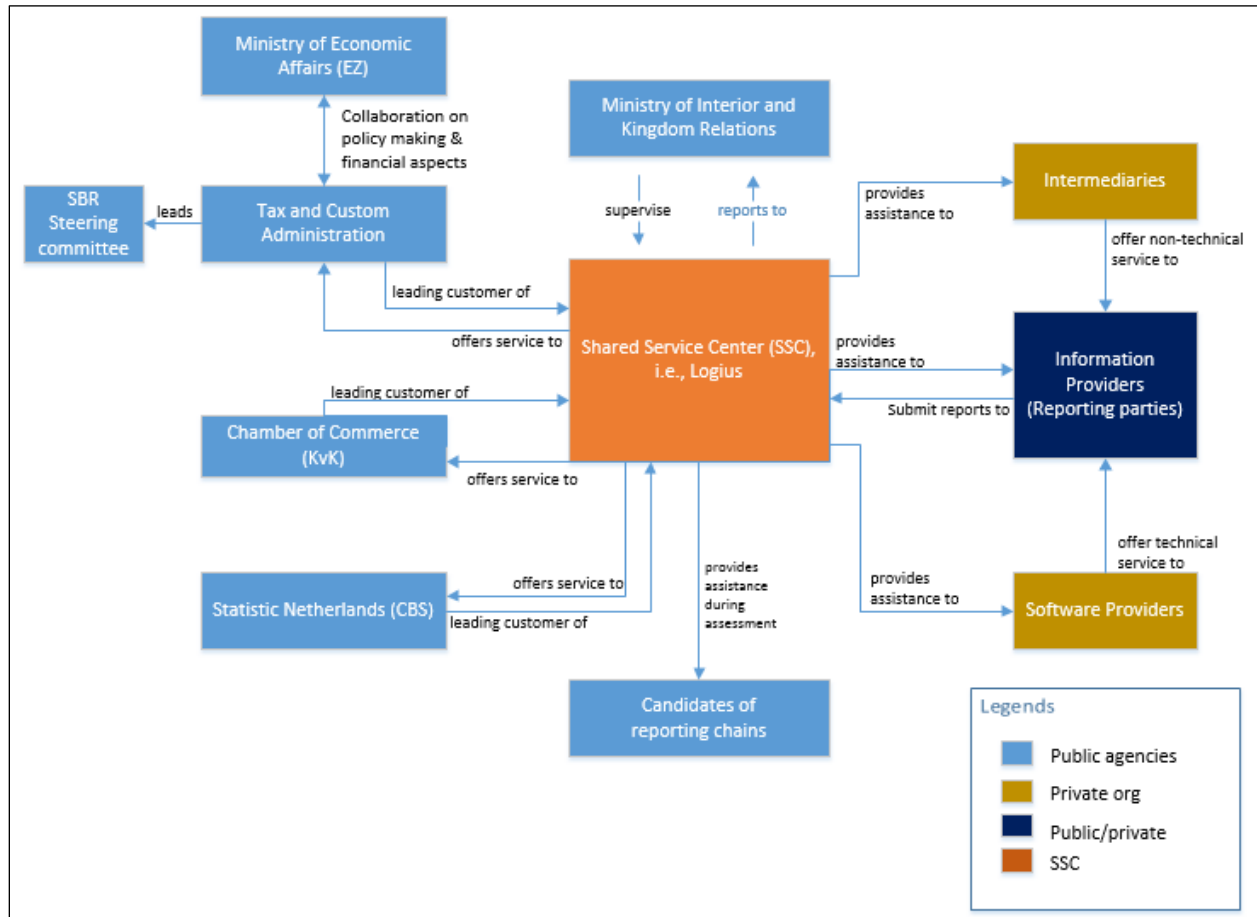


Figure 13: Relationship between SBR stakeholders

The current reporting agencies consists of Tax and Custom Administration, Chamber of Commerce, and the Statistic of Netherlands. Recently, a number of reporting domains started to join the program. Tax and custom administration, as the leading customer of SBR, plays significant roles in establishing the policies and examining the financial aspects of the program, in collaboration with the Ministry of Economic Affairs. They set several procedures in determining the cost allocation of the program. Information providers consist of public or private parties with the obligation to submit business reports to the requesting parties. They get assistance from software providers in terms of technical aspects, and from the intermediaries in terms of business aspect. The intermediaries ranging from individual experts to big companies, which offers services as financial advisers.

SSC is a government organization established under the supervision of Ministry of Interior and Kingdom Relations. It plays substantial role as a single point of mediator that connects the interests of various

stakeholders. SSC manages the standardization of reports' format and information services, and provides a centralized infrastructure. SSC offers services to the requesting agencies by developing standardized services. Nevertheless, SSC also addresses the distinctive needs of respective agencies. Moreover, SSC offers support to the candidate of reporting domains by providing guidelines to assess their specific needs. SSC also provides assistance to information providers in terms of business and technical aspect of implementation. The supports are also provided to the intermediaries and software providers to ensure that they always get the latest update of system requirements. Table 12 presents a more detail explanation of stakeholders involved in SBR. We present the list of stakeholders along with their roles, interests, and opportunities/challenges in SBR program.

Table 12: The Netherlands SBR Stakeholders

Actors	Roles	Interests	Opportunities /challenges
1. The government bodies			
- Ministry of Economic Affairs (EZ)	- Leads the initial steering committee - Responsible for program's funding	- Proper implementation of SBR in terms of business and ICT solution - The allocation of funds based on budget estimation	<u>Opportunities</u> - Enhance the collaboration process in the public and private forums of SBR - Improve the schema of budget planning and allocation
- Ministry of Interior and Kingdom relation	- Supervise Logius - Control and supervise SBR implementation	Proper implementation of SBR in terms of business and ICT solution	<u>Opportunities</u> - Design the strategic directions of SBR implementations - Enhance the relationship between stakeholders
2. Requesting Agencies			
- Tax and custom administration	- The first launching customer of SBR and the major requesting party - Chairman of the steering committee - Policy making principal - Customer of SBR - Main source of funds	- The proper management of financial sources and budget allocation - The effective and efficient coordination of steering committee - The proper Taxonomy development and system development that meet requirements	<u>Opportunities</u> - Improve the value added services to reporting parties - Design the better financial allocation - Design the strategic directions of SBR - Enhance the relationship between stakeholders - Improve the existing condition of SBR program
- The Chamber of Commerce (KvK) and The Central Statistics of the Netherlands (CBS)	- Leading customer of SBR - source of fund	The proper Taxonomy development and system development that meet technical and business requirements	<u>Opportunities</u> - Design the strategic directions of SBR implementations - Improve the existing condition of SBR program
- Other candidates	Candidates for reporting chains, such as education domain and housing domain	- The relevant information about the benefits of SBR program - The assistance during the project assessment	<u>Opportunities</u> - Join the SBR program to improve their business reports - Formulate their better information chain
3. Shared Service Center (SSC)			
- Logius	- As a Shared Service Center (SSC) under the Ministry of Interior and Kingdom relation - To be responsible for the design and the maintenance of the	- A proper coordination and collaboration with the government, requesting agencies, reporting parties,	<u>Opportunities</u> - Formulate and propose better information chain for the candidate reporting domains

Actors	Roles	Interests	Opportunities /challenges
	National Taxonomy and Generic Infrastructure. - Logius hires experts from various sectors such as IT companies, consulting services, and legal experts.	intermediaries, and software developers - A robust and reliable SBR Taxonomy and Generic infrastructure that meet the technical and business requirements	- Improve the standardization of data, standardization of information process, and infrastructure
- Logius partners	- Partners hired by Logius based on their expertise. - They offer various services to Logius, such as conducting the pilots, finding the right specifications, and developing the taxonomy.	- A proper coordination and collaboration with Logius, requesting agencies, reporting parties, intermediaries, and software developers	<u>Opportunities</u> - Propose the enhancement of taxonomy and system development from the technical and business perspectives
4. Information providers/reporting parties			
Entrepreneurs or companies that have to comply with the reporting governance.	Submit business reports based on SBR standards	- Ease of use of the system - Business and technical value added - Get the technical and business assistance from requesting agencies, intermediaries, and software providers	<u>Opportunities</u> - Improve the quality of the reports - Extend the audience of reports <u>Challenges</u> Have a high dependence to the intermediaries and software providers
5. Intermediaries			
Individual experts or companies such as KPMG, PWB, and Deloitte	- They offer the services on reports' submission, such as bookkeeping accounting, reporting services, and SBR governance. - They have the obligation to fully aware of SBR governance and the latest updates	- Get the information about the latest updates of the SBR program - Good coordination and collaboration with the reporting parties and requesting agencies	<u>Opportunities</u> Assist the information providers regarding the knowledge gap on the SBR <u>Challenges</u> Getting the up to date information concerning SBR
6. Software providers			
Software providers	- Software companies that create software and offer technical service of SBR reports - They have to make investment regarding the adjustment with SBR standards	- Get the latest updates of the SBR program - Good coordination and collaboration with the reporting parties and requesting agencies	<u>Opportunities</u> The potential creation of economic of scale for XBRL tools and solutions <u>Challenges</u> The high competition among software developers
7. Innovation champion			
Innovation champion	- A figure that speak for the innovation (SBR) - He promotes the benefits of SBR and connect the interest of various parties	- The increase of public awareness on the benefits of XBRL	<u>Opportunities</u> Delivers the information about the benefits of SBR to potential domains <u>Challenges</u> Applying effective and efficient communication strategy
8. Financial reporting partnership			
The collaboration of 3 major banks (ABN, ING, Rabobank)	- To create extended SBR taxonomy for credit reporting - ABN, ING, Rabobank use their own infrastructure and implement extended SBR taxonomy	- The assistance regarding the creation of <i>extended taxonomy</i> for the purpose of credit reporting standardization	<u>Opportunities</u> Inherit National Taxonomy for credit reporting purpose <u>Challenges</u> Applying the extended taxonomy to their own infrastructure (without joining SBR generic infrastructure)

5.2.2. Main characteristic of SBR program

The following table summarizes the characteristic of the Netherlands' SBR based on the interview results and the information from the book, challenging the chain (Bharosa, Wijk, Winne, & Janssen, 2015).

Table 13: Characteristics of SBR program

Characteristics	Explanations
Main goals	SBR is a public private partnership with the main goals to minimize administrative burdens, to improve data transparency and data quality.
Cost	The SBR council is responsible for SBR funding. The cost of implementations are covered by the program's participants (requesting agencies). Software developers have to make investment in terms of knowledge, getting the right taxonomy, make adjustment to the standardized interfaces, and provide digital certificates.
Program's governance	<ul style="list-style-type: none"> - SBR governance manages the relationship between the government, businesses, and society - SBR roadmap is the result of collaboration in <i>the public private SBR forums</i> - SBR program council meeting is chaired by SBR commissioner
Roadmap	<ul style="list-style-type: none"> - Running projects: tax, chamber of commerce, statistic, education, and housing - Candidate domains (roadmap 2020): healthcare, agriculture, subsidies, and assurance.
Infrastructure	<ul style="list-style-type: none"> - Centralized generic infrastructure (<i>Digipoort</i>) - Standardized interfaces specifications and information process infrastructures
SBR Taxonomy	<ul style="list-style-type: none"> - The Netherlands Taxonomy Architecture is the baseline of the creation of <i>sub-taxonomy</i> and <i>extended taxonomy</i> - SBR taxonomy working group periodically releases an updated version of SBR taxonomy. It consists of the group of experts and specialists in various knowledge that translate business requirements into XML/XBRL concept.
Promise champion	The innovation champion of SBR program is the SBR council's commissioner. He meets government agencies and related parties to promote SBR. He is politically independent and serves the interest of various parties. He is knowledgeable of the strategic and the technical aspects of SBR.
Legal aspects	<ul style="list-style-type: none"> - Mandatory use of SBR for tax domain starting from 2015 - Mandatory use of SBR for chamber of commerce starting from 2017
Information dissemination	Having a collaboration with the university by conducting the course of Management and Design (as part time master program) in collaboration with Delft university of technology.

5.2.3. Timelines of key events

The following figure (Figure 14) presents the timelines of the key events during the adoption and implementation of SBR. The more explanation about Figure 14 is provided in APPENDIX C – SBR page 129.

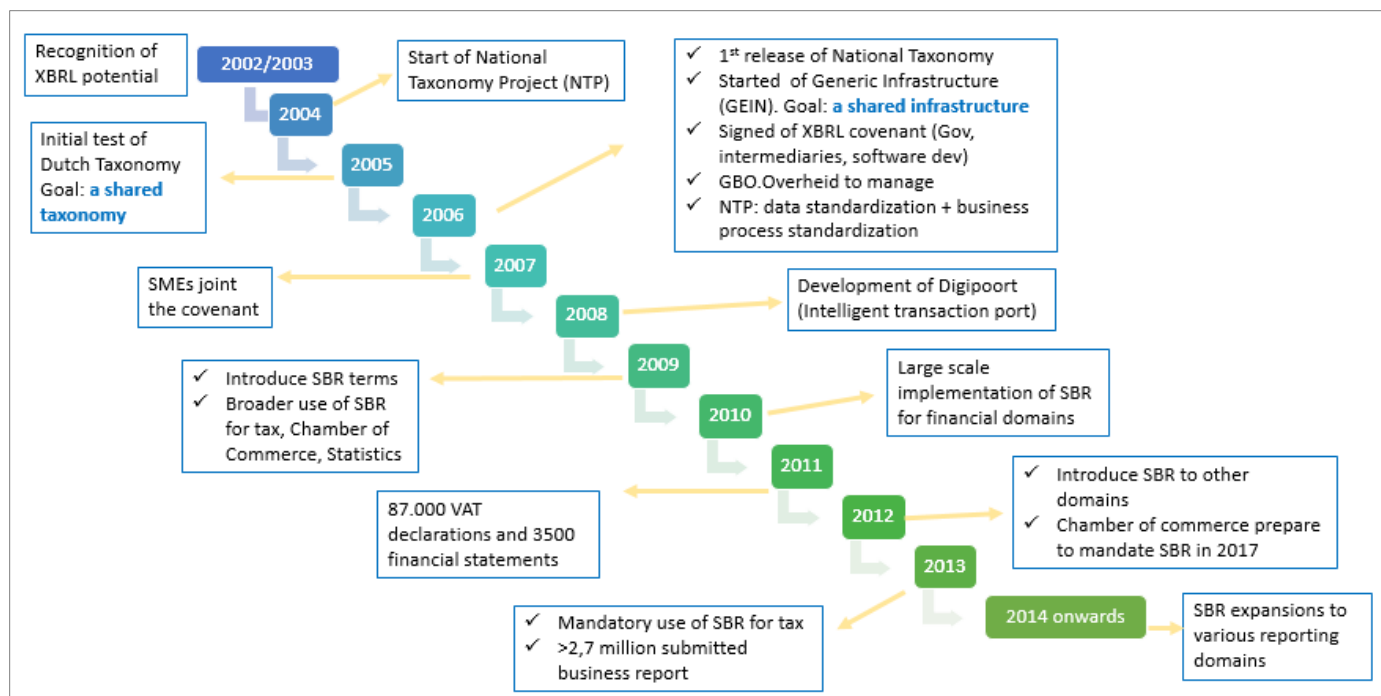


Figure 14: Timeline of key events – SBR

5.3. Factors influencing the implementation of SBR

This sub-section describes the factors that influence the implementation of the Netherlands SBR based on the interviews' results and literature. The TOE framework is applied to classify *the factors*.

A. Technological contexts

1. Flexibility of XBRL

XBRL is not only suitable for financial information, but can also be used to tag any kind of business information. As an impact of this flexibility, SBR program can be extended to other domains in addition to the initial launching domains (Tax, Annual Reports, and Statistics). The long term roadmap of the SBR program comprises numerous reporting areas, for example housing corporation, education, banking sectors, healthcare, agriculture, subsidies, and assurance.

2. The improvement of XBRL tooling

XBRL tooling encountered significant improvement in comparison to the initial condition. Nowadays, various specialized XBRL tooling are available, in contrast with the initial phase where people can only use *notepad* to develop the taxonomy. The improvement of XBRL tooling influences the speed of SBR implementation in the pilot project phase, particularly during the development of the taxonomy.

3. The stability of interfaces specifications

One of the main features of the Netherlands' SBR is stable interfaces specifications. With the stable interfaces specifications, the burden of the reporting sides and software providers is minimized. Software developers can be more focused on other technical and business issues aside from the need to make a continuous adjustment to the required interface specifications. The stable interfaces specifications are strengthened by *Digipoort*. *Digipoort* is another key element of SBR (Hameleers & Kuipers, 2011), which refers to 'a combination of generic process infrastructure and the associated services' (Bharosa, Wijk, Winne, & Janssen, 2015, p. 23). *Digipoort* responsible for, among others,

setting up the connection between parties, checking the integrity of the messages, and validating the digital signatures. Digipoort ensures the secure digital communication channel between the government and reporting parties. Stable interfaces specifications and the presence of the generic infrastructures influence the speed of SBR implementation, especially during the wide scale implementation phase and during the maintenance phase.

B. Organizational contexts

1. A shared service center (SSC), i.e., Logius

The government have a shared service center to centralize expertise and infrastructures. SSC is an outsourcing specialist service provider which functioned as a centralized standardization platform that provides services to various users (Bharosa, Wijk, Winne, & Janssen, 2015). It saves cost considering 20:80 Pareto rules of software development which implies that any software development resulted in a 4-fold maintenance efforts. The Shared Service Center (SSC), as illustrated in Figure 15, is one of the most prominent characteristics of the Netherlands' SBR. This picture depicts the position of SSC as the central mediator of the inter-organizational information exchange process. SSC handles the data and content specifications (the taxonomy), information process specifications (the automated exchange of data), and services to be accessed by reporting parties and requesting agencies. Since 2006, Logius was appointed as an SSC for the Netherland Taxonomy Project (NTP) and the generic infrastructure. It means, the Netherlands' SBR has a single organization that responsible not only for the standardization of data, but also for the standardization of processes and technology.

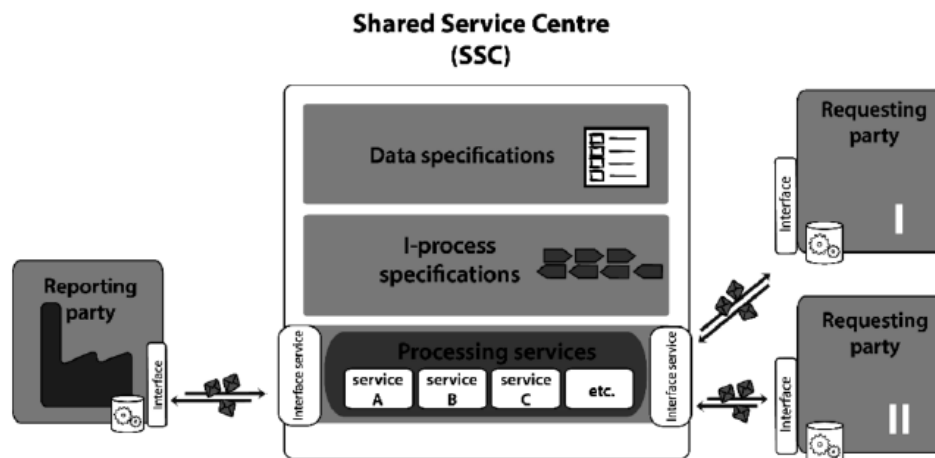


Figure 15: SBR Shared Service Centre (SSC) (Bharosa, Wijk, Winne, & Janssen, 2015)

2. Taxonomy development

The design of the taxonomy determines the formats of the reports and the standardization of the business rules. It influences the strategy to avoid the redundant of reports' submission. The Netherlands SBR has a taxonomy working group that consistently releases a new version of taxonomy based on the National Taxonomy. This working group manages the rules and procedures in *extending the taxonomy* and *creating sub taxonomy* to ensure the harmonization of the Netherlands Taxonomy (NT). All of the requests to edit or to extend the existing taxonomy should be submitted to this working group. They make decisions regarding the changes and release the latest update publicly within a

certain period of time. This working group consists of experts with the expertise on the translation of requirements into XML/XBRL concepts. Furthermore, a certain level of knowledge and experience on XBRL taxonomy are required to design a proper taxonomy structures that meet the requirement and can be extended easily for the future expansion/addition.

3. SBR governance

In order to govern the relationship between the stakeholders in the public private partnership, an SBR governance is designed to manage the collaboration and communication. The governance of SBR is depicted in Figure 16. It consists of two main blocks: *the public SBR forums* and *the public-private SBR forums*. The public SBR forums regulate the administrative authority of the public-private SBR forum, regulate the horizontal integration between the main stakeholders, and regulate the vertical integration between the main stakeholders and SSC. The public-private forums focus on the issue in SBR development regarding *network integration*, for example the strategy to create the network effects in SBR implementation, the compliance with SBR standards (e.q., National Taxonomy and SBR architecture), and the compliance with non-SBR standards (e.q., XBRL, PKI, and TCP/IP). The highest body in public SBR forums (i.e., SBR steering committee) and the highest body in public-private forums (i.e., SBR board) are lead by the Director General of the Tax and Customs Administration.

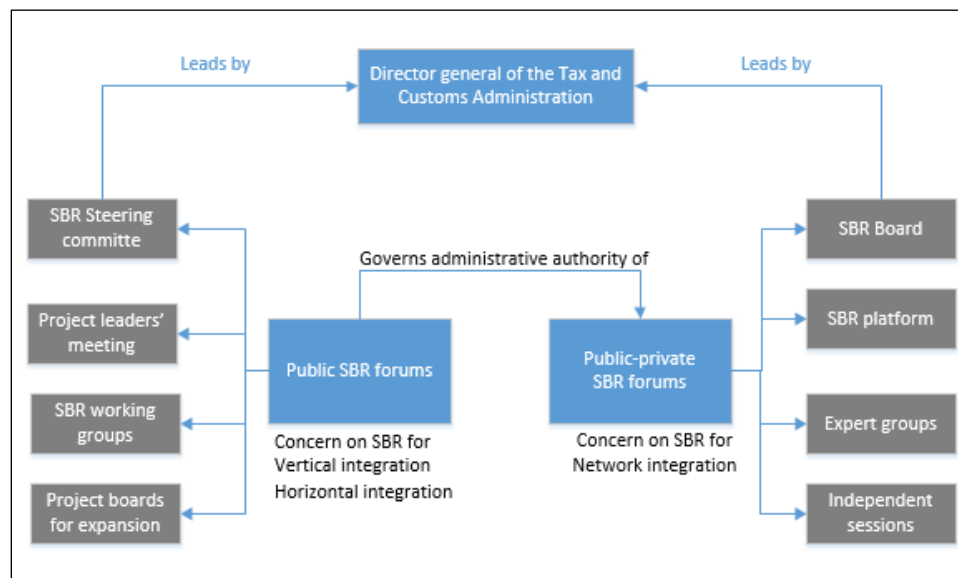


Figure 16: SBR governance, reconstructed from Bharosa, Wijk, Winne, & Janssen (2015)

4. Helpdesk assistance

Software developers have to make adjustments on their products to comply with the SBR standard. Consequently their awareness on the updates are substantial. Logius have to make sure that all of the software developers, intermediaries, and professional associations are aware of the changes. Concerning the needs for up to date information, there are *assistance days* provided by Logius for software developers and business experts, in addition to the regular helpdesk assistance.

5. Financial capability

The main cost of the implementations are covered by the program's participants (requesting agencies). A regular meeting is conducted by the committee to formulate budget estimation in yearly basis. Moreover, Information providers, with the help of software developers, have to prepare their

own cost for system adjustment and digital certificates. The financial capability of requesting agencies and information providers influence SBR program in terms of the scope of the project, the strategy of the implementation, and the future roadmap of the program.

6. Implementation strategy

The implementation strategy with a clear goal and deliverables influence project's continuity. For example, when the government mandated the use of SBR as the only way to submit the tax reports, the software companies received an assurance and got the confidence that the standard has been defined. As a result, there is no reason to postpone the investment. This certainty is substantial because the businesses have to invest for knowledge, getting the right taxonomy in their systems, and getting a digital certificate. They have to make sure that they will not lost the investment in the event of sudden changes of the policy.

7. Agenda of future development

The current scope of SBR program comprises tax, housing corporations, and education domain. With reference to the SBR roadmap 2020 in Figure 17, the future development also covers healthcare, agriculture, subsidies, and assurance (The Netherlands SBR, 2015). Figure 17 illustrates the roadmap of SBR to reap the maximum benefits of the program. It translates the goal of the Netherlands to go far beyond SBR, that is not only as a 'technical solution', but also as a completely new approach to the optimal organization of large-scale information traffic (The Netherlands SBR, 2015).

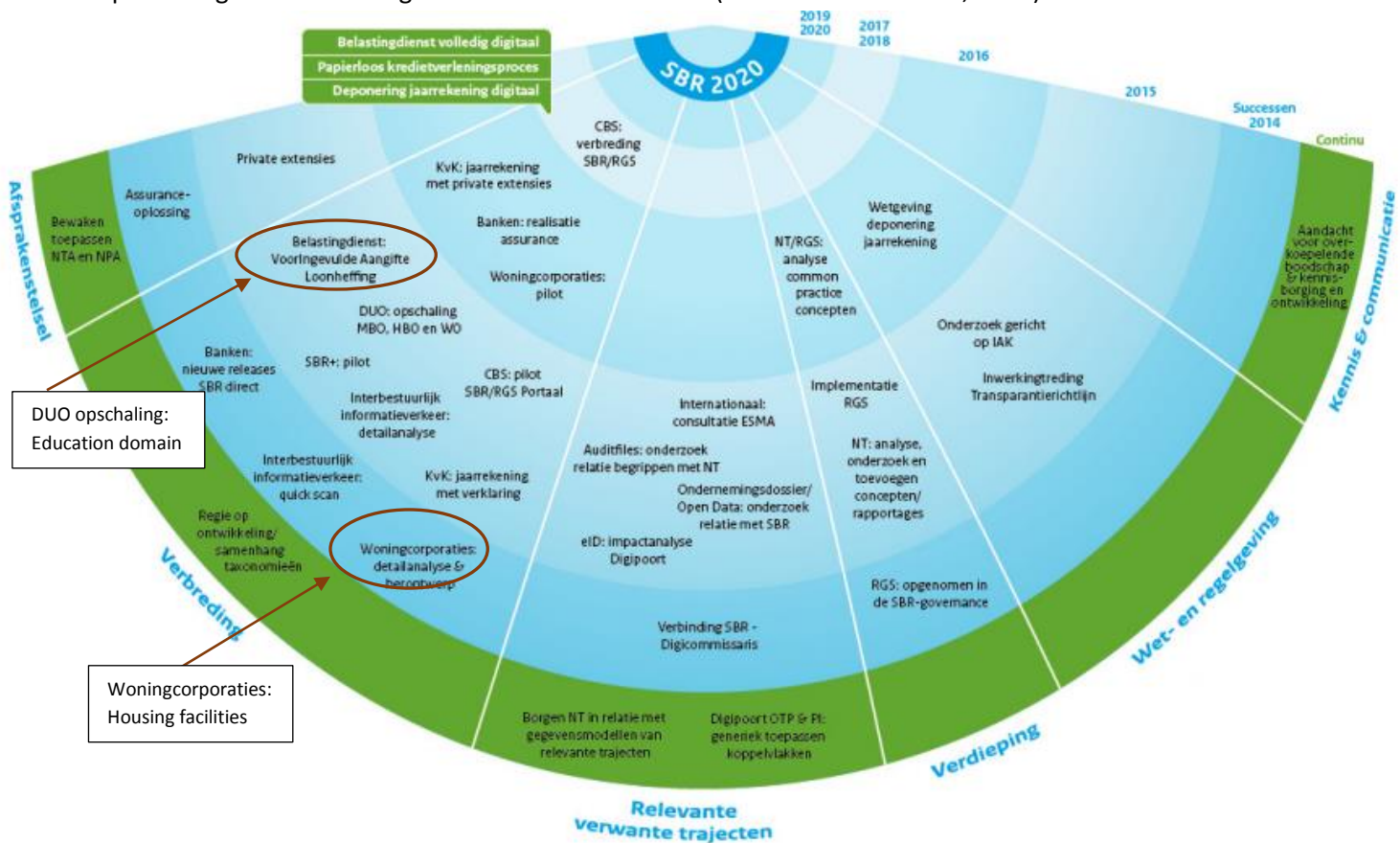


Figure 17: SBR Roadmap 2020 (The Netherlands SBR, 2015)

Two of the most recent projects are *DUO opschaling* (submission of reports in education domain) and *Woningcorporaties* (XBRL project for housing facilities). A clear agenda of future development influences the implementation process because it provides explicit guidelines and targets to be achieved in the short term as well as in the long term.

8. Organizational readiness

The regulations that mandate the use of SBR will be useless if it is not accompanied by organizational readiness and system readiness in the requesting agencies and in the reporting parties.

a. Requesting agencies

The expertise in the SBR program need to possess various knowledge, such as law, accountancy, auditing, public key infrastructure, and business process modelling. Logius requires experts with various type of knowledge to help the government agencies to define the requirements and to conduct the development process. They need the knowledge on how the information providers work together, what information do they store, when do they store it, and how to process it in a structured way. They also need to have sufficient knowledge on information security, such as what security level is needed, how to encrypt the messages, on which level do we need to encrypt it, and how to treat the high level sensitive information. The knowledge requirements not only on the technical aspect but also on the organizational part; for instance how to organize the activities, which committees are involved, and how is the economic aspect of the projects. In terms of experts' requirements, Logius outsources various kind of services to the consultants, for example EBPI as the technical experts and Thauris as the business experts.

b. Reporting parties

The reporting parties in the SBR program do not required to equip themselves with the technical knowledge on the SBR standards, because they can always hire intermediaries and software providers. However, to ensure the success of the implementation, they need to own sufficient level of awareness on SBR program before consulting their requirements.

9. Project change management

Project change management is designed to anticipate any potential changes during project implementation. Change management is required to handle, for example, the changes of legal regulation in the middle of the project. The potential changes of regulation in the EU level should also be anticipated.

10. Communication strategy

SSC has to recognize the various interests of stakeholders. Based on this knowledge, SSC has to produce a solution which delivers benefit to all parties. Moreover, SSC needs to find the proper strategy to communicate the solutions to the stakeholders. The innovation champion also plays significant role in communicating SBR to stakeholders, including the candidates of reporting domain.

11. Innovation champion

Promise champion, as defined by Lente & Rip (1998) is a political independent person who consistently promote the advantage of an innovation to potential audiences. A promise champion continuously communicate the expected benefits and the long term vision of the innovation. For the case of SBR, we consider Rob Kuipers, the SBR council's commissioner, as the promise champion. He consistently meets the government, the businesses, the intermediaries, the software developers, and the candidate domains to promote the benefits of SBR and to connect the interests of various parties.

C. Environmental contexts

1. The common idea (shared believe)

We argue that the Dutch National Taxonomy Project (NTP) in 2004 is a starting point of SBR program, with an idea to pursue a common visions, i.e., one syntax and one set of definitions for data exchange. It is followed by the subsequent project, generic infrastructure (GEIN), which focus on the development of the infrastructure. The shared believe of having a centralized taxonomy and a centralized infrastructure empowered the formulation of the goals and the strategy.

2. Regulations

a. Nation-wide regulations

The government announced the mandatory use of SBR for income tax and declaration tax starting from 1 January 2013. The mandatory enforcement speeds up the adoption process in the reporting parties' side due to several reasons. Firstly, it provides assurance on the use of SBR standard. As a result, the software developers have a confident in making system adjustment. Secondly, there is no alternative ways of submitting the reports other than SBR, hence, the use of SBR is inevitable. As a result of the mandatory enforcement, more than 2.7 million business reports had been submitted to SBR in 2013. It is a huge improvement in comparison with the 87.000 transactions in 2011 (before the legal enforcement). Nonetheless, as explained in the organizational aspect, the mandatory enforcement should also taking into consideration of the readiness of involved parties.

b. International regulation

The design of the program should prepare the adjustment with XBRL international (XII), International Financial Reporting Standards (IFRS), or international accounting standard.

3. The trust to the government

Before investing in the system, the software providers need to have a confidence on government's regulation, to ensure that they have make a proper investment decisions.

4. Availability of business consultants

Most of the reporting parties use intermediaries, for instance, KPMG, PWC, or Deloitte, to help them to submit the report. The intermediaries aid the reporting parties conducting the bookkeeping accounting. The reporting entities also rely on the intermediaries for the expertise and knowledge on SBR governance. There are approximately 12.000 tax intermediaries in the Netherlands which ranging from individual experts, small companies, and big companies. They offer services on the submission of the tax reports, the filing of end year reports, and the submission of statistic reports.

5. Software providers

Software providers develop software based on SBR standards. By the help of software providers, the reporting parties do not have to understand the technical aspects of the system. The quality of software, which depends on the competence of software developers, determines software's reliability and the reliability of data. Considering this situation, the Netherlands SBR set a certain procedure for the software companies. Having completed the adjustment on their software (based on the changes announced by Logius), the software companies have to submit their system to Logius for a review and validation. Only the software with *a certificate of approval* from Logius are allowed to join the competitive market, i.e., to attract millions of information providers in the Netherlands. Moreover, software developers play significant role not only in system development but also in

communicating the system to the end users. One of the interviewees even believe that sometimes software companies are the best party to communicate SBR regulation to the reporting parties.

6. Reluctant parties

In the initial phase of the program, the reluctance from various parties arose. This is due to the knowledge gap and the desire to keep the status quo. It is a predictable situation considering the complexity of XBRL. The people might wondering on several issues, such as the rational of choosing XBRL, the concrete deliverables of the technology, and the reasons of using digital certificates, which might not always easy to explain. However, we argue that the SBR has passed that initial struggle, and recently concentrates on the more advance issues such as the expansion of the reporting domains.

7. Cultural aspects

The culture of the Netherlands with the emphasis on the consensus in the decision making process influence SBR implementation. The formulation of decisions is based on the agreement of all the stakeholders. On the one hand, there is a guarantee that the agreed decision has been in accordance with the interests of the majority. On the other hand, it might prolong the decision making process.

5.4. Conclusions of the case study

We recognized eight stages of SBR adoption and implementation: (1) the initial phase, (2) the exploration phase, (3) the detail design phase, (4) system development, (5) the wide scale implementation, (6) the running solution, (7) the project evaluation, and (8) the future expansion. Table 14 shows the existence of factors that influence each stage based on the case study results.

Table 14: Matrix of factors vs implementation phase - SBR

Factors	1	SBR project (iterative)				6	7	8
		2	3	4	5			
A. Technological contexts								
1. Flexibility of XBRL								√
2. The improvement of XBRL tooling	-	-	-	√	√	√	-	-
3. The stable interfaces specifications	-	-	-	√	√	√	-	-
B. Organizational contexts								
1. A shared service center	√	√	√	√	√	√	√	√
2. Taxonomy development	-	-	-	√	√	√	-	-
3. SBR governance	√	√	√	√	√	√	√	√
4. Helpdesk assistance	-	-	-	√	√	√	-	-
5. Financial capability	√	√	-	-	-	√	-	√
6. Implementation strategy	-	√	√	√	√	-	-	-
7. Agenda for future development	-	√	√	√	√	-	-	√
8. Organizational readiness	√	√	√	√	√	√	√	√
9. Project change management	-	√	√	√	√	√	-	-
10. Communication strategy	√	√	√	√	√	√	√	√
11. Innovation champion	-	-	-	-	-	-	-	√
C. Environmental contexts								
1. The common idea (shared believe)	√	-	-	-	-	-	√	√
2. Regulations	√	√	√	√	√	√	√	√
3. The trust to the government	-	-	-	√	√	-	-	-
4. Availability of intermediaries (business)	-	-	-	√	√	√	-	-
5. Software providers	-	-	-	√	√	√	-	-
6. Reluctant parties	√	-	-	-	-	-	-	-
7. Cultural aspects	√	√	√	√	√	√	√	√

CHAPTER 6: INDONESIA CASE STUDY

The purpose of this chapter is to answer sub question 5, the factors influencing XBRL implementation in a case study in Indonesia, by discussing the implementation of LSMK-LBUS⁸, an XBRL-based reporting project in the Central Bank of Indonesia. Similar with the structure of the contents in chapter 5, this chapter analyses the implementation of XBRL in the Central Bank of Indonesia with the focus on the factors influencing the process of implementation.

The remainder of this chapter is structured as follows:

- Section 6.1 presents the introduction of the XBRL project in the Central Bank of Indonesia. Sub section 6.1.1 presents an overview of banking supervision authority in Indonesia, and sub-section 6.1.2 provides a brief explanation of LSMK-LBUS in terms of business and technical perspective.
- Section 6.2 elaborates the case study analysis, comprises the stakeholders' analysis (sub section 6.2.1), the main characteristics of the project (sub section 6.2.2), and the timelines of the key events (sub section 6.2.3).
- Section 6.3 presents the factors influencing the implementation of LSMK-LBUS.
- Section 6.4 concludes this chapter with the matrix that shows the relationship between the stages of implementations and the factors influencing respective stages.

Table 15 presents the list of respondents in the case study.

Table 15: List of respondents for Indonesia case study

Interviewee	Organization	Position	Time of interview
1	Indonesia Central Bank (BI)	Director of Department of Information System (IS) Management	2 May 2016
2	Indonesia Central Bank (BI)	Head of Strategy and Transformation Division, Department of IS Management	30 April 2016
3	Indonesia Central Bank (BI)	Information Architect in Information Management Strategy and Policy Division (SKMI), Department of IS Management	5 April 2016
4	Indonesia Central Bank (BI)	XBRL expert in Information Management Strategy and Policy Division (SKMI), Department of IS Management	30 March & 15 April 2016
5	Asian Development Bank (ADB)	XBRL Team Leader for Integrated Financial Reporting Project in OJK (Indonesia financial service authority)	11 May 2016
6	Bank Syariah Mandiri (BSM)	Head of Accounting Group	25 April 2016
7	Bank Syariah Mandiri (BSM)	Head of Department Reconciliation & Monitoring, Accounting group	25 April 2016
8	Bank Syariah Mandiri (BSM)	Financial Control Specialist, Accounting group	25 April 2016
9	Bank Syariah Mandiri (BSM)	Accounting System Development Specialist, Accounting group	25 April 2016
10	Bank Syariah Mandiri (BSM)	Accounting System Development Specialist, Accounting group	25 April 2016

⁸ The definition of LSMK-LBUS is provided in sub-section 6.1.2

6.1. Introduction to LSMK-LBUS, the case study in Bank Indonesia

6.1.1. Banking supervision authority in Indonesia

Before the year of 2013, Bank Indonesia (BI) - the Central Bank of Indonesia, has three main pillars of authority, namely the monetary authority, the banking supervision and regulatory authority, and the payment system authority (Bank Indonesia, 2007). Bank Indonesia has the obligation and authority to issue policies to support the execution of its duties (Bank Indonesia, 2007). In 2013, there was a structural change regarding the authority to regulate and supervise the banking system in Indonesia. Upon the enactment of “the Act No. 21 Year 2011 concerning Financial Service Authority (OJK)”, the duties of regulating and supervising the banking system in Indonesia was transferred from BI to the new regulator, i.e., Financial Service Authority (OJK), effective as of 31 December 2013 (Bank Indonesia Humas, 2013).

From 31 December 2013 onwards, OJK has the authority to regulate and supervise the individual banks (*micro prudential*⁹) in Indonesia (Bank Indonesia Humas, 2013). However, in order to maintain the financial system stability, the authority to supervise *the macro prudential* remains in Bank Indonesia, in coordination with OJK (Bank Indonesia Humas, 2013). Figure 18 shows the changes of authority in banking supervision and regulation *before* and *after* the establishment of OJK. The authority to supervise individual banks was moved from BI (blue shaded area) to OJK (red shaded area, micro prudential authority). This micro prudential authority includes the banking supervision for conventional banks and Islamic banks (Sharia banks) (Bank Indonesia, 2013).

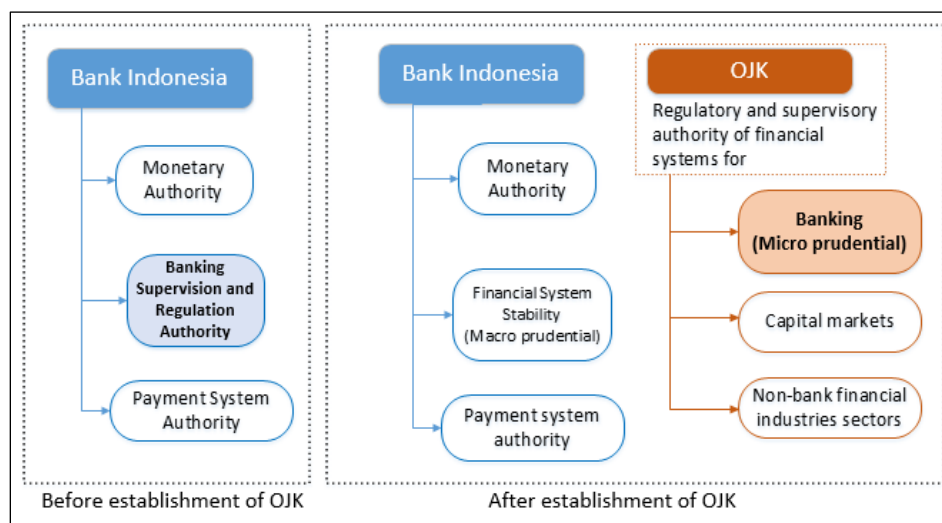


Figure 18: The transfer of function of banking supervisions and regulations

The transfer function of banking supervisions from BI to OJK not only affects the legal aspects of banking supervisions but also the authority in IT system developments and maintenances. Since 2013, a number of IT systems related to banking supervision has gradually transferred to OJK. Consequently, the future development and maintenance of these systems will be conducted by OJK.

⁹ Micro prudential policy addresses the health of individual financial institutions, while Macro prudential policy focuses on risks to the financial system as a whole at the macro level (International Monetary Funds, 2013).

The focus of this study is the development of *one of the banking reporting systems* in Bank Indonesia, which was specifically designed for the Islamic banks' reports submission. This system, LSMK-LBUS, was developed *before* the establishment of OJK and being launched in the early year of OJK. The detail discussion of LSMK-LBUS will be presented in the next sections of this chapter. We explain the story of the banking supervision authority in Indonesia to provide an overview of the changes of the government's structure in the midst of system development, which eventually affects the future roadmap of the system.

6.1.2. The technical aspect of LSMK-LBUS

In the initial assessment to build an integrated banking reporting platform in Bank Indonesia, there were 11 banking reporting systems accessed by 120 conventional banks (14.510 branches), 30 Islamic commercial banks (600 branches), 1.683 rural banks (4.122 branches), 130 Sharia business units, and 11 Islamic banks (474 branches) all over the country (Sugalih & Pahlisa, 2015). This situation created various issues in terms of, among others, the standardization of business rules, consensus on data definitions, flexibility to adopt changes in financial regulations, processing time, and the potential reports redundancy (Sugalih & Pahlisa, 2015).

In order to address the business needs for the simplification of reporting systems, the standardization of information, and the responsive IT systems, Bank Indonesia formulated the grand design for systems' integration (Bank Indonesia XART, 2015). The grand design for the integrated XBRL-based reporting platform was then proposed with several main goals, among others (Expert, 2016):

- To improve *the business aspects* of the reporting activities. Initially, every requesting department in Bank Indonesia has their own reporting formats and own helpdesk. The new design proposed standardized formats and a shared helpdesk.
- To improve *the information aspects* of the reporting activities by creating *data dictionary*¹⁰ to overcome data redundancy issues. The use of XBRL allowing the changes of contents without any enhancement in the application system (only need to adjust the taxonomy).
- To improve *the technological aspects* of the reporting activities by providing a shared infrastructure. From the perspective of the information providers (i.e., banks), the proposed system will reduce the burden in providing various types of reports to a number of different system.

With reference to the grand design of the integrated XBRL-based reporting platform in Bank Indonesia, *the first project* was initiated in 2012. They call it LSMK-LBUS, stands for financial system & monetary stability report – specific for Islamic banks and Islamic units. LSMK-LBUS accommodated the new Indonesian Islamic GAAP¹¹, new regulatory requirement, new Islamic banking products, monetary statistics, and payment system statistics (Wada, 2013). The system was launched in 2014 and accessed by 34 Sharia Banks and Sharia Business Units, and 595 offices all over Indonesia (Buchori, 2014).

¹⁰ A centralized repository about the description of data, its relationship with other data, and other relevant information

¹¹ GAAP stands for generally accepted accounting practices, an international guideline commonly accepted by companies to compile their financial reports' statements (Investopedia, n.d.)

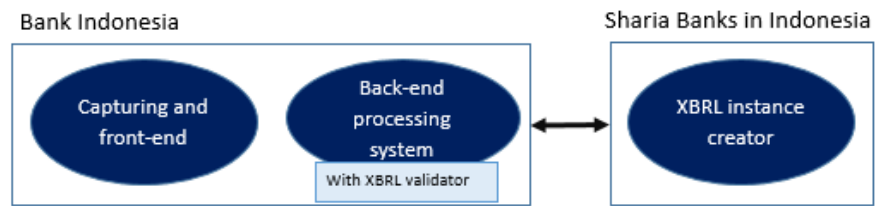


Figure 19: High level system of LSMK – LBUS

Figure 19 describes the high level technical aspect of LSMK-LBUS. It consists of two main systems: the system from regulator’s side, developed by the Central Bank of Indonesia; and the system from the reporting parties’ side, developed by Sharia/Islamic Banks in Indonesia. Legally, upon the enactment of regulation No. 15/4/PBI/2013, all of the sharia banks in Indonesia have to submit their XBRL-based reports via LBUS (Sharia Bank Monthly Reports) to the central bank started on August 2013. Referring to Bank Indonesia regulation No. 12/2/PBI/2010, should they fail to submit the proper report the penalty of maximum IDR 10 Million per branch per month will be imposed.

6.2. Case study analysis

6.2.1. Stakeholder analysis of LSMK-LBUS

There are five main stakeholders in the development of LSMK-LBUS, namely the Central Bank of Indonesia (BI), Islamic/Sharia Banks in Indonesia, the vendors of XBRL validators, software developers, and XBRL international community. Figure 20 presents a visual interactions between stakeholders of LSMK-LBUS.

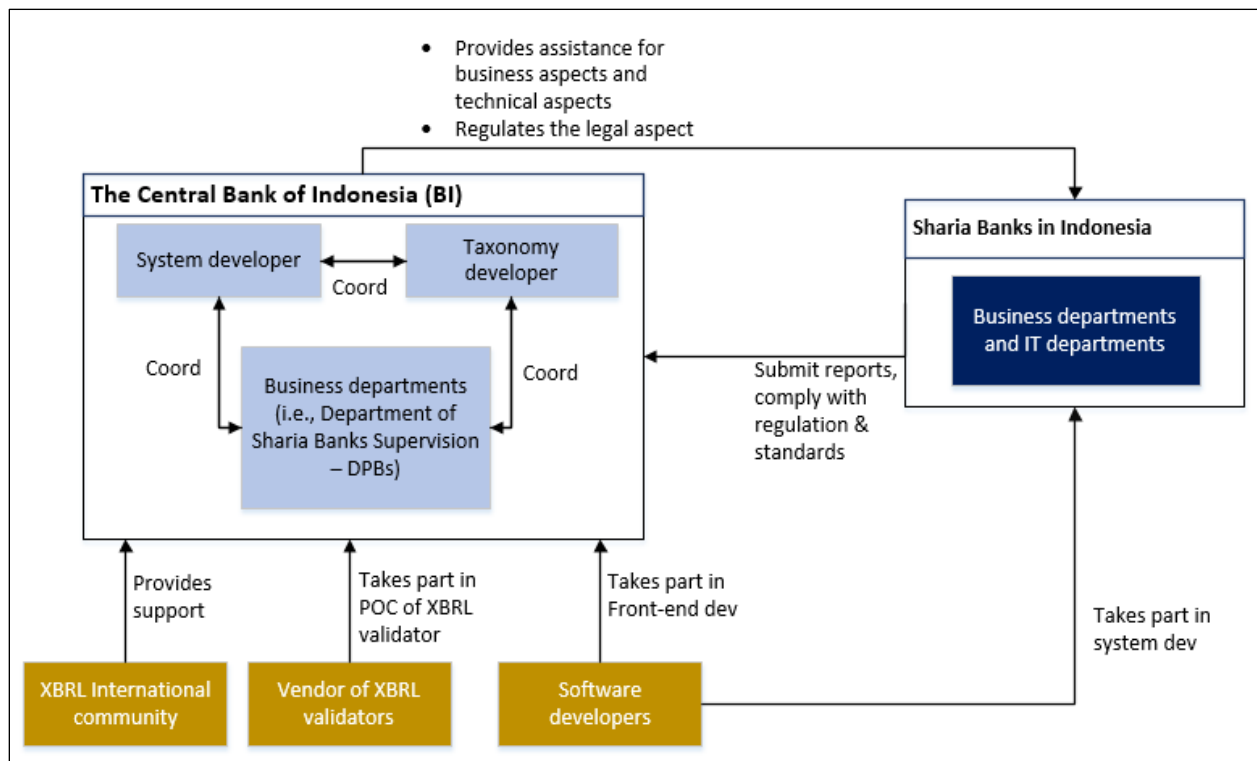


Figure 20: Stakeholders' analysis for LSMK – LBUS

Figure 20 shows the mutual interaction between BI as the regulator and Sharia banks as the information providers. BI regulates the legal aspects of reports' submission and set the standards of reports' format. BI also provides assistance for the Sharia Banks in terms of business aspects and technical aspects of LSMK-LBUS. On the other side, the Sharia Banks have to submit the reports based on the defined technical standards. They also have to comply with the legal aspects of reports' submissions. Software developers take part in the development of the supporting system in Bank Indonesia. They also have chances to take part in system development in the reporting parties' side. XBRL international community provides continuous support during the implementation process, especially during the searching for the appropriate XBRL validator (Architect, 2016).

The following table (Table 16) provides the stakeholders' analysis in terms of their roles, interests, and opportunities/challenges towards project's implementation.

Table 16: Stakeholders of LSMK-LBUS

Actors	Roles	Interests	Opportunities /challenges
1. Bank Indonesia			
Taxonomy Development team	<ul style="list-style-type: none"> - To manage the coordination and collaboration of various stakeholders during re-formulation of new business processes and new formats of reports - Develops, tests, and validates XBRL taxonomy for Sharia banking system - To find the proper XBRL validation engine 	<ul style="list-style-type: none"> - A good coordination and collaboration with various stakeholders - A reliable XBRL taxonomy that meet the requirements - A reliable system that meet the requirements - The proper User Acceptance Test (UAT) 	<u>Opportunities</u> <ul style="list-style-type: none"> - Improve the knowledge in term of XBRL taxonomy - Improve the standardization of reporting formats
System Development team	<ul style="list-style-type: none"> - To design, develop, and maintain the system that meets the requirement of XBRL processing - To find the proper XBRL validation engine 	<ul style="list-style-type: none"> - Robust and reliable front end and back end XBRL processing systems 	<u>Opportunities</u> <ul style="list-style-type: none"> - To formulate and propose better reporting procedures - Standardization of information process and infrastructure
Business departments	<ul style="list-style-type: none"> - To provide experts on various aspects of banking reporting requirements 	<ul style="list-style-type: none"> - The proper taxonomy development and system development that meet technical and business requirements - Ease of use of the system - Business and technical value added - Get technical and business assistance 	<u>Opportunities</u> <ul style="list-style-type: none"> - Improve the value added services to the reporting parties - Design the better business process for reporting activities
2. Islamic/Sharia banks in Indonesia			
Business departments	<ul style="list-style-type: none"> - To comply with the legal aspects and the reporting governance - To submit business reports based on the defined standards 	<ul style="list-style-type: none"> - Ease of use of the system - Business and technical value added - Get technical and business assistance 	<u>Opportunities</u> <ul style="list-style-type: none"> - Improve the value added services - Improve the quality of reports - Extend the audience of reports
System development team	Develop the system for data processing, validation, and creation of XBRL file. Create	Deliver the system for the preparation and the submission of XBRL instance documents	<u>Opportunities</u> <ul style="list-style-type: none"> - Improve knowledge on XBRL technology,

Actors	Roles	Interests	Opportunities /challenges
	tools for preparation and submission of reports.		statistics, taxonomy, and data structure The high competition among software developers <u>Challenge</u> - Adjustment of the system to adapt with changes
3. XBRL International community	Provides support during the development of the system and the taxonomy	The improvement in technical and business aspects of the system	Provides suggestions and recommendations
4. Vendors of XBRL validator	Take part in the POC of XBRL validator	- The improved version of XBRL validator engine - Take part in LSMK-LBUS project	Improvement of system performance to handle Large XBRL instance documents
5. Software developers	Take part in system development in Bank Indonesia and/or in Sharia Banks	The reliable IT system	Improve competencies in XBRL development

6.2.2. Main characteristics of LSMK-LBUS

The following table describes the main characteristic of LSMK-LBUS based on the interview results and the related documents.

Table 17: Main characteristics of LSMK-LBUS

Characteristics	Explanations
Main goals	LSMK-LBUS is the first XBRL-project in BI. The main goal is to improve the business and information aspect of the reporting activities and to comply with BASEL II ¹² regulations (risk-based supervision)
Cost	The cost of implementation for the XBRL processing and XBRL validators are covered by Bank Indonesia, whereas the cost of implementation for the reporting parties' side are covered by the Sharia Banks.
Project's structure	LSMK-LBUS is an XBRL-based reporting project in the Central Bank of Indonesia specifically for Sharia banks' reports.
Infrastructure	- BI provides: (1) capturing and front-end system, and (2) back-end processing system that required an XBRL validator engine for Large XBRL instance. - Sharia banks develop a system for XBRL instance documents creations.
XBRL Taxonomy	The taxonomy for LSMK-LBUS was developed by Bank Indonesia
Legal aspects	Upon the enactment of regulation No. 15/4/PBI/2013, about the financial system and monetary stability report, all of the sharia banks and sharia business units in Indonesia have to submit their XBRL-based reports via LSMK-LBUS
Political aspects	Since 31 December 2013 all of the banking supervision departments moved from BI to OJK. Consequently, the future roadmap of LSMK-LBUS will be developed in OJK instead of in Bank Indonesia. Due to their duty as the regulators, both of the institutions (OJK and BI) need the information from LSMK-LBUS. OJK needs the information from LSMK-LBUS to conduct the task in micro prudential supervision, and BI need the same information to conduct the role of BI in macro prudential supervision. As the result, we argue that the future roadmap of LSMK-LBUS will need the coordination and collaboration between BI and OJK.

¹² Basel II is an international business standards that mandate financial institutions to take into consideration of risk-based supervision by maintaining a certain cash reserve to handle risks (BIS, n.d.)

6.2.3. Implementation stages and timelines of key events

The timelines of the key events during the implementation of LSMK-LBUS is presented in Figure 21. More explanation is provided in APPENDIX D – LSMK - LBUS.

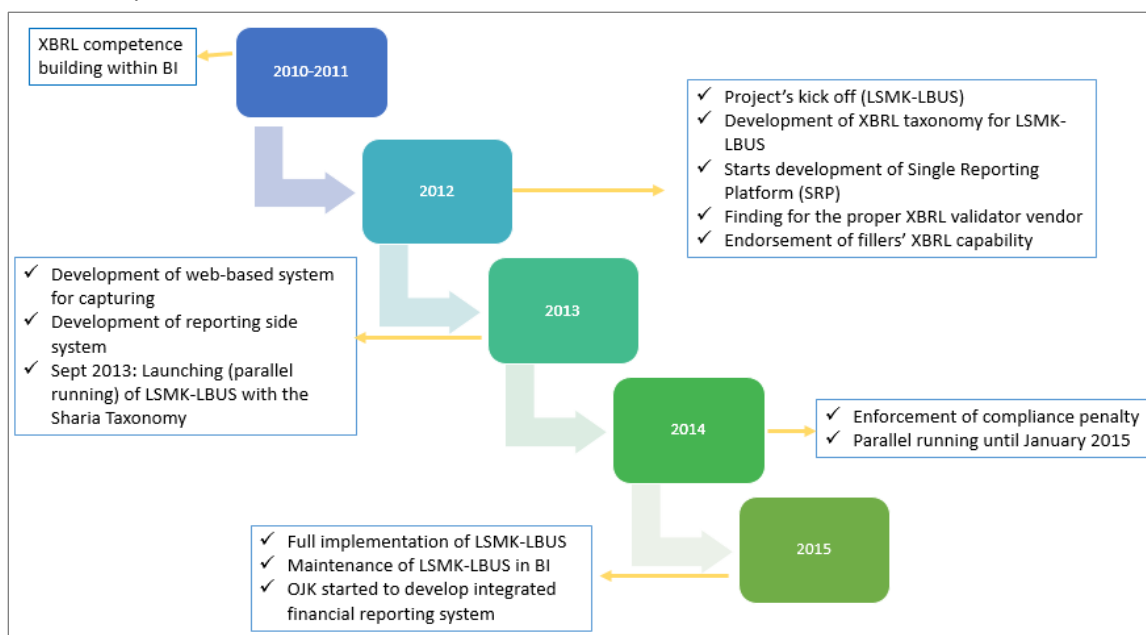


Figure 21: Timeline of key events LSMK-LBUS

6.3. Factors influencing the implementation of XBRL-based reporting platform project in Bank Indonesia

This sub-section describes the factors influencing the implementation of XBRL in Bank Indonesia based on the interviews' results and related references. The TOE framework is applied to classify *the factors*.

A. Technological contexts

1. Data processing system for large XBRL instance documents

One of the challenges during the implementation of LSMK-LBUS was to find an XML processor to process large XBRL instance documents. The intended system required a processor with the ability to process a huge amount (around 34.000 instances) and large sizes (about 1 GB per instance) of XML instances, by using XSLT (Extensible Stylesheet Language) in a high speed and scalable way. The head of strategy and transformation division in IS department in Bank Indonesia (2016) explained that BI has implemented the fastest XML processor, however it cannot concurrently process more than 1 instance in one server despite the optimal use of the processor in that server. In addition to that, there was also a challenge regarding the absence of the XBRL specification that able to meet the requirements. For example, BI needed XBRL specification for the *inter-form validation*, which was not available at that time (Sugalih & Pahlisa, 2015). However, the team confirmed that they have formulated the solutions to achieve the possible optimum performance by utilizing the available options. The back-end system was developed in-house in Bank Indonesia by using the available software in the market, while the front-end system was developed in collaboration with software developers.

2. XBRL validator for large XBRL instance documents

The need to deal with large XBRL instances was considered as an emerging topic in XBRL International conference in 2012 which required urgent attention (Koizumi & Saito, 2013). In addition to the necessity for a proper XBRL processing system, the project also required a proper XBRL validator for large instance documents. The purpose of the validation process are, among others, to validate the XML structure, to validate the XBRL structure, to check the consistency of document with taxonomy and calculation formula, and to check the compliance to business rules. It implies the substantial role of XBRL validator in the whole process. Bank Indonesia had conducted several rounds of POC sessions in order to find the candidates for the proper XBRL validator and invited 16 international vendors. The final result in the 6th cycle resulted in 4 vendors that were able to validate 14 GB instance documents in one hour (Sugalih & Pahlisa, 2015).

3. XBRL validator response time

We conducted an interview with Bank Syariah Mandiri (BSM), the leading Islamic bank that manages to develop an in-house system for the creation of XBRL-based reports. BSM developed a system for data processing, data validation, and creation of XBRL files. The development of the system by BSM is shown in the left part of Figure 22. After the creation of XBRL instance documents, the files are then submitted to the reporting gate Bank Indonesia, and BSM received the feedbacks of the validation. From the perspective of BSM, one of the technical issues during implementation of LSMK-LBUS is the slow process of XBRL validation. Koizumi & Saito (2013) stated that Bank Indonesia is one of the first institutions in the world that implement the large XBRL instance processing, and the main predicted issue was the processing time during XBRL documents validation. The execution of large XBRL instances with the multiple records in one instance leads to lower performance of system, due to the long *turnaround time* (TAT) of validation and the required time to process the instance load (Koizumi & Saito, 2013). The improvement of technology in the future is expected to be able to provide the more advanced solution for XBRL validator with the ability to validate files in shorter time.

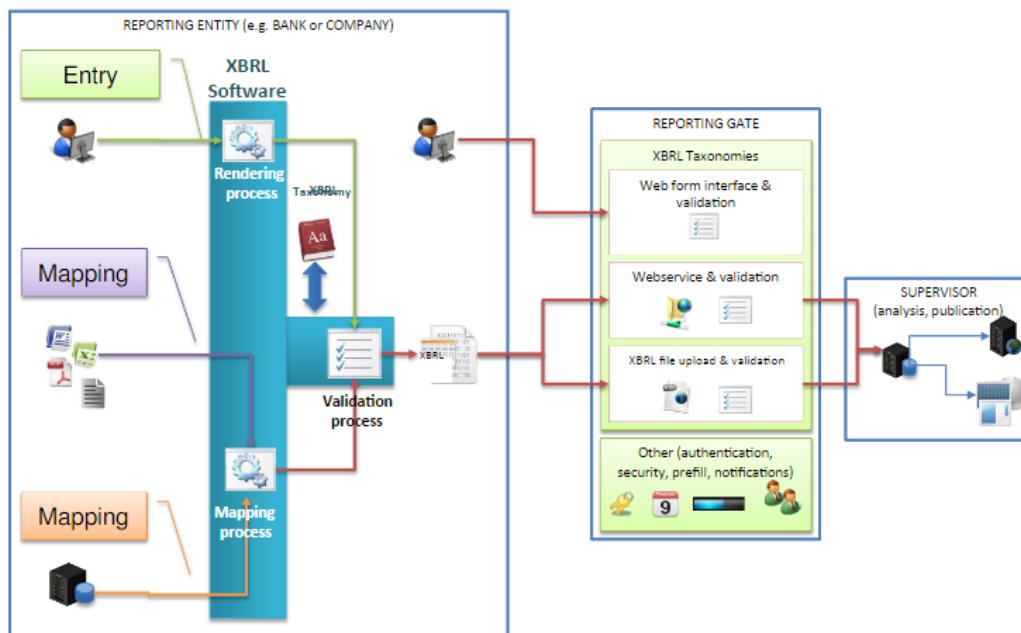


Figure 22: XBRL reporting mechanism (Bank Indonesia, 2012)

4. The availability of supporting software

The Accounting group of BSM developed in-house system for data processing, validation, and creation of XBRL file. BSM perceived some technical challenges during the implementation, such as the unavailability of a processing system in the market, the non-optimal XML indexing in SQL server 2008, and the lack of supporting applications in the market. As a result, they needed to put more effort in delivering the required system. BSM applied various strategies to handle the challenges, for example by changing the validation mechanism from XBRL validation to data validation, having a collaboration with experts from BI and OJK, formed a dedicated team to handle the development of the system, and established a dedicated team to handle the data cleansing.

5. The mapping of the technological gap

One of the concerns of the management on the implementation of XBRL was the conformation of the system with the business requirements. Therefore, in order to convince that the system being designed was in accordance with the requirements, the detail and unambiguous explanation of the expected features of the intended system must be presented. Furthermore, the matrix of mapping between *the expected features* versus *the available technology* must also be provided in order to provide the information about *the technological gap* (the gap between a desired condition and the existing technology). The technological gap is required in designing the strategy of the implementation.

B. Organizational contexts

1. Taxonomy development

In terms of taxonomy development, several factors are considered to be important.

a. Consistency and commitment

The development of XBRL taxonomy required continuous discussions and agreement between related stakeholders in order to be able to issue the common definition of particular terms. Consequently, a high commitment from stakeholders are mandatory.

b. Number of experts and sufficient level of experience

One of the challenges in the initial stage of taxonomy development was the limited number of XBRL experts in the organization. Sufficient number of experts with a certain level of expertise are required in designing a proper XBRL taxonomy. They need to have the ability to convert the business requirements into XML/XBRL terms, and to design the taxonomy which is flexible for future update and expansion.

c. Proper user acceptance test (UAT) strategy

Taxonomy developers not only handle the development of the taxonomy but also the strategy to conduct user acceptance test (UAT) without burdening the users with XML terminology. An XBRL expert in BI (2016) confirmed that they needed to find a proper design of UAT which could be easily understood by the people without XML background of knowledge. The design of UAT scenario affects the length of testing time and eventually influenced the whole timeline of implementation.

2. Helpdesk support

In accordance with the milestones of XBRL project in Bank Indonesia, BI conducted the endorsement of banks' capability in XBRL field. The purpose of this endorsement was to gather the support from

the users and to improve awareness in joining the project. In addition to that, BI also provided assistance for banks during the implementation of the reporting parties' system. It was confirmed by BSM respondents which explained various assistance from BI and OJK in terms of training and supervision. Among these were the regular training and coaching clinic, the discussions about various issues of implementation, intensive on-site supervisions, experts' supports during the system launching, and helpdesk support during the reporting period.

3. Implementation strategy

A number of discussions were conducted to formulate the proper strategy of implementation. For example, whether the project will be started as small pilot or big bang solution, and what are the alternative strategies. Several respondents argued that the clear and detail implementation strategy affects the certainty of project's phases which eventually influence the roadmap of implementation. The following are some strategies applied by BI during the implementation: (1) finding XBRL validator that able to perform a high speed validation process, (2) defining a proper XBRL conversion mechanism that able to convert XBRL instance to text file within an acceptable time frame, and (3) designing an adaptive application system which can adopt changes without continuous adjustment (Division, 2016). Moreover, Koizumi & Saito (2013) suggested the importance of collaboration with software providers since the initial stage of the Large XBRL Instance performance test.

4. Implementation goal

It is not enough just to have the common vision without the same level of agreement regarding the realization of the vision. For example, despite the agreement on the common goal of the project (for example the integration of reporting platform), if the stakeholders perceived that the focus of the integration was only at the technical level, it would be assumed as merely an IT project instead of the project that need high commitment from the all of the stakeholders.

5. Management support

XBRL project does not merely about coding, the main focus is about the framework and the integration issue. It is very important to get the support and commitment from various parties. The execution of the project requires high commitment from business people from various departments, hence a guidance from board of directors is substantial.

6. Organizational readiness

a. Bank Indonesia

- Bank Indonesia has prepared a required IT infrastructure for LSMK-LBUS, for example the hardware with the ability to process 40 GB of data in 1 hour. The availability of the facility for testing and training in Bank Indonesia was also considered as one of the factors supporting the readiness of BI to conduct XBRL project.
- In terms of human competence, the respondents from BI confident on the technical competence of the team regarding XBRL knowledge and the ability to propose proper specifications for the purpose of analysis.
- The head of the strategy and transformation division in BI (2016) argue that the inexistence of a dedicated team to handle the development of application architecture in Bank Indonesia has become one of major bottlenecks in the implementation process. As a result, the developer team conducted the trial and error process in parallel with the development process. Consequently, the implementation process takes longer time. Therefore, in accordance with

the input from McKinsey, a worldwide management consulting, IS department is recommended to have distinctive teams for the following functions: Information Architecture (IA), Enterprise Architecture (EA), Application Architecture (AA), Business Architecture (BA), and Technology Architecture (TA). The development of XBRL Taxonomy will be one of the main products of IA, while the design guideline for the development of an application will be the product of AA.

b. Bank Syariah Mandiri

The level of knowledge of experts in BSM played important role in the implementation process due to the in-house development of the system in BSM. As confirmed by respondents from BSM, IT groups in BSM provided full support to the Accounting Group of BSM during the development. In addition to that, the development process was also conducted under the supervision of Bank Indonesia. Therefore, the development process was expected to be faster and more efficient.

7. Communication and collaboration strategy

a. Communication strategy

Information system department in Bank Indonesia needed support from business partners in various stages of implementation, hence the good collaboration is mandatory. Moreover, the users need to get clear information about the system to be implemented, the role of the reporting entities and regulators, project's schedule, and implementation targets. Therefore, BI must design an appropriate communication strategy to make sure that all of the interests of the involved parties were addressed properly.

b. Coordination and collaboration

BI communicated with other international institutions that also apply the same standard to learn the success story and the failures. Moreover, BI discussed XBRL project with a number of institutions in Indonesia, such as IAI (Indonesian Accountant Organization), Bapepam LK (Capital Market Supervisory Agency), IDX (Indonesia Stock Exchange), Directorate General of Taxation, and SKK Migas (Indonesia's upstream oil & gas regulator). The regular meetings with other regulators were conducted to discuss the possible implementation of XBRL at the nation-wide level. BI also conducted the regular meetings with banks as part of the task in system's supervision. Respondents from BSM confirmed that BI and OJK perform public discussions and private sessions with banks to communicate problems, changes, or updates.

C. Environmental contexts

1. Shared visions

Based on interviews' results, we concluded several aspects of *the shared visions* need to be taken into consideration to achieve the success of XBRL implementation in Bank Indonesia:

- a. BI needs to formulate a clear objective and shared vision, and the objectives must be agreed by all of the involved departments in Bank Indonesia.
- b. The users need to get clear information about the system to be implemented, the role of the reporting entities, the role of regulators, schedule of the project, and implementation targets.
- c. The shared visions have to be communicated with other regulators. This is also as the path to build the nation-wide taxonomy.

d. The high commitment from all of the involved departments during system development and taxonomy development.

2. Regulations

Several regulations influence the implementation of LSMK-LBUS:

a. The initial trigger of LSMK is the mandate to implement a new regulation on information management in Bank Indonesia, especially about the data quality. The initial idea for data dictionary comprises all of the information in Bank Indonesia (not only banks' reports), and all of the format of the reports (not only XBRL). However, the first project to be implemented is LSMK by using XBRL format.

b. The Department of Sharia Banks' Supervision in Bank Indonesia recognized the needs for system's development in order to make adjustment with BASEL II standards, an international standard on risk-based supervision for financial institutions.

c. The changes in the government structure in the midst of project's implementation influences the future roadmap of the project. For the case of LSMK-LBUS, the shift of banking supervision from BI to OJK at the end of 2013 (during the implementation of LSMK-LBUS) affects the continuation of the project in terms of future enhancement as well as system's maintenance.

3. The competence of reporting parties and software providers

The implementation of XBRL in a country requires at least three main parties, namely the regulators, the reporting parties, and XBRL vendors. Based on the interview with the information architect from BI (2016), we conclude that BI, as the first regulator to implement XBRL-based reporting system in the country, needs to recognize the competence of the reporting parties and the software providers since the initial stage of XBRL adoption. Initially, the competence of the reporting parties and the software providers in Indonesia regarding XBRL were minimal. Consequently, BI strengthen their internal competence in term of XBRL expertise and share the knowledge to the stakeholders.

4. Success stories of other industries

One of the challenges of project's implementation is the lack of experts in Indonesia. Moreover, there was no prior industry that uses XBRL in Indonesia, hence the chance to get the lessons from other organizations was minimal.

5. Support from XBRL international community

Guidance from XBRL international was required, especially in terms of moral supports and the technical supports. The searching for proper XBRL validator of LSMK-LBUS involved the participation of XBRL international community (including experts and vendors).

6.4. Conclusions of the case study

Table 18 presents the mapping of LSMK-LBUS implementation stages (head of the column) with the factors influence the process of implementation on each stage (first column) based on the case study results. We identify eight stages of implementation, as also presented in XBRL Asia Roundtable (XART) 2015 (Bank Indonesia XART, 2015). The eight stages are as follows: (1) Internal XBRL competency building, (2) Project's kick off, (3) Taxonomy development, (4) Endorsement of banks' XBRL capability, (5) System development, (6) System's launching, (7) Enforcement of compliance penalty, and (8) Full implementation of LSMK-LBUS.

The stages could be overlapping during times. It means, at the same period of time there might be one or more stages being conducted. For example, during the development of the taxonomy (stage 3), the endorsement of banks' XBRL capability (stage 4) might also be started. The reason is because feedbacks during the endorsement stage (including the awareness program, coaching clinic, and the testing of report submission) might be beneficial for the taxonomy development process. Table 18 shows the relationship between the factors that influence the process of LSMK-LBUS adoption and implementation based on the case study results.

Table 18: Matrix of factors vs implementation phase LSMK-LBUS

Factors		Phase 1	Phase 2	Phase 3	Phase 4	Phase 5	Phase 6	Phase 7	Phase 8
A.	Technological contexts								
1.	Data processing system for large XBRL instance documents	-	-	-	-	√	√	-	√
2.	XBRL validator for large XBRL instance documents	-	-	-	-	√	√	-	√
3.	XBRL validator response time	-	-	-	-	√	√	-	√
4.	The availability of supporting software	-	-	-	-	√	√	-	√
5.	The mapping of the technological gap	√	√	√	√	√	-	-	-
B.	Organizational contexts								
1.	Taxonomy development process	-	-	√	-	√	√	-	√
2.	Helpdesk support	-	-	-	-	√	√	-	√
3.	Implementation strategy	√	√	√	√	√	√	-	√
4.	Implementation goal	√	√	√	√	√	-	-	-
5.	Management support	√	√	√	√	√	√	√	√
6.	Organizational readiness	√	√	√	√	√	√	√	√
7.	Communication & collaboration	-	√	√	√	√	√	√	√
C.	Environmental contexts								
1.	Shared visions	-	√	-	√	√	√	√	√
2.	Regulations	√	√	√	√	√	√	√	√
3.	The competence of reporting parties and software providers	√	√	-	√	√	√	-	√
4.	Success story of other industries	√	-	-	√	√	-	-	-
5.	Support of XBRL international community	-	-	-	-	√	-	-	-

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CHAPTER 7: DEVELOP A FRAMEWORK OF FACTORS THAT INFLUENCE THE PROCESS OF XBRL ADOPTION AND IMPLEMENTATION

The goal of this chapter is to present the main deliverable of this research: (1) a list of factors that influence the process of XBRL adoption and implementation, and (2) a framework that describes the relationship between the factors and the stages of implementation. The developed framework can be used as a tool to assist the future academic research on XBRL implementation (scientific relevance of the research); it also can be used by XBRL practitioners in the implementation of XBRL in particular situations (practical relevance of the research). The stepwise explanation to produce the framework will be presented as the answer to the main research question of this thesis: “How to analyze the factors that influence the implementation process of an XBRL reporting system on a nation-wide level?”

The structure of this chapter is as follows: section 7.1 presents the comparison of factors influencing EDI and XBRL (as the extension of XML); section 7.2 discusses the final conclusions of the case study, i.e., the factors that influence the process of XBRL adoption and the implementation; section 7.3 provides the context-dependent dimensions of the factors; section 7.4 identifies the general stages of XBRL implementation; and section 7.5 presents the developed framework.

7.1. The evolution of factors influencing EDI, XML, and XBRL

Before presenting the results of the case study, we need to recall the evolution of XBRL from EDI, which mainly identified by the improvement in the features of the technology. The acknowledgement in the evolution of the features of the technology leads to the recognition of the differences in the factors that influence the application of the respective technologies. We have provided a brief comparison of EDI, XML, and XBRL in Table 4 of chapter 2. XML is considered as an evolution of the traditional and restricted format of EDI-based message exchange; whereas XBRL is an extension of XML that addresses the reports’ standardization mechanism, metadata and taxonomy, the formulation of business’ rules, and the reports’ validation, as presented in Figure 10.

One of the ultimate differences between EDI and XBRL is concerning the typology of IOS. There are various approaches in defining the classification of IOSs typology. This research refers to the study by Choudhury (1997) which formulated the type of IOSs based on the relationship between the choice of IOSs and the type of message exchange relationship. Choudhury (1997) presented three types of IOS’ typology, namely electronic dyads, multilateral IOSs, and electronic monopolies (Choudhury, 1997). In *the electronic dyads* there is a single one-to-one relationship between two parties that involved in the message exchange processes; *the multilateral IOS* enables the many-to-many relationship of communication between the parties requesting the information with the parties providing the information; *the electronic monopolies* defines an exclusive relationship between two involving parties after considering the available options (Choudhury, 1997).

Based on Choudhury (1997), the traditional EDI-based is considered as *an electronic dyads* due to the one-to-one relationship between the involved parties in the exchange of the information as presented in

Figure 7 page 11. XBRL, on the other hand, falls to the category of the *multilateral IOSs* due to the many-to-many relationship of message exchange between the requesting parties and the reporting parties. Due to the differences in the technical features of EDI and XBRL (as the extension of XML), the factors that influence their adoption and implementation might also differ. This section presents a brief differences between the factors that influence EDI and XBRL. This information is beneficial as a baseline to continue the discussion about the factors influencing XBRL adoption and implementation based on the case study results. Table 19 presents the factors that influence the EDI-based message exchange based on the literature review.

Table 19: Factors that influence the implementation of EDI-based message exchange

Technological context
1. Perceived benefit (Chau & Kuan, 2001)
2. Transaction volume (Mcgowan, 1998)
Organizational context
1. Technical knowledge (Mcgowan, 1998)
2. Human competence (Chau & Kuan, 2001)
3. Resource availability (Mcgowan, 1998)
4. Training availability (Mcgowan, 1998)
Environmental context
1. Critical mass/industry pressure (Chau & Kuan, 2001)
2. Government policy (Chau & Kuan, 2001)
3. Interdependence and commitment of the partner in EDI adoption (Lee & Lim, 2003)
4. The trust between partners (Hart & Saunders, 1998)

Furthermore, by considering the prominent features of XBRL that differentiate XBRL with EDI, we provide the list of factors that influence XBRL-based reporting platform (as the extension of XML-based file exchange), based on the literature review and the case study. They are presented in Figure 23. The left column defines the features of XBRL as the evolution of XML, and the right column provides the list of factors that influence the implementation of XBRL due to the existence of the features.

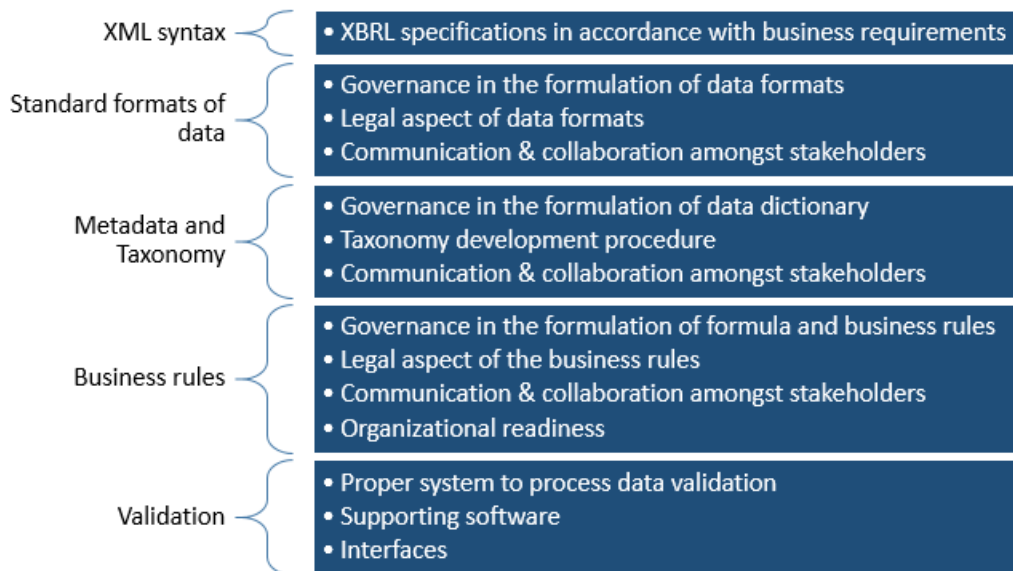


Figure 23: XBRL features as the extension of XML

7.2. Factors influencing the process of XBRL implementation and adoption

This section discusses the steps that we conducted to derive the final list of factors that influence the process of XBRL adoption and implementation based on the case study results.

A. Technological contexts

Figure 24 shows the re-mapping of factors influencing XBRL adoption and implementation in the technological context.

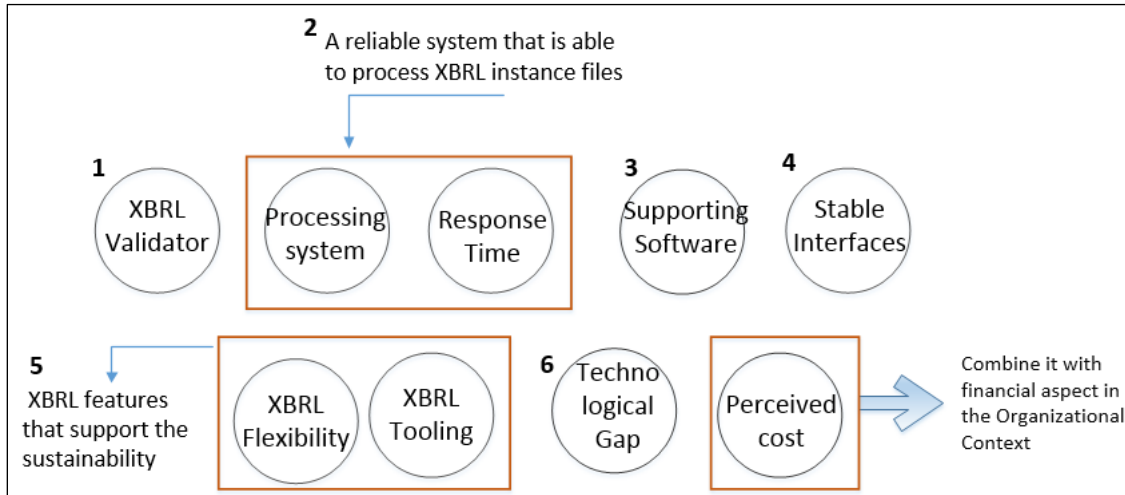


Figure 24: Re-mapping of factors influencing XBRL implementation - Technological contexts

From the empirical results, we found nine factors to be classified as part of the technological contexts. We conducted the re-mapping to group the factors which refer to one integrated entity. For example, *the processing system* and *the needs for a proper response time* are considered as part of one single entity, *a reliable system that is able to process XBRL files*. The followings are the discussion of each factor.

1. The proper XBRL validator

XBRL validator is required to check the conformance of XBRL instance files with XBRL specifications. For the case of XBRL implementation which involves large XBRL instance documents, a specific XBRL validator is mandatory. The organizations that intend to implement XBRL have to carefully examine the potential size of their XBRL documents. The large XBRL instance documents (with size more than 1 GB) must be validated using a specific XBRL validator, and the process of finding the suitable XBRL validator might not be straightforward. We recommend the timeline of XBRL implementation to include a dedicated time period for the procurement process of the validator tools.

“We have to find an XBRL validator that able to perform a high speed validation process” (Architect, 2016)

“Another challenge is to find a proper XBRL validator with the ability to validate a large XBRL instance document (>1 GB) with a complicated validation formula within an acceptable range of time” (Division, 2016)

2. A reliable system that is able to process XBRL instance documents

We define *a reliable system* as the system which is not only able to process the message exchanges, but also able to perform the transactions within an acceptable time frame as required by the users.

- a. In addition to the tools to validate XBRL documents (as discussed in previous point), a specific system have to be developed to process XBRL instance documents. For the case of large XBRL instance documents, the challenges are even more complicated.

“One of the biggest challenges was to find an XML processor which can process a huge amount of XML instances (around 34.000 instances) with large sizes (about 1 GB per instance)” **(Division, 2016)**

- b. There is also a need to address the expectation of the users regarding the response time, i.e., the system is expected to be able to perform the task within a reasonable and an acceptable time.

“One of the current issues is the slow response in the validation process.” **(Mandiri, 2016)**

3. Supporting software

The development of a desirable system is highly dependent on the supporting technology (such as XML processors), and the availability of experts in system development. In the early stage of implementation, system developers have to formulate *the mapping* between system requirement and the available supporting software in the market. The gap between the requirements and available software must be taken into account in designing the implementation strategy.

“The prominent challenge in the technological aspect is the strategy to optimize the uses of the latest technology to support the implementation process” **(Advisor, 2016)**

“We use the latest XML processors. However it has a limited capability. It cannot concurrently process more than 1 instance in one server despite the optimal use of the processors in that server” **(Division, 2016)**

4. Stable interface specifications

We define a *stable interfaces* specification as a standardized infrastructure specifications that govern all the transactions between the reporting parties and requesting agencies. In this case, the required technology and information processes that regulate the mutual interactions between the reporting parties and the receiving ends should follow a set of uniform standards. There is no different treatment between one agency and the others in the contexts of the technological layer. They are only differentiated in the contexts of data layer, i.e., the specifications of required data and report formats. The standardization in system interaction is beneficial for software developers.

“Due to the use of the standardization for all kind of system’s interaction, the software developed by the software developers for one domain can also be used for the reporting purposes in other domains. It implies the improvement of efficiency for the software companies” **(Leader, 2016)**

“Now, we don’t change the interfaces anymore, those are all stable. We use one set of interfaces specification. So, we don’t have to always bother several parties with new changes” **(Consultant, 2016)**

5. The features of XBRL technology that support the sustainability.

We define *the sustainability of a system* as the ability to easily expand the system in terms of the addition in the number of the users, the enhancement of the technology, the expansion to various domains, and the addition of the type of services.

a. XBRL flexibility

The flexibility of XBRL technology enables the developed system to tag any kind of information, not only financial information. SBR has utilized this prominent feature of XBRL by expanding the application of SBR in various domains.

“XBRL is not only suitable for financial information. It is started with that, but you can use it to tag any kind of information you want” **(Consultant, 2016)**

b. The improvement of XBRL tooling

XBRL tooling has experienced significant improvement in the past few years. A number of XBRL software tools has been designed to fully exploit XBRL benefits, such as the add-ins software to customize XBRL using Excel spreadsheets, the tools that are able to create multiple connections between XBRL and external data processing system, and a number of tools to aid the accountants in improving their way of interaction with financial statement data.

“The tooling gets better. In the beginning, they started to release notepad. It is very hard to define the specification using XML or XBRL in Notepad. But now they have a specialized XBRL tooling” **(Consultant, 2016)**

6. Technological gap

In order to reap the full benefits of XBRL technology and the supporting software, a clear requirement of the intended system must be explicitly stated in the early stage of implementation. Ideally, the design of the new system addresses all of the business requirements and can be supported by the available technology.

“The functional coverage of the system has also become an issue in the development. The unclear statement of intended functional coverage might trigger a long discussion and have potential to prolong the project” **(Expert, 2016)**

However, we argue that the system designers will never be able to precisely define the point where the complete design of XBRL-based system (or any IT system) has been formulated. It implies that, the improvement of the initial design during the development process is inevitable. Being aware of this condition, this point emphasizes the importance of having a clear mapping of the features of *the available technology* and *the intended system* to be developed, so we can use the *finding gaps* as the guideline for the adjustment/improvement in system’s development.

“There is always room for improvement during the implementation process. It means, the initial design will experience continuous revisions and improvement during the process of implementation” **(Advisor, 2016)**

B. Organizational contexts

Figure 25 shows the re-mapping of factors influencing XBRL adoption and implementation in the organizational context.

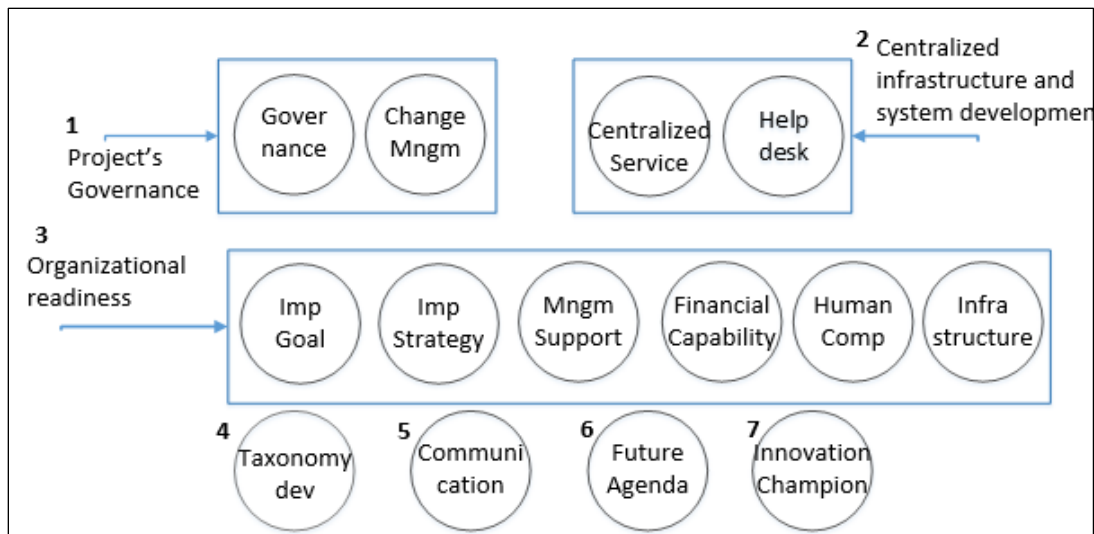


Figure 25: Re-mapping of factors influencing XBRL implementation - Organizational contexts

1. Project's governance

There are a number of definitions of *IT governance* in the literature. For the purpose of this study we use the definition by Simonsson & Johnson (2006). They defined IT governance as 'the preparation for, making of and implementation of decisions regarding goals, processes, people and technology on a tactical and strategic level' (Simonsson & Johnson, 2006, p. 1). Therefore, it regulates the goals, the processes, the people, and the technology. We define the governance of an XBRL project as the activities to manage the coordination and collaboration between stakeholders to address strategic and technical issues in the project. A solid project's governance affects the continuity of XBRL implementation due to its role as the central mediator for all the possible concerns.

As emphasized by Mr. Kuipers (**Nitchman, 2015**), the director of SBR, "The SBR program is a public-private partnership that needs an agreement with all of the involved parties in the Netherlands"

"The governance helps the parties to be on the same table. The governance assists the involved parties in deciding on what to have and what not, how to proceed with the next stages, what is the legal baseline of the activities, and the impacts of the processes" (**Advisor, 2016**)

"The governance of the system in the technical way is conducted by Logius. The governance of the system in functional way, such as defining the architecture, is conducted by the public private expert groups" (**Leader, 2016**)

Moreover, project change management is considered as part of the governance. It is required to handle unpredictable events or the potential changes during project implementation. This aspect is substantial because the implementation of an XBRL-based business reporting platform depends on a number of international regulation such as International Financial Reporting Standards (IFRS), international accounting standard, and XBRL specification.

"Change management is required to anticipate the changes of legal regulation in the middle of the project." (**Consultant, 2016**)

2. A centralized infrastructure and system development

a. A centralized infrastructure

From the perspective of system owners, the centralization of the infrastructure enable them to maintain one single infrastructure to handle transactions from various sources instead of handling one system for each government agency. It reduces the operational burden and saves the maintenance costs.

“By moving the gateway function to Logius, the Tax Administration (and other government agencies) only have to deal with one party when there is a change” **(Leader, 2016)**

From the perspective of the reporting parties and software developers, they only need to submit reports to one single standardized infrastructure instead of sending them to different destinations with different technical requirements. It decreases the operational costs and saves time. It also reduces the burden of the reporting parties and software developers in making adjustments towards the required specifications. Eventually, it contributes to the reduction of the potential technical failures.

The use of SBR improve system’s efficiency by reducing the number of gateways from 15.000 of gateways, between Tax Administration and tax consultants; to become only one gateway, between Logius and Tax Administration. **(Leader, 2016)**

b. A centralized system development

We define *a centralized system development* as a one stop service of XBRL implementation which govern the technical aspect of system implementation. As a result, the management of technical issues during the implementation process and maintenance period can be conducted more efficiently. Furthermore, it enables fast collaboration and communication processes among stakeholders.

“If all of the government agencies build their own shared service center, then it will be very costly” **(Consultant, 2016)**

“We have Logius as the service center of the government. They hire experts from various sectors like IT, consulting services, to help them to do the SBR projects” **(Consultant, 2016)**

c. Helpdesk support

The service center should also provide the helpdesk assistance to support the implementation and the operational activities in terms of business knowledge and technical solutions.

“Logius provides assistance, helpdesk, so you can call them and say ‘hey, I am working with your specification but I get error 350 or I cannot send the message, I get the status notification, I wonder what does that means’. Logius will help them” **(Consultant, 2016)**

“Tax Administration provides a testing environment which can be used by software developers, to test the specifications that they receive from Logius together with some extra information from the Tax Office” **(Leader, 2016)**

“There are supports from Bank Indonesia to overcome the challenges, such as a regular training and coaching clinic, the discussion regarding the implementation of LSMK, intensive on-site supervision, allocation of PICs to support the system launching , providing helpdesk support during the reporting period” **(Mandiri, 2016)**

3. Organizational readiness

We discerned several factors as part of the organizational readiness, namely the implementation goal, the implementation strategy, management support, financial capability, human (technical) competency, infrastructure, and organizational structure.

“The readiness of the industry to make adjustments in terms of knowledge, human competence (experts), and system enhancement is required to support the implementation process” **(Department, 2016)**

“The government need to be aware of the system readiness and organizational readiness. The readiness of the users influence the success of the implementation” **(Consultant, 2016)**

a. Implementation goal and strategy

The explicit and obvious implementation goal influences the behavior of stakeholders during the process of implementation. For example, by stating that the goal of implementation is the integration of infrastructure and the re-design of the reporting formats, implying that the project requires high participation of the business department (to design the new reporting procedure) as well as the IT department (to design the new single infrastructure). On the other hand, if it only states that the goal of implementation is the establishment of an integrated reporting platform, the business departments might be unaware of the importance of their role in re-defining the new formats of reports and reporting procedure.

“BI needs to formulate a clear objective and shared visions, and the objectives must be agreed by all of the involved departments” **(Architect, 2016)**

Furthermore, the implementation strategy have to be formulated in the early stage of implementation, because each step of implementation demands specific requirements, for example specific infrastructure, particular types of knowledge, and a certain level of coordination.

b. Management support

The support from top level management is required for several purposes, such as to enforce the collaboration between involved stakeholders, to get the approval of project’s continuity, and to impose rules and regulations regarding the implementation process.

“The support from high level management is one of the supporting factors in the development of the system and taxonomy ” **(Division, 2016)**

“The leadership from the top management is very important due to the need of commitments from business departments. Guidance from the board of director is substantial” **(Expert, 2016)**

“We need the support from top management in terms of regulation and moral support” **(Mandiri, 2016)**

c. Financial aspects

The clarity of the financial aspect determines the scope of the project and the implementation strategy. The project's committee have to formulate the strategy to finance the project and each party have to be aware of their responsibility in terms of financial contribution.

"Everybody finances its own part. Tax Administration pay all of the activities by themselves. The same procedure happens for the Chamber of Commerce, the Central Statistics, or the banks. Logius has to invest in digipoort and in the maintenance of the taxonomy" **(Leader, 2016)**

"An adequate financial resources for the investment purposes is mandatory" **(Department, 2016)**

d. Human competence

Human competence aspect comprises the individual knowledge and the organizational structure. In terms of the organizational structure, the IT department in the organization must at least have the function of *application architect* and *information architect*. Information architects play an important role in taxonomy development, whereas application architects play a substantial role in the design guidelines of applications. In terms of individual knowledge, various levels of knowledge are required in XBRL implementation. The reason is because XBRL implementation is not merely about the reporting format, but also covers the topic of, among others, report's standardization, the concept of integration, the re-design of new information flows, the accounting aspects of the report, the compliance to the regulations, the insight about auditing processes, the concept of public key infrastructure, and business process modelling.

"The expertise in the SBR program need to possess various kind of knowledge, not only XBRL, but also legal knowledge, accountancy, auditing, public key infrastructure, business process modelling, public private collaboration and so on" **(Consultant, 2016)**

"The technical competence of the experts in the organizations is mandatory" **(Department, 2016)**

e. Infrastructure

For the requesting agencies to develop an XBRL-based reporting system, they have to prepare a proper infrastructure. For example, the servers with particular specifications, the storage with minimum size requirements, the databases with particular specifications, specific bandwidth requirements, network characteristics, and particular security needs. Before the project started, the required infrastructure must be in place to ensure the smoothness of system development.

"In comparison with the traditional digital reports, the XBRL data is considered large. It needs a huge investment in the regulators' side as well as in the reporting parties' side" **(Department, 2016)**

"The initial capacity planning includes the hardware with the ability to process 40 GB data in 1 hour" **(Architect, 2016)**

“The readiness of the infrastructure is a crucial aspect of the implementation. There is a pressure on the government to quickly adopt the technology that improve the infrastructure” **(Auditor, 2016)**

4. Taxonomy development procedure

XBRL taxonomy is the baseline for the next phase of system development. The development of a taxonomy must be conducted by experts with the ability to convert business requirement into XML/XBRL concepts. Despite the ability of XBRL taxonomy in supporting the standardized definition of data, the process of achieving the common definition of the business terms is critical and sensitive.

The Director of Information system in Bank Indonesia **(2016)**, stated “The biggest challenge in the implementation of XBRL project is to reach an agreed definition during the creation of the data dictionary which is applicable to all of the financial industries”.

The similar insight is confirmed by an advisor from SBR international **(2016)**, “The main challenge is not in the technology to describe the data definitions; it is handled by XBRL with the ability to standardize the presentation of data definitions. The challenge is in the process of achieving the common definitions”. He added “There is a need for alignment between the designed taxonomy and the reference law/standards”

“Some of the challenges are the limited resources, the lack of experiences, the process of finding a proper strategy to produce the code for the business rule in the most efficient way, and a strategy to conduct User Acceptance Test (UAT) without burdening the users with XML” **(Expert, 2016)**

5. Communication and collaboration

XBRL project requires participation from various stakeholders and each stakeholder plays a different role in the implementation process. The stakeholders also have different interests, challenges, and opportunities with respect to the project’s implementation. In order to convince the stakeholders about the intersection between their interests and project’s vision, a proper communication strategy is mandatory. The key messages must be delivered efficiently to deliver the importance of project’s vision from the point of view of the stakeholders.

“It is important to have a proper strategy to communicate with various people/organizations which have different roles and interests. How to get them work together to achieve the common visions. The management have to ensure that the people really want to cooperate in realizing the shared vision. Even if a report format is mandatory, it is important to appreciate the relationship and the trust amongst stakeholders” **(Auditor, 2016)**

“We need to have a good coordination and collaboration with the institutions issuing the standards, and with other institutions that also apply the same standard” **(Division, 2016)**

“There is a need to have a proper coordination between regulators, for example BI and OJK, in order to define a common perceptions” **(Department, 2016)**

“The users need to have a clear information about the system to be implemented, the role of the reporting entities, the role of the regulators, the schedule of the project, the implementation targets, and training and education” **(Architect, 2016)**

“The regular meetings with other regulators are conducted as part of the task force. The regular meetings with the banks are carried out as part of the supervision activities.” **(Architect, 2016)**

“XBRL enables the transparency of information and ease the exchange of data between governmental agencies. As a result, the coordination and collaboration between the agencies is mandatory” **(Bank, 2016)**.

“We need a proper communication with the reporting parties and other stakeholders especially in terms of XBRL technology, so they can appreciate the end-to-end process and being aware of what their roles are” **(Bank, 2016)**.

6. Future agenda

A clear future agenda of implementation provides important insight to the stakeholders about the long term visions of the project. It provides explicit guidelines about the targets to be achieved. Presenting the long term agenda of the project to the public might leverage the confidence of the stakeholders regarding the shared commitments to achieve the common goals.

“SBR is an innovation. This innovation requires participation, requires knowledge exchange, commitment, and clear agenda, i.e., the agenda for the future users. Not only just having the idea” **(Consultant, 2016)**

7. Innovation champion

Lente & Rip (1998) define a promise champion as a person who consistently promotes the benefits of the innovation and technology with the main goal to raise the attention of the potential audiences. Lente & Rip (1998) argue that one of the key factors for the success of the introduction of an innovation is the ability to create a *rhetorical space*, a space to offers promise, expectation, and reputation of a new innovation to various stakeholders.

C. Environmental contexts

The re-mapping of the environmental context is presented in Figure 26.

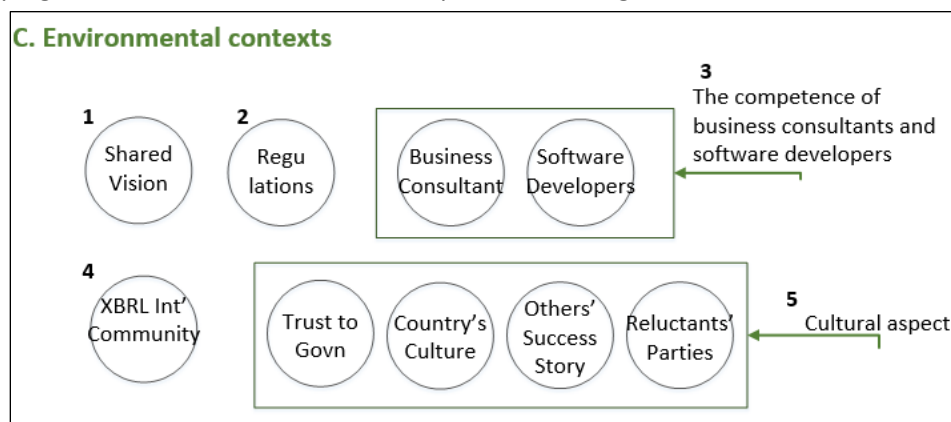


Figure 26: Re-mapping of factors influencing XBRL implementation - Environmental contexts

1. Shared visions

We use the definition from Li (2005) to define the meaning of *shared visions*, i.e., a cooperative relationship as the result of similarities in psychological values. Li (2005) investigates shared visions as one of the bounding mechanisms that influence inter-organizational interactions. Based on the empirical results of this study, we found that the shared visions, which are presented as the common baseline of XBRL implementation, play an important role in the implementation process. The example of the concrete common vision is the vision to have a shared nation-wide taxonomy, followed by the recognition of the needs to have a centralized infrastructure and standardized information processes. Furthermore, the formulated visions of the project must be agreed by all of the involved parties so that their continuous actions will always lead to the achievement of the common goals.

“The changes is eventually about the people, not only the system and the technology. It is important to start the innovation with *the why*, the visions; instead of *the what*” (Advisor, 2016)

“So the idea of having the taxonomy was there, the idea of having a shared infrastructure for the government was there” (Consultant, 2016)

“Implementation of LSMK requires the shared visions and commitment among involved parties towards the success of the implementation” (Mandiri, 2016)

2. Regulations

a. Nation-wide regulations

The legal enforcement to use a system increases the confidence of the software developers to immediately adjust their system in accordance with the standard. It also leverages the use of the system by the reporting parties

When SBR became mandatory, the software company started to adapt the software, and businesses started to use it. Moreover, as the impact of the network effects, more regulators joined the program. Eventually, the level of transactions involved in SBR increased significantly” (Advisor, 2016)

A change of government structure in the middle of project implementation influence the future roadmap of the project.

“Due to the transfer of function in banking supervision from BI to OJK, there is uncertainty on the business reporting process, however a new task-force has been initiated to formulate a new business processes” (Architect, 2016)

b. International regulations

Some of the international regulations that influence implementation of XBRL-based reporting system are International Financial Reporting Standards (IFRS), International Accounting Standard, XBRL specifications, and other international policy regarding financial reports. For the case of SBR, any new regulations mandated by the European Union also affects SBR implementation.

“We need to make an adjustment of LBUS reporting standard with BASEL II standard and data cleansing” (Mandiri, 2016)

3. The competence of intermediaries

The intermediaries in this case is referring to business consultants and software developers. Software developers play crucial roles in system development and maintenance. The regulators could provide the standards for system development, and let the software developers involve in a competitive environment to deliver the best solutions. In order to maintain software's quality and reliability, the pre-launching software need to pass the certification from the regulators. The quality checks is also aims to ensure the support of information validation (by the software) since the initial entry of data. The software developers also take part in communicating the solutions to the reporting parties.

"Sometimes it is the software developers who is the best party to communicate with the individual tax clients. Because the developers could inform the tax clients about the way they implemented the new functionality in their systems" **(Leader, 2016)**

"There is a limited software developers who is aware of XBRL technology, as a result the implementation of XBRL is perceived as an expensive and exclusive project" **(Bank, 2016)**

"The readiness of the software developers also play crucial roles in system development. We need to ensure that the software developers are able to develop an XBRL-aware system" **(Bank, 2016)**

"A number of software companies hard-coded their own XBRL-engines while making adjustment with a certain version of SBR. It becomes a problem when there is a change in taxonomy or the system in SBR, because it is difficult for the hard-coded software providers to quickly adapt with the new requirements" **(Advisor, 2016)**

"There is no software developer that has develop XBRL processing data in the country" **(Mandiri, 2016)**

The role of business consultants is required to support the reporting parties in terms of the compliance towards the XBRL standards and the business rules set by the regulators.

"The reporting entities also rely on the intermediaries for the expertise, knowledge, and SBR governance. There are approximately 12.000 tax intermediaries in the Netherlands which range from individual experts, small companies, and big companies. They offer services for tax reporting, filing in end year reports, and statistic reports" **(Consultant, 2016)**

4. Support from XBRL community

Recently, the international community of XBRL scattered around the world. It consists of, among others, the XBRL jurisdictions, XBRL consortiums, XBRL regional community, technical working groups, individual experts, and XBRL vendors, with the common goal to improve business reporting processes. The supports from the XBRL international community is very useful in assisting the implementation processes. It also plays significant role in shortening the learning curve of the technology.

"There is a good support from XBRL International community since the POC until the post-implementation of LSMK-LBUS" **(Architect, 2016)**

5. Cultural aspect

a. The trust in the government

For the nation-wide scale of implementation that highly dependent on the expertise of software developers, the trust in the government plays an important role in the implementation process. Software developers have to make investments in terms of system adjustments to accommodate new policy/standard. Consequently, they need to be sure that the policy maker will not make a substantial change in the recent policy in the middle of adjustments' process.

“Sometimes there is a skepticism about the government role; they wonder whether the government will oblige the business to use the system” **(Consultant, 2016)**

b. Country's specific culture

There are some distinctive cultural aspects of a country which influence the decision making process. For example, the Dutch is famous for the consensus culture in making decisions. Consequently, the agreement from all of the involved parties are mandatory. Other countries might also have a distinctive culture which influence various aspect of project's implementation, for instance the relationship between government agencies, the 'wait and see' culture, or the initiative to start the action.

“The coordination process in SBR which requires the public and private collaboration to formulate the common agreements is suitable with the culture of the Dutch” **(Advisor, 2016)**

“All of the decision is based on collaboration between the members of the committee that consist of multiple parties” **(Consultant, 2016)**

c. The success story of the preceding industry

The existence of a preceding industry that has implemented XBRL is beneficial for learning purposes. For example, for the case of LSMK-LBUS, BI required a special design of taxonomy for sharia banks' reports. However, there is no other institution that has implemented an XBRL-based reporting system for Sharia banks. Consequently, the development of the sharia taxonomy must be started from scratch. Moreover, BI is also considered as one of the first institutions to implement large XBRL instance documents. Therefore, there were no proven guidelines to be followed. On the one hand, the unavailability of the preceding implementation with the similar issue allows the organizations to acquire knowledge's improvement. On the other hand, it might slow down the implementation process.

“There is a lack of information resources about XBRL, especially in Indonesia; there is no industry that uses XBRL” **(Mandiri, 2016)**

d. Reluctant parties

Several parties might be reluctant to the idea of implementing XBRL to support business report submission due to the inclination towards the status quo and the allegation on project's complexity.

The following table (Table 20) is the final compilation of the above discussion.

Table 20: Factors influencing XBRL adoption and implementation

Technological contexts
1. XBRL validator
2. A reliable system that is able to process XBRL instance files
3. Supporting software
4. Stable interfaces
5. XBRL features that support the sustainability
6. Technological gap between requirement and existing technology
Organizational contexts
1. Project's governance
2. A centralized infrastructure and system development
3. Organizational readiness. Consists of (1) goal and strategy, (2) management support, (3) financial capability, (4) human competence, (5) technical capacity, (6) infrastructure
4. Taxonomy development
5. Communication strategy
6. Future agenda
7. Innovation champion
Environmental contexts
1. Shared visions
2. Regulations
3. The competence of software developers and business consultant
4. Support from XBRL community
5. Cultural aspects

7.3. Context-dependent dimension

The result of the case study can also be presented in the dimension of *XBRL context dependent*. We define a *context dependent factor* as a factor which highly dependent on the settings of the external factors. The *context dependent factors* of XBRL adoption and implementation are presented in Table 21 along with the explanation of the defining situations.

Table 21: Context-dependent factors

No	Context Dependent Factors	Defining situations
1.	The mapping of the technological gap between system requirements and the existing technology	It depends on the projects' scope and the strategy of the implementation.
2.	A centralized infrastructure and a centralized system development	It depends on the nature of technology adoption in the country. A country which implement the bottom up approach might not need to implement a centralized infrastructure in the initial phase of implementation due to various considerations.
3.	Project's governance	The arrangement of project's governance depends on the type of the stakeholders, the culture of the organizations/country, and the scope of the project.
4.	Organizational readiness (goal and strategy, management support, financial capability, human competence and technical capacity)	The readiness of the organization highly depends on the alignment of the strategic vision of the organizations with XBRL technology application.
5.	Communication strategy	It depends on (1) the visions, (2) the interests of the stakeholders, (3) the key messages (intersection of stakeholders' interests and project's visions)

No	Context Dependent Factors	Defining situations
6.	Future agenda	The definition of the future agenda depends on the level of users' awareness and the level of adaptation towards XBRL technology
7.	Shared vision	It depends on (1) the level of knowledge and awareness in the organizations towards the importance of XBRL, and (2) the strategy to deliver the messages regarding the roles of XBRL in addressing common goals.
8.	Regulations	It depends on (1) the comprehension of the policy maker towards the importance of XBRL, (2) the political will to issue the policy, and (3) the existing regulations
9.	The competence of related stakeholders	It depends on the level of adoption of XBRL in the country, which affect the availability of XBRL experts and the developer of XBRL software in that country.
10.	Cultural aspects	It depends on the cultural pattern of a country in adopting a new technology

In contrast with the context dependent factors, the *context independent factors* do not depend on any external factors. Their existence is mandatory and does not affected by the particular conditions of project's implementation. There are differentiated by the technical requirements of the intended system. The followings are the factors classified as *context independent factors*: (1) XBRL validator, (2) a reliable system that is able to process XBRL instance files, (3) supporting software, (4) stable interfaces, (5) XBRL features that support the sustainability, (7) Taxonomy development, and (9) Support from XBRL community.

7.4. The general stages of implementation

We have explained the implementation stages of SBR in section 5.2.3, and LSMK-LBUS in section 6.2.3. Regarding SBR, we conclude eight steps of the program's implementation, as displayed in Figure 27. SBR program consists of a number of projects that represent reporting domains, for instance Tax & Custom domain, Statistic domain, housing domain, and real estate domain. For each of the domains, there is an iterative process of project's execution, starting from *the exploration phase* to *the evaluation phase*.

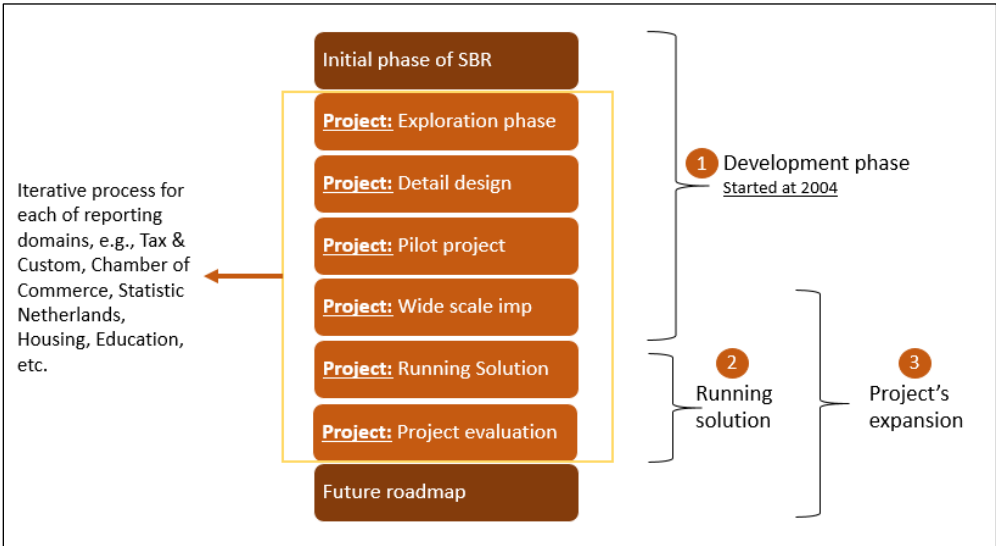


Figure 27: Implementation stages of SBR

In contrast with SBR program that consists of iterative process for each individual projects, LSMK-LBUS is an independent project consists of a series of processes. Figure 28 presents the stages of adoption and implementation for LSMK-LBUS.

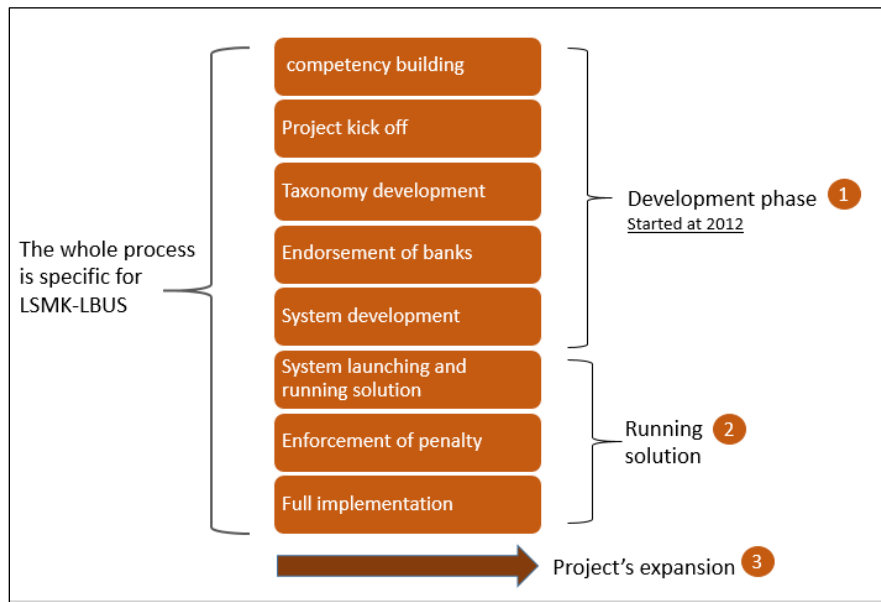


Figure 28: Implementation stages of LSMK-LBUS

Furthermore, we recognized three general stages of implementation for both cases:

1) The development phase

It covers the activities from the initial stage of considering XBRL as the desired solution, exploration and assessment of the requirements, design phase, taxonomy development, system development, testing, to project's launching. It also involves the activity related to the formulation of legal enforcement.

2) Running solution

It comprises all activities related with system's maintenance, trouble shooting, improvement of existing conditions, extending the taxonomy, and adjustment of the system towards changes in regulations.

3) Project's expansion

It focuses on all activities aimed to expand the range of services to a wider scale of implementation, for example, from the pilot project to nation-wide scale implementation, or from the application in a specific domain to the expansion in multiple domains.

The following figure displays the simplified version of the implementation stages.

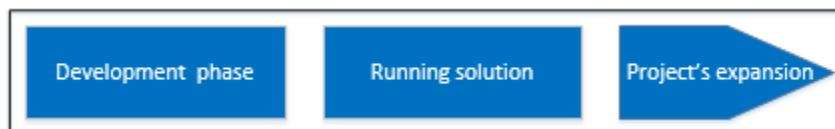


Figure 29: stages of XBRL implementation – simplified version

7.5. The proposed tool for analysis

By now, we have two important outcomes of the case study, (1) the table presents the list of factors that influence the stages of XBRL adoption and implementation, and (2) the general stages of XBRL adoption and implementation. Moreover, we developed a framework that present the relationship between *the factors* and *the stages* of XBRL adoption and implementation.

Based on the empirical results, we come up with two contrasting approach of XBRL implementation, namely *the top down approach* and *the bottom up approach*.

1. We define *the top down approach* as a strategy to implement XBRL-based reporting system by recognizing the needs to have a nation-wide level standard in various aspects of implementation since the early stage of implementation. The issues regarding *the what* and *the how* strategy to realize a nation-wide standardization is to be discussed in the strategic forum.
2. On the other hand, we define *the bottom up approach* as the implementation of XBRL initiated by a number of different institutions in one country, within a specific range of time, in order to meet the business requirements in their respective authorities. The potential implementation in the country-level might be discussed afterwards.

We argue that the ultimate difference between the two contrasting approaches is the condition whether the needs for a nation-wide level of standardization has been recognized and formally defined since the early stage of the implementation. This section is divided into two parts. The first part presents the framework of analysis to be used in the top down approach of XBRL implementation, and the subsequent part provides the framework of analysis to be used in the bottom up approach of XBRL implementation.

7.5.1. Top down approach

The framework of factors that influence XBRL implementation for the top down approach consists of two components: the first component is a table (Table 22) which describes in detail the role of factor in each phase of XBRL implementation, and the second component is the visual representation of the conceptual model (Figure 30).

A. The tool for XBRL implementation analysis – top down approach

Table 22 presents the factors that have to be taken into consideration while designing the nation-wide implementation of XBRL-based reporting system by using a top-down approach. For each factor, we formulate two important components: *the what* and *the how*.

Table 22: The factors influencing XBRL implementation- top down approach

THE FACTORS	THE GENERAL PHASES		
	Development phase	Running solution	Project's expansion
A Technological contexts			
1 XBRL features that support sustainability	- What: XBRL tooling - How: XBRL tooling experience improvement from time to time. The use of the latest XBRL tooling to manage XBRL data will speed up the development process, due to the	NA	- What: the flexibility of XBRL tagging - How: providing rooms for expansions of XBRL report due to the ability to support all kind of information tagging

THE FACTORS		THE GENERAL PHASES		
		Development phase	Running solution	Project's expansion
		improvement of data management efficiency.		
2	Stable interfaces specifications	<ul style="list-style-type: none"> - What: the stable interfaces - How: the standardized interfaces that regulate system-to-system information flow will minimize the potential errors during system development due to the implementation of the uniform rules for message transactions 	<ul style="list-style-type: none"> - What: the stable interfaces - How: it reduces the technical adjustment efforts by the software developers during the operational and the maintenance phase due to the certainty in message transactions' rules 	NA
B Organizational contexts				
1	Project's governance	<ul style="list-style-type: none"> - What: project's governance - How: the clear governance of the project is mandatory, (1) to ensure that all of the involved stakeholders are on the same table, (2) to enforce the decision making process, and (3) to define the baseline for harmonization and standardization 		
2	A centralized development and infrastructure	<ul style="list-style-type: none"> - What: a centralized development - How: it is a mandatory component for the development of a nation-wide level of XBRL implementation, due to its role as a centralized mediator for various issues of development (especially technical issues). This service center also plays role in mediating communication between stakeholders. 	<ul style="list-style-type: none"> (1) - What: a centralized infrastructure - How: the centralized infrastructure saves costs of operational and costs of maintenance considering 20:80 Pareto Rules (2) - What: a centralized helpdesk - How: by providing technical assistance for software developers during maintenance and development 	<ul style="list-style-type: none"> - What: a centralized development - How: being an intermediate party that bridge the coordination and collaboration amongst stakeholders, for the purpose of future expansion
3	Taxonomy development procedure	<ul style="list-style-type: none"> (1) - What: a centralized taxonomy development procedure - How: The working unit develops a nation-wide taxonomy and maintains the harmonization of the taxonomy (2) - What: sufficient number of experts with certain level of experience - How: translating the requirements into XML/XBRL based language to build a reliable nation-wide taxonomy 	<ul style="list-style-type: none"> - What: a centralized taxonomy development procedure - How: the proposed extension of taxonomy from various agencies are submitted to the centralized taxonomy working unit. The working unit then compiling all of the request for changes while maintaining the harmonization of a nation-wide taxonomy 	NA
4	Organizational readiness	<ul style="list-style-type: none"> (1) - What: a clear implementation goal and strategy - How: It is a mandatory requirement since the early stage of implementation to ensure that all parties moving towards the same visions, missions, and directions. (2) - What: financial capability 	<ul style="list-style-type: none"> (1) - What: technical competence - How: the solving of the technical issues is to be centralized in the single service center (2) - What: IT infrastructure - How: a reliable infrastructure affects the completion of technical 	<ul style="list-style-type: none"> (1) - What: financial capability - How: the future expansions of the project have to be designed align with the financial capability of the organizations (2) - What: technical competence - How: a sufficient level of technical competence in the organization is substantial to design the long term roadmap of the project

THE FACTORS	THE GENERAL PHASES			
	Development phase	Running solution	Project's expansion	
	<ul style="list-style-type: none"> - How: It influences project's scope, implementation strategy, and implementation target. (3) - What: management support - How: It is required to provide directions, and to facilitate the coordination of the strategic issues. (4) - What: technical competence - How: the solving of the technical issues is to be centralized in the single service center (5) - What: IT infrastructure - How: the capacity planning regarding technology infrastructure (server, storage, network, IT security) must be provided before starting the project. 	<ul style="list-style-type: none"> issues during the operational and maintenance phase 	<ul style="list-style-type: none"> (3) - What: IT infrastructure - How: The future expansions of the project have to take into account the ability of the organization to provide required IT infrastructure. 	
5	<ul style="list-style-type: none"> Communication strategy and collaboration 	<ul style="list-style-type: none"> - What: a strategy to communicate visions - How: a proper communication strategy is required in the early phase of development, in order for all of the parties to be aware of their roles, interests, challenges, opportunities, and the expected benefits of the project. 	<ul style="list-style-type: none"> - What: a strategy to communicate solutions - How: the communication strategy in this phase emphasizes the collaboration to solve the problems, to find the solutions, or to improve the existing situation 	<ul style="list-style-type: none"> - What: a strategy to communicate future collaboration - How: a proper communication strategy is required to stimulate the prospective reporting domains to join the information chain
6	<ul style="list-style-type: none"> Agenda for future development 	<ul style="list-style-type: none"> - What: a sustainable design of system and infrastructure - How: the design of infrastructure and the design of system are influenced by the agenda for future development. For example, the design of infrastructure for the project aims to address the nation-wide scope of implementation will be different with the design of infrastructure aims for the collaboration of several government agencies only. 	<ul style="list-style-type: none"> NA 	<ul style="list-style-type: none"> - What: assess challenges and opportunities - How: the agenda for future development must assess the possibilities and the challenges of the expansion of the information chain
7	<ul style="list-style-type: none"> Innovation champion 	<ul style="list-style-type: none"> NA 	<ul style="list-style-type: none"> NA 	<ul style="list-style-type: none"> - What: a rhetorical space - How: a rhetorical space, i.e., the discussion of the promising benefits, is introduced to influence the perception of the potential candidate of information domain towards the benefits of the project.
C Environmental contexts				
1	<ul style="list-style-type: none"> The shared believe 	<ul style="list-style-type: none"> - What: common psychological values - How: there is a need to emphasize the common psychological values in the early stage to help all stakeholders to identify the expected value added of the project 	<ul style="list-style-type: none"> NA 	<ul style="list-style-type: none"> - What: common psychological values - How: the common psychological values amongst stakeholders need to be strengthened and reaffirmed before defining the plan for expansion

THE FACTORS		THE GENERAL PHASES		
		Development phase	Running solution	Project's expansion
2	Regulations	<ul style="list-style-type: none"> - What: (1) the nation-wide regulations, (2) the international business standards. - How: providing the guidelines of the project in terms of legal foundation and technical references. 	<ul style="list-style-type: none"> - What: mandatory enforcement - How: mandatory enforcement significantly speed up the level of adaption, due to (1) the increase in the confidence of the private parties to make investment, and (2) the increase in users' participation 	<ul style="list-style-type: none"> - What: (1) the nation-wide regulations, (2) the international business standards. - How: defining the core aspects and boundaries of the system's expansion
3	The competence of business consultants & software developers	<ul style="list-style-type: none"> - What: the competence and the confidence of software developers - How: to implement the system based on requirements 	<ul style="list-style-type: none"> (1) - What: the competence and the confidence of software developers - How: to conduct system's adjustment to accommodate changes in standard or taxonomy (2) - What: the availability of business experts - How: their expertise is important in assisting the reporting parties during the submission of the required information 	<ul style="list-style-type: none"> (1) - What: the competence and the confidence of software developers - How: in the process of designing the future roadmap, it is mandatory to create the mapping that explain the gap between the existing software developers (in the market) and the required conditions. This is because the expansion of the project is highly dependent on the availability of the software developers. (2) - What: the availability of business experts - How: their expertise is important in assisting the reporting parties during the submission of the required information
4	Cultural aspects	<ul style="list-style-type: none"> (1) - What: the trust to the government - How: In order to start the development or to do adjustments in their system, the software developers need the assurance that they can trust the mandatory enforcement set by the government (2) - What: reluctant parties - How: reluctant parties might hamper the initial phase of the project due to the inclination towards the status quo and the allegation on project's complexity. 	<ul style="list-style-type: none"> - What: Distinctive cultural value - How: Some countries have a distinctive cultural aspect which influence the decision making process, especially during the operational and maintenance phase). For example, the Dutch is famous for the consensus culture in making decision. Consequently, the agreement from all of the involved parties are mandatory. 	<ul style="list-style-type: none"> - What: Distinctive cultural value - How: the distinctive culture of the countries also influence the design of the future roadmap of the project, for example the level of trust and willingness to cooperate between government agencies.

B. The conceptual model – top down approach

The following figure (Figure 30) is the visual representation of the conceptual model that illustrates the factors influencing XBRL implementation for the top down approach based on the content of Table 22. We use three different group of colors to differentiate the TOE clusters. The model consists of four layers: the 1st layer presents the categories of the factors, the 2nd layer presents the development phase of implementation, the 3rd layer presents the running solution phase, and the 4th layer presents the project's

expansion phase. The explanation about how to use this model for academic and practical application will be presented in section 7.5.4.

TOP DOWN APPROACH

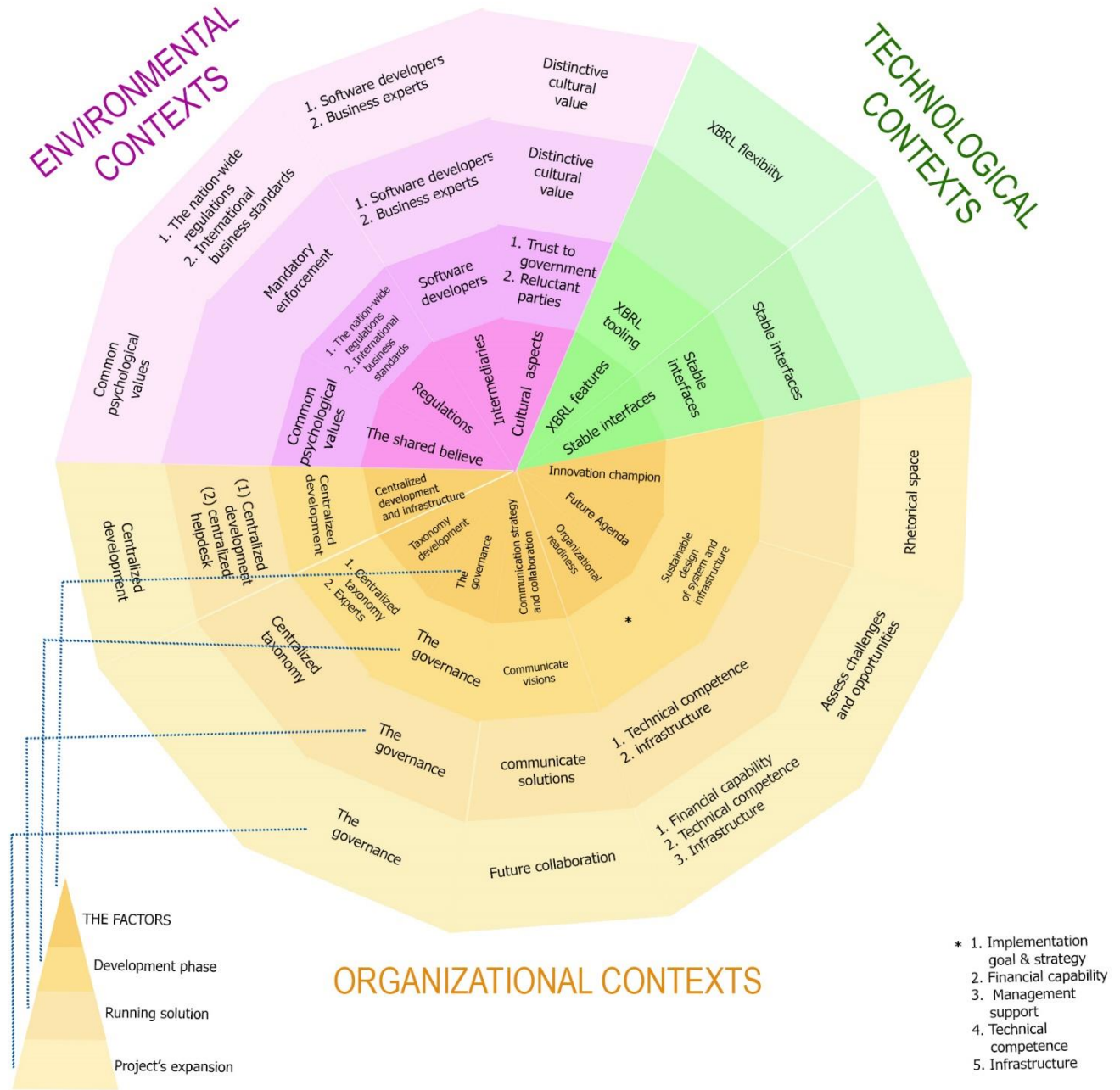


Figure 30: Conceptual model of factors influencing XBRL implementation - top down approach

7.5.2. Bottom up approach

Similar with the top down approach the proposed model of analysis of XBRL implementation for the bottom up approach consists of two components: the first component is a table (Table 23) which describes

in detail the role of factors in each phase of XBRL implementation, and the second component is the visual representation of the conceptual model (Figure 31).

A. The tool for XBRL implementation analysis – bottom up approach

For the top down approach, we identify three layer of implementation stages, namely the development phase, running solution, and project expansion. We argue that the same general phases is also applicable for the bottom up approach of XBRL implementation. However, based on the result of the case study, we can only formulate the factors influencing bottom up approach XBRL implementation in two general phases: the development phase and the running solution. This is due to the changes in the role of the government agencies in the midst of the implementation process in the case study. Consequently, the future roadmap of project’s expansion is still in the progress of discussion. We will explain this matter as the limitation of this research in section 8.2.

Table 23 presents the factors that have to be taken into account while designing the implementation of XBRL-based reporting system by using a bottom-up approach.

Table 23: The factors influencing XBRL implementation - bottom up approach

THE FACTORS		THE GENERAL PHASES	
		Development phase	Running solution
A Technological contexts			
1.	XBRL validator	- What: XBRL validator - How: XBRL validator is required to validate XML structure, to validate XBRL structure, to check the consistency of document with taxonomy and calculation formula, and to check the compliance to business rules. The size of XBRL instances influence the specifications of XBRL validator. The project which involves large XBRL instance documents needs specific requirement of XBRL validator which are not always available in the markets. Consequently, a proper strategy of software procurement and the strategy to test the software have to be defined conscientiously.	- What: XBRL validator - How: the selected XBRL validator must be able to perform validation process within a reasonable time.
2.	A reliable processing system	- What: a reliable processing system - How: we argue that XBRL processing system is one of <i>the core technological components</i> of XBRL-based reporting system along with XBRL validator and the interfaces. Core components of the system imply that without any one of them the XBRL-based solutions are unlikely to be delivered.	- What: a reliable processing system - How: the ability to process XBRL instance documents based on the requirements, e.g., the processing time, the quality of data, and the error rate in data processing.
3.	Supporting software	- What: the required software to build the reporting system - How: the level of technology sophistication determines the strategy in system’s development	- What: the required software to upgrade the system - How: the feature of the existing technology determines the strategy of enhancement
4.	Mapping of the technological gap	- What: the mapping of expected features of intended system versus the available technology - How: by finding <i>the gap</i> between the existing technology and the requirements of the intended system. <i>The finding gaps</i> are to be used as the guideline for the adjustment or improvement during system’s development. This concept is align with <i>agile development principle</i> .	- NA
B Organizational contexts			
1.	Taxonomy development	(1) - What: consistency & commitment	- What: experts with sufficient experience

THE FACTORS		THE GENERAL PHASES	
		Development phase	Running solution
		<ul style="list-style-type: none"> - How: defining a common data definitions is one of the most challenging process in development of XBRL taxonomy. It requires agreement and understanding of various parties. The process of reaching an agreement for particular definitions of data might take a considerable long time. Consequently, the consistency and commitment of the involved parties is mandatory. (2) - What: an adequate number of experts - How: adequate number of experts will increase the speed of taxonomy development. (3) - What: experts with sufficient experience - How: experts with sufficient level of knowledge are expected to be able to build a reliable taxonomy which is scalable for future adjustment. (4) - What: a proper UAT strategy - How: by conducting efficient testing without burdening the users with XML terminology 	<ul style="list-style-type: none"> - How: taxonomy experts with sufficient level of knowledge are able to accommodate changes and updates based on requirements.
2.	Helpdesk support	<ul style="list-style-type: none"> - What: helpdesk supports - How: by providing technical and business support during system development. 	<ul style="list-style-type: none"> - What: helpdesk supports - How: (1) by providing technical assistance for software developers during maintenance and operational; (2) by providing business guidelines for reporting parties during report submission period
3.	Organizational readiness (Requesting agencies)	<ul style="list-style-type: none"> (1) - What: implementation goal - How: by defining the visions and missions of the project with clear roles and benefits for all parties (2) - What: implementation strategy - How: a clear implementation strategy is required to design project's stages, to define XBRL conversion mechanism, to design adaptive system, and to formulate required specifications (3) - What: management support - How: to provide guidance of strategic issues and to get approval of project's execution (4) - What: technical competence - How: by building internal competence in the organizations (5) - What: IT infrastructure - How: the capacity planning of IT infrastructure is required before the commencement of the project. It consists of, among others, servers, storage, bandwidth, and network. (6) - What: financial capability - How: to ensure the adequacy of financial resources to cover the costs of implementation 	<ul style="list-style-type: none"> (1) - What: technical competence - How: to support operational & maintenance, despite the availability of software developers (2) - What: IT Infrastructure - How: by designing the contingency plans to handle unexpected failures (3) - What: financial capability - How: to ensure the adequacy of financial resources for training and maintenance
4.	Organizational readiness	<ul style="list-style-type: none"> (1) - What: implementation goal 	<ul style="list-style-type: none"> (1) - What: technical competence

THE FACTORS		THE GENERAL PHASES	
		Development phase	Running solution
	(Reporting parties)	<ul style="list-style-type: none"> - How: by checking the alignment of project's goal with organization's visions or with the strategic value of the organization (2) - What: implementation strategy - How: by designing the strategy of implementation which align with the requirements from regulators (3) - What: management supports - How: It is required to provide directions, and to facilitate the coordination of the strategic issues. (4) - What: technical competence - How: by building internal competence of organizations through seminars or training. (5) - What: IT infrastructure - How: by preparing required servers, storage, bandwidth, and network to support the development process (6) - What: financial capability - How: to ensure the adequacy of financial resources to support the development process 	<ul style="list-style-type: none"> - How: to support operational & maintenance (2) - What: IT infrastructure - How: by designing the contingency plans to handle unexpected failures (3) - What: financial capability - How: by ensuring the adequacy of financial resources for operational, maintenance, and training.
5.	Communication strategy and collaboration	<ul style="list-style-type: none"> - What: a proper communication strategy - How: to build a collaboration between technical and business department within organizations, to agree on the taxonomy and the format of the reports 	<ul style="list-style-type: none"> - What: a proper communication strategy - How: to find solution of problems and to improve existing situations
C Environmental contexts			
1.	The shared believe	<ul style="list-style-type: none"> - What: a clear sharing visions - How: (1) by defining the objectives, the schedule, and the expected benefits of the project, (2) by formulating the roles and the required commitments of the stakeholders 	NA
2.	Regulations	<ul style="list-style-type: none"> - What: (1) the nation-wide regulations, (2) the international business standards. - How: providing the guidelines of the project in terms of legal foundation and technical references. 	<ul style="list-style-type: none"> - What: mandatory enforcement - How: It speed up the level of adaption due to the increase in users' participation
3.	The competence of reporting parties & software providers	<ul style="list-style-type: none"> - What: the competence of (1) the reporting parties (for in-house project in the reporting parties' side), or (2) software developers - How: to implement the system based on requirements 	<ul style="list-style-type: none"> - What: the competence of (1) the reporting parties (for in-house project in the reporting parties' side), or (2) software developers - How: for system maintenance and technical adjustment
4.	XBRL International community	<ul style="list-style-type: none"> - What: support from XBRL international community - How: (1) by seeking for advice and recommendation to handle specific issues of development. Such as to find a proper XBRL validator that able to validate a large XBRL instance documents, (2) shortening the learning curve 	NA
5.	Cultural aspects	<ul style="list-style-type: none"> - What: Success story of other industry - How: to learn lessons from success and failures 	NA

B. The conceptual model – bottom up approach

The following figure (Figure 31) is the visual representation of the conceptual model that illustrates the factors influencing XBRL implementation for the bottom up approach based on the content of Table 23.

BOTTOM UP APPROACH

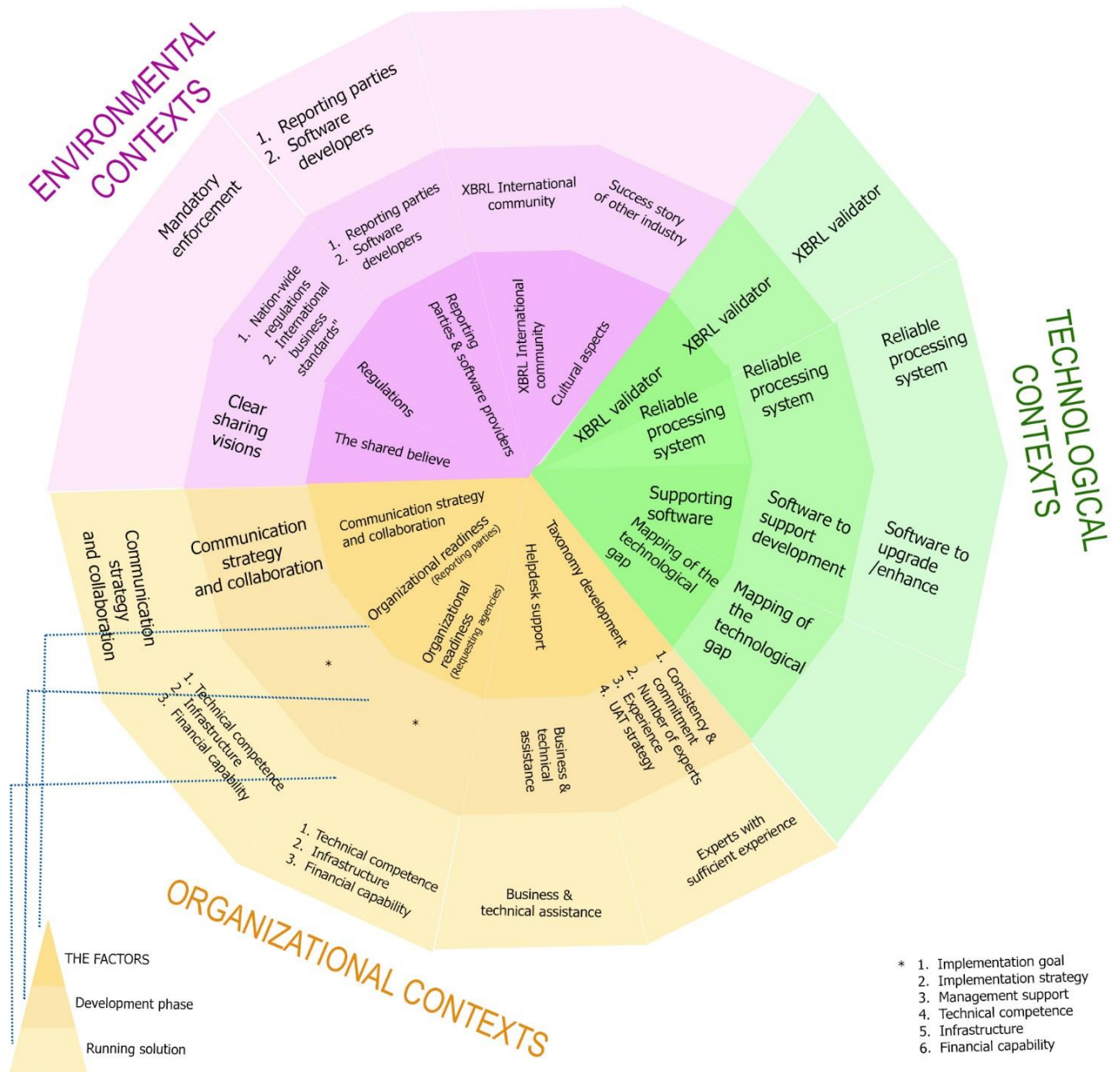


Figure 31: Conceptual model of factors influencing XBRL implementation - bottom up approach

We use three different group of colors to differentiate the TOE clusters. The model consists of three layers: the 1st layer presents the categories of the factors, the 2nd layer presents the development phase of implementation, and the 3rd layer presents the running solution phase. In contrast with the top down approach of implementation, we are not able to represent the 4th layer (project's expansions) for the bottom up approach due to the unavailability of data from the case study.

7.5.3. The combination of top down and bottom up approach

Furthermore, we have to emphasize that both of the lists (Table 22 and Table 23) and the models (Figure 30 and Figure 31) are not mutually exclusive. They can also be perceived as complementary to each other for a more comprehensive list of factors to be taken into account in the adoption and implementation of XBRL-based reporting system. The following figures shows the combination of the factors from the top down approach and bottom up approach. The figures are presented in three context: technological contexts (Figure 32), organizational contexts (Figure 33), and environmental contexts (Figure 34).

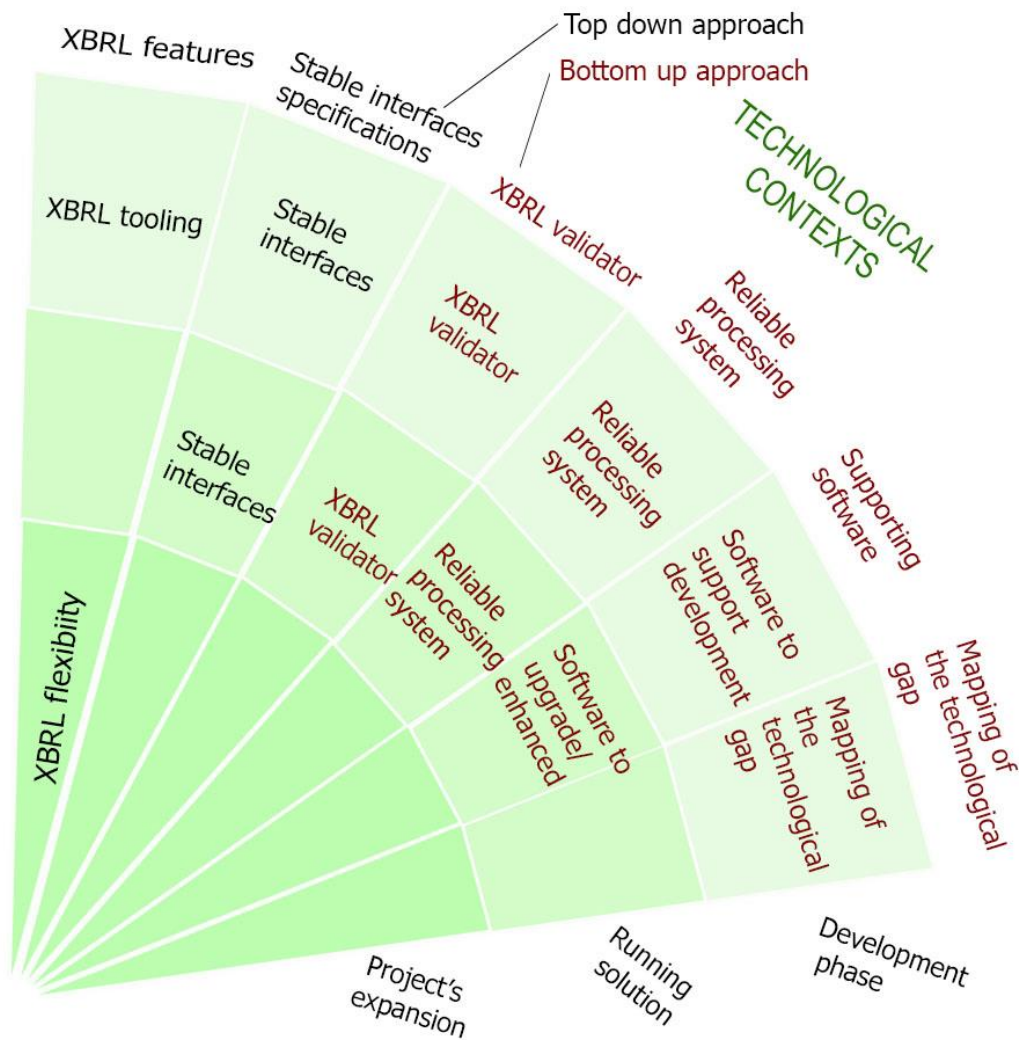


Figure 32: Combination of top down and bottom up approach - Technological Contexts

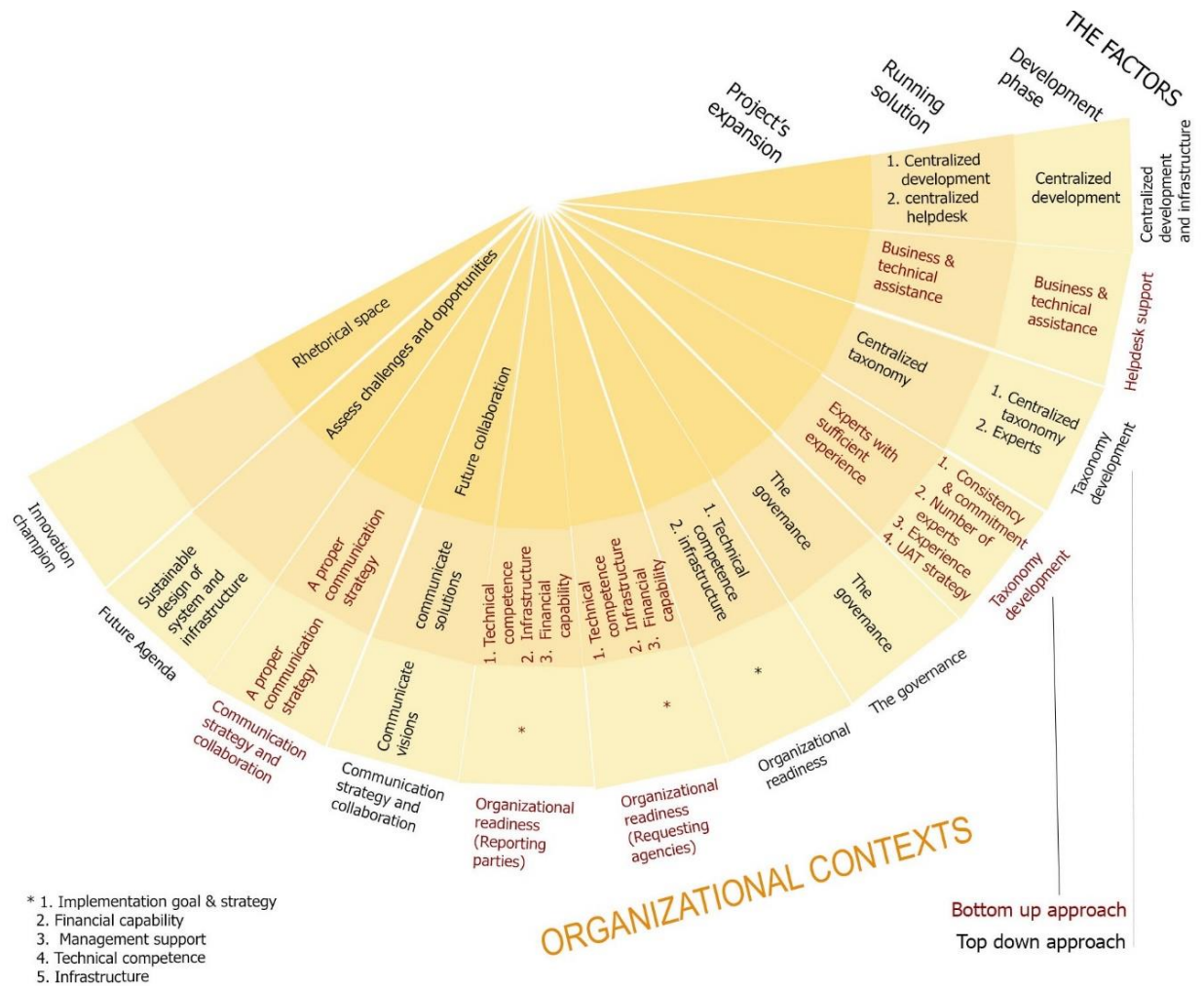


Figure 33: Combination of top down and bottom up approach – Organizational Contexts

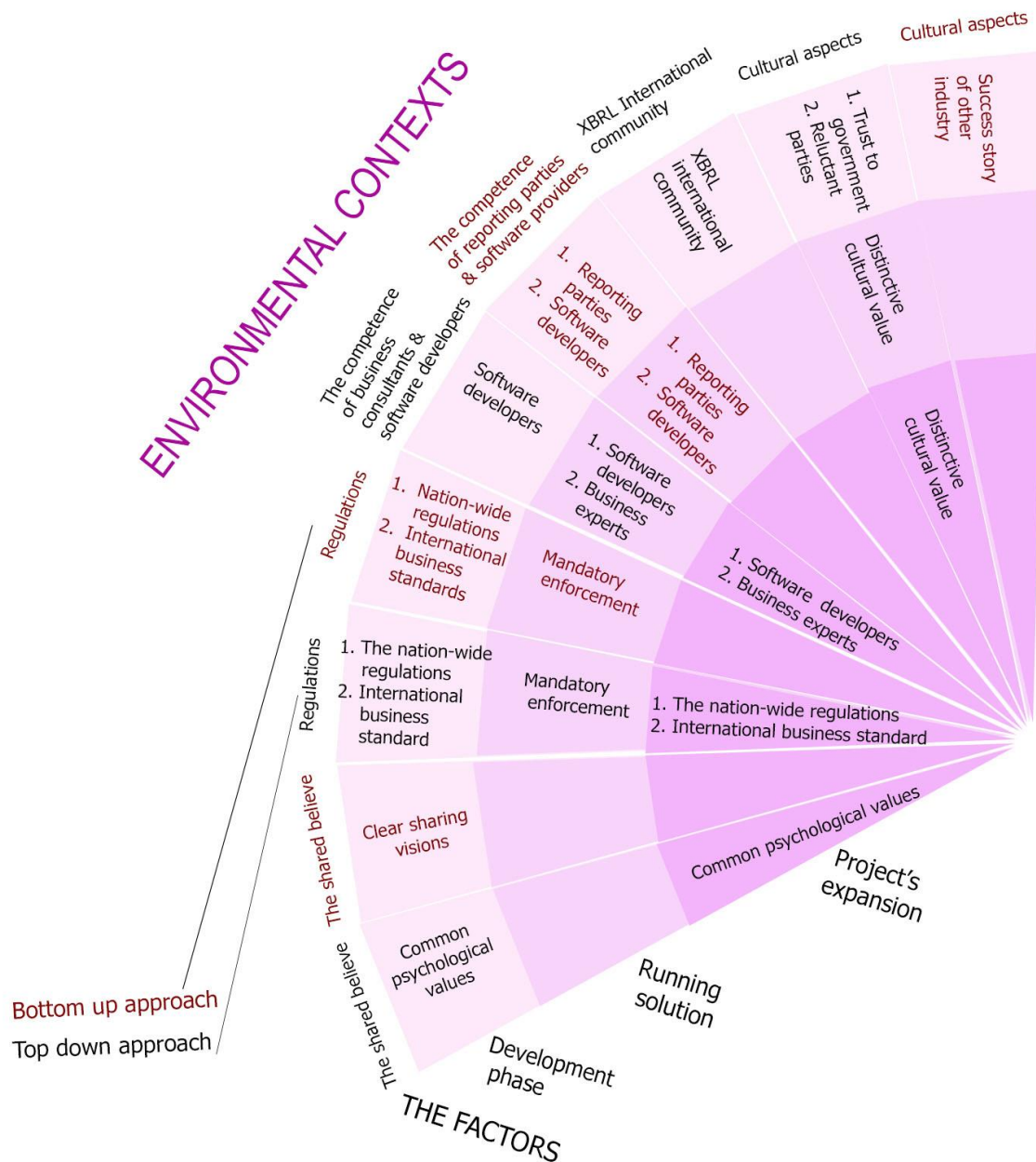


Figure 34: Combination of top down and bottom up approach – Environmental Contexts

7.5.4. How to use the tools

A. For practitioners (societal relevance)

The proposed tool is beneficial for the organizations that intend to apply XBRL as the means to improve their business reporting process. It is applicable to the organizations that want to implement a nation-wide XBRL implementation (top down), or for the organizations that want to implement XBRL to improve business reporting procedure in their domain of authorities (bottom up). This tool can be used by the

practitioner of XBRL in the technical level as well as by the decision maker in the strategic level. For example, for the top-down approach of implementation, the technical level person will be aware of the importance of having a set of stable interfaces due to its role in minimizing the potential technical errors (during the development stage), and its role in reducing the technical adjustment efforts (during the running solution's stage). On the other hand, the people in *the strategic level* will appreciate the importance of having a centralized taxonomy, a standardized rules of information exchange, and a centralized management of IT infrastructure as the mandatory requirements in designing a the country-wide level of XBRL implementation.

B. For researcher (scientific relevance)

The tools that we provide are designed based on two case studies. Therefore, a more case study research is required in order to validate the generality of the developed framework. The researcher can use the framework as a tool to discover a general pattern of factors influencing XBRL implementation. The list from the proposed model is to be used as the guidelines to check the existence of particular factors in the case studies. A sufficient number of case study will be able to provide the results to discover the specific pattern of XBRL implementation. For example, to discover the dominant factors that influence XBRL implementation seen from the technological perspectives, to discover the factors that have the highest degree of influence in the development process, or to discover a pattern that explain the interdependency between actors involved in the project.

CHAPTER 8: CONCLUSIONS AND RECOMMENDATIONS

This chapter summarizes the answer to all the sub research questions to provide a concise yet complete understanding of this study. It is followed by the final conclusions which answer the main research question. The limitation of this research is presented to give the comprehension of the possible improvement of this study in order to generate a more general model. The academic reflection is discussed in order to allow the reader to view this project from a distance, a higher level perspective. We conclude this chapter by providing recommendations for XBRL implementation, and options for future studies.

8.1. Conclusions

8.1.1. Answering the research questions

Due to the need to reduce administrative burdens of financial reporting, a proper information system sharing within organizations is required. The intended system was initially aimed to provide the pool of information resources that support information exchange beyond organizational borders. Traditionally, various formats of data are submitted to a number of systems residing on the requesting party's side. Subsequently, the authorized parties will convert the received data into the format recognized by their system. Due to the variety of requesting parties, the redundant submission is inevitable. In addition to that, several issues emerge, for instance human error input, software compatibility during data exchange, time constraints, and data interpretation.

Based on the literature, XBRL, as the extension of XML language, addresses not only the need for report consistency problems. It also addresses the resource discovery problem and attribute recognition problem, by utilizing the prominent feature of XBRL: the ability to tag the information using metadata and the ability to formulate business rules. A number of research had been conducted in the past two decades to address various aspects of XBRL. The literature shows that the area of XBRL research which has attracted a lot of attention are, among others, future development, processing issues, knowledge issues, and advanced standardization of XBRL. However, there is a lack of research on the process of XBRL adoption and implementation. This research aims to address that gap by exploring the factors influencing the dynamic process of XBRL adoption and implementation. The Netherlands and Indonesia are chosen as the object of the case study due to the contrasting features of both countries in terms of implementation scale and implementation approach. The main question of this research is formulated as: *"How to analyse the factors that influence the implementation process of an XBRL reporting system on a nation-wide level?"* Consequently, a comprehensive explanation is required, starting from the exploration of the factors through multiple case studies, the analysis of the results, and developing a framework that illustrates the factors influencing the process of XBRL adoption and implementation.

In order to structure the discussion that will lead to the answer to the main research question, several sub-questions were designed. Sub-question 1 demands explanation about the domain description of this study, i.e., the concept of XBRL as the application of the Inter-organizational information system (IOS). We answer this question by providing explanation on the concept of IOS and XBRL, and followed by the

discussion that elaborates how to apply XBRL technology in supporting business information exchange. It discusses EDI as the de facto standard of IOS and how it compares with XML, the internet based IOS. The technical and non-technical aspects of XBRL, as the extension of XML, are presented along with the stakeholders' analysis. We conclude this part by emphasizing that the development of XBRL not only creates new perspectives of business reporting activities, but also improves the effectiveness and efficiency of internal and inter-organizational information exchange. Moreover, the flexibility of XBRL creates room for the application of this technology not only for financial reports but also for other business reporting fields.

Sub-question 2 is *“What are the theory of IT adoption models that can support the analysis of factors that influence XBRL implementation?”* In order to answer this question, we analyzed the existing theories of technology adoption and implementation. We present a comparison of established models by providing the definitions, the level of analysis, the main focus, and the limitations of the models. We choose TOE out of other models based on the considerations from the theoretical aspect (i.e., the solid theoretical foundation of TOE, the consistent empirical basis of TOE, and the room for external contexts in the analysis), and considerations from the practical aspect (i.e., the relevance to assess organizational level adoption, free from industry-size, and the potential to investigate the dynamic of project complexity). Specific for this research, the choice for TOE is supported by the following arguments:

1. Out of 11 observed models, only IDT, TAM, IASAM, and TOE are applicable for organizational-level assessment. While IDT, TAM, and IASAM are more focused on making prediction of IT adoption, TOE on the other hand also gives rooms for the discussion of *the process of the implementation*.
2. The choice to adopt XBRL might be an involuntary option from the employee perspective because the decision is made at the management level. TOE framework addresses this involuntary aspect of adoption by examining the external driving force of the projects.
3. The room to explain the external/environmental factors align with the needs to analyze XBRL adoption and implementation which might be influenced by the factors beyond internal and technical aspects.
4. TOE framework is suitable for the assessment of big organizations, hence suitable to assess XBRL technology which is usually implemented in large organizations.

To answer sub-question 3, *the factors influencing IT adoptions and implementations based on the preliminary studies*, we extracted the information from the scholarly articles and classified them using the TOE framework. The understanding of the factors influencing XBRL implementation is substantial because they affect the policy designed by the regulators and technology innovators. We conclude that the diversity of factors influencing XBRL implementation reflects the variety of organizations' culture, the complexity of data management, the various motivations of initial adopters, the complexity of XBRL technology, and the substantial roles of regulations and other external factors.

Sub-question 4 and 5 addressed the empirical part of this study: *What are the factors influencing XBRL implementation in the Netherlands' SBR and in Indonesia's LSMK-LBUS?* The list of factors that influence the process of XBRL adoption and implementation is presented in Table 20. This table is derived from the case study results and the literature. Furthermore, we answer sub-question 6, which is also the main

deliverables of this research, i.e., the framework that show the complexity of relationship between the general stages and the factors influencing each stage. The framework, along with the detail explanation of how to differentiate the role of the factors in each stage, constitutes a tool for process analysis. The designed tool is beneficial for the academic purposes as well as for practical implementations.

8.1.2. Academic contributions

The followings are the contributions of this research to the academic study:

1. Confirming the results of this study with the finding from the previous studies

By comparing the results of this research with the list of factors from the previous studies (Table 8), we found that several factors influencing XBRL implementation in this study can also be found in the preliminary studies. For example, supporting software, organizational readiness (implementation goal and strategy, management support, financial capability, human competence, technical capability), innovation champion, regulation (includes incentive scheme), available support on XBRL components, successful adoption of other organizations, and support from XBRL international.

2. Adding the list of factors influencing implementation of XBRL

Furthermore, the results of this research provide academic contribution to the existing literature by adding a number of factors that have not been recognized from previous studies. Among these are the importance of an XBRL validator, the system that is able to process large XBRL instance documents, the centralized infrastructure with stable interface specifications, the features of XBRL technology that support the sustainability of business reporting system in various domains, a centralized service center, a proper taxonomy development strategy, project's governance, an agenda for future development, a communication strategy, the shared believe, and the competence of reporting parties and software providers.

3. Proposing a conceptual model of factors influencing XBRL implementation process

This research proposes a framework that describes the factors influencing *the process* of XBRL-based reporting system adoption and implementation in a nation-wide level.

8.1.3. Societal relevance of the project

The result of this study is beneficial for the organizations that intend to apply XBRL as the means to improve their business reporting process. It provides contribution in two level of perspectives, i.e., the strategic level and the technical level. From the technical perspective, this study provides a high level explanation about the mandatory components required to build an XBRL-based reporting system. Even though we do not present a very detailed explanation regarding the technical issues, we argue that this study is able to describe *the required building blocks* of an XBRL-based reporting system. For example, the intended solution should consists of, at least, two main building blocks: the system to create and submit XBRL documents (developed by the software providers to support the reporting parties), and the system to validate and to process the submitted XBRL documents (provided by the requesting parties). This research also examines several desired conditions to support the technical aspects of system development, for instance the importance of a stable interfaces, the role of a centralized service center and helpdesk assistance, and the importance of the supporting software.

From the strategic perspectives, we argue that XBRL implementation is a complex project which not only has to deal with the advanced technologies, but also needs to handle the interests of various stakeholders. As a result, the proper strategy of project management is mandatory. This study considers several factors that constitute *the structural foundations* of the project management, i.e., the governance of the project, the regulations, the shared vision, and the readiness of organizations. *The regulations* and *project's governance* serve as the legitimate foundations to ensure the project comply with legal aspect and business standards. *The shared visions* functions as the bounding mechanism that affects implementation goal and strategy. *The readiness of organizations* reflect the preparedness level of organizations concerning the financial capability, human competence, technical capacity, and support from management.

8.2. Research limitation

The proposed tool of analysis is designed for the academic purposes as well as for practical applications. However, there are several limitations that have to be taken into consideration:

1. This model cannot be applied to the general case of XBRL implementation due to the limitation in the number of case studies, the limitation in the scale of implementation, and the limitation in the type of respondents. In order to make it more general, we recommend the following suggestions:
 - a. Increase the number of case studies. The future researchers needs to include the cases of implementation in various countries and various type of industries, with an emphasis on investigating *the dynamic process* of implementation. By doing so, we will be able to formulate *the general patterns* that explain the presence of specific factors in each of the TOE contexts.
 - b. Pay more attention to the software providers. Based on the results of the interviews, we found that the software providers play crucial roles in the implementation process due to their support in the initial development, during the adjustment due to changes in standards and regulations, during the testing with various kinds of testing environments, in the socialization, and operational and maintenance. Due to the limitation in time, we have not interview any software providers.
 - c. Conduct quantitative studies in order to verify the model that we develop. The surveys and questionnaires should include the Likert scale in the questions, in order to give the weight to the finding factors. By doing so, we will be able to make a one-to-one comparison of the level of importance of each factor.
2. The final list of the factors that we present in chapter 5 and chapter 6 are based on the literature review and the results of the interviews. For a more comprehensive data analysis process, the final list of factors influencing XBRL implementation in both countries could be verified, commented, or enhanced by other XBRL practitioners in both countries who were not involved in the interviews, for a more balanced insight.
3. The interview questions are designed to be open-ended questions. We did not mention any factor from literature or preliminary studies as it might affect the opinion of the respondents. On the one hand, we can assure that the list that we provide really reflects the importance of these factors for the respondents. On the other hand, we are not able to make a one-to-one comparison regarding the existence of a particular factor in both cases. This limitation can be covered by the survey of quantitative research by the future researchers.

4. For the case study of the Netherlands, we identify three general stages of XBRL implementation, namely the development phase, the running solution, and the future expansions. We argue that this general pattern is applicable for all case of XBRL implementation process. Unfortunately, this general pattern cannot be discovered in the case of Indonesia due to the changes in the structure of the government agencies in the middle of project's development. As a result, we cannot show the factors influencing the third phase, i.e., the future expansion due to the unavailability of the information. This limitation can be covered by conducting other case studies with the similar characteristic (bottom up approach).

8.3. Reflections

We contemplate several insights regarding the results of this study. It comprises *the macro perspective* of XBRL implementation, i.e., the role of XBRL in improving the sustainability of a country, and *the micro perspective* of XBRL implementation, i.e., the identification of the dominant factors influencing XBRL implementation. We also contemplate the relationship between this research and the MOT program of TU Delft.

The role of XBRL in improving the sustainability of a country

The main philosophy of XBRL is about the standardization of information formats which leads to the improvement of processes (i.e., efficiency), and improvement of information contents (i.e., data quality). Apart from various benefits of XBRL implementation, we believe that the benefits of XBRL is far beyond the reduction of administration cost and burden. We argue that, the successful implementation of XBRL in a country may lead to the sustainability of that nation. One of the examples is in terms of the tax reporting system. With the high quality of data provided by an XBRL-based system and by the help of the mandatory enforcement to pay the tax and the law enforcement for violation, the implementation of XBRL for tax reports has the potential to improve the revenues of a country. The revenues can be used to build public infrastructure, and eventually lead to an improvement in the quality of live. The next example is in terms of resource allocation for public subsidy. By implementing XBRL, a country will be able to cultivate reliable information regarding the population, age range, income, health condition, and disease trends in particular regions. As a result, a more effective allocation of public subsidy is possible.

We can also expand the example to various aspects of social life, for instance public expenditure allocation for education facilities, and optimizing the revenues of a country from customs. The main idea is that the application of XBRL increases the possibilities to maximize the country's revenues and to improve the efficiency of the state expenditure, with the ultimate goal to improve the prosperity of the people which leads to the sustainability of a country. For the case of the Netherlands, the adoption of SBR has proved to save EUR 350 Million of the administrative burden of business reports by the year of 2014 (Sajjan & Dixit, 2014). This is align with the commitment by the Netherlands' government to reduce the administrative burden of businesses by 25 percent by applying three big tickets, i.e., the implementation of XBRL based reporting system, the integration of social contribution collection with tax payment, and the mandatory enforcement of e-filing (OECD, 2008).

The identification of the dominant factors

One of the interesting side-findings during the analysis of the empirical results of the study is the identification of *the dominant factors*. We define the dominant factors as the factors that have a stronger influential power in the process. We argue that the implementation of an XBRL based reporting system in a nation-wide level will be unlikely possible without the existence of these factors. We propose three clusters of the dominant factors influencing XBRL implementation, namely (1) the factors which functioned as *the core part the system*, (2) the factors which functioned as *the structural foundation of project management*, and (3) the factors which has *the highest influential power* toward other factors. We present the proposed model in Figure 35. However, more case study research is required in order to strengthen the validity of the clustering. Therefore, we provide it here as the part of project’s reflections that can also trigger the future research.

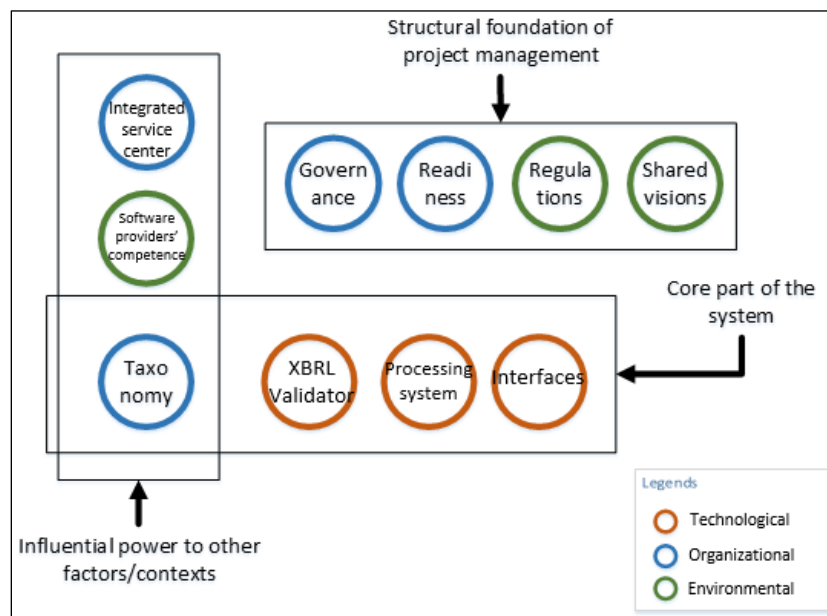


Figure 35: Dominant factors influencing implementation of XBRL

Relationship with MOT program

XBRL framework can be considered as one of the cutting-edge innovations in the financial reporting system. XBRL is an innovation in terms of reporting *business process* and reporting *information system*. In terms of the business process, XBRL enables the revolution of the procedure in business reporting mechanism from the perspective of the requesting parties (for instance the government agencies) and from the perspective of the reporting parties (information providers). By using XBRL, there is an improvement in administrative efficiency by minimizing the cost of reporting process, simplifying reports’ preparation mechanism, improving reports’ validation, and saving time. A research by Sajjan & Dixit (2014) shows the saving of EUR 350 Million due to the implementation of the Netherlands’ SBR. XBRL implementation leverages the standard of business reporting process by promoting the principle of transparency, i.e., the reports produced by XBRL are intended for public consumption

In terms of the reporting information technology, XBRL contributes to the innovation in the efficiency of software development. With the flexibility in the tagging process, i.e., XBRL enable the tagging of any kind of business information. As a result, a software developed in a specific information domain can also be used in other information domains as long as they refer to the same set of taxonomy, follow the same format of business reports, and refer to the same set of business rules. For the case of SBR, the software developed for the Tax and Administration Office can also be used to submit the XBRL-based report to the Chamber of Commerce (annual report) as well as to the Central Statistics of the Netherlands because the three government agencies are referring to the same set of taxonomy, business rules, and infrastructure. This kind of efficiency is unlikely to be achieved without the use of XBRL.

8.4. Recommendations

This research contributes to the theoretical aspect of XBRL implementation by proposing a conceptual model that describes the factors influencing XBRL implementation in two case study. Moreover, issues at the practical level also need to be taken into account. The followings are several recommendations for the practical aspects of XBRL implementation:

A. Recommendations for the technical aspects of implementation

1. Standardization at the data level

There is a need to define a centralized building block of taxonomy for all types of information. In order to do so, a dedicated team must be established to design and develop the XBRL taxonomy. The common definitions must be agreed upon by the experts from various fields to prevent any possible disagreement in the future. A proper governance and communication strategy must be defined to regulate the collaboration and coordination among stakeholders during the process of formulating the business terms.

2. Standardization at the level of information processes and technology

In order to reap the maximum benefits of XBRL, the standardization process should not just stop at the data level (taxonomy). It should also addresses the centralization of information processes as well as infrastructure. As a result, the business processes will be standardized, and the maintenance costs of the technology will be reduced.

B. Recommendations for the strategic and managerial aspects of implementation

1. Build inter-organizational discussions

The potential implementation of XBRL at the nation level must be started by the awareness of the government agencies about the expected benefits of XBRL technology. In order to do so, inter-organizational discussions or seminars between government agencies or regulators could be conducted as the initial step to establish the shared visions.

2. Start big

It is recommended to start the implementation of XBRL with the biggest requesting party, i.e., the institution which demand reports from a huge number of customers, for example tax offices, the central banks, or the country's audit board. By doing so, the most complicated needs for the taxonomy and the infrastructure would have been defined since the early stage of implementation.

3. Specialization of expertise in the organizations

The readiness of the organizations is highly dependent on the organizational structure that supports the emphasis on specialization of expertise in the development stages. For example, a dedicated team of application architects is mandatory to design the proper system, a devoted team of information architects to design the taxonomy, and a dedicated team of application developers to build the intended system.

8.5. Future research questions

Based on the conclusions and the reflections of this research, we formulate the followings potential future research questions:

1. “How to design a conceptual model that explains the relationship between the stages of XBRL implementation and the factors influencing each of the stages?”

This master thesis is specifically focused on finding the presence of factors in the process of XBRL implementation. We also formulate the relationship between the general stages and factors influencing each stages. Furthermore, in order to make it more general and to improve the validity of the generality of the model, more case study is required. In order to propose a general pattern of relationship between *the stages* and *the influencing factors*, a sufficient number of case studies is required.

2. “How to explain the dominant factors influencing the implementation of XBRL?”

A quantitative study with surveys and questionnaires can be conducted to grade the value of each factors and to make the comparison of the grade between factors. The questionnaires should be distributed to a number of XBRL practitioners in various countries.

3. “How to explain the strategy to handle the issues regarding the implementation of the large XBRL instance documents?”

The implementation of large XBRL instance documents is a relatively new topic in the XBRL field of study. A dedicated research can be performed to investigate the nature of the issues, the causes, and the potential strategies to handle with these issue. The researcher might be interested to know what determines the size of the instance documents, the possibilities of simplifying the reports’ format, the chance to redesign the business reports, and other potential strategies that might reduce the size of the data.

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APPENDIX A – INTERVIEW QUESTIONS

Topics to be addressed during the Interviews:

- A. General Questions, including but not limited to:
 - 1. What are the main objectives of the implementation of this system?
 - 2. What are the triggers of the implementation of this system?
 - 3. Are there any milestones in the system implementation? If yes, what are they? In which milestone is the current status?
 - 4. What are the benefits for the organization to implement this system? How?
 - 5. Who is the system owner? Who is responsible with implementation cost? Is there any guidance of implementation? Any sharing or workshop to help user? Any specific requirements before implementing the system?
 - 6. Who is the one who operate and maintain the system? Does your organization consider to be more active in this case? Why?
 - 7. Can you tell us the involved actors and stakeholders of the system?

- B. Technology context questions:
 - 1. Is there any technological barrier in implementing the system? How can your organization overcome such barrier? Is there any help from system owner? If yes, how?
 - 2. What are the impacts of the barrier(s) toward the implementation process? Is there any additional cost to overcome this kind of barrier(s)?
 - 3. Would you like to tell us the IT architecture of the system? Do you know why such architecture is chosen for this system? What are the differences between this system and previous one in term of IT architecture? Is there any changes during the implementation process, if yes what and why?
 - 4. Is there any specific software and hardware required to implement the system? Who is the provider? Who is responsible to ensure the interoperability of the system?
 - 5. Would you like to describe the activities of reporting process? For example: how many forms must be submitted, the frequency of each form, the timeliness of each form, and the reporting mechanism for each form.
 - 6. Who is responsible in developing the taxonomy? Is there any user involvement in that process? Do you think this is important for users to be involved in taxonomy development?
 - 7. How the system ensures the privacy and security of the users, or sensitive data shared by users?
 - 8. Do you think the current condition is suitable for financial reporting obligation? If there is an improvement in term of technology, what would it be?

- C. Organization context questions:
 - 1. How can you align the implementation of this system with your organization strategy?
 - 2. How many users of the system in your organization? Including in your regional branch offices.
 - 3. How is the resource management for system's implementation? How do you deal with the skills and knowledge required to operate the system? Does your organization need to make changes to implement the system? Why and how?
 - 4. What are the organizational barriers in implementing the system? How can your organization overcome such barrier? Is there any help from system owner? If yes, how?
 - 5. What are the impacts of the barriers to the implementation process? Is there any additional cost to overcome this organizational barrier(s)?

6. Would you like to explain how your organization top-level management supports the implementation of the system?
 7. Is there any formal meeting for the coordination or the collaboration purpose with system owner and other stakeholders? If yes, how often? Can you explain the decision making procedures?
 8. In your opinion, in addition to those discussed above, is there any other important things, especially in organizational context, that may affect the implementation process of the system?
- D. Environment context questions:
1. (Indonesia) In accordance with the change in Bank supervision from BI to OJK since 2013, what kind of impacts perceived by the organization?
 2. Is there any mandatory enforcement in using the system? Is there any changes during the implementation process? If yes, why and how?
 3. Related to question no.2, can you tell us the regulation(s) that mandate your organization to send your reports via the system? Is there any sanction should the reporting parties fail in the reports' submission?
 4. Do you think that your organization decision to implement the system also being influenced by your competitor?
 5. How about the image of your organization in the market, do you consider it as an important factor that affect the implementation of the system?
 6. Is there any political situations that affect the process of implementation?
 7. How is the support from the government?
 8. Is there any strategic issue with respect to the alignment of taxonomy creation with international accounting standard (IAS) or other international standards?

APPENDIX B – THE EXISTING THEORY OF IT ADOPTION MODELS

The innovation and diffusion theory (IDT)

This theory was presented by Rogers (1962; 1995) to illustrate how the ideas and technology spread among individuals or organizations. This theory has become one of the main references on multiple disciplines, especially the diffusion studies (Orr, 2003). Individual beliefs and perceptions toward a particular innovation influence their decision for adoption (Agag & El-Masrya, 2016). Rogers (1995) elaborates five attributes that play important roles in adoption decision, i.e., the relative advantages, the trial ability, the complexity, the compatibility, and the observability. At the firm/organizational level, IDT explains that the innovativeness of the organization is influenced by three main contexts, i.e., the managers/leaders, the structure of the organization, and external factors (Rogers, 1995).

The Theory of Reasoned Action (TRA)

TRA was developed by Ajzen & Fishbein (1975) to address the individual attitudes and normative factors. The actions are believed to be performed consciously by the individuals (Ajzen & Fishbein, 1980). TRA emphasizes that users behave rationally in making decisions for technology adoption (Hossain & Quaddus, 2011). The major challenges in this model are the need to define precisely *the salient beliefs* that influence attitude and subjective norms, and a limited focus on controllable and uncontrollable environmental variables (Bagozzi, Davis, & Warshaw, 1989).

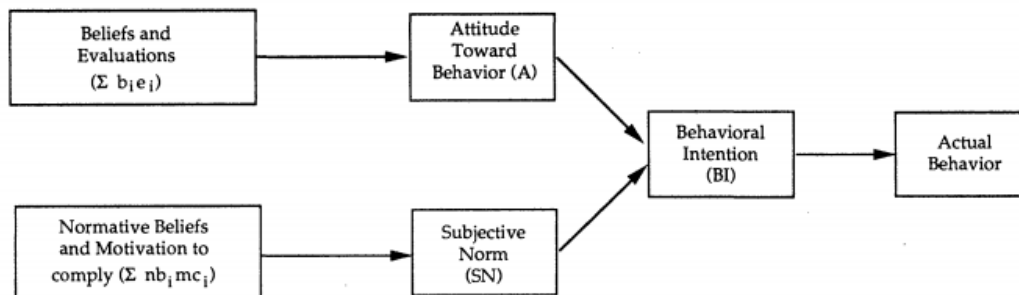


Figure 36: TRA (Bagozzi, Davis, & Warshaw, 1989)

The Theory of Planned Behavior (TPB)

TPB is an expansion of TRA by including *the perceived behavioral control* in the model (Hossain & Quaddus, 2011). In spite of the superiority of TPB model comparing with the TRA, TPB has some nature limitations such as TPB deals mostly with the voluntary adoption (Hossain & Quaddus, 2011). Hence it is not likely to be used in involuntary adoption analysis, such as the mandatory technology in a particular organization. In addition to that, TPB model is relatively more complicated comparing with the other model with similar predictive ability such as TAM, to be presented below (Davis & Venkatesh, 2000).

Expectation Confirmation Theory (ECT)

This model was initially designed for the marketing discipline to explain the factors influencing customer satisfaction on a particular product (Bhattacharjee & Premkumar, 2008). In the IT adoption context, a number of empirical studies were conducted to validate the model such as in the online banking research

(Bhattacharjee, 2001), web customer satisfaction (McKinney, Yoon, & Zahedi, 2002), and IT usage in general (Bhattacharjee & Premkumar, 2004).

Expected Confirmation Model (ECM)

The main idea of this theory is the argument that user's intention to keep using a particular technology is greatly influenced by *the satisfaction level* and *post-usage perceived usefulness* (Hossain & Quaddus, 2011). In contrast with TAM model which explains user behavior based on a forward-looking perspective, ECM investigates individual behavior by applying backward-looking perspective (Bhattacharjee & Premkumar, 2008). Hence, each of them (TAM or ECM) provides *a partial understanding* in explaining user's behaviour toward IT adoption (Bhattacharjee & Premkumar, 2008).

Technology Acceptance Model (TAM), TAM 2, and TAM 3

It was developed by Davis (1989) to explain two important factors influencing user decisions in accepting technology, i.e., *perceived usefulness* and *perceived ease of use*. Partala & Saar (2015) explain that the original version of TAM, which was developed based on the TA model by Ajzen & Fishbein (1975), emphasizes how the degree of personal impressions affect technology adoption. One of the limitations of original version of TAM is the exclusion of *subjective norm* as the direct determinant in influencing individual behavior whereas the perceived norm might affect the degree of compliance in a particular system (Bagozzi, Davis, & Warshaw, 1989). Moreover, this model pays more focus on initial adoption instead of continuous usage of a technology (Bhattacharjee & Premkumar, 2008). In addition to that, TAM is mostly dealt with the voluntary adoption (Hossain & Quaddus, 2011) and does not take into account the qualitative, emotional, and cultural components as the influence factors of actual behavior (Ward, 2013).

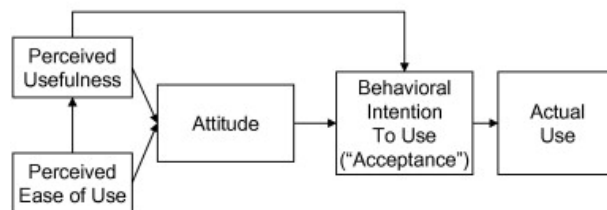


Figure 37: Theoretical framework of TAM (Davis & Venkatesh, 2000)

The original version of TAM was expanded by Davis & Venkatesh (2000) by investigating *the external factors* in explaining the technology adoption decision. The new model (TAM 2) explains the impact of the social influence towards technology adoption decision (Davis & Venkatesh, 2000). Furthermore, TAM 2 was enhanced by Bala & Venkatesh (2008) in order to provide more comprehensive factors in explaining individual acceptance of technology. They explain *the importance of the intervention*, i.e., pre-implementation and post-implementation intervention, in IT adoption process in the company. This new model (TAM3) has the main focus on how the intervention by the organization can help employees to make a better decision on technology adoption (Bala & Venkatesh, 2008).

Technology, organization, and environment model (TOE)

TOE model was introduced by (DePietro, Rocco, Wiarda, & Fleischer, 1990), even though often cited as Fleischer & Tornatzky (1990). It investigates three contextual factors that influence the adoption of a particular technology, namely technological, organizational, and environmental context.

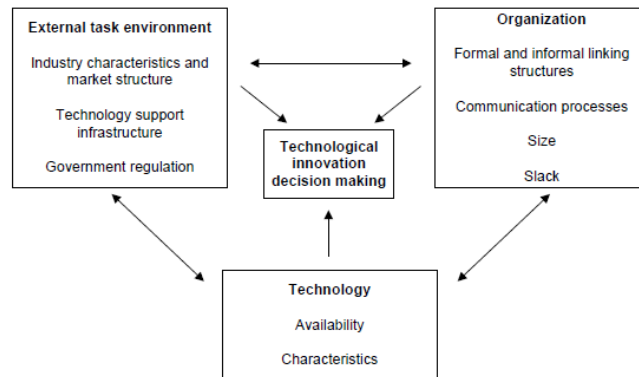


Figure 38: Technology, organization, and environment framework (Fleischer & Tornatzky, 1990)

The technological aspects comprise existing IT infrastructure and readiness to novelty; the organizational factors cover not only organization parameter (size and structure) but also perceived barriers; the environmental aspects address production improvement, products and service enhancement, competitive pressure, and regulations (Li, Li, Wang, & Zhang, 2016). The environmental context is the arena of the business, hence the influencing factors involving the competitor, industry, political conditions, culture and norms, relevant local contents, economic conditions, and government regulations (Arpaci, Ozkan, Turetken, & Yardimci, 2012). TOE framework includes environmental context in the analysis, hence it becomes better able to explain external and intra-institutional innovation adoption (Martins & Oliveira, 2011). TOE is considered by Dedrick and West (2004) as ‘a useful analytical tool for distinguishing between inherent qualities of an innovation itself and the motivations, capabilities, and broader environmental context of adopting organizations’ (Doolin & Troshani, 2007, p. 201).

Unified Theory of Acceptance and Use of Technology (UTAUT)

Davis, Davis, Morris, & Venkatesh (2003) introduced the Unified Theory of Acceptance and Use of Technology (UTAUT) model by integrating elements across eight different models in order to provide a more useful tool in understanding the determinants of technology acceptance. These eight existing models are TRA, TAM, Motivational model, TPB, integration of TAM and TPB, PC utilization model, IDT, and Social cognitive theory (Davis, Davis, Morris, & Venkatesh, 2003). The comparison is being conducted to investigate the individual acceptance towards IT systems, and the empirical study has shown the superiority of UTAUT comparing with the other eight preceding models (Ginters, Lescevic, & Mazza, 2013). Figure 39 illustrates eight determinants that influence the individual behavior in IT adoption.

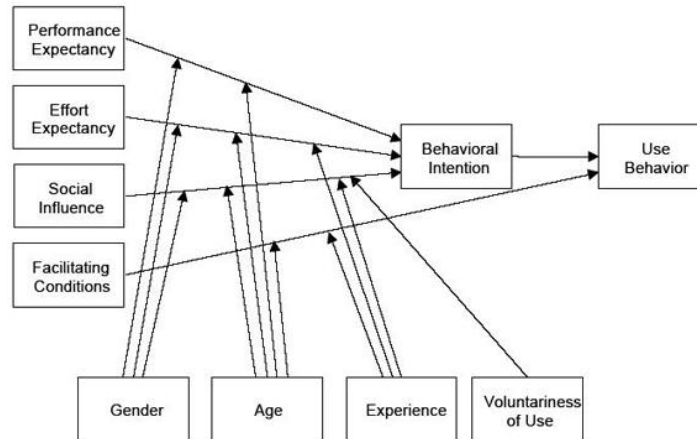


Figure 39: UTAUT (Davis, Davis, Morris, & Venkatesh, 2003)

Integrated Acceptance and Sustainability Assessment Model (IASAM)

IASAM was designed by the Socio Technical Systems Engineering Institute at Vidzeme University of Applied Sciences to assess technology acceptance and sustainability (Barkane, Ginters, & Vincent, 2010, p. 359). This model was introduced in the framework of the European FP7-ICT-2009-5 CHOREOS project No. 257178 (Barkane, Ginters, & Vincent, 2010), as the FP7 European program to design a large scale design of the internet (CHOReOS, 2009). IASAM evaluates socio-technical factors that affect the failures in the development phase, implementation phase, and maintenance phase of technology by consolidating the UTAUT model with other factors (Aizstrauta, Celmina, Gintersa, & Mazza, 2013).

This model integrates socio-economic aspects and socio-technical aspects in the design (Aizstrauta, Eroles, & Gintersa, 2015). It states that the combination of individual psychological aspects and socio-technical factors provides a better understanding of ICT adoption (Aizstrauta, Celmina, Gintersa, & Mazza, 2013). IASAM consists of four types of determinants that influence both technology acceptance and sustainability, those are Management, Quality of Technology, Technology Acceptance, and Domain development and societal processes (Aizstrauta, Celmina, Gintersa, & Mazza, 2013). Technology sustainability is the concept to assess *the long-term usage of technology* (Aizstrauta, Eroles, & Gintersa, 2015).

APPENDIX C – SBR

I. Report once vs set up once

The following figure illustrates the difference between *report once* (what many people assume SBR is) and *set up once* (what SBR really is). The figure and the explanation are being re-constructed based on the interview with an expert in data auditor in the Netherlands' Tax and Administration Office (Expert, 2016).

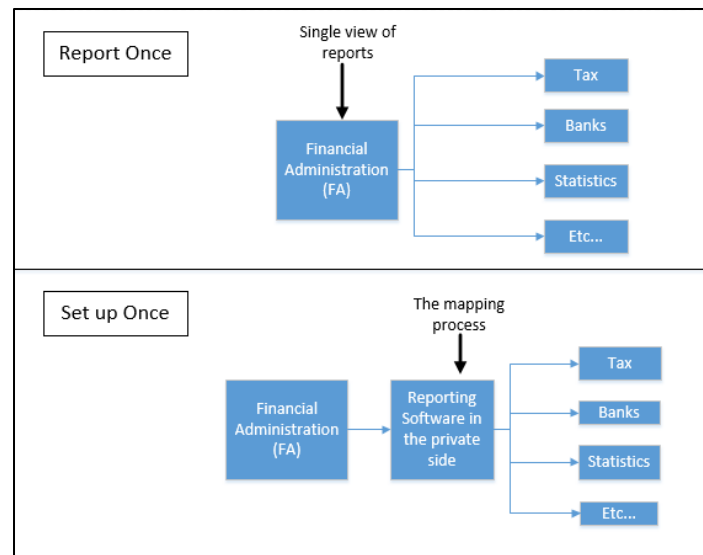


Figure 40: Report once vs set up once

1. Report once (what many people assume SBR is)

This term is also called *single window* (Expert, 2016). For instance, in order to report the instance of *the wage tax*, there was only a single view for this report in the database of the corporation. These streams of data elements will be submitted to different governmental bodies, for example the Tax and Custom Office, the Governmental Municipality, and the Netherlands Statistics. Consequently, a number of governmental bodies receive the single view of data (Expert, 2016).

2. Set up once (what SBR really is)

We need to only create one mapping, i.e., the mapping of *the chart of accounts* used by a company to *the referential set* provided by the regulators (Expert, 2016). The XBRL taxonomy provided by the government (i.e., SBR Taxonomy) is used as the reference. The taxonomy maintains the set-up of data elements from different angles of different bodies. As a result, the one-time mapping process in the beginning enable us to make reports to various agencies based on the guideline from the taxonomy (Expert, 2016). For example, an agency requires a report that consists of information of the assets, the liabilities, and the profits in a certain format; whereas another agency requests the report of the same information with different accumulation level (Expert, 2016).

II. SBR implementation stages

SBR Program

The term 'SBR' was introduced in 2009 with the goal to improve the credibility of the initial program (National Taxonomy) in the business reporting field (Bharosa, Wijk, Winne, & Janssen, 2015). It continues the initial goal of the Netherlands to build a standardized business reporting process and a shared building block, in addition to data standardization (The Netherlands SBR, 2015). Based on the interview results, we conclude five stages of the SBR program:

1. Initial phase of SBR program
2. SBR projects, a repetitive cycle for each reporting domain:
 - a. The exploration phase
 - b. The detail design phase
 - c. The pilot phase
 - d. Wide scale implementation
3. Running solutions
4. Project evaluation
5. Future roadmap

SBR Projects

SBR program consists of multiple projects from multiple domains, for example the tax domain and the statistic domain. Several projects under the SBR program have finished the implementation process and become the running solutions, while some others are still in progress. Based on the information from the book, *challenging the chain* (2015), there are four stages of projects' implementation: (1) the exploration phase, (2) the detail design phase, (3) the pilot phase, and (4) the wide scale implementation. SBR provides the detailed guidelines for all of the stages. The deliverables of the first stage is *quick scan documents* that consist of the answers to the questions which investigate the potential of a particular candidate reporting domain to join SBR program. The second stage provides the detail design for the new information chain. The next stage is the pilot project (small scale implementation). The positive result of the pilot project is a legitimation to move to the final stage of project's implementation, namely large scale implementation.

The maintenance and the evaluation of the running solutions are handled by Logius. During maintenance and evaluation, various assessments are conducted to determine whether the system has met the predefined criteria. Among these are the easiness of message exchange processes, the structure of the information, and the ability of the infrastructure to deliver the messages instantly.

III. SBR timelines of key events

The initiative of the program had been started in 2002 when the Dutch government recognized the potential of XBRL technology to simplify business reporting process. At the initial phase, there were various projects relevant to the current SBR (Bharosa, Wijk, Winne, & Janssen, 2015). However, the National Taxonomy, which was initiated in 2004 can be considered as a concrete starting point of SBR, with the main idea to have a common set of definitions for data exchange. At the same year, the design for Generic Infrastructure (GEIN) was also started. In 2006, the design for GEIN has completed and the Netherlands release the first version of the Netherlands Taxonomy (NT). During 2006 numerous meeting

had been conducted to establish the public-private covenant between the government, intermediaries, and software developers. The common goal was the adoption of the Dutch XBRL Taxonomy for business reports. GBO.Overheid, a public service center that has responsibility to provide various public e-services in the Netherlands, was appointed to be in charge of the development of both the taxonomy and shared infrastructure. Since then, the focus of NTP was expanded to business process standardization in addition to the data standardization. In 2007, Small and Medium Enterprises (SMEs) in the Netherlands joined the covenant.

In 2008, the development of digipoort was started. Digipoort is an ICT center where the message traffics for the government is settled. Governments can use Digipoort to automate business and supply chain processes. The year of 2009 is another important year in the history of SBR, because the government started to use the term 'SBR' to replace the initial name (NTP) along with the declaration of the redefined objective, i.e., a generic system to system message exchange (S2S). The government also decided to expand the use of SBR for the Chamber of Commerce and the Netherlands' Statistics in addition to the tax declarations. In 2010, the large scale of SBR implementation was started and GBO.Overheid became Logius (renamed). A large volume of XBRL messages within the financial domains were involved in the system.

In 2011, 87.000 value added tax (VAT) declarations and 3.500 financial statements were processed through the system. The operational issues then become part of the focus of the program due to the high number of message exchange. At the same year, the government decided to mandate the use of SBR as the exclusive channel for tax and customs reports per 2013, and as the exclusive channel for VAT per 2014. SBR started to expand the potential use of XBRL in non-financial fields in 2012, and Chamber of commerce prepared to mandate the use of SBR in 2017. In 2013, more than 2.7 million business reports had been submitted to SBR, and many more to come. Since 2014, SBR committee started the design of SBR expansions in various domains (see Figure 17, SBR Roadmap 2020).

APPENDIX D – LSMK - LBUS

I. BI as one of the Central Banks that implement XBRL

There are five active XBRL Jurisdiction¹³ members in Asia and Oceania namely China, Japan, Korea, Australia, and India (Wada, 2012) as part of 22 active jurisdictions all over the world (Andone & Enachia, 2015). In addition to that, Indonesia, Iraq, Malaysia, New Zealand, Singapore, Taiwan, and Thailand are also implementing XBRL (Wada, 2012). In contrast with XBRL project in the Netherlands which is part of the national agenda, the XBRL implementation in Indonesia is conducted separately by several institutions. The Central bank of Indonesia has started the XBRL project since 2010 (Bank Indonesia XART, 2015). The Indonesian Stock Exchange (IDX) officially launched their XBRL reporting system on 2014 by implementing the Indonesian Financial Accounting Standard (PASK) taxonomy that complies with IFRS¹⁴ (Nitchman, XBRL International, 2015). The Indonesia Financial Service Authority (OJK) is currently in the process of developing the Integrated Financial Reporting Project for all of the financial institutions in Indonesia (Buchori, 2014), see also (Utami, 2015).

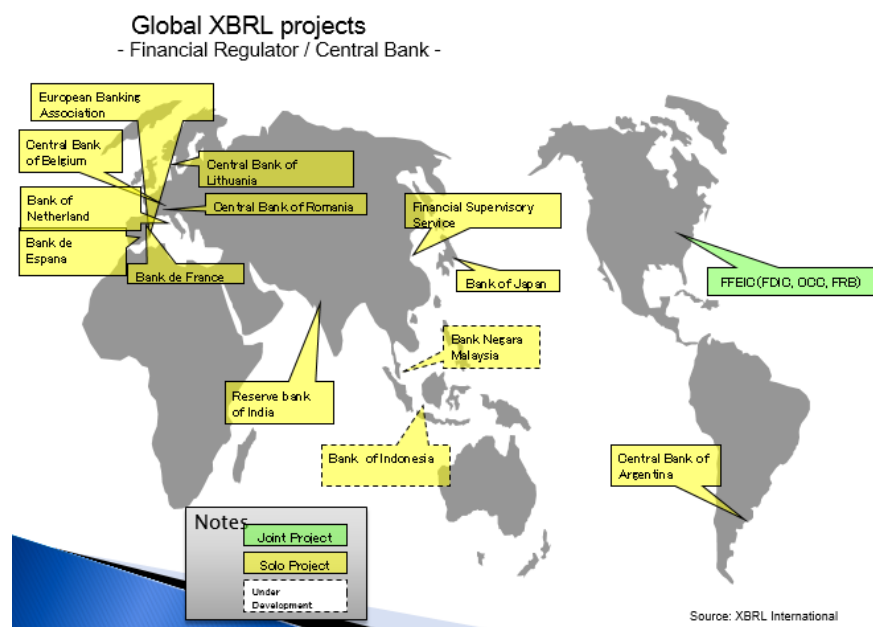


Figure 41: Global XBRL projects for financial regulator/Central Bank (Wada, 2012)

From international perspective, XBRL project in Bank Indonesia is one of the financial regulator projects together with other 13 central banks all over the world (XBRL International, 2015), see Figure 41. BI is also considered as one of the first financial institutions in the world that implements a large XBRL instance processing by combining the data from 34 Sharia Banks (more than 500 fillers), in which for the case of loan statement can have the size more than 1 GB (Koizumi & Saito, 2013). From the country's perspective,

¹³ XBRL Jurisdiction is non-profit organizations based on countries or region, with the main role to promote XBRL to institutions/firms (XBRL International, 2011)

¹⁴ IFRS is the set of accounting standards developed by International Accounting Standard Boards (IASB) to be used by global community as the guideline for financial performance comparison of public listing companies (IFRS, n.d.)

BI is the first institution that implements XBRL in Indonesia (Sugalih & Pahlisa, 2015). BI started their XBRL project (LSMK-LBUS) in 2010 preceded by the development of XBRL taxonomy (Bank Indonesia XART, 2015).

II. LSMK-LBUS timelines of key events

Figure 21 describes the important events of LSMK-LBUS implementation:

1. 2010 – 2011

In response to the issue of inefficient reporting processes, weaknesses in data management, inflexible modification, and longtime process of system enhancement, BI started to design XBRL-based integrated reporting system in 2010 (Sugalih & Pahlisa, 2015). During 2010-2011 BI conducted various activities to improve XBRL competence in the organization. Among these are attending XBRL International's seminars and workshops, assigning XBRL training, joining XBRL International as direct member, and conducting comparative studies to other central banks.

2. 2012

The development of LSMK-LBUS, as the first project of XBRL-based integrated reporting system, was started in 2012. It comprises several main activities, such as *the projects' kick off* to improve stakeholders' awareness on the benefits of XBRL, the development of XBRL taxonomy, and the development of standard reporting platform (SRP). In addition to that, BI also sought advice and support from local, regional, and international XBRL community. Furthermore, as part of the task to build the system that able to process large XBRL instance documents, BI needed to find the proper XBRL validator vendor. It spent 16 cycles of POC during 1 year of period to find the most suitable candidate. In 2012, BI also started the endorsement of fillers' XBRL readiness through awareness program, coaching clinic, and testing involvement for report submission.

3. 2013

The development of web-based system for capturing was initiated to support the uploading process, validation, submission report, and monitoring. In 2013, the information providers (i.e., Sharia banks and Sharia business units) developed the system for reporting ends' side. They developed the system in-house or by hiring the software developer consultants. In September 2013, the LSMK-LBUS was launched.

4. 2014

After the parallel running of the old system with the new system (LSMK-LBUS) for 1 year, the full implementation of LSMK-LBUS was started at the beginning of 2015. The enforcement of compliance penalty was performed in 2014, during the same timeline with the parallel running.

5. 2015

Fully enforcement of the regulation (includes the penalty) was commenced in 2015. Since January 2015, Sharia banks were obliged to submit their financial reports using LSMK-LBUS. Recently, LSMK-LBUS is maintained by Bank Indonesia, and OJK started to develop their own system for the XBRL-based integrated financial industry reports