



# A comparative study of e-government XBRL implementations: The potential of improving information transparency and efficiency

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## ABSTRACT

This study examines the e-government implementation of eXtensible Business Reporting Language (XBRL) to increase accountability and transparency in business and financial information. The business and financial information gathered in XBRL format is machine-readable and interoperable, thereby improving the ease of public dissemination and analysis. This study focuses on identifying and examining the determinants of successful XBRL implementation and draws from several bodies of literature: e-government, institutionalism, collaborative public management, regulatory compliance, and management information systems to identify determinants of successful implementation. This study selects four diverse implementations: the Netherlands, Australia, the United States, and Singapore. Empirical analysis follows a comparative case study method. The findings of this exploratory study underscore the importance of program goals and strategic alignment in achieving information transparency and efficiency, the advantage of strategies correlating to institutional setting, the critical need to provide incentives for adoption, and the usefulness of incremental implementation. The managerial and theoretical implications of these findings as well as future research opportunities are explored.

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## 1. Introduction

The lack of financial transparency was one of the main causes of the financial crisis of late 2008. The magnitude of the financial meltdown drew the attention of public administrators and public managers around the world. Complex financial instruments, such as mortgage-backed securities and their derivatives, masked underlying risks. Motivated by financial incentives, investment institutions in the financial sector hid and passed on these risks via the creation of complex financial instruments designed to maximize short-term profits.

Government has the responsibility and is well-positioned to safeguard the health of the financial sector (Khademian, 2009). Government is accountable to citizens and businesses in so far as it is responsible for maintaining the financial health of the country. Citizens and businesses regard government as the last line of defense in times of financial crises. More broadly, citizens hold government accountable for spending tax money effectively and efficiently when providing public services such as monitoring and maintaining a healthy financial sector. Government has the unique role of safeguarding the interests of the general public, rather than the financial interests of a few. Government has played the role of monitor, regulator, and rescuer in the evolution of the financial market. Thus, debates center more on how government should best be involved, not whether it should be involved (Peretz & Schroedel, 2009).

This notion of government accountability over the general financial health requires that it goes beyond improving transparency of investment activities; it must also guarantee the effective and efficient monitoring of a country's economy and its implications for financial health. Many governments have passed regulations and/or administrative rules requiring that businesses and citizens report business and financial data to gather information needed for monitoring. However, the increasing number and complexity of reporting requirements have created undue administrative burdens for reporting entities and reporting costs can have substantial impacts on the economy. At the same time, the increasing amount of information collected and inconsistency in reported data may further weaken the effectiveness of government in trying to understand the financial sector and economic activities.

One challenge is the lack of data standards for business and financial information. Accurate and timely business and financial information is the foundation of any informed financial and economic decisions, whether made by individuals, institutions, or government. For government, the lack of a standard business identification numbering system for various government agencies impedes the ability to make sense of financial and business information submitted by businesses. On the business side, compiling business and financial reports for various government agencies with differing data definitions and rules is burdensome. For investors, it is difficult to compare the financial performance of two businesses when, for example, the definition of "expenditure on equipment" differs across agencies. Another information challenge arises when one tries to extract financial information from various

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reports and try to aggregate it into a systematic/sector overview. Clearly, manually processing data extraction from paper or PDF reports is time-consuming and error-ridden. Even when financial information is collected electronically, the integration of data elements from various data sources is difficult without a common data standard.

Recent developments and implementations of a standard business reporting language known as eXtensible Business Reporting Language (XBRL) have shown some initial success in addressing these challenges. At the heart of XBRL is a data dictionary (taxonomy) that standardizes the financial terms used. Such standardization allows for meaningful comparison of financial information across businesses and allows for the aggregation of financial information across a business sector for monitoring purposes. Moreover, such a taxonomy enables the development of software applications to make the financial information machine-readable. Once stored in XBRL format, businesses can transmit the information electronically to government for reporting purposes. Hence, the burden of manual processing can be significantly reduced. Government, when using XBRL as a standard, can be more efficient in gathering and analyzing financial and business information. XBRL also allows for business rules to be embedded, which enables automatic validation of business rules in financial reports. Such automation is a significant efficiency gain, as seen, for example, in the U.S. FDIC's implementation project (*Federal Financial Institutions Examination Council (FFIEC), 2006*).

Advancements in information technology offer opportunities for improving the collection and dissemination of financial and business information. Web 2.0 technologies form a participatory platform to socially construct knowledge and online communities (*Lytras, Damiani, & de Pablos, 2009; O'Reilly, 2005*). These technologies allow citizens to share information on financial institutions and government accountability. For example, the U.S. government's website *Recovery.gov* tracks the spending of government funds disbursed under the American Recovery and Reinvestment Act and allows citizens to report fraud. Moreover, the development of the semantic Web (Web 3.0) further complements the participatory platform to make the Web more of a database/software in which data online are standardized and machine readable to organize around topics of interest (*Devedžić, 2006; Siegel, 2009*). Such a semantic web has the potential to let citizens assess financial risks of government policies by combining relevant data sets and harnessing the power of online data processing and analysis. XBRL is a data standard (taxonomy) that lays the foundation for business and financial information to be machine-readable and standardized for meaningful comparison. Once XBRL is made available on the Web, it has the potential for introducing a new era of open government.

To date, there has not been enough scholarly attention on improving transparency in business and financial information and on realizing efficiency gain in collecting, analyzing, and disseminating such information. Scholars recognize the importance of transparency in preventing financial crises (*Khademian, 2009*) and the potential of applying information and communication technologies to improve transparency and open government (*Bertot, Jaeger, & Grimes, 2010; Dawes & Helbig, 2010*). However, there has only been limited research on the actual e-government XBRL implementations that have the potential to increase transparency and efficiency in business and financial information. Moreover, the few published studies on XBRL implementation are limited to a single country such as the study of XBRL implementation in the Netherlands (*Bharosa, van Wijk, Janssen, de Winne, & Hulstijn, 2011*) and the one on the U.S.'s SEC (*Debrecey et al., 2005*).

This study aims to fill this knowledge gap. The main contribution is to advance the theory and practice of XBRL e-government implementation by focusing on the implementation of XBRL rather than on discussing its benefits. It covers two main types of XBRL implementation: a) single agency implementation and b) cross-agency standard business reporting (SBR). The SBR's objective is for businesses to

conduct one-stop electronic reporting for all regulatory compliance following standardized XBRL taxonomy. The denotation of XBRL/SBR is to indicate the inclusion of XBRL implementation in the context of SBR. Such empirical investigation is grounded in a broad base of literature ranging from public administration to information systems. Additionally, this study contributes to generation of a preliminary list of e-government XBRL implementation strategies in various countries by going beyond a single country to compare implementations of four different countries. Therefore, the primary research question is "What are the determinants of successful XBRL/SBR implementation in increasing the potential of information transparency and efficiency in managing business and financial data?"

The next section begins with a basic definition of information transparency and efficiency as the main outcomes or policy objectives. It then draws from various bodies of literature to identify the factors affecting successful e-government implementation of XBRL. The empirical investigation of these factors starts with data and methods, and then four cases of XBRL implementation are examined to explore the relevance these factors and their nuances have for different contexts. Discussions and the conclusion focus on the implications and limitations of the findings and opportunities for future research.

## 2. Improving information transparency and efficiency with e-government XBRL implementation

The implementation of XBRL aids in the improvement of information transparency and efficiency in regulatory compliance. Transparency entails truthful communication of government operation and performance (*Koppell, 2005, p. 96*). *Bertot et al. (2010)* make a strong case for the use of information and communication technologies to further enhance transparency, which underlies the present study. In terms of financial and business information, information transparency is about ultimately making such information available. This involves collecting, analyzing, and disseminating business and financial information, as well as organizational performance on such functions to further ensure the health of financial systems. The collection aspect may include, for example, setting data standards for financial reporting to generate useful information for transparency. The dissemination encompasses making business and financial information available to the public.

To achieve regulatory goals, targeted transparency is considered effective (*Fung, Graham, & Weil, 2007*). When citizens (consumers) are given relevant information, they are able to drive the market and advance the public interest (*Fung et al., 2007, p. 3*). For example, the publication of motor vehicle safety ratings has been used as a regulatory tool to improve vehicle safety as a public interest (*Fung et al., 2007, p. 3*). Analogy can be made for business and financial information to ensure the protection of the interests of investors and the public when they can help monitor business behavior online. However, it should be noted that e-transparency for government may have a heterogeneous effect on various dimensions of trust in government (*Grimmelikhuijsen, 2009*). As a result, e-transparency needs to be carefully managed (*Bannister & Connolly, 2011*).

Efficiency in the regulatory compliance and monitoring of financial activities is one of the main policy objectives of XBRL/SBR implementations. Efficiency gain can be seen in various steps of the process in achieving regulatory compliance and transparency. Efficiency in gathering business and financial information by using XBRL/SBR can be gained by business reporting once to meet multiple regulatory requirements from multiple government agencies (*Madden, 2009*). This is made possible by standardization in business and financial terms and reporting using single XBRL taxonomy. Automation in validation and management of business and financial information is the second area of efficiency gain. The software programs can take advantage of information filed in XBRL format to perform validation and fraud detection, which is much faster than the

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