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Overview of XBRL Technologies for Decision Making in Accounting Information Systems

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Abstract

XBRL (Extensible Business Reporting Language) is a language for the electronic communication of business and financial data in XML (Generalized Markup Language). This technology has benefits in the preparation, analysis and business data informing compared with other methods of paper basis or hoc technologies of previous EDI (Semantic Web). These advantages include cases such as cost reduction, greater efficiency and effectiveness, accuracy and reliability for all activities involved in supplying or using financial data. This article has an overview to XBRL technologies and how to employ them in decision-making in various financial areas and also considers the Semantic Web and Web Services as future challenges.

Keywords: XBRL, accounting, decision making, accounting information systems

Introduction

Since the inception of the Internet, many technologies such as EDI have emerged which can provide the possibility of data transfer between different systems. Currently, the size and speed of data acquisition improves the decision making process to achieve greater efficiency and effectiveness or specific positions against competitors (Debreceny, et al, 2009). For example, investors who want to use their own tools to analyze the provided data in, for example Bloomberg, they should copy manually these data from these sites and register in their systems or transfer information from various parts of the organization to a spreadsheet, so they can make decisions based on it. However, the format of information is different in various systems. Consequently, much more time is needed to produce and prepare the data for analysis compared with XBRL. XBRL is a language for the electronic communication of business and financial data.

XBRL is an open standard, free and available language which is created based on XML for the production of financial reports (Santos and Castro,2011a). As a language, does not intend to modify any accounting operations of the GAAP (Generally Accepted Accounting Practices) and only intended to show the proper form of financial and accounting data. This data can include financial information (such as balance sheet, gains and losses statement or cash flow statements) or non-financial information (such as performance appraisal, loan applications or reporting forms of rules / regulatory). XBRL is an open standard that facilitates many of the activities related to the financial reporting supply chain that involves the storage, exchange and analysis of financial and statistics data (Reporting activities such as reporting financial status of company to different groups of legislators and tax authorities, banks and governments, risk assessments, etc.). Its major benefits include enhancement of speed and reduction of production cost and investigation of reports, no need to transfer, translate or data searching, creating the ability to search and compare types of business data. From a technical perspective, XBRL to be replaced the previous standards of XML to describe the financial content and business processes over the past few years, such as FpML, RIXML or cbXML. One reason for this replacement refers to its extensive coverage. The nonprofit consortium of XBRL International, with approximately 450 members of companies and agencies is responsible

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for the development and advancement of the technology. Many regulatory authorities have suggested using it and entities such as the SEC (Security and Exchange Commission) has updated its own database called EDGAR, to support the XBRL. EDGAR provides availability to global information of companies among more than 13,000 companies. CNMV (National Observer of Spanish market), UK Inland Revenue in Britain, Australian Taxation Office, Tax Agency of Japan, etc. accept the XBRL reports or even consider it necessary. Therefore, many companies use the XBRL language in their databases and as a part of external reporting systems. This language is also supported by the major software vendors such as SAP, Microsoft, Oracle, etc. Moreover, in Europe Union, the Europe Committee of Banking Supervisors have considered the development of XBRL, according to the development of two taxonomies of main reporting with titles of COREP (Common Solvency Ratio Reporting) and FINREP (Financial Reporting) which are used as a common framework for financial data reporting. This article is classified as following: part 1, an overview of XBRL, part 2, describing the functionality of XBRL in the projects, and tools to support decision making, and then describing the technologies associated with XBRL, and finally conclusions and future work.

XBRL in short

As was mentioned earlier, XBRL is an open standard based on XML and related standards (XML Schema, XML Namespaces and XLink) which is designed to share financial information and avoid previous problems such dissimilar types and forms of information. Therefore, XBRL is independent of any hardware or software. XBRL is composed of specification regarding how structured business data and a common framework for structuring and naming information. XML provides a structure for naming, defining and data correlation and classifications and classify various business concepts by using the list of labels. For example, XBRL GL, make possible the daily classification (journal taxonomy), display the ledger data (general ledger) and certain office, etc (subledger). It is noteworthy that the classification does not include actual data for concepts, data has placed in sample documents of XML

Further, according to XBRL taxonomy using XML Schema is created to describe the meaning of XML elements. The reason to create the various taxonomies is that different companies in different industrial sectors use the terms in various ways. In classifications it is attempted to use the terms with the highest share or are most relevant to the industrial sector .

In summary, different technologies can be described as follows:

- XML describes the data as elements among tags in a simple text. For example, an account balance can be displayed by <balance> 545 </ balance>; the name of elements are placed within <>, and the remaining amount (545) is placed between the start tag and end tag. Elements to be joined together in series like manner, based on a single-rooted tree structure.
- Document XML Schema defines the document structure of XML, namely, its vocabulary. This technology define which elements can be displayed, how are their order in the structure of series like elements, the corresponding number and order, data type, values / default values and values / constant values. XML Schema also uses the XML Namespaces for unification of names label with different meanings. For example <title> can be changed by adding a prefix to create a title with different definition to this shape, for example, a book <book title> or a CD <CD title>. A taxonomy of XBRL is a XML Schema which defines the concepts of financial reporting and the communication among them, for example, the data types that are defined in common way include: Monetary Item Type, shares Item Type, decimal Item Type, string Item Type, unit Item Type, data Time Item Type), tuple Type.
- XML Linking (XLink). XBRL uses Linkbase to extend the semantics of defined concepts and to determine the relationship between these concepts. Concepts are defined by using Schema but balance sheets, assets, current assets, non-current assets, liabilities, etc cannot be defined by that, because, for example, in the case of current assets, we must note that this is a type of asset, how to detect and calculate the current assets from non-current assets, and how to report these concepts. XBRL uses XLink with five aims: 1) definition links, 2) calculation links, 3) show / presentation links, 4) labels / names, 5) references. The definition links are used to define relationships between the available concepts in a class. The calcula-

tion links define how to calculate the elements. The show/presentation links define the required communications to demonstrate, for example parents - children communication. Labels / names do not define the communicative references among the data, but have human use. The labels / names are used to connect the readable text to every notion or relevant reference to authentic literature. These two last cases do not necessarily need to be in English and other languages are also supported in these two cases.

• Instance Documents. These documents contain real data for financial reports, namely the set of values / variables in a class represent a sample document. Usually, there are multiple instances for a class. For example, there is a class for balance, but a company can have an instance of balance for each year. Concepts defined in the taxonomies are organized as an item or as a tuple. Items are data base that are reported (e.g., <assets ...> 124 </ assets>); XRML taxonomies have referred to simple and complex types of XML Schema and define a set of possible data that can be included in a data. On the other hand, tuple are concepts that are being used for including other concepts or other items or other tuple, for example, address is composed of street, city and postcode. Instance documents in addition to actual information, can contain other elements that represent text information (text elements), such as the date or period. Finally, among other possible elements can be pointed to these cases: unit that represents the units of measured items; scenarios that are used to show the condition of the reported items; precision which indicates how many digits are reliable, footnotes; CWA (Closed World Assumption) that indicates whether the report is complete or not and are the data valid?, and groups that organize the items in the instance documents.

Sometimes it is necessary to create new categories for developing the existing categories. For example, if a state or accounting standard has created a class, a company may be willing to expand the existing jurisdictional taxonomy by adding its own elements and modify their communications according to the company's financial taxonomy. For example, a jurisdictional class defines the properties but a company may intend to distinguish the cash in the bank and in the stock market.

Decision making with XBRL

Financial instruments used to improve decision-making processes in the financial area include these cases: Business Activity Monitoring, Digital Dashboard (which is also called the Balanced Scorecard Systems), Portal, Business Intelligence tools, Data Warehousing and Data Mining. The new generation of this instrument is being accepted and implemented XBRL, as a result of a wide range of projects and activities of its supportive organizations.

One of the advantages of XBRL refers to the auditors because make the ongoing audit possible. XBRL allows the auditors to produce reports at a much shorter time frame compared with traditional methods which is called continuous auditing. As previously mentioned, one of the requirements in designing XBRL refers to its ability to collect, organize, analyze and maintain information about the business units. The shorter time frame in auditing by using XBRL potentially provides the possibility to start corrective actions in more useful and more effective manner, compared to traditional auditing that the required time period between the data analysis and report presenting is longer. A project that is conducted in Amprio State University is provided an online description of such capabilities. The MUSING project is an example of this project which is pointed in this website that present a new generation of services and knowledge management solutions which makes the activities related to critical business information possible directly by considering the end-user. MUSING provide services for three practical areas: (1) financial risk management, (2) internationalization (3) IT operational risk and continuation of business. To provide these services, this project aims to develop and expand modules and business intelligence tools based on Semantic Web and content systems, to improve decision-making. Technologies needed for these types of tools are described in the next section. The Dutch national XBRL project which is supported by the Justice and Finance Ministries of the country also provides examples of XBRL capabilities in online form.

The Enhanced Business Reporting Consortium (EBR) is an independent organization that has a mission to promote quality, integrity and transparency of information used in decision making. The international XBRL organization along with consortium EBR are trying to improve the content of financial reporting over time by using the XBRL capabilities.

Supporting technologies of XBRL for decision making

In this section, technologies are introduced that are integrated with XBRL to create accounting sys-

tems that can be used in decision making. The existing tool is updated to support the XBRL, the tool that only support taxonomies and creating instances and accreditation of XBRL, such as Microsoft Office and ERP (Enterprise Resource Planning) tools such as SAP. In the next subsection, technologies are introduced that completely support all capabilities of XBRL.

XBRL and Web Services

Web services are defined by an URL as identified software applications that their connecting lines and interfaces have the capability of definition, description and discovery in XML artifacts and support the interaction between other software applications that use the XML-based messages through internet-based protocols. Reasons why web services are appropriate for the application of XBRL accounting system are as follows: interoperability among different technologies and programming languages, namely independence of platforms (software platforms) and the ability to connect to heterogeneous applications and networks by using Web-based standards that are present everywhere; reusability of components, no need to install and integrity, and tight integration of software; accessibility to the title of assets, legacy assets and internal applications, these applications are available on the website and also they can be accessed by using any device, anywhere and anytime. Similarly, the XBRL is developed as a set of open standards by a consortium of companies, the web services are also developed in open form by Consortium of World Wide Web (W3C) and other industrial standard organizations (Oasis, WS-I). Also, as we have seen earlier, XBRL is developed based on the Web services technologies such as XML and XML Schema.

General-use of web services related to XBRL in companies refers to auto-recovery of financial reports in XBRL form by financial analysis programs, without having to search and download information (a feature of Web services, the ability to detect them in a clear manner).

Currently, there are different instances of web tools for the analysis of companies' reports:

- Dutch Commerce and Companies Agency (DCCA) have created a tool called Digiregn Web to generate and analyze the documents in XBRL form. This tool allows the users to generate, reform and confirm the documents according to the selected classes. Documents are presented to the user in the form that they can edit and reform them.
- SEC has provided a test drive for a web tool called Interactive Financial Report Viewer, to the companies that have voluntarily announced their readiness to participate in this program. It is noteworthy that this tool does not yet enlisting the full capabilities of Web services.

Ontology and taxonomies of XBRL

There are many similarities between the definition of XBRL taxonomies and creation of ontology concepts. Ontology can be seen as part of the engineering domain knowledge. In fact, ontologies are engineering artifacts which are created to provide a common and satisfactory perception from the knowledge of a domain (Santos and Castro,2011b). The ontology approach is used for integration and information integration, informing on what others have achieved, adapting the objectives in organization and support the efficiency and effectiveness of processes. Therefore, this means that the ontologies can help to achieve a desirable quality, such as reusability, which provides an opportunity to formal presentations, ability to search that turn the metadata as an index to the information, reliability that check the stability and continuity and so on. Thus, the ontologies allow us to add meanings to the data and so, it is possible that the different software components to be shared homogenously. Common uses of ontologies include the relationship between people and organizations and interoperability between systems, namely, translating modeling methods, paradigms, languages and software tools. The ontologies can be used for formulating the concepts in the financial domain to create better taxonomies namely for data modeling, concepts, terminology and communication, processes and activities to supply financial reporting chain. One point of ontologies is that a lot of things have been done and there are many tools such as Protйgй that can be used in conjunction with XBRL technology. A major advantage of these ontologies refers to the clear integration of financial systems. For example, it can be pointed to the use of different names for a specific concept in different parts of an organization, such as personnel and personnel costs; instead of manually combining these accounts, by using ontology will have access to these accounts.

On the other hand, ontological engineering refers to a set of activities in the process of perception, design, implementation and employment of

ontology. Earlier works in ontological engineering processes can be adapted with XBRL ontological engineering, namely, with definition processes and development of taxonomies in XBRL. In this regard, Piechocki and Felden (2005) have presented process model for engineering of XBRL taxonomies based on the ontological engineering and software. The problem is that the creation of ontologies is indirect and there are several different methodology model and different guidelines to do this work.

The use of ontologies is largely related to the Semantic Web and in addition to the standards such as OWL (Ontology Web Language) and RDF (Resource Description Framework), the defined technologies in the web services are also used. As in previous cases, these standards were open and have been developed by W3C.

Conclusion and suggestion for further research

XBRL, by getting support of legislators such as SEC in the United State of America and Basel 2 framework in Europe, has turned to the standard for financial reporting data. XBRL is a language by oneself that make possible the preparation, analysis and business information informing. From the rates of this language can be pointed to the reduction of cost, greater efficiency and effectiveness, accuracy and reliability of all activities related to the provision of financial data. Popularity of XBRL as an open standard to be determined with support of groups, organizations and companies such as the International Consortium of XBRL which is a non-profit entity with over 450 members from around the world among the big audit companies, major software vendors such as Microsoft, IBM or SAP, stock exchanges, banks, the body of accounting data suppliers, etc.

This article provides an overview on XBRL and somewhat on its related technologies such as Semantic Web and Web Services, as the next challenge while implementing XBRL- based tools.

Future research includes investigating and trying to solve problems in the implementation of XBRL technologies that remain unsolved so far. For example, one of these problems is that the different accounting practice methods in different countries have not fully covered. This paper described how the XBRL ontologies can be applied to solve this problem.

References

Debreceny, R., Felden, C., Ochocki, B., Piechocki, M., & Piechocki, M. (2009). XBRL for Interactive Data: Engineering the Information Value Chain. Springer, Dordrecht Heidelberg London New York. ISBN 978-3-642-01436-9.

Heinze, K. (2009). Data Model and Matrix Schemas. XI European Banking Supervisors XBRL Workshop, November 16th-20th, Vienna, Austria.

Piechocki M, & Felden C, (2005). XBRL Taxonomy Engineering. Definition of XBRL Taxonomy Development Process Model. In Proceedings of the Fifteenth European Conference on Information Systems, Regensburg, Germany.

Santos, I., & Castro, E. (2011a). XBRL and the Multidimensional Data Model. In Proceedings of the 7th International Conference on Web Information Systems and Technologies, WEBIST 2011, pages 161-164, Noordwijkerhout, The Netherlands.

Santos, I., & Castro, E. (2011b). XBRL Interoperability through a Multidimensional Data Model. IADIS Internacional Conference on Internet Technologies & Society (ITS 2011). Shanghai, China,