An XML Perspective in E-Financial Reporting Process

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Abstract
Nowadays it is particularly difficult for the financial decision-making community to acquire the right information in a consolidated manner and to perform a high volume of complex analysis in a cost-effective way. There is a need to enhance the usability of financial information reports via digital and web-based means to support the knowledge extraction and decision-making activities. A literature review of the approaches of financial reporting process, as well as, the examination of the possibility to leverage Internet practices and standards, in order to enable extensive distribution of financial information to the end-users (e-financial reporting) are the main objectives of the paper. After presenting the main characteristics and requirements of the financial reporting process and synthesizing the current approaches and practices, the paper examines the financial reporting process by an XML perspective.

Keywords: financial reporting, eXtensible Markup Language (XML), financial data integration, International accounting

Introduction

Shareholders, financial institutions, regulatory authorities, corporate staff and executives who mainly handle and acquire corporate financial data, require information that must be concise, accurate, reliable and in a humanly readable fashion. This information must be organized and integrated in such a way that users can exploit it according to their specific needs. There is also a demand for a mechanism for flexible reporting, summarizing and ad-hoc querying. Satisfying such a requirement is the basis of an effective decision support system and can become the framework for the adoption of a knowledge management strategy within the enterprise. Although, several financial reporting approaches have been presented and applied in the last years, they are usually costly, highly manual and error-prone processes that prevent accurate and timely data analysis. Furthermore, the rapid growth of the Internet and the World Wide Web have emphasized the need for a standardized language that will increase the usefulness and globalise the form and content of financial information.

A literature review of the financial reporting process, and the examination of the possibility to leverage Internet practices and XML standards, in order to enable extensive distribution of financial information to the end-users, are the main objectives of the paper. The first section deals with the basics (main characteristics and requirements) of the financial reporting process from the points of origin to the points of presentation and knowledge extraction.

After synthesizing previous literature on financial data reporting, an XML and web-based perspective of financial reporting process is presented and analyzed, for a more efficient representation and dissemination of financial information. Finally, directions for future research and suggestions for a successful application in Greece of the above view are also provided.

Exploring the financial reporting process

Financial reporting is a wide commonly used term, describing the process of supplying general-purpose financial information to individuals outside an organization (Meigs, et al. 1996). This financial accounting information is disseminated to a variety of users through summarized reports, known as financial statements, in order to become the basis of the decision-making process. In order for the financial statements to be comparable among the ones issued by the several organizations, meaning presenting similar information in a similar format, they are prepared in consistency with a set of prescribed rules, called Generally Accepted Accounting Principles (GAAP). Nowadays, in the frames of the globalization trend, this set of rules tends to become accepted and drawn on international level.

Even though by definition financial reporting is addressed to external users, it is still a significant source of information for the employees - managers of the organization (Lymer et al. 1998). Initially, as far as the financial information users are concerned, there exist two basic clusters. The first cluster consists of people outside the organization; investors / stakeholders, creditors, taxing authorities, regulatory agencies, customers, labor unions and economic planners (Kimmel, et al. 2004). Investors are interested in obtaining accounting information in order for them to make decisions concerning the stock (buy, hold or sell the stock). Creditors, primarily suppliers / trading partners and banking institutions, develop the accounting information in order to evaluate the risks involved in admitting credit or providing loans and financial advances. Taxing authorities exploit the accounting information to ensure the company's compliance with the tax laws. Likewise, regulatory agencies exploit information to ensure company's compliance with the legitimate predefined and prescribed rules. Customers are interested in ensuring that the company will continue honor product guarantees and support its product lines. Labor unions require information to comprehend the employers' ability to pay increased wages and benefits. Finally, economic planners use the published accounting information in order to analyze, evaluate and forecast economic activity. Apart from the above-mentioned interest group of outsiders, people inside the corporation, also, use accounting information. Inside users most commonly derive from the company's management group and use the accounting information in order to plan, organize and run the business activities.

The financial accounting information is communicated to the users through the financial statements, which form the basis for evaluating the financial position of an organization and for considering its historical and forthcoming financial performance. Financial statements provide information concerning the financial health of a company, primary to basic business decisions (Fraser and Ormiston, 2002). A complete set of financial statements consists of four related accounting reports (Balance Sheet, Income Statement, Statement of Owner's Equity and Statement of Cash Flows) that summarize in a few pages the financial resources, obligations, profitability and cash transactions of a company (Meigs, et al. 1996). Moreover, several pages of notes, providing additional information, useful in interpreting the financial statements, commonly supplement a complete set of financial statements. Finally, financial statements are printed and made public trough local specialized publications and in certain cases published through the corporate web sites, to become available to the interest group.

Financial reporting process involves a number of stages, beginning from the collection of corporate data that will develop into accounting information, and ending by presenting and publishing the financial statements. Debreceny and Gray (2001) divide the financial reporting process into two major tasks: mechanics and analysis. Mechanics refers to the preliminary work the analyst performs locating, collecting, disaggregating, aggregating and reformatting. Then the analyst gives full attention to analysing the data. In more details the financial process can be defined as follows: At the first stage raw data is accumulated from the various intra and extro-organizational sources to be, at the following stage, transformed into accounting information by adding them value. At the next stage the accounting information is uploaded into a central data storage area to be exploited and developed into pre-specified accounting reports, the financial statements. Finally, financial statements are presented, habitually, on a paper form and published on the local press. By this way, corporate accounting information is communicated to the various users, who analyze the information submitted by converting it into knowledge extremely valuable to decision-making. The knowledge leads to specific actions. If the actions come to an end, knowledge is transformed back into information until actions apply again (Lau and Yen, 2001; Tin et al. 2001).

New issues and challenges in Financial Reporting process

Nowadays cross-country economic activities are becoming more and more intense. Local companies are becoming multinational organizations. Investors participate not just in the local stock exchange market, but also in the several stock exchange markets around the world. Creditors provide credit inside and abroad their national borders. New technologies have been developed to support the quality of the information, plus the cross-country communication. Generally, a variety of revolutions have taken place that influences the framework of the financial reporting:

1. The worldwide adaptation of International Financial Reporting Standards (IFRS).
2. The inadequacies of the existing means of financial reporting publication.

3. The promises that Internet standards and technologies can change the manner by which companies and other business entities communicate their business status.

The new set of worldwide accounting rules concerning financial reporting called International Financial Reporting Standards (IFRS), often known by the older name International Accounting Standards (IAS), are issued by the International Accounting Standards Board (IASB) to be fully applied by the end of 2005. In general, financial reporting is obtaining multinational character. Thus, corporate accounting information will soon be presented in a common format, understandable by inside and outside users throughout the world. The international framework for financial reporting is becoming set. International companies are getting organized to put into practice.

An issue that needs to be progressed concerns the publication of the corporate financial statements, in order for the financial information to be easily accessible and reachable from the interest groups throughout the globe. In general, today's commonly practiced approaches for financial reporting tend to be manual, time and effort consuming, error prune and costly. Financial data is moved across the reporting cycle in a variety of non-standard and non-interchangeable formats (software application or web files), such as excel spreadsheets, postscript, acrobat, text and html files. These formats are appropriate and helpful for editing and formatting, but they don't offer any advantages over the traditional typed reports (e.g. simple paper photocopies), when it comes to sharing data between software applications and users on heterogeneous computing platforms. Also, the existing formats cannot ensure that the information will be presented in a user-friendly format in order for the end user to receive, analyze, and use effectively the available information. The modernization of the existing publication means seems to become indispensable. Moreover, as Debreceny and Gray (2001) point out, the financial users are not completely satisfied with the information that third-party information intermediaries provide. They identify three problems: 1. The long period between the publication of information by the corporation and its inclusion in the third party's database, 2. The fact that the third-party's data may be two or three generations removed from the company's data, and 3. The business data that they provide are not aggregated and presented in a format that allow financial analysts or stakeholders to understand the accounting choices made by the corporations.

During the last years, Internet has proven to be an important tool for the business environment. Especially for the case of knowledge management, Internet contributes a lot to its continuous development and establishment. Various organizations invest in knowledge management in order to effectively control the corporate information, including the corporate financial information. A continuous increasing number of organizations make use of the Internet for publishing their financial annual reports in preference to the traditional printed version (Lymer et al. 1998; Westarp, et al. 2000). The above statement is based on the following researches: 1. 99% of the top 100 Fortune-500 companies have web sites, and 94% include financial information (FASB, 2000), 2. 69% of 10000 corporations that trade on the NYSE, NASDAQ and TSE have web sites and 35% include financial information Trites, 1999), 3. 86% of the 30 corporations from each of 22 countries

(660 companies) have web sites and 62% include financial information (Lymer et al., 1998).

These organizations have established intranets, extranets and corporate websites aiming to help employees, the financial community and other stakeholders easily reach and exploit the specific section of the company's knowledge base that deals with financial reporting. Still, the systems for managing the financial information, used by the several organizations differ, since they are based on various formats, hardware and software systems. Moreover, even though the Internet has grown remarkably during the past years, Internet-based reporting is not following the same fast track. Many researches in the past pointed out the various characteristics of the internet that contribute to the above statement: 1. The use of HTML language to present information (Huizich, 2000), 2. The inefficiency of search engines (Shneiderman et al., 1998), and 3. The absence of schemas that could be used to locate, classify and present financial information (Debreceny and Gray, 2001).

Thus, on a global level, it seems that the available technologies seem to be inefficient to establish a common database for financial reporting, where the corporate financial information will be easily accessible by the users and in such a format to facilitate the financial analysis (Davis, et al. 2003; Rezaee, et al. 2001; Lymer, et al. 1998; Westarp, et al. 1999). Therefore a commonly accepted Internet based framework needs to be established in order for the various corporate financial reports to be accessible and comprehensible by the several financial information users.

An XML Perspective in Financial Reporting Process

This paper presents the e-reporting financial process from an XML and Internet standards point of view. Nowadays, Internet has become a major information source even for the case of the economic and financial markets around the world. Many organizations publish their financial statements via their corporate web sites or other financial expert portals. Furthermore, many web-based standard financial languages (such as eXtensible Business Reporting Language - XBRL) are considered to be the required means to improve the value of reported information in accordance to the GAAP principles (Hamscher and Vun Kannon, 2000). By using XML technologies all the required financial data can be converted to XML documents following the structure of common agreed financial standards and be easily integrated and exchanged with financial data from other enterprises.

In the literature there are many research efforts about the potential application of the Internet and XML standards for the optimization of e-reporting financial process. Some of them identify the effect that these approaches can have in the integration of financial reporting cycle (Goldstein, 2000; Hannon, 2000; Collins, 2001; Debreceny and Gray, 2001). Others emphasize the financial information transparency perspective in financial value chain (Wallace, 2001; Youngwon, 2003), the reusability aspect of financial assets (Ramin and Prather, 2003; Pollock and Papiernik, 2001), and the increase of trustiness among financial clusters (Cohen and Hannon, 2000; Coffin, 2001; DiPiazza and Eccles, 2002). Kutler (2000) and Hannon (2001) recognize the significant impact that Internet practices and XML standards could

have on the analysis of financial data and consequently in the decision-making and risk-management processes.

By synthesizing the above literature this paper furthermore presents an e-reporting framework for the integration of financial reporting life cycle by using Internet as the major distribution channel through applying XML standards for the modeling, consolidation, and presentation of the financial information. The proposed framework consists of five stages:

- Identification and extraction.
- Transformation.
- Modeling.
- Data analysis and knowledge extraction.
- Presentation.

It will support and ease the extraction process of important financial data in order to facilitate easier production of knowledge to end-users.

Identification and extraction

Identifying the appropriate data to be afterwards transformed into financial information is the initial step of the financial reporting process. Generally, enterprise financial data can derive from many internal and external sources. Every company uses information systems and maintains databases where operational and transactions' data are stored. It is estimated that more than of one-third of the information that resides in Enterprise Resource Planning (ERP) systems belongs to the financial or investment sector of the company (Tin, et al. 2001). Additionally, many financial raw data derives from other business entities such as partners' information systems, financial institutions, specialised financial services providers, and public / governmental agencies and organisations. This information is stored and/or presented as structured content (relational databases), unstructured content (plain text) or unstructured content with structured presentation (html files), in many and different forms (such as texts, charts, figures, or tables, etc.), as well as, in both typed and electronic format (plain, multimedia or files), due to the following reasons:

- Inside every enterprise there is no standard way to define how information should look or be represented and
- Enterprise software applications vary from entity to entity, and even if a standard software package is used, output formats commonly vary.
- It is clear that the inefficiency and inaccuracy involved in the financial gathering process has significant side effects into the subsequently stages.

Transformation

When the previous stage is complete, a large effort and time is required for the validation, normalisation, correction and consolidation of the extracted financial data. More specific, in this phase, the financial data are transformed in accordance to specific business and accounting rules, functional and decision-making needs,

quality edits and upcoming operations. Enterprises have specified the required financial information, they have made all the actions to support and improve their reporting policies and processes, and furthermore they have reduced the risk levels due to poor-quality financial information.

Modeling

The main objective of this stage is to model the extracted and transformed data, so as to allow their uniform management and utilization. Thus, there is a need for common business vocabularies that describe the structure and the semantics of the financial data (Debreceny and Gray, 2001; Folinas, et al. 2003). These vocabularies allow users to document these requirements (existing or proposed) in a neutral format that will act as a standard. In essence, a standard is just an agreed-upon set of elements, attributes, structure, semantics, and processes with which financial information can be used, exchanged or presented. All the above, with the exception of processes, can be easily represented in XML Schemas technology. XML Schemas can be used to encode financial information needed, to provide adequate technology for specifying standards and assuring that financial documents prepared are valid. The last mentioned is very important due to the fact that in most other data formats, errors are not usually detected until something goes wrong leading to low information quality, which in turn leads to poor decision quality. Thus, schemas can be used as a more advanced "data dictionaries". In the financial services industry a number of finance specific XML Schemas - standards have emerged to deal with different and specific aspects of markets' requirements and decision-making process needs. These standards include XBRL, Financial Products Markup Language (FpML), Financial Information Exchange Markup Language (FIXML), ISO 15022 XML, Interactive Financial eXchange (IFX), Version 1.1, Open Financial Exchange (OFX), etc. each of which addresses a specific aspect of financial transactions. All the above standards create a link between Internet innovative technology (XML) and accountancy standards. For example, the XBRL standard (taxonomy) is the translation of a GAAP into XML documents, and its purpose is to provide a framework for the consistent creation of XML-based documents for financial reporting purposes of commercial and industrial companies (Cohen and Hannon, 2000; Coffin, 2001; Pollock and Papiernik, 2001). Every enterprise can use the above vocabularies or even modify them in order to develop financial documents in XML-based format. Due to its nature, XML is data-centric, unlike document-centric typed or electronic reports as pdf's or html pages, allowing information to be structured in a way that makes it readily accessible for the final users.

Data analysis and knowledge extraction

During the previous stages the financial raw data were identified, extracted, cleansed, indexed, and finally unified based on XML standards. During this step, the produced data provide more useful information, called knowledge. The main objective of knowledge is the integration, procession and organization of the produced data with the experience of the final users (Tin, et al. 2001; Davenport, et al. 1997). In financial market, according to Lau "knowledge can also be considered as the information that is tested against the trading rules of the market and found to be valid by knowledgeable individuals" (Lau

and Yen, 2001). Thus, the data in XML-based format can be examined based predefined users' logic principles and / or can be summarized or consolidated in relation to the specific needs of different economic or financial fields. For instance, if a user wants to compare the performance of different companies or search for a particular keyword based on their annual financial reports, an appropriate mechanism can be applied to an XML document, which contains the various annual reports (Kutler, 2000). XML technologies provide a large number of mechanisms for the processing of financial documents similar to the advanced, complicated, and costly Data-Warehouses and Executive Information Systems (Lau and Yen, 2001). For example one technology is XPath, which can be considered as the SQL of relational databases. Another technology is the Extensible Stylesheet Language for Transformation (XSLT) initiative, which at its early stages provided many processing capabilities, such as sorting capabilities, calculating operations, etc. Today XSLT has a wider use as a transformation language of XML documents between two different financial standards. The XML Query is another XML available technology. Its purpose is to provide a standard set of functions and operators, as well as, flexible query facilities in order to extract data from several web documents. XML Query is considered to be the required mechanism for the interaction between the Internet and the database world. A relative study that occurred by the Universities of Washington and Indiana, provided significant evidence that XML-enabled search technology increases the transparency of financial statement information (KPMG, 2004).

Presentation

In this stage the Internet is used as the distribution channel for the presentation of financial data in a user-friendly manner and the knowledge dissemination. One of the main advantages of XML technologies is their ability to separate data and presentation. EXtensible Stylesheet Language (XSL) technology can be used to present the knowledge to financial markers. Specifically, an XSL style sheet covers two essential achievements: transformation (that takes place in the previous stage) and formatting. Transformation deals with how the elements inside an XML document are manipulated and filtered against specific rules. Formatting controls how the final output looks. Using various tools, the XSL processor can output different presentation, in formats such as the pdf, html, Wireless Application Protocol WAP) pages or even XML and for various devices such as Personal Digital Assistant (PDA), mobile phones etc. An XSL style sheet can be applied to more than one XML file. There is no need to duplicate the transformation and formatting instructions for every single XML file in the storage area. Changing one style sheet will change the transformation and formatting instructions of every single XML file that uses this style sheet. Also, the output can be presented in a human readable format that optimizes the decision-making process.

Discussion - Conclusions

In this paper, basic issues concerning financial reporting are presented in order to better comprehend the suggested XML and web-based framework, as a result of the examination of the existed literature. Applying Internet and XML standards in the financial

reporting process comes out to be beneficial for all the parties involved in the preparation and the management of the various financial reports. These advantages include financial reporting in a real-time basis and rapid and versatile preparation, extraction and analysis of business information. As a result forming financial statements becomes less time and resource consuming and on the other hand, the end-users obtain easier and continuous access to the required financial information, plus they gain the capability of producing on-line financial analysis. By this way, better knowledge extraction is achieved to be used in the decision making process.

Moreover, the suggested e-reporting financial framework that exploits Internet and XML practices could be applied in Greece due to the adaptation of the International Financial Reporting Standards (IFRS) in the year 2005. However, significant work still remains to fully investigate these standards concerning their applicability in the Greek financial market, which is characterized by a series of special features. These specialties of the Greek financial market need to be taken into serious consideration as they strongly influence the potentials of establishing a widely accepted XML financial standard based on the IFRS principles for defining, exchanging, and disseminating business reporting information. Major issues of the Greek financial market, concerning the legislative, the operational and the technological framework, turn out to be:

- The strong intervention of the Greek taxation legislation to the financial legislative framework, which strongly increases the complexity levels (Sakellis, 2002).
- The relatively unstable taxation and legislative framework that changes due to the direct governmental intercession.
- The major Greek financial institutions are at their main sharing part of public ownership.
- The financial application software used by the greatest portion of the Greek companies, who are mainly small businesses, does not support XML standards.
- The limited use of Internet on business level. The Greek companies primarily exploit Internet as a means of advertisement and general information research.

Moreover, despite the benefits that the XML perspective provides for the financial information supply chain, its current usage in EU countries is rather limited. In Greece the National Bank of Greece has make progress to establish an XBRL jurisdiction. As Wallace (2001) indicates, three requirements must be met in order for XBRL to be successfully deployed in a global basis: 1. Common specifications need to be developed. That means that the business vocabularies (specifications) should use a common XML based framework, 2. Software applications that automate tagging of information with XBRL tags need to be developed, and 3. Style sheets that can produce information in various different reporting formats need to be created. Another critical point is the deployment of appropriate knowledge extraction methods and tools.

Generally, financial reporting is obtaining a new modernized character, which influences the financial markets on a global level. Several issues have emerged during the last years, not only at a Greek level, driving the need for changes not only at the legislative and regulatory level, but also at the technological. The adaptation of a

web-based, XML technology will prove to be beneficial for all the interest parties involved at financial reporting. Still, at this point it has to be mentioned that the success of any knowledge-based monitoring system will depend upon the quality and integration of the imported financial data and on the intelligent tools to finally help users to know what is happening in financial market in order to make better decisions.

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