ASSURANCE ON XBRL FOR FINANCIAL REPORTING

ABSTRACT

"Tagging" financial information using eXtensible Business Reporting Language (XBRL) creates documents that are computer readable and searchable. Since 2004, the Securities and Exchange Commission (SEC) has taken steps toward requiring XBRL to be used in its filings, including a voluntary filing program. Once XBRL is required, investors are likely to demand assurance on the tagging process. The PCAOB has issued guidance on attest engagements regarding XBRL financial information furnished under the SEC's current voluntary filer program, which relies on the auditor agreeing a paper version of the XBRL-related documents to the information in the official EDGAR filing. While this process may be adequate for the current paper-oriented reporting paradigm, the power of XBRL is that it allows individual pieces of financial data to be extracted from the SEC's financial database outside the context of the statements as a whole. This article provides some background on the SEC's efforts to incorporate XBRL into its filing process and a brief overview of the technical aspects of XBRL. Its principal focus is on several important questions that assurance guidance must address in a "data centric" reporting environment, such as, what constitutes an error or what does materiality mean when individual pieces of financial data will be used outside the context of the financial statements? It also describes some XBRL-related areas where academic research can and should provide inputs to the process of developing guidance for XBRL-document assurance.

ASSURANCE ON XBRL FOR FINANCIAL REPORTING

David Plumlee
Professor of Accounting

and

Marlene Plumlee
Associate Professor of Accounting

School of Accounting
University of Utah
Salt Lake City, UT 84112

February, 2008

ASSURANCE ON XBRL FOR FINANCIAL REPORTING

Interactive data is created by "tagging" financial information using eXtensible Business Reporting Language (XBRL), an accounting-specific markup language. The current XBRL tagging process converts the financial information contained in a document (e.g., Word or Excel) to a "document" or computer file with XBRL codes, which makes the document computer readable. Once the tagged document is entered into a financial information database (such as EDGAR) investors, analysts, and others can download it more quickly and perform analysis more easily than using traditionally stored data. In 2004 the Securities and Exchange Commission (SEC) took a preliminary step toward making filing of interactive data in the US a reality when it amended its rules to allow registrants to furnish, as supplements, their financial data on EDGAR using XBRL.[1] Since then the path toward mandated XBRL filing has accelerated; the ACIFR (Advisory Committee on Improvements to Financial Reporting) recently released their report recommending that "The SEC should mandate the filing of XBRL-tagged financial statements within a defined time frame" (p. 84). Based on the statements and progress made to date, many foresee that the SEC will ultimately require XBRL to be used in its filings.

Should XBRL-based financial data become a required part of SEC filings the potential for material misstatements due solely to the tagging process required to convert the information into XBRL documents becomes a very real concern. Consequently, many suggest that some level of third-party assurance on the tagging process and its compliance with technical specifications and regulatory requirements will be demanded by investors and other users. For example, in its response to the proposed Voluntary Filer Program (VFP)[2] rule Deloitte & Touche, LLP stated

---

[1] Currently EDGAR accepts as official filings only submissions using American Standard Code for Information Interchange (ASCII) or HyperText Markup Language (HTML).

[2] The Voluntary Filer Program was established by the SEC in 2004 and allows registrants to voluntarily file their annual and quarterly reports (10-Ks and 10-Qs) using XBRL filings as supplements to their

"that certification and assurance requirements would be appropriate should the Commission consider the use of tagged data on a mandated basis in the future" (p 6). Ernst & Young, LLP agreed in its response to the same proposal stating that "…an audit opinion or interim review report only should accompany financial statements that are included in the official filing" (p 2). Ernst and Young also stated that by implementing the VFP "the Commission would promote, and be able to evaluate, the market demand for, and the related costs and benefits of, auditor attestation to XBRL-tagged information" (p 2). Another indication of the potential demand for assurance on XBRL-related documents is found in the CFA Institute's survey of its membership regarding issues associated with XBRL tagged data (CFA 2007). Respondents were asked to indicate the level of assurance they felt necessary to ensure that appropriate XBRL tags are assigned to the amounts from the financial statements. 69% of the respondents said that they preferred either an integrated audit or a separate audit by an independent auditor; 16% felt that certification by management would be sufficient; another 11% supported a non-audit examination by an independent reviewer. Only 3% felt that neither management certification nor an independent audit was necessary.

Auditors currently attest to the material accuracy of the financial statements filed with the SEC using generally accepted accounting principles (GAAP) as the criteria against which the management prepared financial statements are evaluated. Attestation on the financial statements does not apply to the current process of creating XBRL documents, and it is not clear what criteria would be used by auditors or others as they provide assurance services in an XBRL environment. In contrast to a traditional financial audit, the subject matter in an XBRL assurance engagement would be on the XBRL "documents," which are computer files created in the

---

required filings. While the specific registrants that participated in the program have varied across time, participation has averaged around 40 registrants a year.

tagging process. As the Assurance Working Group of XBRL International (XBRL 2006) points out "GAAP do not provide enough guidance on these subjects to be used alone as criteria" (p 5). Technical standards such a XBRL Specification 2.1 and the newly developed suite of US GAAP taxonomies may provide the basis for the measurement required of criteria. However, there are a multitude of practical and conceptual issues, from the initial engagement agreement to a final report, which must be resolved in order for a third-party assuror to complete the XBRL assurance process. These issues include concepts fundamental to a financial statement audit (e.g., the meaning of an error or the nature of materiality) and ideas that underlie sampling (e.g., tolerable deviation rate and sampling risk). The purpose of this paper is to clarify significant but unresolved issues involved in providing assurance on XBRL documents and enumerate some of the potential research issues where accounting and auditing academics might make important contributions.

The remainder of this article is organized as follows: (1) provides background information, including a brief history of XBRL, a description of the critical elements found in XBRL, and the process of tagging financial information, (2) an explanation of some of the shortcomings of current assurance literature, and (3) a discussion of some aspects of providing assurance on XBRL where accounting and auditing research may prove useful in moving XBRL into the mainstream of financial reporting.

BACKGROUND

A Brief History of XBRL

In 2004 the SEC took preliminary steps toward making interactive filing a reality in the US when it amended its rules to allow registrants to voluntarily submit supplemental, tagged financial information using XBRL as exhibits to specified EDGAR filings. In its Proposing

Release (Proposed Rule Release No. 33-8496; September 27, 2004 http://www.sec.gov/news/press/2004-138.htm) the SEC asked interested parties whether they thought that auditors should be required to attest to financial data furnished as part of the VFP. The prevailing sentiment was that, to encourage participation and experimentation as part of the voluntary program, attestation should be allowed but not required. To assist auditors and other, the Public Company Accounting Oversight Board (PCAOB) issued Q&A's (PCAOB 2005) related to attest engagements regarding XBRL financial information furnished under the VFP. It states that "an auditor may be engaged to examine and report on whether the XBRL-Related Documents accurately reflect the information in the corresponding part of the official EDGAR filings" (p 1) under its interim attestation standards, *Attest Engagements* (AT section 101), as amended. Thus far, only United Technologies Corporation, a VFP participant, has had its XBRL related documents assured by its auditors (Boritz and No 2007).

Currently, the SEC has an interactive data test group, which agrees to voluntarily submit a full year of its annual, quarterly and other reports using interactive data. As of September 2007, more than 40 companies participated in the program with a combined market capitalization of that exceeded $2 trillion. Since the XBRL-based financial data under the test program are considered to be 'furnished not filed'[3], there is no requirement to provide independent assurance on the data. In the absence of such assurance and to ensure that investors and others who use EDGAR will not rely on XBRL-based financial data submitted as part of the test program, the SEC warns users that the purpose of the program is to test the related format and technology and that "the XBRL data should not be relied upon for making decisions about a company's filing. You should refer to the official filing if you need to see what has been filed with the SEC."

[3] Currently XBRL documents are furnished as exhibits in addition to the official filing to which they relate. Generally, this means that the filer is not liable under SEC rules for information in its XBRL-related documents as long as they reflect the same information that appears in the corresponding portion of the official filing.

(http://www.sec.gov/Archives/edgar/xbrl.html). In addition, the XBRL-based financial data furnished under the test program are not subject to any of the internal control over financial reporting provisions adopted under Section 404 of the Sarbanes-Oxley Act.

The SEC continues its push toward requiring XBRL-based filings. Both the VFP and the test program are ongoing. In September 2007, SEC Chairman Christopher Cox announced completion of a full suite of US GAAP taxonomies to be used in XBRL reporting whose development began a year earlier under a $5.5M contract with XBRL US, Inc. A month later he announced the creation of the Office of Interactive Disclosure to coordinate the SEC's disclosure modernization and advance the use of interactive data in financial reporting in the United States and around the world. In addition, significant progress has been made towards completing the taxonomies; in December 2007 XBRL US published the draft of US GAAP taxonomies for public testing and comment, which includes tags for financial statements and notes, and a draft preparer's guide. Public review currently is scheduled to end April 5, 2008. XBRL-US anticipates that the final taxonomy and preparer guidance will be issued in Spring 2008.

The SEC is not the only regulator who has expressed interest in XBRL filings. In 2007 the Canadian Securities Administrators initiated a voluntary XBRL filing program. Other countries have moved beyond voluntary XBRL filings to requiring the same. For example, China requires interactive data filing for the full financial statements of more than 800 listed companies. Japan has mandated XBRL reporting for all listed companies, beginning with quarterly reports in the second quarter of 2008, and Australia has scheduled implementation of interactive data for mid-2010, with pilot programs and proof-of-concepts beginning in 2008. There is no indication that XBRL assurance issues have been resolved in these jurisdictions.

A Brief Overview of XBRL

Below is a brief and somewhat simplified discussion of how the financial reporting process functions using XBRL.[4] XBRL is a markup language, similar to XML or HTML but designed specifically for business applications, made up of computer-readable tags that allow computers to extract data from the marked-up documents.

Companies rely on XBRL taxonomies, 'dictionaries' that contain standard definitions along with specifications for other attributes associated with each financial statement item via the XBRL tag. The definitions are based on how items within GAAP-based financial statements, such as Revenues, Sales, or Accounts Payable, are generally employed in issued financial statements. Table 1 lists seven attributes of financial statement items along with a brief explanation of how that attribute that would be associated with an item as part of the XBRL tag. For each taxonomy element the first six attributes listed in the table are specified. In December 2007, XBRL US released the Beta Version of the US GAAP taxonomies, which maps approximately 12,000 additional items found in the primary financial statements and the notes to the financial statements to XBRL elements.[5]

The third column of Table 1 provides an example of the attributes that would be found in an XBRL tag (taxonomy element) using Trade Accounts Payable as the financial statement item. The *standard label* represents what would be printed for the element in a financial document produced using the tagged data. "TradeAccountsPayable" is an example of the *names* found in tags that are used to associate the XBRL element with other attributes found in the taxonomy, such as its normal *balance*, the *type* of element that it is, such as whether it is a monetary element or a string of text. In the case of Trade Accounts Payable, the taxonomy would include the fact that it normally has a credit balance and is a monetary item. The description of the element is

[4] See Deshmukh (2004) for a more detailed, comprehensive discussion.
[5] Previous US GAAP taxonomies related to only items on the face of the financial statements, and there was some limitation on the industries to which they applied.

included in the taxonomy to allow preparers and potentially third-party assurors to assess the appropriateness of the element in the taxonomy represented by the tag. To further help in the assessment of the tags appropriateness to taxonomies includes authoritative *references* for the item; these can be US GAAP standards or SEC regulations.

Insert Table 1 here

The final attribute in Table 1 is the *context* for the financial fact from the company's financial statements. Context is essential to describing the uniqueness of a financial fact. For example, Trade Accounts Payable is a unique number each reporting period; context is the way XBRL identifies the period with which the amount is associated. Context can also be used to identify the nature of the financial statement. For example, if a company restates its annual financial statements, context would identify whether the trade accounts receivable was from original statements or restated ones for the same period. So, it is context in conjunction with the element drawn from the taxonomy that uniquely describes every financial fact, whether it is an amount or part of a footnote's text.

Figure 1 details the process of creating an XBRL document, beginning with the selection of a suitable XBRL technical specification. Currently, the SEC requires filers to use XBRL Specification 2.1 and the XBRL Financial Reporting Taxonomy Architecture (FRTA). These specifications are the rules that, when consistently applied, provide technological compatibility and ensure valid taxonomies and instance documents.

Insert Figure 1 here

The tagging process associates elements from XBRL taxonomies with corporate financial facts found in the primary financial statements as well as other financial disclosures. The newly created US GAAP taxonomies were intended to be as comprehensive as practicable, however, the diversity of US financial reporting practices often leads corporations to create their own "extension taxonomies" to tag information so that their information is calculated and presented as it would be without XBRL tagging.[6] A taxonomy, whether a broadly accepted standard or unique to a company, typically consists of six interrelated XML files:

- A dictionary of elements in the taxonomy;
- *Label Linkbase* – the captions and headings that would appear on a rendered document;
- *Calculation Linkbase* - calculation relation with other elements; whether the element is added or subtracted to arrive at a total or subtotal (e.g., Current Liabilities);
- *Reference Linkbase* - references to the authoritative literature associated with the element;
- *Presentation Linkbase* – specifies the order in which elements in the taxonomy appear on rendered financial statements;
- *Definition Linkbase* – specifies relationships such as parent-child necessary to generate financial statements (e.g., which elements sum to Current Liabilities).

The product of the tagging process (e.g., the tagged financial statements) is labeled an "instance document." It includes the financial facts of a company each connected with a definition from either a widely-accepted taxonomy (such as the US GAAP taxonomy) or an extension taxonomy of its own creation. An instance document is only nominally a document; it is a computer file that contains the XBRL tags and the associated financial facts. While an instance document can be read by a person with substantial knowledge of financial reporting and the technical aspects of XBRL, it is actually intended to be "read" by a computer. The instance document is combined with another computer file called a *style sheet* to produce a "rendered" document, which is a printed document that should very closely resemble the printed version of a

[6] Boritz and No (2007) report on a mock audit they conducted of the XBRL instance document filed by United Technologies for the third quarter of 2005. They found that 44.3% of the instance document was based on the industry taxonomies with the remainder relying on United Technologies own extension taxonomy.

PDF, HTML or Word document. The instance document could also be used as input to a "viewer" which would create the equivalent to the rendered document on a computer screen.[7]

The current practice of creating XBRL documents we describe is essentially a "bolt on" process and is performed after the financial statements themselves have been produced by the traditional accounting process. This approach is expected to evolve so that XBRL tags are incorporated into accounting software and ERP systems; this will substantially change the XBRL tagging process as well as the implications for assurance on XBRL related documents. At that point, the tagging process will be "flipped" and instance documents will be produced prior to Word or Excel files containing the financial statements. In that event, the tagging process is likely to be considered part of the requirement to assess the internal controls over financial reporting mandated under section 404 of the Sarbanes Oxley Act. There is no evidence that this change has begun, but mandated SEC filings using XBRL could easily be seen as a potent accelerant.

Potential Assurance Issues for XBRL-Related Documents

Currently the XBRL-based financial data under the SEC's voluntary and test programs are furnished not filed; there is no requirement that independent assurance be provided. However, it is useful to examine how the regulators and others consider information provided by the VFP to provide insight into potential issues that might arise if assurance becomes a requirement. Among the current criteria the SEC uses to determine whether XBRL-related documents contain only voluntary program content is whether "each data element (*i.e.*, all text and all line item names and associated values, dates and other labels) contained in the XBRL-related documents reflects

[7] In December 2006, the SEC made available to the public its Interactive Financial Report Viewer, which allows investors to view and analyze XBRL-based filings. Less than a year later it released the source code for the Interactive Financial Report Viewer to encourage the development of software tools by the private sector.

the same information in the corresponding official EDGAR filing (*i.e.*, the HTML or ASCII version)" (SEC 2005). The key phrase is "reflects the same information," which is deceptively simple. However, in its response to the proposing release, Deloitte & Touche (2004) commented that the SEC should require that "The information is not 'the same', but it is consistent, which should be sufficient."

In 2005 the PCAOB issued a set of Q&A's related to attest engagements on financial information furnished in the VFP (PCAOB 2005). They dealt with a broad range of issues, including application of general attestation standards such as qualifications of the auditor and knowledge of subject matter. The PCAOB recommends that the auditor "compare the rendered XBRL-Related Documents to the information in the official EDGAR filing, and agree the corresponding content." (PCAOB 2005, p. 5). Several procedures were recommended as means of determining "whether the XBRL-Related Documents (and the related taxonomy documents, as necessary) conform to the SEC voluntary program format requirements" (p. 5) including

- *Test whether the data elements (i.e., text and line item names and associated values, dates and other labels) in the XBRL-Related Documents reflect the same information as the corresponding official EDGAR filing (i.e., the HTML or ASCII version).*
- *Verify that the data elements in the corresponding official EDGAR filing have not been changed, deleted, or in summarized in the XBRL-Related Documents.*
- *Evaluate whether the XBRL-Related Documents comply with the appropriate XBRL specification and EDGAR-supported XBRL taxonomies.*
- *Evaluate whether any company extensions of the taxonomy are consistent with the SEC voluntary program format requirements, including conformity with XBRL specifications.*
- *Test whether data elements in the XBRL-Related Documents are matched with appropriate tags in accordance with the applicable taxonomy.*

The guidance issued by the AICPA in Interpretation Number 5 of SSAE contains very similar direction regarding gathering sufficient evidential matter. Referring to taxonomies and other technical specifications, the guidance states that an auditor shall perform and attest only when "the subject matter is capable of evaluation against criteria that are suitable and available

to users" (Section 9101.51). It concludes that technical specifications, such as XBRL Specification 2.1, meet the criteria of being available and suitable because they had been developed by a panel of experts and their development followed due process that included public comment. However, the AICPA also concludes that practitioners cannot assume than custom or corporate taxonomies have undergone due process procedures, and they direct practitioners to evaluate whether these taxonomies represent suitable and available criteria.

The audit guidance provided thus far by both the PCAOB and the AICPA focuses on comparing rendered documents with the source documents. This "paper-centric" view implicitly assumes users focus on the printed form of financial information. However, the power of XBRL is the ability to extract large quantities of information from EDGAR across a broad set of companies for comparison and other analysis. This "data-centric" perspective, where the focus is not on whether the information looks the same as it did in the printed format, but instead is on the appropriateness and the accuracy of the individual tags. A paper-centric view suggests that preparers emphasize several of the linkbases found in the taxonomies. Consistent with a paper-centric view, preparers in the VFP appear to use the calculation, presentation and definition linkbases to ensure that the XBRL elements in the instance document conform to a format that reflects the presentation exactly as seen in the printed documents. This ability to make the rendered version and the source document appear consistent when in fact the XBRL tagged data may be substantially different potentially undermines the tagging process itself. The PCAOB and the AICPA currently advocate this approach. However, simply because the rendered document and the source document agree does not mean the financial facts within the statements are appropriately tagged.

The shift from a paper-centric to a data-centric focus raises some questions about several aspects of the current audit guidance. First, "agreeing" the rendered version with the source document ignores the steps preparers take via the linkbases to make sure that the documents are the same. This failure to address those intermediate steps raises the issue of whether there exists sufficient precision regarding what constitutes an "error" when providing assurance on XBRL instance documents. While current XBRL validation software can indicate to the auditor whether the tags conform to the technical specifications, it does not provide a measure of whether those tags are appropriate. For example, assume that a preparer is creating a document that includes two comparative income statements. It is possible to accidentally tag the amounts representing sales for each period so that they were for the "other" year and still have the amounts displayed in a rendered document in the appropriate places through the presentation linkbase. In this case, the amounts extracted directly from the database would be wrong (and potentially a material misstatement), yet they would be reflected appropriately in a rendered document. When users employ XBRL as intended, bypassing the 'visible' documents, the potential for material misstatement expands to include tagging errors not necessarily detected through agreeing rendered versions with source documents.

The current audit guidance related to XBRL recommends that the auditor test whether data elements in the XBRL-related documents are appropriately tagged. However, the guidance is unclear about whether sampling of the tags is appropriate or allowed. There are several aspects of sampling of XBRL documents that would need to be clarified to provide adequate guidance to auditors. In traditional audit sampling, the auditor is expected to specify either tolerable error or tolerable deviation rate and a desired reliability (i.e., Bailey 1981; Guy and Carmichael 1986) in order to determine a sample size sufficient to meet the audit objectives. In audits of XBRL

documents if the objective of sampling is to determine whether the tagging process has resulted in a material misstatement, an attribute sampling approach would not be appropriate; sampling would only provide an estimated rate of mistagging. A sampling approach aimed at estimating the errors in the financial statements due to inappropriate tags would require an understanding of the underlying distribution of amounts in the population. However, it is not clear that the amounts of the errors are systematically associated with errors in the tagging process. One can imagine a situation where a single mistagging results in a material misstatement or when numerous mistaggings aggregate to an immaterial amount of error. Sampling in traditional audits has evolved techniques that link dollar amounts to selection probability; it is unclear how similar techniques might be applied in XBRL audits. In addition XBRL tags include text strings from disclosures such as the auditors report and MD&A where the amount of error cannot be quantified, yet it is also the case that a single mistagging could result in the statements being materially misstated. If issues regarding sampling cannot be sufficiently resolved, the alternative is 100% testing that may be more expensive than investors and other users are willing to pay.

The concept of materiality in the context of traditional financial reporting refers to the probable impact on the judgment of a reasonable person of an omission or misstatement in a financial report (SAS No. 47, AU 312.10). In conjunction with auditors' risk assessment, materiality's role in planning a financial statement audit is to determine the allocation of audit effort and in the opinion formation phase of the audit to evaluate the implications of the evidence on the statements "taken as a whole" (Messier *et al*. 2005). It is not clear how the concepts of risk and materiality translate into an audit of XBRL tags. For example, in planning such an audit it is not apparent how auditors would allocate planning materiality (tolerable misstatement) to account balances or classes of transactions. In a financial statement audit, detection risk, the risk

of a material misstatement remaining undetected after audit procedures have been conducted, is a function of control and inherent risks. The notion of control risks in the case of an XBRL engagement pertains to the tagging process rather than the internal controls over the accounting processes. In addition, inherent risk might be more appropriately applied to types of tags, such as those from a standard taxonomy rather than company's extension taxonomy, instead of to an account's or class of transaction's susceptibility to misstatement. In a world where a single inappropriate or missing tag could result in the statements "taken as a whole" being materially misstated some thoughtful and innovative consideration of the concepts of risk of failing to detect mistagging and materiality issues seems necessary.

In addition, it is reasonable to expect that with XBRL-tagged data users will extract single pieces of information from EDGAR about a company across a sample of companies. The concept of materiality in financial statement audits applies to the financial statements taken as a whole. So, it is unclear how the concept of materiality will apply to a single financial fact extracted from EDGAR and viewed outside the context of the financial statements. Providing assurance on such 'data level information' has been proposed (Cohen *et al*. 2003). The data-level assurance would add an additional tag to the financial statement item that would include the nature and date of the assurance and the auditors' digital signature along with other systems related information (Boritz and No 2003).

As was suggested by a mock audit of United Technologies XBRL related documents (Boritz and No 2007), another potentially complicating factor is the ability of individual companies to create their own unique tags. While this poses difficulties in standardizing

reporting practices, it also has the potential to greatly complicate the assurance process,[8] while increasing the power of XBRL to represent financial data. In some jurisdictions, such as the FDIC's requirement for banks to submit their call reports in XBRL or Singapore's Accounting & Corporate Regulatory Authority requirement that companies submit Annual Return filings in an XBRL format, a mandated taxonomy is employed and extensions are not allowed. Filers are required to complete a specified form, inserting amounts based on where the filers believe they should be classified. In contrast, the general attitude in the US toward allowing extensibility is reflected in KPMG's response to the SEC's Proposing Release on the voluntary XBRL program.

> *We support the use of extensions in the voluntary program because we believe that the use of an extension enhances, rather than diminishes, the comparability of financial information among companies. Specifically, if a company is required to use a standard taxonomy, the comparability may be reduced as different data is combined under one caption resulting in a loss of linkage to the official financial statements. The use of extensions allows a company to tailor the US GAAP taxonomy to match the manner in which they report financial information within the confines of US GAAP. The existence of such extensions allows a user of the financial statements to determine the manner in which these financial statement line items are compiled by analyzing the US GAAP taxonomy in conjunction with the company taxonomy. Items the filer deems relevant to be disclosed on the face of the financial statements and distinctions between company specific elements and taxonomy elements would be lost if the filer could not use their own extensions*.(KPMG 2004, p.6)

The current audit guidance for XBRL related documents is intended for use in the SEC's VFP. Ultimately, further guidance will be necessary to implement assurance on XBRL-related documents and will need to clearly identify the subject matter of that assurance. It is important to consider the fact that users' foci may be on the data stored in EDGAR with little or no regard to its appearance in a rendered document. XBRL International's AWG discusses an assurance framework that extends from client acceptance through reporting (XBRL International 2006).

[8] The suite of US GAAP taxonomy that was released in beta version in 2007 greatly increases the number of standardized elements (to approximately 12,000 additional tags) which should greatly reduce the need for company's extension taxonomies.

One question that must be addressed is whether assurance should be provided on all XBRL-related documents or just the instance document (IAASB 2007), which would greatly reduce the importance of taxonomy elements included in the linkbases. Related questions involve the nature of the assurance. However, alternatives such as review engagements, which would only provide negative assurance, or agreed-upon procedures that do not provide an opinion are unlikely to meet the needs of investors. Ultimately, XBRL tagging is likely to be embedded in accounting software becoming integral to the internal controls over financial reporting and, therefore, incorporated in an integrated financial statement audit. At that point audit guidance should be robust enough to apply across a broad spectrum of XBRL-reporting regimes.

The criteria against which the XBRL subject matter will be evaluated must also be clearly specified. The question of whether customized, corporate taxonomies are necessary for effective and efficient communication of company's financial information needs to be addressed. Certainly managers believe that such flexibility is critical, leading to the question of whether the benefits of the additional flexibility offset the costs associated with lack of uniformity in disclosure and assurance on those disclosures. There is also the issue of providing assurance on the technical aspects of XBRL. Depending on the depth of XBRL knowledge required it may be necessary for specialists to provide this assurance. The additional costs of employing specialists must be considered in the analysis and weighed against the perceived benefits to the investors.

The crux of XBRL assurance lies in evaluating the accuracy and validity of the tags applied to a company's financial items. In order to perform this evaluation, auditors will need fairly precise guidance as to what constitutes an error, how materiality should be conceived and applied, as well as definitions of risk in XBRL settings.

Potential Research Contributions from Auditing Academics

Academic auditing and accounting research has that ability to make substantial contributions toward answering questions related to assurance of XBRL documents. The potential contributions exist across a broad set of topical areas, including technical XBRL issues and financial markets, such as the level of assurance on XBRL-related documents required by market participants or automation of necessary XBRL assurance procedures. Potential contributions also cross a broad range of research techniques, including archival econometric studies and experiments involving potential users or auditors.

Auditing academics, particularly those with an information systems background, can provide potential solutions to technical issues associated with providing assurance on XBRL-related documents. For example, given the machine-readable nature of XBRL, it would seem that some form of automation as part of the assurance process would improve both the efficiency and effectiveness of these engagements. One technological development that has potential in this area, which originated in the academic community, is Financial Reporting and Auditing Agent with Net Knowledge (FRAANK) (Bovee *et al.* 2005). An advanced prototype of FRAANK uses intelligent parsing of natural-text financial statements to extract and understand accounting numbers from sources such as EDGAR and to convert financial statements into XBRL-tagged documents. This version has the ability to identify segments of the XBRL taxonomy where the matching tag should be located, a capability which could be used to identify potentially mistagged items. Other yet-to-be-developed software could perform similar identification of tags that do not appear appropriate based on semantic relationships or evaluate a company's extension taxonomy for elements that are duplicates of those found in the standard taxonomy. These technological advances could be utilized within an assurance engagement to facilitate the process

while reducing the time required to complete. In addition, for continuing engagements, some means of automating year-on-year comparisons for individual items in a company's financial statements may provide a straightforward way of identifying changes in the tags.

While not directly associated with assurance on XBRL-related documents, technologies based on XBRL could be useful in performing other audit procedures. For example, XBRL tagged data could be used in analytic procedures to quickly develop comparisons based on industry data for very specific types of measures. A similar application might be found in the area of fraud risk assessments. Ultimately, these sorts of applications would rely on the availability of reliable XBRL-based databases. One potential benefit of XBRL may be increased efficiency in the audit process. For example, if XBRL tags were examined early in the process so that reliance could be placed on them throughout the rest of the engagement, providing assurance on XBRL as part of an integrated audit might lead to efficiencies in other aspects of the engagement

There are several economics-based aspects of providing assurance on XBRL-related documents where academics could contribute to understanding the potential costs and benefits of doing so. For example, understanding the perceived value that capital market participants place on XBRL assurance is necessary to estimate the demand for assurance and potential prices. The Assurance Working Group of XBRL International (XBRL 2006) points out that potential formats for XBRL reporting include compliance in a regulatory filing environment, user-prepared reports based on data extracted from sources like EDGAR, and public company prepared financial data tagged and made directly accessible through the Internet (potentially leading to "continuous reporting" (Hunton *et al*. 2003)). Each of these reporting formats may require a different level of assurance with different input costs and output benefits. Economic analysis that examines each

of these levels of assurance could provide very useful information, particularly to standard setters. Different levels of assurance, including "data-level assurance" (Cohen *et al.* 2003), "continuous assurance" (Hunton *et al*. 2003) and assurance on the integrity of XBRL documents distributed over the Internet (Boritz and No 2003), have received attention at a conceptual level. While understanding the economics of these assurance approaches is important, academic research that employs creative approaches to estimating the cost of these prior to broad implementation would yield information to assist regulators and others in making decisions.

Another area where academics might provide insights is in the providers of assurance services. There seems to be a *prima fascia* belief that auditors who currently perform financial audits will be the ones who provide assurance on XBRL-related documents. Certainly, once the accounting systems evolve to include XBRL tags from which all reports, including financial statements, will be created it seems clear that auditors will be required to provide assurance on XBRL tags. However, for companies who do not fall under the authority of 404, assurance may be more cost effectively performed by other third-parties with information technology, rather than accounting, expertise. Research into the costs of alternative assurance providers could also provide useful information to regulators and information users.

Finally, there are numerous XBRL-based research issues that might be explored through the use of behavioral methods. While a few behavioral or experimental studies have been published in the area of XBRL assurance (e.g., Nicolaou *et al*. 2003) or the impact of XBRL-based reporting (Hodge *et al*. 2004), many additional topics could be explored. For example, academic research might provide insights into the importance of technical knowledge in conducting an XBRL assurance engagement. Anyone engaged to provide assurance over XBRL would need a deep understanding of both GAAP and technical aspects of XBRL such as XBRL

Specification 2.1. However, it is not clear to what extent a single individual needs to possess these two types of knowledge, or whether individuals on an audit team would be effective if each possessed expertise in one area but not the other. A related issue is what depth of knowledge of the technical XBRL specifications is necessary to determine whether the client's extension taxonomy and other technical aspects are in compliance with the technical standards. Understanding these issues will assist regulators and others in determining whether the use of a technical XBRL specialist should be mandated.

Judgment is another area that will need to be better understood in the context of an XBRL engagement. For example, certain items that are unique to the client's taxonomy must be evaluated to determine whether they are necessary and adequate extensions. Again, academics can provide information useful in better understanding the level of experience and knowledge necessary to effectively make these sorts of judgments.

Summary and Conclusions

XBRL is an XML-based computer language that allows financial information to be tagged and subsequently stored and retrieved from a financial database such as EDGAR. XBRL documents are created by tagging financial statement information with the XBRL codes to make the data computer readable and searchable. The computer files created in the tagging process translate financial statement information; a potential for material misstatements due to the "tagging" process exists. Consequently, investors and other users are likely to demand some level of assurance on the tagging process and its compliance with technical specifications.

The SEC has taken preliminary steps toward making mandatory XBRL filing likely. Currently, the SEC has an XBRL test group of registrants that voluntarily submits their annual, quarterly and other reports using interactive data. To encourage participation and

experimentation in this voluntary program attestation is allowed but not required. While guidance to auditors that might attest to the XBRL data is limited, the PCAOB has issued Q&A's related to attest engagements regarding XBRL financial information furnished under this program. Current audit guidance from the PCAOB and the AICPA rely on the auditor agreeing rendered XBRL-related documents to the information in the official EDGAR filing. While this process may be adequate for the reporting paradigm based on printed reports and the context of statements taken as a whole, several important issues must be addressed before the assurance guidance is adequate for a "data-centric" reporting environment. These issues include a better definition of what constitutes an "error" and a clearer meaning of materiality when individual data elements can be extracted and used outside the context of the financial statements where they originated. Academic research can and should provide valuable, objective inputs to the process of developing guidance for XBRL-document assurance.

REFERENCES

AICPA (2007) AT Section 9101 *Attest Engagements: Attest Engagements Interpretations of Section*, AICPA, New York, NY.

Bovee, M., A. Kogan, K. Nelson, R. Srivastava, M. Vasarhelyi. 2005. Financial Reporting and Auditing Agent with Net Knowledge (FRAANK) and extensible Business Reporting Language (XBRL) *Journal of Information Systems*, Vol. 19. No. 1, Spring, pp. 19-41.

Boritz, J.E. and W. G. No. 2007. Auditing an XBRL Instance Document: The Case of United Technologies Corporation. working paper, University of Waterloo.

Boritz, J.E. and W. G. No. 2003. Assurance Reporting for XBRL: XARL (eXtensible Assurance Reporting Language). Reporting Trust and Data Assurances in Capital Markets: The Role of Technology Solutions, PricewaterhouseCoopers Research Monograph, pp. 7-16.

CFA Institute Center for Financial Market Integrity. 2007. *XBRL Survey Report*, Charlottesville Virginia.

Cohen, E. E., B. Lamberton and S. Roohani. 2003. The Implications of Economic Theories for Data Level Assurances: Research Opportunities. Reporting Trust and Data Assurances in Capital Markets: The Role of Technology Solutions, 51-60

Deloitte & Touche LLP. 2004. Comments on Proposed Rule: XBRL Voluntary Financial Reporting Program on the Edgar System, http://www.sec.gov/rules/proposed/s73504/deloittetouche111104.pdf

Deshmukh, A. 2004. XBRL. *Communications of the Association for Information Systems* (Volume 13) pp. 196-219.

Ernst & Young LLP. 2004. Comments on Proposed Rule: XBRL Voluntary Financial Reporting Program on the Edgar System. http://www.sec.gov/rules/proposed/s73504/ernstyoung110104.pdf.

Hodge, F. D., J. J. Kennedy and L. A. Maines. 2004. Does Search Facilitating Technology Improve the Transparency of Financial Reporting? *The Accounting Review* 79 (3): 687-703.

Hunton, J., A. Wright and S. Wright. 2003. *The Supply and Demand For Continuous* Reporting, Trust and Data Assurances in Capital Markets: The Role of Technology Solutions, PricewaterhouseCoopers Research Monograph pp. 7-16.

KPMG LLP. 2004. Comments on Proposed Rule: XBRL Voluntary Financial Reporting Program on the Edgar System. http://www.sec.gov/rules/proposed/s73504/kpmg110104.pdf.

Messier, W. F., N. Martinov-Bennie and A. Eilifsen. 2005. A Review and Integration of Empirical Research on Materiality: Two Decades Later. *Auditing: A Journal of Practice & Theory* Vol. 24, No. 2 November. pp. 153–187.

Nicolaou, A. I., A.T. Lord and L. Liu. 2003. Demand for Data Assurances in Electronic Commerce: An Experimental Examination of Web-Based Data Exchange Using XML. PricewaterhouseCoopers Research Monograph 32-42.

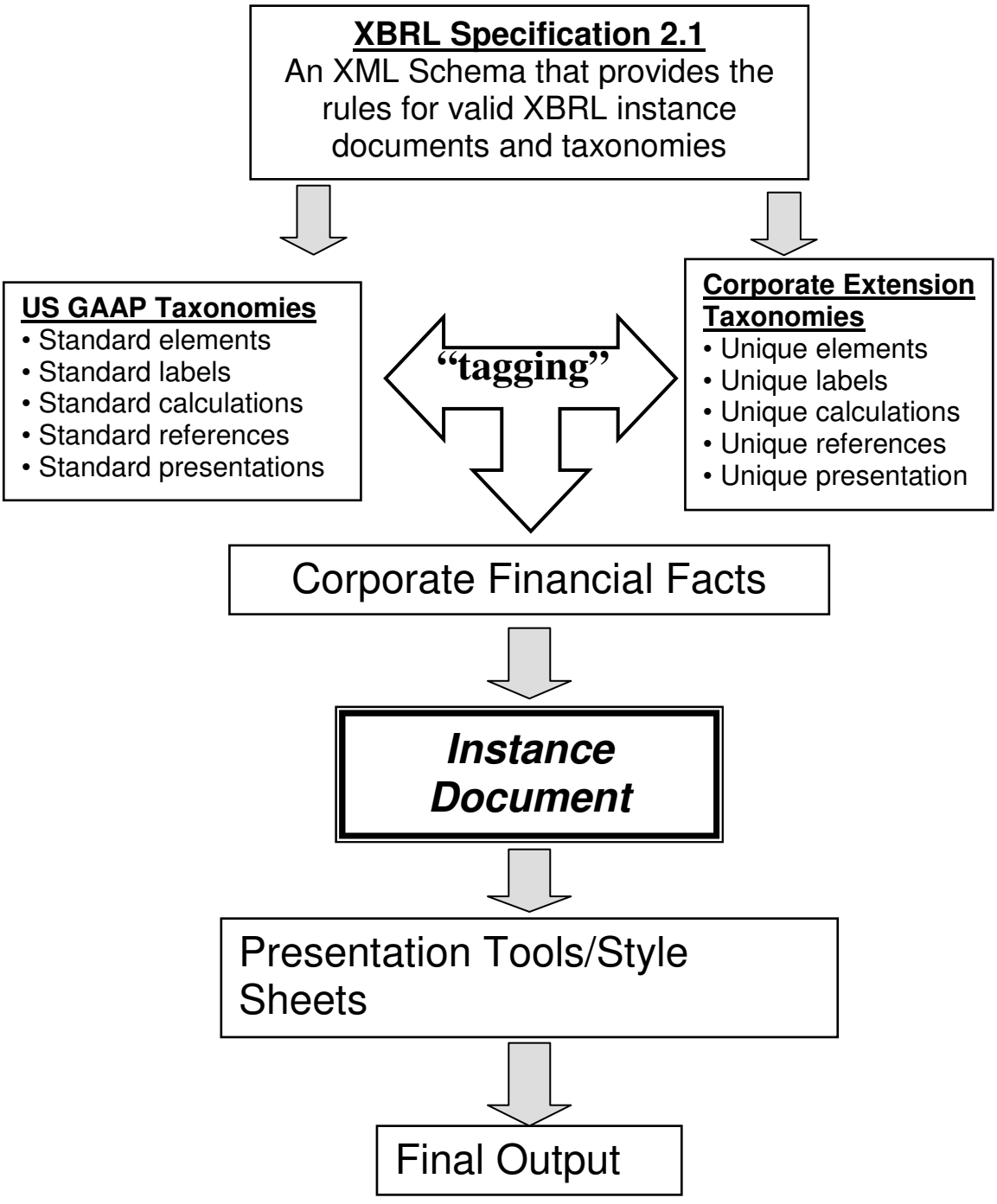
Public Company Accounting Oversight Board. 2005. Staff Questions and Answers, Attest Engagements Regarding XBRL Financial Information Furnished Under the XBRL Voluntary Financial Reporting Program on the Edgar System, Washington, DC.

Securities and Exchange Commission. 2004. XBRL Voluntary Financial Reporting Program on the EDGAR System (Proposed Rule Release No. 33-8496; September 27, 2004)

_____. SEC Final Rule: XBRL Voluntary Financial Reporting Program on the EDGAR System. 2005. Securities and Exchange Commission Release Nos. 33-8529, 34-51129, 35-27944, 39-2432, IC-26747; File Number S7-35-04 (February 3, 2005 [70 FR 6556])

_____. SEC Advisory Committee on Improvements to Financial Reporting. 2008. Draft Discussion memo January 2008. http://www.sec.gov/about/offices/oca/acifr/acifr-ddm-011108.pdf

Table 1		
Attribute	**Explanation**	**Example- Trade accounts payable**
Standard Label	The name of the financial element that would appear in a rendered document.	Accounts Payable - Trade
Name	A unique name that complies with XML naming criteria, such as not containing spaces and other 'illegal' characters.	TradeAccountsPayable
Balance	Indicates whether the normal balance is debit or credit	Credit
Type	The data type such as monetary, text, shares, or decimals.	Monetary
Description	The definition based on the description found in the authoritative literature.	Recurring obligations of a business that arise from the acquisition of merchandise, materials, supplies and services used in the production and/or sale of goods and services.
Reference	Location of the authoritative literature for the financial element. The reference can include the name of the reference literature, as well as reference paragraphs and subparagraphs.	Accounting Research Bulletin (ARB) 43 FASB 7 3A (Standard)
Context	Context includes the specific circumstances of the financial element such as the organization for which the instance document has been prepared, the currency in which the element is denominated and the maximum number of significant digits. It also conveys the type financial data (e.g., actual, budget, restated, pro forma, etc.) The duration of the element identifies whether the element is for a specific date or an interval.	This is a critical attribute because it uniquely identifies the element in terms of the entity, reporting period and types of statements (actual, restated, etc.).


XBRL Specification 2.1
An XML Schema that provides the rules for valid XBRL instance documents and taxonomies
US GAAP Taxonomies
• Standard elements
• Standard labels
• Standard calculations
• Standard references
• Standard presentations
"tagging"
Corporate Extension Taxonomies
• Unique elements
• Unique labels
• Unique calculations
• Unique references
• Unique presentation
Corporate Financial Facts
Instance Document
Presentation Tools/Style Sheets
Final Output