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XBRL Implementation: A Field Investigation to Identify Research Opportunities

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ABSTRACT: The Securities and Exchange Commission (SEC) recently mandated that publicly traded companies furnish their financial statements in XBRL format. However, researchers and practitioners question whether companies are adequately prepared to implement XBRL, and whether software tools and guidance exist to lead preparers through the process of creating XBRL-related documents.

This paper describes how early mandate adopters implemented XBRL reporting. Four themes emerged from our analysis: management support and involvement, implementation approach, organizational readiness or expertise, and control over the XBRL reporting process. Our study contributes to a more complete understanding of how companies implement XBRL by providing a basis for accounting researchers to identify current implementation issues and future research opportunities. Furthermore, we provide educators with a characterization of how companies implement XBRL, thereby facilitating their classroom coverage of this important topic.

Keywords: XBRL implementation; electronic financial reporting; instance documents; taxonomy extension.

Data Availability: Data used in this study are available from the authors upon request.

I. INTRODUCTION

Over the past decade, the corporate use of the Internet as a key channel of communication to stakeholders has grown considerably (Beattie and Pratt 2003; Hunton 2002; Kelton and Yang 2008). Today, most companies disclose their financial and business information (usually in HTML or PDF format) on their websites (CICA 2005; FASB 2000; IASC 1999). Internet financial reporting allows firms to meet stakeholder demands for corporate transparency while increasing cost efficiencies (Beattie and Pratt 2003; Hodge et al. 2004; Kelton and Yang 2008). However, stakeholders are often unable to access information provided in HTML or PDF

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format on company websites without time-consuming and error-prone cutting and pasting of the information from file to file. XBRL (eXtensible Business Reporting Language) overcomes this limitation by providing a standardized method to prepare, publish, exchange, and analyze financial and business information (Cox 2006; Hoffman and Strand 2001; XBRL International 2012). With XBRL, all financial data are represented using elements (or tags) so that stakeholders can easily find the tagged data, extract or transform the data, and analyze the data with analytical applications.

The U.S. Securities and Exchange Commission (SEC) issued a mandate that requires accelerated filers to furnish financial information in XBRL format[1] for fiscal periods ending on or after June 15, 2009, and all public companies to comply for fiscal periods ending on or after June 15, 2011 (SEC 2009b). Although several XBRL implementation resources exist (Garbellotto 2009b; Janvrin and Mascha 2010; Mascha et al. 2009; Phillips et al. 2008; XBRL US 2008, 2009), examining the implementation process of accelerated filers allows us to learn about the *actual* implementation process, issues faced during the process, and opportunities for future research. This paper reports on interviews with accounting officers who are in charge of XBRL implementation at five accelerated filers. Our goal is to describe how early adopters implemented XBRL reporting and to identify issues encountered where academic research is needed.

Four themes with linkages to existing information systems and accounting literature emerged from our analysis. The first theme, management support and involvement, examines whether prior information systems research indicating that support from top management is a most crucial factor in IS adoption and implementation applies to our setting (Chatterjee et al. 2002; Lederer and Mendelow 1988; Leonard-Barton and Deschamps 1988; Wang and Chen 2006). The second theme, implementation approach, discusses how our respondents made their decisions to either outsource or in-house the XBRL implementation process using factors considered in prior research (Blaskovich and Mintchik 2011; Choudhury and Sabherwal 2003; Grover et al. 1996). The third theme, organizational readiness or expertise, emphasizes the value of financial and technical readiness regarding XBRL implementation (Iacovou et al. 1995). The final theme, control over XBRL reporting process, examines early adopters' progress in developing internal controls over the XBRL reporting process.

This study contributes to the growing XBRL literature[2] by examining financial statement preparer tasks involving creating XBRL-related documents (i.e., instance documents and taxonomy extensions).[3] In addition, this research is important to audit firms as they consider their potential assurance role in the instance document creation process and examine how using XBRL instance documents and related rendering software may streamline their analytical review process (Bay et al. 2006; Gunn 2007). Furthermore, understanding the instance document creation process is important since errors in the tagging process by financial statement preparers, which may impact company reputation, and user attitude toward XBRL may go unnoticed until the SEC requires companies to

[1] We acknowledge that the SEC uses the term *interactive data* to indicate business, accounting, and financial information tagged using XBRL (SEC 2008a, 2009b).

[2] Prior research discusses the benefits of XBRL (e.g., AICPA 2009a; Baldwin et al. 2006; Burnett et al. 2006; Hannon 2002; Willis 2005), the technical aspects of XBRL taxonomy and XBRL GL (e.g., Bovee et al. 2002; Debreceny et al. 2007; Cohen 2009; Willis and Hannon 2005), XBRL adoption issues (e.g., Aguilar 2008b; Alles and Gray 2011; Bonsón et al. 2009a; Bonsón et al. 2009b; Debreceny et al. 2005; Doolin and Troshani 2007; Henderson et al. 2011; Locke and Lowe 2007; Pinsker and Li. 2008; Sledgianowski et al. 2010a; Troshani and Rao 2007), and the quality of XBRL submissions and assurance on XBRL-tagged data (e.g., Bartley et al. 2009, 2011; Boritz and No 2008; Debreceny et al. 2010; Du et al. 2011; Weirich and Harrast 2010).

[3] We acknowledge that companies may outsource the XBRL tagging process to third-party providers. Review of XBRL furnishings suggests that errors incurred, particularly related to labels, may have been detected if financial statement providers more closely reviewed their XBRL furnishings prepared by third-party providers (SEC 2010). Thus, even when companies outsource the XBRL tagging process, researchers and financial statement preparers need to understand this process to improve the accuracy of XBRL-related documents.

file rather than *furnish*[4] instance documents (Bartley et al. 2009). Finally, our research is important to educators as they stress the benefits of XBRL to tomorrow's accountants (Farewell 2006; Capozzoli and Farewell 2010; Debreceny and Farewell 2010; Peng and Chang 2010; White 2010).

Our paper proceeds as follows. Section II describes the method used to gather our data. Section III provides a description of the XBRL implementation process, and Section IV reports how firms implement XBRL. Section V describes how our results can be linked to four themes from existing information systems and accounting research, and discusses future research opportunities. We conclude in Section VI with a summary and discussion of study implications and limitations.

II. METHOD

To examine how companies are currently implementing XBRL, we conducted interviews with nine accountants responsible for XBRL implementation at five accelerated filer companies. Participant titles ranged from senior financial analyst to senior director for financial reporting. We chose companies from diverse industries including manufacturing, transportation, health care, and financial services. Each interview lasted approximately one hour. In addition, we validated each company's first two XBRL furnishings under the SEC mandate and rendered these documents using the SEC Interactive Data Viewer and CoreFiling TouchStone.

Similar to several other accounting studies (e.g., Beasley et al. 2009; Cohen et al. 2002; Griffith et al. 2011; Hermanson et al. 2010; Hirst and Koonce 1996; Trompeter and Wright 2010) that followed methods advocated by Cooper and Morgan (2008) and Yin (2008), we employ a qualitative research approach rather than a review of existing documentation (in this case, XBRL implementation guidance) to develop our description for two reasons. First, given the early stage of XBRL implementation, interviews allow us to explore *actual* perceptions of the implementation process from participants, in addition to providing initial feedback on the adequacy of the written implementation guidance. Second, since our research is exploratory in nature, interviews provide rich and detailed descriptions of how people experience a given research issue (Creswell 2009).

A semi-structured interview guide was developed through a review of prior literature (Choi et al. 2008; Bonsón et al. 2009b; Garbellotto 2009a, 2009b, 2009c; Pinsker and Li 2008; Sledgianowski et al. 2010b), implementation guidance (XBRL US 2008, 2009), and discussions with practitioners. A colleague reviewed the interview guide for completeness and clarity. After our first interview, we reevaluated our guide and revised it to address topics that surfaced during the initial interview.

The interview guide consisted of a series of open-ended questions organized into five sections. Questions in the initial section obtained in-depth information about the XBRL implementation planning process. Questions in the second section examined how companies tagged individual account values and extended the standard taxonomy when needed. Questions in the third section explored how participants validated, reviewed, and rendered instance documents. Questions in the fourth section asked about auditor involvement and the process of issuing instance documents. The final set of questions explored the skill set and training needed.

Our interviews followed a semi-structured format. When the interviewee's response took us down an important path, we pursued that path by asking additional questions to better understand the issue before returning to the planned interview materials. In addition, not all questions were asked to every interviewee because some questions were not relevant. To illustrate, we did not ask interviewees who outsourced the XBRL implementation process detailed questions about how they created taxonomy extensions. A sample of questions used in the study is provided in Appendix A.

[4] Information *furnished* to the SEC is generally not be deemed *filed* for liability purposes of Section 18 of the Exchange Act of 1934 (SEC 2009b).

Our initial interviews were conducted between February and June 2009 before any accelerated filers had furnished XBRL information under the SEC mandate. Follow-up interviews were conducted one to three months following the company's first mandated furnishing. We started each interview with non-threatening questions (e.g., job title and responsibility) to make respondents feel comfortable. We then explained the main purpose of the research, followed by a brief background of our prior work with XBRL. The respondents were assured that their identity and responses would be held in strict confidence and that they could withdraw their responses at any time. Based on the detailed implementation examples offered and the wide variance in opinion expressed regarding the XBRL implementation process, the respondents appeared to be fairly candid and honestly described their initial perceptions of the implementation process.

During each interview, both authors took detailed notes and the interviews were recorded. Following the interviews, each author transcribed his/her notes. A graduate assistant summarized the transcribed notes for analysis. The summary was reviewed and modified based on feedback from both authors to ensure that the analysis of the paper was not based on errors made in the summarization process; thus, it faithfully represents our interviewees' responses with respect to their XBRL implementation process.

Similar to other accounting research that uses an interview approach (e.g., Hermanson et al. 2010), we supplemented our analysis with additional data sources. In this research, we validated each company's first and second XBRL furnishings under the SEC mandate using Fujitsu Taxonomy Editor/Instance Creator and CoreFiling TouchStone. Our validation goal was to determine whether the XBRL-tagged data in the instance document accurately reflect the business facts in the original financial statements. In addition, we rendered each company's instance documents using SEC Interactive Data Viewer and CoreFiling TouchStone. Further, on a line-by-line basis, we compared labels, values, and signs between the rendered documents and original financial statements.[5]

III. XBRL IMPLEMENTATION PROCESS

SEC XBRL Financial Reporting Mandate

SEC Rule 33-9002 mandates that publicly traded companies furnish financial statements with XBRL tags. The SEC implemented the mandate over a three-year period. The companies examined in this research were domestic and foreign large accelerated filers using U.S. GAAP (i.e., companies with worldwide public common equity float above $5 billion) that were required to provide XBRL-tagged financial statements for quarterly report on Form 10-Q, or annual report on Form 20-F or Form 40-F for fiscal periods ending on or after June 15, 2009. All other large accelerated filers were required to provide XBRL-tagged financial statements for fiscal periods ending on or after June 15, 2010. Finally, all remaining filers were required to provide XBRL-tagged statements for fiscal periods ending on or after June 15, 2011.

XBRL-tagged financial information is subject to limited liability during the first two years of required XBRL reporting. During this period, the submissions will be deemed to be furnished, not filed, for the liability provisions of the Securities Act of 1933 and the Securities Exchange Act of 1934 (SEC 2008b).[6] In addition, the submissions are not subject to specified antifraud provisions if inaccurate data are provided with good faith and are corrected promptly after the filer becomes

[5] We acknowledge that we did not validate the other disclosures such as footnotes.

[6] Since our respondent companies were large accelerated filers first impacted by the SEC XBRL mandate in 2009, these companies are no longer subject to limited liability regarding their XBRL-related documents.

aware of the failure. Finally, under the new rule, companies are not required to obtain auditor assurance on their submissions (SEC 2009b).

XBRL Implementation Process Framework

Several recent studies address the XBRL adoption decision (Doolin and Troshani 2007; Pinsker and Li 2008; Troshani and Rao 2007). Given the SEC mandate, our research concentrates on the implementation process once the XBRL adoption decision has been made. Several guidelines and studies addressed the XBRL implementation process (e.g., Garbellotto 2009b; Janvrin and Mascha 2010; Mascha et al. 2009; Phillips et al. 2008; XBRL US 2008, 2009). Based on the aforementioned studies and preliminary discussions with standard setters and practitioners, we suggest that the XBRL implementation process includes four major phases: (1) plan implementation; (2) tag financial items and create taxonomy extensions; (3) validate, review, and render XBRL-related documents; and (4) audit and issue XBRL-related documents. Our framework is shown in Figure 1.

XBRL implementation planning begins by acquiring adequate knowledge about XBRL and regulatory requirements, setting up an implementation team, and developing an implementation plan. XBRL guidelines suggest that the implementation team include individuals responsible for current SEC filings and those with information systems knowledge (XBRL US 2008, 9). The implementation team decides whether to create instance documents in-house or outsource this process to a third-party service provider, and identifies the financial information (i.e., primary financial statements or complete financial disclosures with MD&A and footnotes) to be tagged. In addition, the team may train personnel accountable for creating XBRL instance documents, identify who will review the XBRL-related documents, and determine what level of granularity to use to tag the financial information (e.g., block versus detailed footnote tagging).

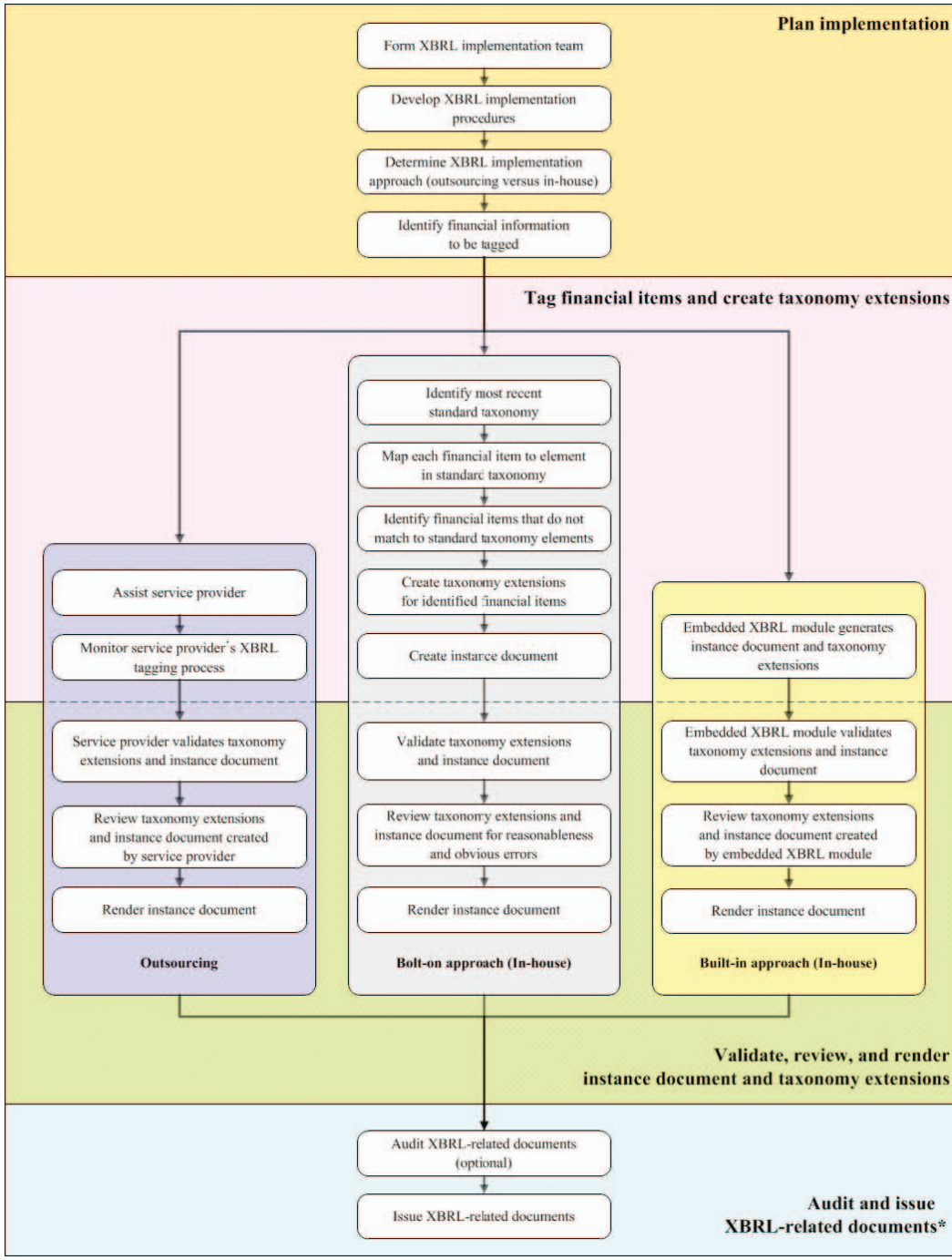
The activities a company performs in the next two XBRL implementation phases (i.e., tag financial items and create taxonomy extensions; and validate, review, and render XBRL-related documents) depend on its implementation approach, that is whether it creates instance documents in-house or outsources this process to a third-party service provider. If the company employs a third-party service provider to tag financial items and create taxonomy extensions, the team works with the provider to monitor the tagging process (i.e., reviewing tags to verify that the provider has selected the appropriate XBRL elements and created appropriate taxonomy extensions when needed). Even when using a third-party service provider, the liability for errors rests ultimately with the company (SEC 2009b; XBRL US 2008).

Companies that decide to tag financial items in-house can use either a bolt-on or integrated approach (Garbellotto 2009b). With a bolt-on approach, the XBRL implementation team first creates the company's initial financial statements and bolts on (or tags) each individual financial item within these statements. In contrast, under the integrated or built-in approach (Garbellotto 2009d), the XBRL reporting process is integrated with the company's financial reporting application or embedded in ERP application (Garbellotto 2009e). In this case, the individual financial items are tagged when they are incurred, and XBRL-related documents are generated and validated from the embedded XBRL module at the end of each fiscal period.[7]

The second phase, tag financial items and create taxonomy extensions, involves several steps. First, the company selects the appropriate standard taxonomy and maps each financial item to an element (or tag) in the standard taxonomy. If the company cannot find an appropriate tag in the standard taxonomy, it extends the taxonomy and creates a new tag. Finally, the company creates the

[7] Given the infancy of XBRL tagging, we are unaware of any companies that currently use the integrated (built-in) approach. Thus, we do not discuss this approach in detail in this paper.

FIGURE 1
XBRL Implementation Process



* XBRL-related documents include instance documents and taxonomy extensions.

instance document. If the company employs a third-party service provider, the tag financial items and create taxonomy extensions phase involves assisting the third-party service provider in mapping each financial item to either an existing XBRL tag in the standard taxonomy or adding a new tag to the taxonomy extension.

In the validate, review, and render phase, the company performs validation tests to ensure that the XBRL-related documents (i.e., instance document and taxonomy extensions) comply with XBRL specifications and regulatory requirements (e.g., SEC rules such as EDGAR filer manual requirements). Further, company management reviews the mapping details for reasonableness and obvious errors. Although not legally liable for presentation (XBRL US 2008), the company may view the XBRL-related documents through rendering software to verify that the information users will view reflects the company's financial statements. If the company employs a third-party service provider, the provider generally validates the XBRL-related documents, but both the company and the provider review and render the documents (Fox 2009).

In the final implementation phase, the company may request that its auditor provide assurance that the XBRL information is complete, accurate, and validly reflects the information in the original financial statements (Boritz and No 2008, 2009; Farewell and Pinsker 2005; McGuire et al. 2006; Plumlee and Plumlee 2008; Srivastava and Kogan 2010). We note that the SEC mandate currently does not require independent assurance for XBRL documents (SEC 2009b). Finally, the company issues its XBRL-related documents to the SEC and places the information on its Investors Relation website for external parties (e.g., investors and analysts) to view.

IV. RESULTS

Next, we discuss our key insights based on the XBRL implementation process framework. These insights are summarized by XBRL implementation process phase in Table 1. A summary of the themes that emerged from our data analysis that can be linked to existing information systems and accounting theory follows in Section V.

Plan Implementation

Main Objective of XBRL Implementation

Consistent with Sledgianowski et al. (2010a), all respondents indicated that the main objective of XBRL implementation was regulatory compliance. In addition to compliance, one respondent indicated that shortening the 10-K filing period was a secondary objective. Another respondent reported that his company was considering using XBRL to compare its financial information to those of its competitors. Leveraging XBRL via integration into information systems was not a priority at this time for our respondents, as only one respondent indicated that senior management was considering leveraging XBRL with other technologies such as XBRL Global Ledger (GL) in the next few years.

In general, respondents indicated that they supported moving toward XBRL. However, one respondent questioned whether any group other than the SEC will benefit from XBRL, since analysts already have sophisticated financial analysis tools and nonprofessional investors may not possess the skill set or motivation to use XBRL-tagged information.

Acquire Knowledge Regarding XBRL and Regulatory Requirements

Respondents had no or limited knowledge of XBRL before starting to work with XBRL. They learned about XBRL by attending conferences and workshops, visiting XBRL-related websites (e.g., SEC, XBRL US, and AICPA XBRL Resources), and studying software tools. In addition, two respondents reported they spoke with other companies regarding their XBRL plans, and one

TABLE 1

Summary of Key Insights by XBRL Implementation Process Phase

Plan Implementation
- All respondents reported the primary motivation for XBRL implementation was the SEC mandate.
- One company was also motivated to implement XBRL to keep up with competitor reporting environment.
- Respondents had no or limited knowledge of XBRL before beginning to plan for XBRL implementation.
- Respondents obtained their XBRL knowledge through attending conferences, webinars, and discussions with consultants.
- Two companies involved controller or CFO at a cursory level in the initial XBRL implementation decision.
- Three companies initially elected to purchase XBRL software.
- Two companies that initially elected to use XBRL provider indicated that their decisions were driven by concerns regarding how to handle tagging footnote details. One company that had a three-year contract with its financial printer regarding its EDGAR filings, signed a shorter (i.e., one-year) contact with the same printer for XBRL support.

Tag Financial Items and Create Taxonomy Extensions

Tag Financial Items
- All respondents used the bolt-on rather than integrated approach to tagging financial items.
- All companies initially tagged their financial statements using 2008 taxonomy and then re-tagged the financial statements once the 2009 taxonomy was available.
- All respondents chose to block-tag footnotes for 2009.
- Two respondents indicated serious concerns with ability to detail-tag financial statement footnotes, with one strongly arguing that given the current state of software and lack of SEC direction, the SEC should delay detailed footnote tagging requirements.

Create Taxonomy Extension
- Respondents tended to minimize the number of taxonomy extensions used due to either a desire to match with the existing standard taxonomy or perceptions regarding the difficulty of creating taxonomy extensions.
- Two companies that purchased XBRL software asked software consultants to create taxonomy extensions.
- All respondents indicated that they found the technical aspects of creating taxonomy extensions challenging.
- Two companies created several extension elements that were not used in their XBRL-related documents provided to the SEC.

Validate, Review, and Render Instance Document and Taxonomy Extensions

Validate Instance Document and Taxonomy Extensions
- All respondents noted the validation process was frustrating and error messages generated were difficult to understand.
- Our validation of each company's initial XBRL furnishing noted inconsistencies in validation error messages between software products. Further, the software products did not use the validation error messages suggested by the SEC.

Review Instance Document and Taxonomy Extensions
- All companies reviewed instance document internally.
- Two companies also asked financial printer to review instance document.

Render Instance Document and Taxonomy Extensions
- Although not required, all respondents viewed their documents using rendering software.
- Protecting company reputation was main reason why companies took the time to view their documents using rendering software.

(continued on next page)

TABLE 1 (continued)

- Two respondents reported frustrations with rendering views included in their XBRL software.
- Respondents reported some frustrations with SEC delays in updating its rendering software to reflect 2009 taxonomy.

Audit and Issue XBRL-Related Documents

- Audit XBRL-Related Documents
  - All companies reported their auditors were not interested in auditing their documents.
  - Only one respondent suggested that audit procedures may differ since, with XBRL tags, materiality may be based on values in individual financial items rather than the entire statement.
- Issue XBRL-Related Documents
  - All companies reported they plan to work with their financial printers to issue their XBRL-related documents.
  - Financial printers use their own software rather than the software used by the financial preparer to produce the XBRL-related documents provided to the SEC and placed on company websites.

Other Insights

- XBRL Skill Set
  - All respondents reported that they already possess the accounting knowledge needed to select XBRL tags.
  - Two respondents indicated that accountants need more computer skills before they can create taxonomy extensions.
  - One respondent noted that knowledge of both financial statements and business processes was critical to successfully tagging financial statements.
- Challenges Ahead
  - Tagging and taxonomy extension process is very time consuming.
  - Software needs to be improved, and service providers need additional XBRL knowledge.
  - Delays in taxonomy updates are frustrating, and a system to instantly update software with next taxonomies would be helpful.
  - Respondents are concerned that XBRL may cause delays in SEC filings.

respondent reported that his company received training from external consultants (i.e., software vendors).

Form XBRL Implementation Team

All respondents indicated that their companies started the XBRL implementation project by organizing an XBRL team. The team usually consisted of individuals from both accounting and information technology. While top management provided support for purchasing software and attending XBRL conferences to encourage company compliance, they were not actively involved in the actual XBRL implementation details.

Develop Implementation Plan

After learning XBRL and gathering information about SEC rules and relevant XBRL software, the implementation team, with senior management support (e.g., CFO and controller), determines how to implement XBRL. This involves identifying who will be responsible for creating XBRL documents, training individuals, and developing governance policies for the XBRL tagging process. While all companies experienced minor obstacles in the XBRL implementation decision-making process, such as obtaining enough XBRL knowledge quickly and struggling while reviewing XBRL software, one respondent stated that he had major obstacles. The implementation team had difficulty understanding XBRL and how to implement XBRL into its current system. To address these issues, the company hired a consultant from a software vendor.

Determine XBRL Implementation Approach

As noted earlier, companies can implement XBRL through outsourcing the tagging process to a third-party service provider, purchasing bolt-on software, or integrating XBRL into their existing information system. All respondents stated that to make an informed decision regarding which approach to take, they conducted research on currently available XBRL software and services, viewed demonstrations from software vendors and service providers, and consulted with other companies. The final XBRL implementation approach choice was made by each implementation team with input from senior management.

Three companies initially elected to purchase bolt-on software.[8] To select the XBRL software best suited for their needs, the respondents reviewed several XBRL software packages. All respondents indicated that they based their software selection on ease of use, cost, and technical support. All companies that purchased bolt-on software reported information technology infrastructure problems. One company needed to change its server settings to get the official XBRL taxonomy to load into its software. A second company purchased a stand-alone package and had to upgrade the memory on the target personal computer after discovering that the software required more memory. The third company had difficulty feeding its financial information from its financial reporting system directly into its purchased software.

Two companies employed third-party service providers. The choice of which third-party service provider to use was based on the amount of support the provider offered. For instance, one service provider provided only six free customer service calls for software issues and two calls for accounting-related questions. Interestingly, one company that had a three-year contract with its service provider to prepare its EDGAR filings, signed only a one-year agreement with this same service provider for XBRL support since the service provider had not developed its strategy to provide detailed footnote tagging.

Identifying Financial Information to Be Tagged

The implementation team also identifies which financial information to tag. All respondents planned to tag only the three basic financial statements for their first furnishing. All respondents started by tagging their income statement and balance sheet. Respondents indicated that tagging the cash flow statement was the most difficult. Respondents noted that most of their taxonomy extensions involved cash flow statement items. While respondents limited the information tagged to the three basic financial statements in their first furnishings, at least one respondent has looked ahead and investigated how the tagging process may be impacted should his/her company expand and tag additional financial information in the future.

Tag Financial Items and Create Taxonomy Extensions

After developing an XBRL implementation plan, financial statement preparers select a standard taxonomy and apply the taxonomy to each financial item. For companies employing third-party service providers, the company selects the standard taxonomy to use. The service provider applies the taxonomy to each financial item and works with the company to determine if taxonomy extensions are needed.

[8] One company subsequently changed to using a third-party service provider following its first XBRL furnishing to the SEC due to staffing issues. This company's financial reporting unit had several projects to complete with limited staff. Thus, they found it was less expensive to use a third-party service provider than hire another accountant. Given we are examining the initial XBRL implementation process, we count this company as one that purchased bolt-on software.

Tag Financial Items

Four companies used the GAAP commercial and industrial standard taxonomy. The fifth company used the insurance and real estate standard taxonomy. All five companies initially used the 2008 standard taxonomy. Four respondents expressed concern regarding the need to keep up to date with the latest taxonomies and frustrations with the delays in issuance of the 2009 standard taxonomy. One respondent indicated that XBRL US' delay in issuing the 2009 standard taxonomy caused her company to fall three weeks behind its initial implementation schedule. Another respondent whose company purchased bolt-on software had difficulty loading the 2009 standard taxonomy, while another indicated that viewing the potential tags in the 2009 standard taxonomy was difficult using his/her software.

To select XBRL tags, respondents looked at the tag definitions and asked if the definition fit their financial statement items. The general philosophy of each company was that using standard tags was more efficient for analysis purposes, although all respondents developed taxonomy extensions for situations where their accounting or industry treatment was not included in the standard taxonomy. When in doubt about whether to use a standard tag or create an extension, at least one respondent spoke with accountants from competitors to identify what common industry practice was. Another respondent consulted his financial printer.[9] Two respondents indicated that they found the XBRL US GAAP taxonomy guide difficult to use.

Taxonomy Extensions

All respondents created at least one taxonomy extension. Respondents indicated they created extensions when financial items did not match the standard description. Most extensions were due to unique industry needs, stock split issues, or cash flow statement concerns. All respondents attempted to minimize the number of taxonomy extensions due to either the desire to match with the existing standard taxonomy or their perceptions regarding difficulty creating taxonomy extensions.

All respondents found the technical aspects of creating taxonomy extensions difficult, especially working with the label, presentation, and calculation linkbases. Thus, two of the three companies that initially used purchased software asked their software vendors to create the extensions with the companies reviewing the vendors' work. Respondents from the company that created extensions internally, indicated that they have only one employee currently trained to create extensions. They planned to document the procedures used to create extensions and train a second employee in this area shortly.

Respondents from companies employing third-party service providers indicated that reviewing taxonomy extensions created by their service providers was difficult and they were not completely confident in the accuracy of some extensions. Specifically, these respondents were concerned about whether the calculation and presentation links were properly created by the third-party service providers. Both companies that employed third-party service providers reported that no other companies in their industries were implementing XBRL yet. Thus, their service providers planned to work with XBRL US to add their industry-specific extension tags to the next standard taxonomy.

Our review and validation of the initial furnishings for each company noted that two companies created significantly more extensions than they used. For example, as shown in Table 2, Company

[9] Financial printers convert financial documents into the appropriate style needed for filing with regulatory agencies, distributing to underwriters, and posting to their websites. The two respondent companies that initially outsourced their XBRL tagging hired their financial printers to create their XBRL-related instance documents. The third respondent, who initially purchased bolt-on software (as discussed in footnote 8), hired a third-party service provider with expertise in XBRL software development to create its XBRL-related documents following its initial XBRL furnishing.

C created 43 extensions but only used 24 in its financial statement and notes. The unused extensions were included in the XBRL-related documents provided to the SEC. Company C indicated that it elected to not use these extensions, related to discontinued operations, at this time but may use them in the future. Including unused extensions may increase the likelihood that investors may question the company's reputation, should they believe that the unused extensions better matched the financial items than the tags selected.

Validate, Review, and Render XBRL-Related Documents

Validate XBRL-Related Documents

The three companies initially purchasing bolt-on software used the validation function within the software to check whether the documents created were in compliance with XBRL specifications. All respondents indicated they had difficulty understanding some validation error messages generated by their software. For example, respondents found confusing the text of the Section 6.5.16 error, which read: "Facts of type 'text block' whose un-escaped content contains markup must satisfy the content model of the BODY tag as defined in 5.2.2." Validation problems varied between respondents. At least two discovered that their footnote financial values were formatted as text when the software was expecting the values to be formatted as numbers.

Respondents from companies that employed third-party service providers asked their providers to validate the documents. One respondent noted that she did not know how the service provider completed the validation process. Another indicated that the service provider validation report was difficult to understand. This respondent called the service provider with questions, and the service provider was able to explain the exceptions and made corrections when necessary.

Our validation of each company's initial XBRL-related documents, summarized in Table 2, found that the number of errors and warning codes varied by validation software used. For example, using one validation software revealed that two of the companies had three errors, while another validation software found that the same instance documents contained only one error each. Further, XBRL software vendors used their own error and warning codes, not the codes suggested by the SEC (2009c). We attribute the difference in number of errors between validation software packages to the infancy of XBRL taxonomies and software, and expect this to decrease as the XBRL taxonomies stabilize. However, despite inquiry to software vendors, we are unable to determine why the vendors used their own error and warning codes rather than the SEC codes.

Review XBRL-Related Documents

According to XBRL US (2008), management should review their XBRL-related documents because they are responsible for the accuracy and completeness of XBRL-tagged data. All respondents conducted internal reviews of their XBRL documents. Respondents from four companies compared the XBRL documents manually to their financial statements to review for reasonableness and obvious errors. One company asked its financial printer to also review the XBRL-related documents. The final company asked its bolt-on software provider to review the documents.

Render XBRL-Related Documents

All respondents indicated that although they are not legally liable for presentation, presentation was important. For example, one respondent indicated that even after explaining to senior management that reviewing the rendering was irrelevant, senior management insisted that the company review the renderings of all financial statements. Another respondent stated, "We value our reputation with investors and want to ensure that any presentation of our financial information is

TABLE 2

Validation Results

		Company A		Company B		Company C		Company D		Company E	
Furnishings		**Quarterly Report**	**Annual Report**	**Quarterly Report**	**Quarterly Report**	**Quarterly Report**	**Quarterly Report**	**Quarterly Report**	**Quarterly Report**	**Quarterly Report**	**Quarterly Report**
Taxonomy validation	Fujitsu	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK
	CoreFiling	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK
Instance validation	Fujitsu	OK	OK	OK	OK	1 warning	1 warning	OK	OK	OK	OK
	CoreFiling	OK	OK	OK	OK	1 warning	1 warning	OK	OK	OK	OK
EDGAR manual validation	Fujitsu	2 errors	OK	1 error	OK	2 errors, 1 warning	1 warning	1 error	OK	1 error	OK
	CoreFiling	2 errors	OK	4 errors	1 error	4 errors	1 error	3 errors	1 error	3 errors	OK
Context		10	40	44	46	63	64	51	52	10	10
Extension element created[a]		10	15	14	15	43	42	31	30	5	6
Official element[b]		111	142	119	118	130	130	109	106	115	110
Financial items		81	102	93	94	109	108	82	80	89	90
Notes		18	28	13	12	9	10	14	14	12	11
Document and entity information		12	12	13	12	12	12	13	12	14	9
Extension element[c]		8	11	6	7	24	25	10	9	4	5
Financial items		6	7	1	1	20	21	7	6	2	2
Notes		2	4	5	6	4	4	3	3	2	3
Total element		119	153	125	125	154	155	119	115	119	115
Total lines[d]		286	453	342	385	517	519	413	402	271	267

[a] The number of extension elements differs from the number of elements used in the XBRL instance document because some of the extensions elements (e.g., OperationsAndSegmentationAbstract) are created to represent relationships to other elements (e.g., presentation).
[b] The number of elements that are based on the approved XBRL taxonomies.
[c] The number of elements that are based on the company taxonomy extensions.
[d] The total number of elements that exclude XML Declaration, Namespace, Context, and Unit sections.

in a format that is easy for investors to understand." Three companies (two that purchased bolt-on software and one that employed a third-party service provider) encountered delays up to three weeks in the rendering process due to SEC delays in posting the 2009 taxonomy in its rendering tool.

We rendered each company's first and second XBRL furnishings under the SEC mandate using both the SEC Interactive Data Viewer and CoreFiling TouchStone. As shown in Table 3, we noted rendering differences for the statement of stockholders' equity for Company B and two negative label problems for the statement of stockholders' equity for Company D.

Audit and Issue XBRL-Related Documents

The final XBRL implementation phase is to audit and issue XBRL-related documents. As noted earlier, companies are not required to have their XBRL furnishings audited by a third party. Although many public companies have voluntarily engaged or plan to engage their auditors to perform agreed-upon procedures on their XBRL furnishings (Ernst & Young 2011), all respondents indicated their auditors showed little interest in their XBRL furnishings. Two respondents met with their audit teams to discuss the general implementation process and the SEC mandate. All respondents indicated that their auditors were not interested in providing assurance on the XBRL implementation process at this time. Two respondents suggested that auditors' lack of interest in assuring the XBRL process was due to legal liability concerns. Only one respondent suggested that materiality guidelines may change from being based on values in the entire statement to values based on individual financial items due to XBRL.[10]

All respondents reported that they worked with their financial printers to issue their XBRL-related documents. Our review of each company's first XBRL-related documents found that several financial printers used their own software rather than the software purchased by the financial preparer to produce the XBRL-related documents provided to the SEC. In addition, only one company placed its XBRL-related documents on its corporate website; the remaining companies used their service providers' websites.

XBRL Skill Set

The skill set needed to implement XBRL varied by respondent. Respondents indicated they already possessed the accounting knowledge needed to select XBRL tags. Two respondents suggested that accountants need better computer skills to create taxonomy extensions. One respondent noted that knowledge of both financial statements and business processes was critical to successfully tag financial items.

Challenges Going Forward

We asked all respondents to identify challenges as they go forward with the XBRL implementation process. Challenges fell into four categories. First, all respondents found the tagging and taxonomy extension process very time consuming. In addition, two respondents commented that the current software is difficult to use, and better software and more knowledgeable service providers are needed. Third, three respondents worried whether taxonomy updates would occur as scheduled and whether their software could "instantly" be updated with these taxonomy changes. Finally, three respondents expressed concern that the XBRL mandate may delay their SEC filings, a potential situation that both top management and investors wanted to avoid if possible.

[10] See Lowe and Locke (2011) for a detailed discussion of the impact of XBRL on materiality guidelines.

TABLE 3

Rendering Results

		Company A		Company B		Company C		Company D		Company E	
Furnishings	**Primary Financial Statement**	**Quarterly Report**	**Annual Report**	**Quarterly Report**	**Quarterly Report**	**Quarterly Report**	**Quarterly Report**	**Quarterly Report**	**Quarterly Report**	**Quarterly Report**	**Quarterly Report**
SEC Interactive Data Viewer	Statement of Income	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK
	Statement of Financial Position	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK
	Statement of Cash Flow	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK
	Statement of Stockholders' Equity	NA	OK	[a]	[a]	OK	OK	[b]	OK	NA	NA
CoreFiling TouchStone	Statement of Income	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK
	Statement of Financial Position	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK
	Statement of Cash Flow	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK
	Statement of Stockholders' Equity	NA	OK	OK	OK	OK	OK	[b]	OK	NA	NA

[a] SEC Interactive Data Viewer did not show two items (i.e., total comprehensive income for two reporting periods).
[b] Common shares, quarter-ending balance (SEC Interactive Data Viewer and CoreFiling TouchStone) was 41, but quarter-ending balance (original) was −41. Should use negate label.
NA = not available.

V. MAJOR THEMES AND FUTURE RESEARCH OPPORTUNITIES

Four themes that can be linked to existing information systems and accounting theory emerged from our analysis of the interview data: the role of management support and involvement, the implementation approach (i.e., outsourcing versus insourcing), organizational readiness or expertise, and control over the XBRL reporting process. We discuss each theme and related future research opportunities, as summarized in Table 4. Future research is particularly important given that nearly 80 percent of financial preparers recently surveyed indicated their companies had no XBRL expert on staff (Aguilar 2008a), and over 60 percent were not familiar with XBRL (AICPA 2009b).

Management Support and Involvement

Prior literature suggests that management support and involvement is a critical factor for successful technology implementation (Lederer and Mendelow 1988; Jarvenpaa and Ives 1991). Employees are less likely to adopt new technology without management support and involvement (e.g., Chatterjee et al. 2002; Leonard-Barton and Deschamps 1988; Wang and Chen 2006). XBRL implementation also requires top management commitment and adequate resources to align XBRL with the existing financial reporting process. According to Sharma and Yetton (2003), top management is responsible for allocating appropriate resources to an innovation effort, aligning incentives, monitoring progress toward goals, and intervening to get innovation projects back on track. Therefore, active participation by upper management is essential to determine the XBRL implementation approach (i.e., outsourcing or insourcing), identify skilled individuals and organize them into an XBRL team, review implementation processes and outputs (e.g., XBRL-related documents), and promote company-wide acceptance of XBRL.

Our respondents emphasized the importance of management support and involvement. However, respondents stated that senior management involvement was often limited to the initial XBRL implementation approach decision and high-level XBRL instance document review. They were not actively involved in actual XBRL implementation details such as developing XBRL implementation procedures or identifying financial information to be tagged.

Related Research Opportunities

While senior management in this study appeared to provide support for planning and were directly involved in high-level review of the XBRL-related documents, future research might address whether their support and involvement efforts are effective and efficiently using company resources. Further, is management support needed for other stages of the XBRL implementation process such as tagging and extension creation?

Alles and Gray (2011) develop a framework for examining the costs associated with providing assurance on XBRL-related documents. Researchers could examine whether the level of senior management involvement in the XBRL implementation process may influence the relative assurance cost considerations.

Finally, we noted that while senior management involvement varied somewhat, all respondents indicated their management was concerned about rendering issues. Future research could address how management concern over rendering may impact which XBRL tags are selected and how labels are applied. Further, regulators in the United Kingdom recently mandated that companies use inline XBRL (iXBRL)[11] (Curtis 2011). Future research could examine whether the use of iXBRL may reduce management concern over rendering.

[11] iXBRL embeds XBRL fragments into an HTML document to facilitate document rendering.

TABLE 4

Themes and Future Research Opportunities

Theme	Research Opportunities
Management support and involvement	What level of support should management provide in XBRL implementation? To what extent should management be involved in various stages of XBRL implementation process (e.g., tagging and extension creation, audit and issuing process)? Does the involvement of senior management influence relative assurance cost considerations? What are the major concerns of management in terms of rendering XBRL instance documents? What is the impact of management's rendering concerns on the XBRL tagging process (e.g., selecting XBRL elements)? Will use of iXBRL reduce management's rendering concerns?
Implementation approach (outsourcing versus insourcing)	Are the major factors and other drivers that affect outsourcing vs. insourcing decisions for XBRL implementation similar to those identified in prior research? What factors may drive companies to move from outsourcing to insourcing? What factors may influence companies to move beyond implementing XBRL for regulatory requirements and adopt an integrated XBRL insourcing approach?
Organizational readiness or expertise	What level of knowledge or experience do organizations need to become successful in XBRL implementation? What type of skills do they need? Are the current methods of obtaining XBRL knowledge and experiences (e.g., attending conferences, webinars, and discussions with consultants) effective and efficient? What is the best approach to educate or train accountants? How can external sources (e.g., software vendors, consultants, and XBRL US) reduce knowledge barriers that can hinder organizational adoption of complex technologies such as XBRL? What procedures to review taxonomy extensions are most effective? What is the impact of inconsistent validation error messages on the accuracy of XBRL-related documents? What are the best approaches to mitigate this impact? What procedures to review XBRL-related documents and rendering processes are most effective? How can the process of detailed footnote tagging be improved?
Control over XBRL reporting process	What internal controls over the XBRL tagging process should companies develop and implement when the limited liability provision is phased out? Why are auditors not interested in providing assurance services on XBRL-related documents? What is the impact of XBRL on the audit process?

Implementation Approach (i.e., Outsourcing versus Insourcing)

At present, most companies prepare their XBRL-related documents by either outsourcing the tagging process to a third-party service provider or creating the XBRL-related documents in-house by purchasing bolt-on software (i.e., insourcing). Information systems outsourcing has gained increasing popularity in companies of all sizes as a common business practice (Dibbern et al. 2004). Companies outsource all or part of their information systems operations to acquire economic, strategic, and sociologic advantages. While a company may outsource for several reasons (i.e., cost savings, improved quality, access to state-of-the-art technology, and operational efficiency; see review by Blaskovich and Mintchik [2011]), prior research suggests that cost savings is the most prominent motivation (Bardhan et al. 2006; Gonzalez et al. 2010; Sobol and Apte 1995).

Among the companies we interviewed, the two companies that initially hired a third-party service provider indicated that cost savings motivated their decision. Further, these respondents stated that employing a third-party service provider was a fast, convenient way to comply with the SEC mandate (i.e., operational efficiency).

In addition, trust has been recognized as an important factor in the development and success of inter-organizational relationships (Hart and Saunders 1997; Zaheer et al. 1998), including outsourcing (Grover et al. 1996; Sabherwal 1999). For instance, vendor trustworthiness, which is often derived from prior experience with a vendor or the vendor's reputation, may be recognized by companies as an important factor affecting their outsourcing decisions (Choudhury and Sabherwal 2003).

Vendor trustworthiness is important in outsourcing XBRL (Sledgianowski et al. 2010a, 2010b). All respondents who outsourced by hiring their current financial printer indicated that their decision was driven by the trust they had previously established with the printer. Further, our respondents stated that the current printer's knowledge of their unique business and reporting processes was important. Finally, we note that respondents expressed concerns that outsourcing typically contributes little to developing individual knowledge and skills that may be needed in the future (e.g., integrating XBRL into their existing financial system).

Benefits of insourcing technology include a high degree of control, flexibility, and retaining organizational knowledge (Lacity and Hirschheim 1995). The two most frequently addressed benefits of creating XBRL-related documents in-house are full control over the XBRL-related documents creation process (Ernst & Young 2010) and acquiring hands-on XBRL knowledge (CICA 2009). The three respondents who initially purchased bolt-on software indicated that their management wanted more control of the financial reporting process by developing in-house expertise.

Related Research Opportunities

Future research could examine whether the factors that drive the XBRL implementation approach decision are similar or different than prior research. In addition, Henderson et al. (2011) identify factors that influence a company's decision to adopt an integrated insourcing approach. Since we expect that some companies that initially outsourced may move operations in-house in the next few years, identifying factors and the success rate of such moves may provide useful insights.

Further, while prior literature (Garbellotto 2008; Hannon and Willis 2008) suggests companies can take three approaches to implement XBRL,[12] all our respondents adopted either outsourcing or a bolt-on approach. While these approaches are simple and potentially less expensive, companies may not obtain the full benefits of XBRL, such as transparency in financial reporting process and enhanced internal control (e.g., Bergeron 2003; Garbellotto 2009a; Klein 2001, 2008), without

[12] The three approaches are outsource, purchase bolt-on software, and integrate XBRL into the company's business reporting supply chain.

integrating XBRL into their business reporting supply chain. Hence, we encourage research and education for companies to move beyond implementing XBRL for regulatory requirements, to examine how it may add value to the entire compliance and reporting process (i.e., from the initial business transaction to the release of financial statements or management report).

Organizational Readiness or Expertise

Organizational readiness refers to the degree of technological and financial resources available for information systems adoption (Iacovou et al. 1995). Technical readiness indicates the level of available technology resources for information systems adoption such as staffing capabilities, technical competence, and currently implemented technology, while financial readiness refers to the monetary capital available for the adoption such as installation costs, training, and ongoing expenses during usage. Prior research suggests that organizational readiness influences information systems adoption such as EDI and e-commerce (e.g., Grandon and Pearson 2004; Iacovou et al. 1995; Kuan and Chau 2001). That is, a high degree of organizational readiness for information system innovation leads to low risk of innovation failure, which in turn produces more success in the innovation.

Similarly, XBRL implementation can be affected by organizational readiness. Doolin and Troshani (2007) conducted a case study of XBRL adoption and diffusion in Australia and addressed factors that limit XBRL adoption. One factor is limited resources in organizations. Limited financial resources, time, and skillful staffs inhibited many organizations from considering XBRL adoption (Alles and Gray 2011) and may explain why roughly 90 percent of companies that submitted XBRL-related documents to the SEC during the first two years of the mandate used third-party service providers (Ernst & Young 2011). The technical complexity of XBRL is another factor that limits XBRL adoption. Several new XBRL specifications are being developed or will be developed in the near future (e.g., versioning specification). Further, new taxonomies are released by FASB and IASB (e.g., 2011 US GAAP and IFRS taxonomies) each year. Similarly, our respondents indicated they had no or limited knowledge of XBRL before starting to work with XBRL.

Another common obstacle was related to software tools and technical issues. Our respondents indicated that many currently available XBRL software packages are very difficult and time consuming to use, and require a high level of XBRL and accounting knowledge. In addition, all three respondents who initially purchased bolt-on software reported some information technology infrastructure problems. Further, all respondents indicated that developing taxonomy extensions is difficult and requires extensive knowledge.

Related Research Opportunities

Respondents obtained their XBRL knowledge through attending conferences, webinars, and discussions with consultants. Future research could examine the efficiency of these methods. Further, external sources can play an important role in reducing knowledge barriers that can hinder organizational adoption of complex technologies (Attewell 1992). Research examining how external sources such as software vendors, consultants, and XBRL US may help reduce knowledge barriers may be important.

All respondents minimized the number of taxonomy extensions used due to either a desire to match with the existing standard taxonomy or perceptions regarding the difficulty of creating taxonomy extensions. Further, due to limited XBRL knowledge and experience, respondents indicated they were uncomfortable evaluating whether taxonomy extensions are consistent with applicable XBRL specification and regulatory requirements. Hence, future research may assist companies as they develop procedures to review taxonomy extensions.

The three companies that initially purchased software found the validation process frustrating and the error messages generated difficult to understand. Our review of their initial XBRL-related

documents revealed several inconsistencies in validation error messages between software products. Further, the error messages differed from those suggested by the SEC (2009c). Prior error detection research in both systems and accounting (Caster et al. 2000; Klein 2001, 2008) may provide guidance to researchers examining the impact of inconsistent validation error messages on the accuracy of XBRL-related documents. Perhaps stronger SEC validation guidance is needed.

All companies reviewed their XBRL-related documents internally, and two companies asked their financial printers to review their documents. Although not required, all respondents viewed their XBRL-related documents using rendering software to reduce the possibility of information display errors. Research to develop and test better review and rendering processes may be needed.

All respondents chose to block-tag footnotes. Two respondents indicated they had serious concerns with the ability to detail-tag financial statement footnotes. One respondent argued that given the current state of software and lack of SEC direction, the SEC should delay requiring detailed footnote tagging. Recent work by Nelson and Tayler (2007) suggests that the amount of effort users expend to obtain the information disclosed in footnotes may affect their judgments. Since proponents argue that XBRL may impact the effort required to examine footnote information, future research improving the process of detailed tagging footnote information is encouraged.

Control Over XBRL Reporting Process

The quality of XBRL-tagged data depends on the process used to prepare XBRL-related documents (Boritz and No 2009; Srivastava and Kogan 2010). The adequacy and effectiveness of internal control over the creation of XBRL-related documents will be necessary to ensure the validity and reliability of the information (Rezaee et al. 2002). Currently, XBRL-tagged financial statements submitted to the SEC are not required to obtain auditor assurance. The submissions are also excluded from the provisions related to internal control over financial reporting adopted under Section 404 of SOX (SEC 2009b).[13]

Several researchers argue that management should assess the adequacy of internal control over XBRL reporting as mandated under Section 404 of SOX because the quality of XBRL-tagged data will depend on the process used to prepare XBRL-related documents (Bartley et al. 2011; Boritz and No 2009; Plumlee and Plumlee 2008). Furthermore, as the technology improves, the creation of XBRL-related documents will be an integral part of the financial reporting process, and thus become interdependent with the preparation of financial statements. In this situation, a filer and its auditor will need to evaluate the adequacy and effectiveness of internal control over its financial reporting process, including the creation of XBRL-related documents (SEC 2009b). We asked all respondents about internal control over the XBRL reporting process. However, only one respondent mentioned internal control issues with respect to the mapping or tagging process. Our respondents currently disregard control issues that might impact their financial reporting process, especially when the limited liability provision expires after the first two years of required SEC reporting.

Related Research Opportunities

Given the observed lack of internal control, several research opportunities exist. First, regardless of which implementation approach a company takes, appropriate controls may be needed to ensure the accuracy of XBRL-tagged financial information. Research to develop and implement internal controls over the XBRL tagging process is needed, especially since the limited liability granted by the XBRL mandate is phased out after two years.

[13] Section 404 of SOX mandates management and their external auditor to evaluate the effectiveness of the firm's internal control over financial reporting and to produce an internal control report as part of the firm's annual report filed with the SEC (U.S. House of Representatives 2002).

Although several researchers argue for the need for assurance (Boritz and No 2008; Gunn 2007; Plumlee and Plumlee 2008; Srivastava and Kogan 2010), most respondents reported their auditors were not interested in auditing their XBRL-related documents. Further, research examining why auditors are not interested in providing assurance on XBRL-related documents and the impact of XBRL on the audit process may be appropriate.

VI. CONCLUSION

The SEC recently mandated that publicly traded companies furnish their financial statements in XBRL format (SEC 2009b). Several obstacles remain before extensive use of XBRL occurs (Aguilar 2008a; AICPA 2009b; Derby 2005; Rappeport 2008). This study concentrates on one obstacle: understanding the process to create XBRL-related documents. While implementation guidelines exist (e.g., SEC 2009a; XBRL US 2008, 2009), examining how early filers *actually* implement XBRL provides valuable insights to researchers, regulators, and practitioners. To achieve our research objective, we conducted a field study that culminated in a description of how publicly traded companies currently implement XBRL and identifying research opportunities.

Four themes linked to existing information systems and accounting theory emerged from our analysis: the role of management support and involvement, the implementation process (i.e., outsourcing versus insourcing), organizational readiness or expertise, and control over the XBRL reporting process. Our results indicated that significant hurdles still exist to XBRL implementation, including the lack of a clear role for management support and involvement, the significant diversity of opinion regarding outsourcing versus insourcing, the lack of organizational readiness or expertise, and the need to develop internal controls over the tagging process.

We believe that the contributions of our study are threefold. First, we extend accounting information systems research by focusing on financial statement preparer tasks involving creating XBRL-related documents (i.e., XBRL instance document and taxonomy extensions). While XBRL will impact both financial statement preparers and investors (Hannon 2002; Hoffman and Strand 2001; Willis 2005), we focus on preparer tasks since accountants are likely to perform these tasks. Second, research examining the process to create XBRL-related documents may benefit audit firms that streamline their analytical review process by tagging client financial statements with internally developed XBRL taxonomies (Bay et al. 2006). Third, we identify several research opportunities related to XBRL implementation.

Our study has several limitations. First, we only interviewed nine individuals from five accelerated filer companies. While this number may seem low, no companies provided XBRL-related documents to the SEC during our initial interview period. However, we acknowledge that our findings may not generalize to larger populations since our samples are small and nonrandom. Furthermore, our interviews dealt only with the SEC mandate. The XBRL implementation process in other countries may be different than that described here.

We expect that the rapid pace of change will continue for the financial reporting environment and for the demand for XBRL software as the SEC works to replace its EDGAR system with an XBRL-based system (SEC 2008a). With the demand for XBRL increasing and recent surveys suggesting companies are unprepared for XBRL (Aguilar 2008a; AICPA 2009b; Rappeport 2008), additional research examining the process to create XBRL-related documents is warranted.

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APPENDIX A
SAMPLE QUESTIONS

Plan Implementation

SEC Mandate

- What are your main objectives in XBRL adoption?
- Did you have any other reasons to adopt XBRL in your company except SEC mandate?
- When did you make the decision?
- Who was involved in XBRL adoption decision?
- Who made the final XBRL adoption decision?
- How did you make the decision?
    - Did you hire a consulting firm?

    - How much did you pay?
    - Was it beneficial?
  - Did you consult with other firms?
- What were the major obstacles or surprises in XBRL adoption decision-making process?
- How did you overcome those obstacles or surprises?

Implementation Planning

- What are your XBRL knowledge as well as experience levels?
- Did you form an XBRL implementation project team to implement XBRL?
  - What are the roles of the XBRL project team?
  - Who are the team members?
  - What are their positions and experiences?
  - What are the XBRL knowledge as well as experience levels of each team member?
- Who usually makes decisions in XBRL implementation process?
  - What is his or her position?
  - Does he or she have adequate knowledge and experience?
    - With respect to XBRL?
    - With respect to accounting process?
- What is the organizational level involvement?
  - Who planned the XBRL implementation?
  - Who oversaw the XBRL implementation?
  - Does your top management support XBRL?
    - In terms of communicated messages?
    - In terms of resources committed for XBRL?

Service Provider versus Purchase Software

- Do you use service provider or purchase software?
  - Who made the decision?
  - What is the main rationale of your decision?
  - What are your concerns encountered during the decision-making process?
- If you purchased software:
  - What software are you using?
  - Is it a separate software package or add-in to larger ERP system?
  - Why did you choose the software?

Infrastructure

- Did you have any IT infrastructure-related problems with respect to network, computers, and software?
  - How did you overcome such problems?

Tag Financial Items and Create Taxonomy Extensions

- When do you tag financial information?
  - Integrated or bolt-on approach?
- What are your considerations when choosing the financial information to tag?
- Do you tag footnotes?
  - In detail or block?
  - If you use block now, when do you plan to move to detail footnote tagging?
- What standard taxonomy do you use?

XBRL Software

- How do you rate ease of usage of current software?
- What are the two most difficult or frustrating aspects of current XBRL software?

Extend Taxonomy

- Do you use your taxonomy extensions?
  - What criteria do you use to create an extension?
  - Approximately what percent of total taxonomy are extensions?

Validate, Review, and Render XBRL-Related Documents

Validate

- How do you validate the tagging process?
  - Instance validation
  - Taxonomy validation
  - SEC requirements
- What process do you use for identifying and correcting tagging errors?
- Did you find the XBRL terminology consistent and comparable?
- Does XBRL potentially introduce errors in creating or reading data due to complexity of taxonomies?

Review

- Does anyone review instance document for reasonableness?
  - What procedure do you use to check the XBRL-related documents?
    - Whether the XBRL-related documents are created in accordance with the relevant XBRL specifications and regulatory requirements
    - Whether the XBRL-related documents accurately reflect, in all material respects, all business facts presented in the source documents or files (e.g., a regulatory filing)
    - Whether all business facts in the source documents or files are completely tagged in the XBRL-related documents
    - Whether XBRL-related documents contain information that is not in the source documents or files
    - Whether the XBRL-related documents are prepared in a manner consistent with prior periods

Render

- Do you render your instance documents for review?
- What type of problems did you experience during the rendering process?

Audit and Issue XBRL-Related Documents

Auditor Involvement

- What is the involvement of your auditors?
- Do you have plans to consider audited XBRL documents in the future?
    - What impact will auditing XBRL-related documents have on auditors' materiality concepts?

General Questions

Skill and Knowledge

- What skill sets are required to create XBRL documents?
    - Technology background?
    - Knowledge of XBRL concepts?
    - What are the most important XBRL concepts needed?

XBRL Training

- Did you take any XBRL courses?
    - Type of education (e.g., XBRL class, conference)?
    - Length?
    - Learning curve?

Challenges Going Forward

- Going forward, what challenges do you expect to encounter in the XBRL implementation process?