The Impact of Information Tagging in the MD&A on Investor Decision Making: Implications for XBRL

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ABSTRACT

This paper investigates professional and nonprofessional investors' use of the Management Discussion and Analysis (MD&A) portion of the corporate annual report. The MD&A is a key component of financial reporting that provides management's view on the company's current and future performance. We investigate alternative structures for the MD&A, comparing the standard format currently used by companies to a "tagged" format that mimics XBRL. We make this comparison in the context of a company that discloses a possible violation of the Foreign Corrupt Practices Act as a material weakness in the Section 404 auditor's report, indicating risk of corporate misconduct and perhaps fraud. Overall, we find that investors using the tagged format spend less time viewing the risk information and view relatively fewer items than those using the standard format. However, within the tagged format, there is a stronger association between use of information on this source of risk and investors' financial judgments and predictions. This implies that the tagged format facilitates the incorporation of risk information into investors' decision processes, compared to the standard MD&A format in current use. These results have both efficiency and effectiveness implications for moving to XBRL-enabled search strategies.

Key Words: XBRL, Investment decisions, Risk, Material Weakness, MD&A

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I. INTRODUCTION

This paper investigates how professional and nonprofessional investors use the information contained in the Management's Discussion and Analysis (MD&A) portion of the corporate annual report in making financial decisions. In studying use of the MD&A, we compare the standard paragraph format used by U.S. public companies to a "tagged" format consistent with eXtensible Business Reporting Language (XBRL). This study is important for several reasons. First, investors' use of MD&A is of continuing interest because the MD&A is a key part of management's disclosure package (e.g., Clarkson et al. 1999; Barron et al. 1999). However, relatively few studies focus specifically on the MD&A. Second, as part of efforts to simplify and streamline corporate reporting, high-level commissions are examining whether to move some content from other portions of the annual report to the MD&A and to enhance the amount of narrative content provided by management (IFAC 2008). Thus, the importance to investors of this information source could potentially increase.

Third, through actions of the Securities & Exchange Commission (SEC) and other financial regulatory authorities (e.g., the Federal Deposit Insurance Corporation), corporate financial reporting is moving toward an XBRL format. In fact, the Pozen Committee's final report issued in August, 2008, recommends that the SEC continue its efforts to tag financial information using XBRL in order to facilitate users' access to financial information across companies (Pozen Committee 2008). After issuance of that report, the SEC voted to require the use of interactive data for filing annual reports to improve the usability of financial information for investors (SEC 2008). In XBRL, information is not structured as blocks of text; rather, a common set of tags (i.e., labels) is used to identify individual items (e.g., financial statement

balances) in a corporate report. Because the tags are computer-readable, information submitted by report preparers can be automatically sorted, parsed, organized and edited by users, thus decreasing the cost of using information and increasing its value. While XBRL implementation is proceeding with numerical information, progress in applying it to the important qualitative information that accompanies the financial statements is hindered by lack of a common tagging structure. In this study, we use a tagging structure for the MD&A based on the framework developed by the Enhanced Business Reporting Consortium (EBRC 2005). We then compare professional and nonprofessional investors' decision processes and outcomes using the standard and tagged formats, with common information content. Because the tagged structure allows investors to link disparate parts of the MD&A that are associated with common themes, the tagged structure should be associated with better linkage of the risk information contained in the case.

Case materials for the study are based on the 10-K of a publicly traded U.S.-domiciled company. To accomplish the study's goals, two forms of the case were prepared, containing common information needed for the enhanced MD&A disclosure. We gathered this information from the company's MD&A, supplemented with information from other parts of the 10-K. We then prepared two forms of the enhanced MD&A, with identical overall content. One version of the case uses the subtitle/paragraph format used by the company in its filings. This reflects the standard form currently used by U.S. public companies. The other version uses information tagging that is reflective of XBRL format.[2] We adapted our tagging structure from the EBRC

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[2] If some information reflects multiple tags, that information appears in multiple places. For instance, information about a pending patent lawsuit against the company might be tagged as "Political & Legal" and "Threats".

(2005) framework, and added several information categories based on suggestions and preferences of focus groups of professional and nonprofessional investors.[3]

Each case version also contained the external auditor's opinions on financial statements and internal control over financial reporting (i.e., the Sarbanes-Oxley [SOX] Section 404 report), as well as summary financial data. The SOX 404 report provides the basis for the risk information that is the focus of our hypothesis tests. The Section 404 material weakness of the case company relates to possible violation of the Foreign Corrupt Practices Act by employees working in China. As portrayed in case materials, the company has detected possible bribery payments made to employees prior to the release of the 10-K, and has referred the matter to the U.S. Department of Justice.

Data were collected from 234 nonprofessional investors and 119 professional investors using a dedicated web site and process-tracing software. Participants selected information to be used in making their investment decisions, judged company risk, and predicted the company's future earnings per share and stock price. In addition, they rated the website structure for usability and responded to demographic questions.

Results show that investors consider the website structure of the tagged and standard conditions to be similar in usability, with one exception; nonprofessionals thought the standard structure to be simpler to use (likely due to the larger number of information items in the tagged structure). For both investor groups, participants used relatively fewer information items overall in the tagged structure, when scaled by the number available. Also, both investor groups spent less time examining information on the Section 404 material weakness in the tagged condition, and had fewer visits to items containing that information. Despite indications that the standard

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[3] The procedures for eliciting focus group preferences and the outcomes of their activity are described in Arnold et al. (2008b).

condition was viewed as simpler to use for nonprofessional investors, we find that the association of their use of risk information (in terms of number of cues and time viewing those cues) with company risk judgments and stock price predictions is stronger in the tagged condition, relative to the standard condition. For professional investors, the association between number of views of risk information and stock price predictions is also stronger in the tagged condition. Overall, results are consistent with our expectation that the availability of tagging within the EBRC framework facilitates better incorporation of risk information into investors' mental model of the subject company, for investors who choose to focus on that information. Further, it takes them less time to review that information in the tagged format, which indicates a more efficient decision process.

In the following section, we discuss the background of our study, and develop our research hypotheses. Section III describes our research methods, and Section IV presents results. The final section of the paper discusses our main findings and the study's limitations.

II. BACKGROUND AND HYPOTHESIS DEVELOPMENT

Background of the Study

Corporate Financial Reporting and XBRL

XBRL is an open-source structure for providing information. As noted on its web site (http://www.xbrl.org/Home/), XBRL provides an identifying tag for each individual item of data, making it computer readable. Thus, data items can be automatically read by machine and combined according to user specifications, both within and across companies. This facility should enable more rapid and efficient processing of information, as well as increase decision usefulness by improving consistency and comparability of data (Baldwin et al. 2006). Securities regulators in some countries have implemented voluntary programs for XBRL filings. For

example, in the U.S. in 2005, the SEC adopted a voluntary filing program (VFP) that allows registrants to submit filings using XBRL. The SEC recently voted to require all publicly traded companies to file their financial reports using XBRL (SEC 2008) with the requirement being phased in over the next three years.

Regulations Regarding the MD&A and Related Research

The MD&A is an integral component of the "disclosure package" prepared by U.S. public companies, which also includes financial statements and the related footnotes, as well as other information required by the SEC. Regulation S-K (Item 303) and subsequent releases contain the SEC's guidelines for MD&A content. Because the MD&A is management's portrayal regarding the company's past performance and future prospects, it is likely a key component of these disclosures. Prior research investigates the extent to which MD&A information is used by financial market participants. These studies generally show that investors value the information in the MD&A. For instance, Rogers and Grant (1997) analyze the content of reports prepared by U.S. sell-side financial analysts, and find that MD&A information is often cited in those reports. This implies that the MD&A should affect the properties of analysts' forecasts, and by extension, stock prices. Clarkson et al. (1999) show that the MD&A provides incremental information content in explaining the decisions of Canadian sell-side financial analysts. Bryan (1997) finds that the MD&A has information content in financial predictions, over and above financial information. However, they note that disclosure quality varies among companies. Barron et al. (1999) find that MD&A information has a substantial effect on analysts' forecasts, and that higher MD&A quality (as measured by the SEC) is associated with less dispersion and less error among those forecasts. In a more recent study, Thomas (2003/4) reports that financial analysts using the MD&A of a case company had lower financial predictions, but

stronger buy recommendations, than those without access to the MD&A. From a review of the MD&A literature, Cole and Jones (2005) conclude that the information in this section of the disclosure package is used in financial predictions, but may not be efficiently incorporated into market prices. This implies the need for research on ways in which investors might more fully utilize MD&A information, such as alternative structures for communicating that information effectively.

Hypothesis Development

The above cited evidence from research and practice indicates that XBRL is rapidly gaining in importance, and that the MD&A is a key component of financial reporting. These lines of research suggest that applying XBRL to the MD&A could result in more effective and efficient use of that information by investors. However, this application is not currently feasible due to the inability of existing taxonomies to effectively accommodate textual information, including the text within the MD&A as well as other parts of the 10-K. Thus, companies wanting to use XBRL for such information face significant challenges in trying to map MD&A information with existing taxonomies. Further, to the extent that companies develop differing tagging strategies as they adapt standard taxonomies, users will be unable to easily compare information across companies, and the value of tagging will be reduced. Boritz and No (2008) provide some evidence in this regard. They report that companies engaging in the SEC's VFP are large and profitable, implying an ability to absorb the costs of initial adoption of XBRL. However, even among those large companies, only one in 68 used XBRL for the MD&A. This implies a significant barrier in practice to applying XBRL to the MD&A.

To address this issue, the EBRC recently undertook an initiative to propose a more specific structure for the MD&A, which if adopted would facilitate development of a common

structure for tagging of MD&A information. In this study, we adapt the EBRC's framework as a means of comparing investors' use of tagged MD&A information to their use of information presented in the standard paragraph structure. In this section, we develop several hypotheses to guide that comparison.

We base our hypotheses on the general notion that a tagged structure will provide greater ability for users to link disparate information elements in the MD&A. As noted by Baldwin et al. (2006, 104), XBRL should "give greater context to data, turning text-based information into documents that are efficiently and effectively retrievable, searchable and analyzable". If investors can locate relevant information more easily, then they should consider the website containing that information to be more usable. However, a counter-argument is that because the EBRC structure is unfamiliar and contains more information categories than the usual MD&A format, investors may find it more difficult to use, at least at first. Thus, our first hypothesis, which concerns differences in usability between MD&A structures, is non-directional:

> **H1:** Investor perceptions of website usability will differ when MD&A information is presented using a tagged structure, in comparison to a standard structure.

Our second hypothesis relates to information use. In an XBRL structure, specific information items may be accessed through a variety of tags. Due to the multiple tags that could be attached to an item, we expect that users will be better able to acquire and integrate information on specific themes. Our case information contains reference to an investigation regarding possible bribery of company officials in China. Because it relates to a significant risk of an overseas subsidiary, this information is tagged under EBRC framework categories of "Legal Proceedings", "International Operations", "Threats", and "Weaknesses", in addition to appearing in the overview and the external auditor's Section 404 report as a material weakness. We propose in H2 that the tagged structure will facilitate attention to and combination of risk

information in the case. That is, if risk information is acquired and used to a greater extent in the tagged condition, investors' risk assessments should correspondingly increase and their predictions of the company's future stock price should decrease. However, we expect these associations to be weaker in the standard format, without the linkages provided by tagging. Our second and third hypotheses are:

H2: The positive association between use of risk information and risk assessments will be stronger for investors using a tagged structure, in comparison to using a standard structure.

H3: The negative association between use of risk information and stock price predictions will be stronger for investors using a tagged structure, in comparison to using a standard structure.

Finally, we propose a research question relating to the differences between professional and nonprofessional investors. Research in psychology shows that professionals' greater expertise and well-developed knowledge structures lead to more effective use of information (e.g., Chi et al. 1988). While few studies investigate both professionals and nonprofessionals in the investment context, two recent studies provide direct comparisons. Hodge and Pronk (2007) find that professionals visiting a real company's web site more often view some types of information (e.g., financial statements). Arnold et al. (2008a) also show that professional investors acquire more annual report information in a number of categories, and use that information differently in making financial predictions. To investigate differences between these investor groups, we test the above hypotheses separately among professionals and nonprofessionals.

RQ: How will professional and nonprofessional investors differ in their use of risk information and stock price predictions in the standard and tagged MD&A structures?

III. METHOD

Sample and Data Collection Methods

Participants in the study are 234 experienced nonprofessional investors who use financial information in making their personal investment decisions and 119 financial professionals. We obtained professional participants through a private survey company specializing in solicitation of professionals for research studies on a national level. Our criterion for inclusion was experience indicative of expertise in evaluating information for valuation of stocks and participants were only forwarded to the experimental website if from an array of possible job descriptions they selected the option for "Financial (Venture Capitalist, Fund Manager, Financial Analyst, etc)".. Nonprofessional participants were solicited by a second survey company with experience in providing experienced nonprofessional investors for research. Criteria for inclusion in the nonprofessional investor survey included income greater than $75,000, readily available assets of over $50,000 that are currently invested or could be invested, and a current investment portfolio that included self-purchased corporate stocks or other corporate issue securities.[4] All participants were compensated by the survey firms for their participation.

We used computerized process tracing to capture each information item acquired and the time spent viewing each acquired information item. Participants performed a case analysis, using information adapted from the MD&A of a real public company (with identifying information altered to protect anonymity of the firm). Case information was accessible through the internet and organized into separate web-linked components. This research method allows the researchers to observe patterns of information acquisition and usage to determine whether those patterns are associated with variation in individual

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[4] Those who logged on to the web site but did not meet the criteria were directed away from the experiment.

judgments and decision outcomes.

On entering the web site, participants were randomly assigned to one of two MD&A structure conditions (described in a subsequent sub-section). Upon completion of the case analysis, participants were asked to judge company risk, forecast the future stock price, and respond to a demographic questionnaire. The web-linked case allows the researchers to monitor which parts of the MD&A information are accessed.

Description of the Case Company

The two versions of the case differ only in format, as noted below. The content of both versions is identical. Most of the information was taken directly from the company's MD&A. Additional information needed for the EBRC proposed categories was gathered from other sections of the annual report (e.g. the financial statement footnotes, the "Business Data and Risk Factors" section, and the "Other Required Information" section) and the company's website (e.g. environmental strategies and compliance efforts). Both versions contain summary financial data, including five-year trends in income, cash flows and main balance sheets headings. Both versions also contain the external auditor's report on financial statements and the auditor's SOX Section 404 report. The 404 report notes a material weakness related to possible violations of the FCPA. For instance, the auditor's Section 404 report says that the company, "… did not maintain effective internal control over financial reporting as of December 31, 2007, because of the effect of the lack of controls in place to prevent unauthorized payments made to intermediaries in China that have been brought to the attention of the Department of Justice, based on criteria established in Internal Control—Integrated Framework issued by the Committee of Sponsoring Organizations of the Treadway Commission (COSO)." This issue is also referred to by management in several other parts of the enhanced MD&A.

Independent Variable: MD&A Format Manipulation

Two versions of the case were used to investigate effects of variation in the format of the MD&A (i.e., a standard and a tagged format) while keeping the set of information common across conditions. Information categories contained in the two formats are shown in Table 1. Our hypotheses predict that, relative to the standard format, the tagged format will lead to greater use of risk information, greater awareness of risk (as measured by response variables described below), and lower predictions of future stock price. The standard format mimics the actual format of the company's MD&A in its annual report, which (as is usual for U.S. companies) consists of a series of paragraphs describing the company and its operations. Information categories from the standard format include: MD&A Overview; Results of Operations; Liquidity and Capital; Contractual Obligations and Commercial Commitments; Business and Risks Overview; Product Development; Business Landscape & Industry Competition; Regulatory and Environmental Issues; Sales, Marketing, and Logistics; Critical Accounting Policies; Related Party Transactions; and Management Ownership and Compensation.

<div align="center">**Insert Table 1 About Here**</div>

The other version mimics a "tagged" format such as XBRL, in which selecting one item leads to available links to related items. To construct the tagged format condition, we used the model categories developed by the Enhanced Business Reporting Consortium (EBRC). This format consists of the following main headings: Business Landscape, Strategy Overview, Resources, Processes, and Performance. Within each main EBRC category are several subheadings. For example, Business Landscape subheadings include: Economic, Industry Analysis, Technological Trends, Political & Legal, Environmental, and Corporate

Social Responsibility. Both standard and tagged format conditions also have main headings for the Auditor's Reports and Summary Financial Information (from the company's website).

In both the standard and tagged format conditions, we identify the specific portions of the MD&A containing information relating to the possible violation of the FCPA. The sections containing this information are shaded in Table 1.

Variable Definitions and Hypothesis Tests

To test H1, we measure web site usability using several questions adapted from the framework developed and refined by McKnight et al. (2002) for perceived web site quality. Participants responded to each question on a scale ranging from one (strongly disagree) to seven (strongly agree). The following questions are included as web site usability measures: (1) Overall, this site worked very well technically; (2) Visually, this site resembled other sites I think highly of; (3) This site was simple to navigate; and (4) On this site, it was easy to find the information I wanted. We test H1 using a t-tests of differences between MD&A structure conditions on each of these measures among professional and nonprofessional investors, respectively.

Table 2 describes other variables used in the study, which relate to tests of H2 and H3. These hypotheses predict that the association of use of risk information with company risk judgments (H2) and stock price predictions (H3) will be greater in the tagged structure relative to the standard structure. We use two measures of information use: the number of visits to relevant information items, and the time spent viewing those information items. We present descriptive statistics on the total number of visits to all information cues (*TOTAL_VIEWS)* and the total time viewing information *(TOTAL_TIME).* However, because H2 and H3 concern the ability to integrate risk information, we test these hypotheses using views and time to risk information

only *(VIEW_RISK_INFO* and *TIME_RISK_INFO)*. These variables are the sum of number of visits to information categories in the shaded categories in Table 1, and the time spent viewing those categories, respectively.

Insert Table 2 About Here

To test H2, we measure investors' judgments regarding the level of risk in the case company through four questions taken from Koonce et al. (2005). Due to constraints on the number of questions we could ask our participants, four questions were selected from those used by Koonce et al., on the basis of significance in their models and relevance to our case situation. These relate to overall risk, relative worry about the company, the relative difficulty of management in controlling risk, and the possibility of catastrophic risk. Each is measured on a seven-point Likert scale, increasing in risk. The test variable is *COMPANY RISK JUDGMENT*, which is the sum of the four components. H2 is tested by examining the magnitude and significance of the correlations between information use and *COMPANY RISK JUDGMENT*.

To test H3 on investors' stock price predictions, case materials ask for three predictions (highest, lowest, and most likely values) for stock price as of 12/31/07, the end of the year following the fiscal year end of the 10-K. Case information notes that the stock price on March 15, 2006, the date of release of the 10-K, was $25.25. The variables representing stock price predictions are *PRICE_MOST LIKELY, PRICE_HIGH* and *PRICE_LOW*. H3 is tested by examining the magnitude and significance of the correlations between information use and a combined stock price prediction variable (*PRICE_COMBINED*) developed by factor analyses of the three individual predictions within each participant group.

IV. RESULTS

Demographic Data

Professional participants in this study have on average 13.4 years of professional experience, and 57.5 percent are male. In terms of professional qualifications, 34 percent are Certified Financial Analysts and 35 percent are Certified Public Accountants. Nonprofessional investor participants have a mean of 13.5 years of personal investing experience, and 56.8 percent are male.

Descriptive Statistics and Test of H1

Table 3 reports descriptive statistics on information use. Among nonprofessionals, the mean number of views to individual information items (*TOTAL_VIEW)* in the standard structure is 11.66, while the mean number in the tagged format is 14.46. The number of item views in the tagged structure is significantly greater than the number in the standard structure ($p < 0.05$). However, because the tagged structure has 35 individual information categories while the standard structure has only 14, we also present the number of views scaled by the available number of categories in each respective structure. In the standard structure, the mean scaled views for nonprofessionals is 0.83, while in the tagged structure, the mean scaled views is 0.41. This difference is significant at $p < 0.01$. Thus, while nonprofessional participants in the tagged structure had more views to information items, they viewed relatively fewer items based on the number available. Among professional investors, the mean number of views is 11.70 in the standard structure and 12.02 in the tagged structure. While that difference is not significant, the difference in scaled number of views between standard (0.84) and tagged (0.34) structures is significant at $p < 0.01$. Thus, based on the information available, both the professional and

nonprofessional investors viewed relatively more information in the standard as opposed to the tagged format.

Insert Table 3 About Here

Regarding *TOTAL_TIME*, nonprofessional participants in the tagged structure spent significantly less time looking at information that those in the standard structure (10:33 versus 12:51, $p < 0.05$). For the professional investors, the time spent looking at information in the tagged format is numerically higher than in the standard format (11:43 compared to 10:39), but the difference is not significant. Focusing on the categories containing information regarding the case company's possible FCPA violation, we find more visits to items containing this information, and more time spent on those visits, in the standard format relative to the tagged format, for both investor groups. For nonprofessionals, the mean of *VIEW_RISK_INFO* is 3.23 (2.67) in the standard (tagged) format ($t = 2.23$, $p < 0.05$), and the mean of *TIME_RISK_INFO* is 5:50 (2:14) in the standard (tagged) format ($t = 5.69$, $p < 0.00$). For professionals, mean values of *VIEW_RISK_INFO* are 3.57 (2.13) in the standard (tagged) format ($t = 4.49$, $p < 0.00$), and the mean of *TIME_RISK_INFO* is 4:26 (1:51) in the standard (tagged) format ($t = 4.05$, $p < 0.00$). These results suggest that investors may have to spend relatively more effort to acquire and analyze information in the standard MD&A structure than in the tagged structure. This suggests that the tagged format is more efficient to use by making the salient information more readily available.

Table 4 Panel A provides descriptive statistics on *WEBSITE_USABILITY*, the basis for testing H1. There are four measures of website usability, each with a Likert scale of one (low) to seven (high). Among nonprofessionals, mean responses to the question regarding whether the site worked very well technically are 6.01 (5.70) for standard (tagged) structures. On whether the

site resembles other sites the respondent thinks highly of, mean responses are 4.44 (4.55) for standard (tagged) structures. On whether it was easy to find information on the site, mean responses are 5.80 (5.75). None of these differences are significant. However, responses for whether the site is simple to navigate are 6.08 (5.68) for standard (tagged) structures. This difference in mean responses is significant at $p < 0.05$. Thus, there is some evidence that nonprofessional investors found the standard structure easier to navigate. Among professional investors, mean responses are 5.92 (5.90) for standard (tagged) structures on whether the site works very well technically; 5.33 (5.05) on whether the site resembles other sites the respondent thinks highly of; 6.03 (5.83) on whether the site is simple to navigate; and 5.92 (5.56) for whether it was easy to find information on the site. None of the differences across structures are significant for professional investors.

Insert Table 4 About Here

Table 4 Panel B provides descriptive statistics on investors' judgments and predictions relating to case information, which are used to test H2 and H3. *COMPANY RISK JUDGMENT* is a composite variable measured as the sum of responses to four questions on various dimensions of risk. The mean of the composite is approximately 21 in all four cells (on a maximum of 28), suggesting fairly high risk judgments. No differences in company risk between the standard vs. tagged MD&A structures are observed for either investor group. Panel B also presents descriptive statistics on stock price predictions.

The mean most likely stock price predictions for nonprofessionals are $25.07 ($24.03) for standard (tagged) format; for highest stock price, the mean predictions for nonprofessionals are $27.91 ($26.35) and for lowest stock price nonprofessionals' mean predictions are $20.90 ($20.60). The differences between MD&A structures are significant for the most likely stock

price and the high end of the range (p < 0.05), with the tagged format showing more conservative predictions. For professional investors, mean most likely stock price predictions are $25.74 ($25.72) for standard (tagged) format; for highest stock price, the mean predictions for professionals are $28.52 ($29.41) and for lowest stock price professionals' mean predictions are $21.96 ($21.61). None of the differences in professional investors' stock price predictions are significant across conditions.

Descriptive Statistics and Tests of H2 and H3

Table 5 shows results of testing H2 and H3. H2 predicts that the positive association of use of risk information with company risk judgments will be stronger in the tagged MD&A format, relative to the standard format. Panel A shows correlations of information use (measured as time viewing items containing information on the possible violation of the FCPA in the company's China subsidiary) with risk judgments and stock price predictions. Panel A shows that, for nonprofessionals, time spent viewing risk information is positively correlated with company risk judgments in both the standard structure (Pearson correlation = 0.169, p < 0.10) and the tagged structure (0.245, p < 0.01), although the correlation is higher in the tagged structure.

<div align="center">**Insert Table 4 About Here**</div>

H3 predicts that the negative association of time viewing risk information (*TIME_RISK_INFO*) with stock price predictions will be stronger in the tagged structure relative to the standard structure. To test H3, we first use factor analysis to develop *PRICE_COMBINED*, a score summarizing most likely, high and low stock price predictions.[5] Table 5 Panel A shows

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[5] Component factor scores for nonprofessional investors are as follows. For the standard format, *PRICE_MOST LIKELY* = 0.971; *PRICE_HIGH* = 0.747; *PRICE_LOW* = 0.675. For the tagged format, *PRICE_MOST LIKELY* = 0.975; *PRICE_HIGH* = 0.841; *PRICE_LOW* = 0.888.

that H3 is supported for the nonprofessional group: the correlation of time viewing risk information with *PRICE_COMBINED* is negative and weakly significant (-0.135, p < 0.10) in the standard format, but is negative and highly significant (-0.327, p < 0.01) in the tagged format.

Table 5 also shows correlations of time viewing risk information with nonprofessionals' individual stock price predictions. In the standard format, these are as follows: for most likely stock price, -0.135, p < 0.10; for the lowest expected price, -0.129, p < 0.10; and for the highest expected price, -0.062, not significant. In the tagged format, nonprofessionals' correlations of the three individual predictions with time viewing risk information are stronger: for the most likely stock price, -0.326; for highest, -0.228; and for lowest, -0.325 (all at p < 0.01). In summary, these results support H3 by indicating that in the tagged condition, as the time viewing risk information increases, nonprofessionals' risk judgments increase and their stock price predictions decrease. These associations are weaker or nonexistent in the standard structure. This is consistent with the tagged condition providing better incorporation and understanding of risks to the company from the possible FCPA violation, among nonprofessional investors.

Table 5 also shows the same set of statistics for professional investors.[6] The correlation of time viewing risk information with risk judgments is not significant in either format. For both the standard and tagged structures, we also observe no significant correlations between time viewing risk information and either company risk judgments or stock price predictions. Thus, neither H2 nor H3 is supported among professional investors using this measure of risk information use. Apparently, time spent viewing risk information is not as important for professionals as for nonprofessionals in affecting their mental model of a company's

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[6] Component factor scores for professional investors are as follows. For the standard format, *PRICE_MOST LIKELY* = 0.871; *PRICE_HIGH* = 0.831; *PRICE_LOW* = 0.828. For the tagged format, *PRICE_MOST LIKELY* = 0.978; *PRICE_HIGH* = 0.816; *PRICE_LOW* = 0.855.

performance. This is likely due to some professional investors with greater expertise having developed standardized decision processes for analyzing financial information, thus enabling them to process information more efficiently than others.

Panel B of Table 5 provides similar analyses, but with use of risk information measured as the number of visits to information items referencing the company's FCPA problem in China. Among nonprofessionals in the standard structure, there are no significant correlations between number of views and company risk judgments or stock price predictions. In contrast, all correlations in the tagged condition are in the expected direction and are significant at some level. The correlation of number of visits to risk information with company risk judgments in the tagged format is significant at 0.141 ($p < 0.10$), again supporting H2 for nonprofessional investors using risk information. Similarly, the correlation of visits to risk information with *PRICE_COMBINED* is not significant in the standard format, but is negative and significant in the tagged format (-0.211, $p < 0.01$), supporting H3 for nonprofessionals using visits as the risk information usage measure. The correlations of visits to risk information with individual stock price predictions of nonprofessionals are as follows: most likely, -0.217 ($p < 0.001$); highest, -0.137 ($p < 0.10$), and lowest, -0.217 ($p < 0.01$). These results confirm that nonprofessionals' information use is associated with risk judgments and predictions in the tagged structure, but not in the standard structure.

For professionals, Panel B shows that H2 is also not supported for professionals using views to risk information, as the correlation with risk judgments is not significant. However, H3 is supported for professionals. While the correlation of visits to risk information with *PRICE_COMBINED* is insignificant in the standard format (as with all individual prediction components), this correlation is negative and significant in the tagged structure (-0.340, $p <$

0.01), supporting H3. For professional investors, all three individual correlations are also significant in the tagged structure: most likely, -0.346 (p < 0.01), highest, -0.216 (p < 0.10), and lowest, -0.333 (p < 0.01).

In summary, we find that H2 is supported for nonprofessional investors, in that the associations of company risk judgments with both time viewing risk information, and number of views to risk information, are stronger in the tagged structure than in the standard structure. However, H2 is not supported for professional investors. We also find partial support for H3. The associations of stock price predictions and the number of views to risk information are stronger in the tagged structure than in the standard structure for both investor groups. However, the association of stock price predictions and the time spent viewing risk information are stronger in the tagged structure than in the standard structure only for nonprofessional investors. The following section presents our conclusions and the limitations of our analysis.

V. CONCLUSIONS AND LIMITATIONS

In this study, we examine the effect of varying MD&A structure on decision processes and outcomes of professional and nonprofessional investors. Specifically, we employ a between-subjects comparison of the standard MD&A structure to a structure that mimics the "tagging" feature of XBRL and is organized according to the framework proposed by the EBRC. This study is important, as while implementation of XBRL for financial information is rapidly taking place, implementation of XBRL for textual information in the financial statements is inhibited due to lack of agreement on a common structure for that information, including the MD&A. The EBRC framework provides one such structure, but research has not yet examined how investors' decisions based on MD&A information might differ in an XBRL-enhanced information environment using the EBRC structure.

We examine this issue using case materials adapted from the 10-K of a public company, to enhance the external validity of our study. We propose and test several hypotheses, comparing investors' perceptions of web site usability in the two structures, as well as the association between measures of their decision processes and decision outcomes across experimental conditions. Studying both investor types is motivated by prior research finding differences in decision processes and outcomes of individuals at different levels of task experience, as well as recent research specifically in the investment context. We have several findings of academic and practical interest.

First, we compare investors' perceptions of the usability of websites containing MD&A and other information (summary financial data and auditors' reports). We find little difference between the tagged and standard structures, except that nonprofessional investors find the tagged structure more difficult to navigate. This is likely due to the larger number of information items in the EBRC framework.

Second, because our design provides the ability to track information chosen by participants for use in the task, we are able to observe elements of their decision processes, and compare process across MD&A structure conditions. We find evidence that when the number of available information items in each condition is considered, relatively less of the available information is used by investors in the tagged structure, compared with the standard structure, in both investor groups. Nonprofessional investors also spent less time overall in viewing case information in the tagged condition.

To highlight investors' attention to financial risk when processing financial information, we focus on a specific event in the company: the discovery of a possible violation of the FCPA due to a company employee in China charged with bribery of local officials, which resulted in a

Section 404 material weakness. We measure relative use of information about this event by tracking the number of visits to information items referring to it, and by the time spent on those visits. Results show that both groups of investors spent less time viewing information on this source of risk in the tagged structure, and made fewer visits to that information. This suggests greater efficiency of their decision processes with regard to this information.

Third, we examine this issue by investigating the association of attention to company risk information with financial judgments and decisions, in both MD&A formats. We expect that if an information structure facilitates incorporation of information into an investor's mental model of the company, that relatively greater use of this information should be associated with higher perceptions of risk, and lower predictions of future stock prices. We find that evidence consistent with these expectations is much stronger in the tagged structure than in the standard structure. However, for professional investors, only number of views has a significant association with stock price predictions, and not time viewing that information. It is likely that some professional investors have adopted regular routines of using financial information through extensive practice, and thus they can incorporate new information efficiently without spending more time doing so. This would bias against finding an association of viewing time with decision outputs for those individuals. Taken together, our findings suggest that while the tagged structure is not as simple to use (at least by nonprofessionals), investors are better able to consider the implications of key risk information using that structure, despite spending relatively less time and effort doing so.

In sum, this study's results suggest that the tagged MD&A structure results in more effective and efficient incorporation of risk information into financial decision-making. Generalization of these results beyond the current sample is limited by several design features of our study. Although our case materials are based on an actual company to improve realism, they

reflect only a single company. Further, we present case materials on a web site in specific formats, with hyperlinked information. While use of these formats was necessary to test our research hypotheses, investors may prefer to use other formats; i.e., they may prefer a .pdf format, as shown by Hodge and Prink (2007) or, in the case of professional investors, they may have proprietary formats that are commonly used in the workplace. Third, while our tagged structure condition replicates important features of XBRL, it is not a complete XBRL environment. Further research should explore various aspects of XBRL, in order to build a body of research that will help guide XBRL implementation, and predict likely user responses once XBRL is implemented for non-numeric company information.

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Table 1. Website Structure Manipulation

Standard Structure	Tagged Structure
Overview	*Business Landscape*
Results of Operations	Economic
Liquidity and Capital	Industry Analysis
Contractual Obligations and Commercial Commitments	Technological Trends
	Political & Legal
Business and Risks	Environmental
Business and Risks Overview	Corporate Social Responsibility
Product Development	*Strategy Overview*
Business Landscape and Industry Competition	History of Company
Regulatory and Environmental Issues	Vision and Mission
Sales, Marketing, and Logistics	Strengths
Critical Accounting Policies	Weaknesses
Related Party Transactions	Opportunities
Management Ownership and Compensation	Threats
Auditor's Reports	Corporate Strategy
Summary Financials	Demographics and Growth Strategy
	International Operations
	Resources
	Monetary Capital
	Physical Capital
	Relationship Capital
	Organizational Capital
	Products & Research and Development
	Human Capital
	Top Management Team
	Human Resources Analysis
	Employee Stock Ownership
	Processes
	Manage Products and Services
	Manage External Relationships
	Performance
	GAAP Performance
	Company-specific Performance
	Management's Goal Achievement
	Capital-Markets Based Performance
	Analysis of Analyst Projections
	Auditor's Reports
	Summary Financials

Notes: The specific portions of the MD&A containing information relating to the possible violation of the FCPA are shaded.

Table 2. Variable Definitions

Variable Name	Variable Definition
TOTAL_VIEW	Number of visits to case information
VIEW_RISK_INFO	Number of visits to sections of case information regarding the possible FCPA violation in the company's China subsidiary
TOTAL_TIME	Time spent viewing case information
TIME_RISK_INFO	Time spent by an investor to sections of case information regarding the possible FCPA violation in the company's China subsidiary
WEBSITE USABILITY	Four measures of web site usability taken from McKnight et al. (2002), relating to: working well technically, resembling other sites the user thinks highly of, simplicity of navigation, and ease in finding information.
COMPANY RISK JUDGMENT	The sum of responses to four questions regarding company risk from Koonce et al. (2005), each on a ten-point scale (1 = low, 10 = high), relating to: overall risk, relative worry, difficulty of management to control, catastrophic risk. (Full wording of questions is shown in Table 3 Panel A.)
PRICE_ MOST LIKELY, PRICE_HIGH, PRICE_ LOW	Investors' prediction of the most likely (highest, lowest) stock price for the subject company in the upcoming year.

Table 3. Descriptive Statistics on Information Use Measures

	Nonprofessionals		*Professionals*	
	Standard *(n = 110)*	*Tagged* *(n = 124)*	*Standard* *(n = 63)*	*Tagged* *(n = 56)*
TOTAL_VIEW	**11.66 (6.53)**	**14.46 (9.08)**	11.70 (4.71)	12.02 (8.33)
TOTAL_VIEW (Scaled by number available in each category)	**0.83 (0.47)**	**0.41 (0.26)**	**0.84 (0.34)**	**0.34 (0.24)**
TOTAL_TIME	**12:51 (8:01)**	**10:33 (7:44)**	10:39 (8:16)	11:43 (8:38)
VIEW_RISK_INFO	**3.23 (1.79)**	**2.67 (2.01)**	**3.57 (1.68)**	**2.13 (1.89)**
TIME_RISK_INFO	**5:50 (5:34)**	**2:14 (4:06)**	**4:26 (4:60)**	**1:51 (2:64)**

Notes: This table presents means (standard deviations) of information use variables. We test for differences between standard and tagged structures within each participant group using univariate statistics. Boldface type indicates significance at least at < 0.05.

Table 4. Descriptive Statistics on Response Variables:
Web Site Usability, Risk Judgments and Stock Price Projections

	Nonprofessionals		Professionals	
	Standard (n = 110)	*Tagged* (n = 124)	*Standard* (n = 63)	*Tagged* (n = 56)
Panel A.				
WEBSITE USABILITY (H1)				
Technical	6.01 (1.48)	5.70 (1.72)	5.92 (1.51)	5.90 (1.46)
Resemble	4.44 (1.85)	4.55 (1.74)	5.33 (1.38)	5.05 (1.52)
Simple	**6.08 (1.55)**	**5.68 (1.47)**	6.03 (1.49)	5.83 (1.64)
Easy to find	5.80 (1.62)	5.75 (1.33)	5.92 (1.51)	5.56 (1.63)
Panel B.				
COMPANY RISK JUDGMENT	21.10 (3.23)	21.58 (3.32)	20.94 (3.10)	20.79 (3.00)
PRICE_MOST LIKELY	**$25.07 ($3.53)**	**$24.03 ($3.77)**	$25.74 ($4.67)	$25.72 ($3.69)
PRICE_HIGH	**$27.91 ($5.05)**	**$26.35 ($3.41)**	$28.52 ($5.13)	$29.41 ($4.98)
PRICE_LOW	$20.90 ($4.45)	$20.60 ($4.78)	$21.96 ($4.44)	$21.61 ($4.04)

Notes: This table presents means (standard deviations) of response variables. We test for differences between standard and tagged structures within each participant group using univariate statistics. Boldface type indicates that differences between MD&A structures within a participant group are significant at < 0.05.

Table 5. Correlations of Risk Judgments and Stock Price Predictions with Use of Risk Information

Correlations with:	Nonprofessionals		Professionals	
	Standard (n = 110)	Tagged (n = 124)	Standard (n = 63)	Tagged (n = 56)
Panel A. TIME_RISK_INFO				
COMPANY RISK JUDGMENT (H2)	0.169*	0.245***	-0.011	-0.057
Price – Combined (H3)	-0.135*	-0.327***	-0.006	-0.008
PRICE_MOST LIKELY	-0.135*	-0.326***	0.118	-0.021
PRICE_HIGH	-0.062	-0.228***	0.022	-0.023
PRICE_LOW	-0.129*	-0.325***	-0.161	0.025
Panel B. VIEW_RISK_INFO				
COMPANY RISK JUDGMENT (H2)	-0.082	0.141*	0.001	0.172
Price – Combined (H3)	-0.024	-0.221***	-0.017	-0.340***
PRICE_MOST LIKELY	0.003	-0.217***	-0.133	-0.346***
PRICE_HIGH	-0.021	-0.137*	0.036	-0.216*
PRICE_LOW	-0.050	-0.217***	0.060	-0.333***

Notes: This table presents correlations of company risk judgments and stock price predictions, with measures of use of risk information (i.e., information concerning the subject company's possible violation of the Foreign Corrupt Practices Act). Use of risk information is measured as total time viewing information categories containing risk information, and the total number of views to those categories. The following symbols indicate significant correlations: *** = < 0.01; ** = < 0.05; * = < 0.10.