# Does Innovation Matter to Conference Calls?

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The first draft: December 2003
The second draft: July 2004
The third draft: September 20 2005

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**Abstract:**

The main purpose of this study is to investigate whether the likelihood, frequency and information content of conference calls are positively associated with innovation. The study is based on 534 conference calls conducted in 340 firm-years from 1997 to 2001 in Taiwan. Our findings indicate that more innovative firms are more likely to conduct conference calls and conduct them more frequently than less innovative firms. Consistent with prior research, high growth firms and larger firms are more likely to hold conference calls, and hold them more frequently, than other firms. Low price-earnings firms are nonetheless more likely and frequent to host conference calls when their stock price has been undervalued. We also find supporting evidence that cumulative abnormal returns surrounding the event dates of conference calls are positively associated with the level of and change in innovation investments. In addition, our empirical results of market reaction driven by conference calls are still robust after controlling the effect of selection bias, market expectation, and timing of conducting conference calls. Finally, we also find that firms that more innovative firms are more likely to discuss innovation activities during conference calls.

**Key Words:** Conference calls, innovation, research and development, patent value, patents, intellectual property

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## 1. Introduction

This study primarily explores the association between innovation, conference calls, and market reaction to the contents of conference call discussions. While recent studies on intangible assets or innovation focus more heavily on relevance and reliability attributes of recognized and estimated intangible assets (see Anandarajan, Kleinman and Palmon, 2000, and Canibano, Garcia-Ayuso, and Sanchez, 2000) there is relatively little evidence on the nexus between innovation activities, voluntary disclosure mechanism, and the stock market reaction to conference call disclosures. In this study, we predict that firms with more innovative activities are more likely to hold conference calls, and have more positive conference call announcement abnormal returns. We also predict that firms with more innovative activities will be more likely to discuss these activities during conference calls. These innovative discussions in turn are expected to drive market reaction. We focus our analysis on the efficacy of using conference calls as a medium for voluntary disclosure of non-financial information to the investing public. These are a common method that firms use to communicate with outside investors. We believe that these results, and the methodology used, should be relevant to researchers of corporate disclosure in other, less-transparent, financial information environments.

Under current Generally Accepted Accounting Principles, innovation investments, for example research and development expenditures as well as internally-developed patents, which are of substantial economic importance for many firms, are typically unrecognized in the balance sheet as accounting assets. While the rate of innovation

activities is increasing in Taiwan[1], lack of accounting recognition and other appropriate disclosure of innovation reduces financial statement informativeness. In addition, future economic benefits associated with innovative activities, such as developing new products or markets, inventing manufacturing processes, and helping employees develop new skills, are typically difficult to assess and verify. Under these circumstances, the information asymmetry about the value of the firm that exists between firms and investors is greater when firms' innovative activities increase, thereby giving managers incentives to voluntarily disclose private information (e.g. Grossman, 1981; Milgrom, 1981). Prior studies indicate that high quality firms find it less costly to signal favorable value-relevant information than low quality ones so that firms making voluntary disclosure benefit from better-performing stock returns and enhanced analyst following (e.g. Lev and Penman, 1990; Healy, Hutton, and Palepu, 1999). The major focus here is on how disclosed innovative activity affects stock market reactions, upon release of this information via the medium of conference calls, as well as how the level of innovative activity affects the frequency of conference calls, and how more frequent conference calls within a period affect the information content as reflected in market reaction to the more frequent conference calls. In the process, we will also examine whether more innovative firms are more likely to make innovation-related disclosures during conference calls.

The evidence presented in the current study indicates that more innovative firms tend to hold more frequent conference calls and that the information released in the

[1] Taiwan's national R&D expenditures relative to gross domestic product rank ninth in the world. (See *China Times*, the best selling newspaper in Taiwan, 08/24/2002). Taiwan's outbound patent filings in the U.S. rank fourth in 2000, following only the U.S., Japan, and Germany. (See Eastwood and Shiue (2002) for more details about intellectual property protection in Taiwan). These statistics show that innovation activities in Taiwan are very frequent compared to the world level.

conference calls results in greater cumulative abnormal returns, indicating that the conference call announcements had information not previously available to the market. The lack of recognition of innovation investments as assets causes differences in beliefs held by managers and investors. The external investors are unable to directly observe the quality of the firm's innovation or the success or failure of its implementation. Therefore, the more innovative firms' managers are more likely to hold conference calls and hold them more frequently. During these calls, the more innovative firms were also more likely to disclose innovation-related information. The result of the additional information provided to investors was cumulative abnormal returns, i.e., unpredicted stock price movements.

Selecting a sample for any information content test requires choosing firms that decide to conduct conference calls, resulting in a sample that has self-selected itself. Therefore, our study uses Heckman's (1978) two-step estimation procedure to control self-selection bias. Our study finds that the cumulative abnormal returns that arise from conference calls are positively associated with the level of, and the changes in, innovation investments. The findings suggest that the more innovative firms are expected to host more conference calls for providing further information about innovation activities and innovation progress.

This study adds the following contributions to the extant literature. First, the current study uses R&D expenditures, the number of patents that a firm receives in a given year, and the estimated value to the firm of these patents as innovation proxies to investigate the conference call likelihood, frequency and information content. We further examine how changes in firm-related variables from one period to the next affect the occurrence, frequency and stock market-price-related information content of

conference calls. Also, we demonstrate that more innovative firms are more likely to discuss innovative activities during conference calls. Our findings indicate that either R&D expenditures as innovation input, granted patents as innovation output, estimates of the value of the patents to the firm, and changes in the values of various characteristics of the firms are determinants of conference calls. Importantly, the findings here suggest that the more R&D related information disclosed in a conference call, the more likely the call is to affect the stock market returns of the firm's stock. Also, we find that more innovative firms are more likely to release innovative activity information during conference calls. The results suggest that innovation-related issues are of great interest to market participants and that conference calls serve as an important medium for disseminating information to investors.

The remainder of this study is organized as follows. Section 2 describes the institutional environment of our sample. Section 3 presents a review of the literature that underlies the motivation for the study. Section 4 develops the hypotheses. Section 5 describes the model specification, measurement of variables and sample selection procedures. Section 6 reports descriptive statistics and the results of the empirical tests. The last section, Section 7, provides our discussion and concluding remarks.

## 2. Institutional Environment in Taiwan

The issue of institutional environment is important because various cultures, traditions, and histories of regulatory influences and structures affect how firms in different countries will report to investors. For example, La Porta, Lopez-de-Silanes, Shleifer & Vishny (1998) found that countries can be divided into groups based on the provenance of their securities regulation philosophies and laws. La Porta et al. found that "common-law countries generally have the strongest, and French civil-law countries

the weakest, legal protections of investors, with German and Scandinavian-civil-law countries located in the middle." (See p. 1113). Peng (2003) suggests that emerging and developed countries go through, or have gone through, stages in which the nature of the managers' relationships to their stakeholders changes. In Peng's (2003) framework, the institutional environment of the firms tends to govern the way that firms interact with their stakeholders. Thus, in less developed countries in which institutions of the market have not yet been developed (e.g., regulatory schemes governing corporate relationships with stock market participants), the relationships tend to be more informal, based on networking. As the country becomes more developed, an institutional framework involving external, codified regulation appears, replacing more informal networking strategies that the firms used to manage their environment. More rule-governed institutional environments may require greater codification of financial information release requirements in that such environments are conducive to the development of free market exchanges. As such, the relationship between a firm and its stakeholders becomes more impersonal and there arises a corresponding need to provide information to individuals with whom the provider does not have a personal relationship. Personal relationships provide very rich information environments within which to exchange information and build relationships that assist in the growth of the business. Conference calls may be an important medium for reaching stakeholders with whom firm management does not have a personal relationship. Given the face-to-face nature of these conference call settings in Taiwan, and the concomitant ability to ask follow up questions, these conference calls provide an information rich environment for communicating with others outside the firm and the managers' networks.

In the case of Taiwan, which La Porta et al. (1998) assign to the German-civil-law group of nations, there is literature that suggests that its information environment is relatively less transparent than that of a wide variety of other Asian financial markets (e.g., the Standard & Poor's Company, 2001). This relatively more opaque Taiwanese information environment may present investors in the Taiwanese markets with higher information risk than they would face through investment elsewhere. This higher information risk, of course, may be reflected in a higher cost of capital for Taiwanese firms.

The relative opacity of the Taiwanese information environment may arise from lack of clarity or just the lack of suitable regulatory standards, as well as a relative paucity of enforcement activity by the financial market and reporting regulatory agencies in Taiwan. Peng (2003) notes that as pressures toward isomorphism with one's trading partners grow, there is a concomitant pressure to develop regulatory codes and enforcement mechanisms to assure the implementation of the code.) Understanding the determinants of communication efforts by Taiwanese corporations, therefore, may help the investing and research public understand ways that corporations may increase the transparency of their own financial statement results, as well as the determinants of these results (e.g., innovation). Thus, as globalization of the capital markets continues, the investing public will have a fuller picture of the effects of information environment transparency on corporate behavior. Extension of the work reported here to other Asian and developing countries may also shed light on how investors in markets subject to different regulatory traditions and disclosure expectations will react to non-mandated disclosures such as those reported on here. Given that Taiwan was relatively slow to adopt conference calls as a way by which corporations can communicate with

shareholders, the growth in that practice from 1997 to 2002 may reflect a tendency to adopt disclosure practices that have proven effective elsewhere. As such, it reflects an increasing cognitive imperative (see Peng, 2003) among Taiwanese managers to provide information consistent with that provided elsewhere, or that Taiwanese managers believe is provided elsewhere.

Accordingly, understanding the impact of different national regulatory environments on individual and institutional investor reaction to corporate announcements is important in order to facilitate the globalization of the financial markets and provide guidance for regulatory and financial standard development and harmonization. For example, Fan and Wong (2002) state that (p. 3), "Despite efforts to impose stricter reporting rules and standards, a recent survey cited by Asian Wall Street Journal (November 4, 1999) finds that corporate transparency in this region is declining. While the new accounting rules may have increased the quantity of accounting information, investors still do not trust the quality of the reported numbers." Given that, according to Fan and Wong (2002), the East Asian corporate ownership structure, which is relatively concentrated compared to the U.S., is more reflective of corporate ownership structures in the rest of the world than is that of the U.S., developing a base of literature that describes how Taiwanese and other Asian countries' markets respond to non-financial statement corporate disclosures may potentially shed at least a suggestive light on how markets in some other areas of the world would also react. In this paper, we focus on Taiwan specifically.

## 3. Literature Review

Earlier studies explore the determinants of conference calls. Frankel, Johnson, and Skinner (1999) find that firms that hold conference calls tend to be larger, more profitable,

and to have a larger analyst following. Tasker (1998a) finds that firms with low accounting quality are more likely to hold conference calls. She measures accounting quality using a composite measure based on market-book ratios, sales growth rates, and the extent to which book value and earnings explain stock prices. Sunder (2002) shows that the Regulation Fair Disclosure requirements of the US Securities and Exchange Committee (SEC) have been a real impetus to increasing the popularity of conference calls as a voluntary disclosure medium[2]. We extend prior research by relating the likelihood and frequency of "open and face-to-face" conference calls to specific sources of asymmetric information – R&D expenditures, internally developed patents and their estimated value, and connecting the sources of asymmetric information to the ultimate stock market reactions to it, demonstrating thereby that the information asymmetry between managers and investors is reduced through the information provided in the conference calls.

Extant literature also documents the information content of conference calls in non-Taiwanese contexts. Frankel, Johnson, and Skinner (1999) found significantly increasing returns volatility during the conference call period. Bowen, Davis, and Matsumoto (2002) indicate that conference calls enhance analysts' ability to forecast earnings accurately and help level the playing field among analysts. Bushee, Matsumoto, and Miller (2003) examine open conference calls where the public, including individual investors, can access the calls on a real-time basis and these researchers also find a high level of trading activity and returns volatility during the conference call period.

[2] Securities and Exchange Commission (SEC) issued Regulation Fair Disclosure in August 2000, mandating simultaneous full and fair disclosure of all potential market-moving news to all market participants. Bushee, Matsumoto, and Miller (2003) indicate that US firms can immediately, broadly, and inexpensively disseminate information to market participants by Webcast conference calls via the Internet due to recent advances in information technology.

As mentioned above, while conference calls are expected to convey information about innovative activities, few studies address the effect of innovation on conference call announcement returns. The current study extends prior literature by testing the relationship between conference call announcement returns and innovation generally, and specifically extending the contextual environment in which these relationships have been studied to the less-transparent financial information environment of Taiwan.

Pinches, Narayanan and Kelm (1996), expanding upon the work of Kelm, Narayanan and Pinches (1995), present a more detailed picture of the signaling process that takes place between corporations and the investing public. Pinches et al. (1996) argue that there are three stages of corporate R&D that may have information value to the investing public. These three stages are the initiation of a research project, progress in carrying out that research project, and the commercialization of that project. Each stage carries its own information. For example, the initiation of a research project may signal the market that the announcing firm may have found an attractive niche or investment opportunity to exploit that may have positive ramifications for the firm later on. Reports on the progress of a research project may indicate that the project is going along successfully, or not, and that if successful efforts to develop the product or process are being made, then positive cash flow effects for the firm may be realized later. Announcements of the commercialization of a product signal that some of the earlier uncertainties that accompany the process of developing a product have been overcome. Remaining uncertainties, of course, are those that face any firm awaiting public reaction to its product.

Pinches et al. (1996) found that the stock markets had a positive response to the three kinds of R&D announcements tested (initiation, progress announcements, and

commercialization). Pinches et al.'s further analysis revealed that technology leaders' market prices were most responsive to project initiation announcements. There were also greater market responses to progress announcements made by so-called "R&D-intensive" industries (p. 69). Pinches et al. also found that less R&D intensive industries generated market responses only when they made commercialization announcements.

Further, managers of technologically-advanced firms face difficulties in communicating the results of their development efforts to the investing public in that these efforts may be difficult to adequately explain without face-to-face or other interactive contact with the audience for their information. Given that more technological industries may also exist in more dynamic, competitive environments, investors may perceive greater risk to exist in making investments in more technologically active firms. Thus, conference calls give managers of these firms greater ability to describe the innovation efforts that they are making, to characterize the stage of development of various research initiatives, and allow the conference call attendees to seek information on potential dates for commercialization of these innovation efforts. Given the relative lack of transparency of the Taiwanese financial reporting, and the potential for public inability to understand details about the firm's innovation efforts released in other, say printed, forms, the use of conference calls appears to be a powerful medium for communicating with investors and others interested in the status of the firm (see Lang, 1998; Pinches et al., 1996; Narayanan et al., 2000).

Conference calls as a voluntary disclosure metric are increasingly popular in Taiwan. As noted, it is an effective communication channel that firms with less informative financial statements can use to convey private information about future

prospects, especially while innovation is not properly reflected in financial statements. Conference calls in Taiwan are on a face-to-face basis, usually held in hotel ballrooms, typically lasting two to three hours, and open to any market participants, thus providing management with more opportunities to explain the company's recent performance and future prospects to the public. The executives pitch their companies to the public, giving investors an in-depth understanding of the company and a wealth of timely information that simply cannot be found in press releases, quarterly, or annual reports. Dozens of analysts and market participants then lob questions at the executives in the conference. One of the best advantages of conference calls is to allow corporate executives to communicate to numerous investors and analysts at one time, thereby decreasing the need for time consuming one-on-one interactions. Besides, conferences calls in Taiwan, unlike those in US, are not always held in conjunction with earnings releases. Accordingly, we predict that the likelihood and frequency of conference calls will increase as innovative activities increase due to the lower informativeness of traditional financial statements, essentially remedying the problem of information asymmetry that the less informative financial statements cause. The result of that remedy should be a correction in the market prices of the stock, as evidenced by the cumulative abnormal returns at the time of the information that reduces the information asymmetry. This is especially true in the case of Taiwanese firms where financial transparency is much less marked, even compared to Asian nations (e.g., Standard & Poors, 2001), than in the U.S..

Accordingly, a positive relationship is predicted between the information content of conference call announcements and innovation, proxied by R&D expenditures, patent counts, and estimates of the value of the patent to the firm. Extant literature documents

that R&D-intensive firms and firms having more patents, on average, generate substantial current and future economic benefits (see Lev and Sougiannis, 1996; Griliches, 1981). Furthermore, empirical evidence provided by Tasker (1998b) indicates that the majority of questions raised by participants in conference calls are related to R&D-oriented issues, such as the content of the company's product pipeline. Hence, given the lack of proper financial statement recognition and disclosure on innovation, leading to difficulties in interpreting innovation information, we predict that more innovative firms have more positive stock market returns around conference call announcements. We further test the proposition that greater conference call disclosures about the kinds of research innovation being generated by the firm will have a positive impact on the level of positive returns around conference call announcements. In addition, we will examine the question of whether just the existence of conference calls themselves provides information content to investors, as reflected in greater positive stock market returns. This will help answer the important question of whether conference calls serve as an important medium for mitigating the effects of information asymmetry between managers and investors. Ultimately, that is the goal of all information transfers between managers and investors. Understanding whether conference calls serve as an effective medium of information transfer between managers and investors is therefore important in itself.

In order to examine the effect of innovation on conference call activity and market reaction, this study uses data from one developing country, Taiwan, although the issue is applicable toward understanding drivers of conference call activity in many other developing countries. This issue is important in developed countries as well, e.g., the US. There has been little previous research that has examined the relationship between (a) innovation activity, (b) communication through conference calls with the investing

public and their intermediaries, and (c) the reaction of stock markets to information released during these conference calls. This issue is important because different countries present investors with different qualities of information environments. More developed countries (e.g., the United States) have more clearly developed regulatory and information communication structures than less developed countries have. The relative efficiency of the stock markets in different countries may also differ, affecting the impact of newly released information on stock price reaction to corporate news releases.[3]

## 4. Hypothesis Development

Taiwan's generally accepted accounting principles (GAAP), consistent with International Accounting Standards (IAS) No. 38, require that R&D expenditures be expensed as incurred due to great uncertainty about their future benefits.[4] Except for official registration fees, the accounting standards specify that spending to create internally generated intangible assets (e.g. patents) should be not recognized as assets of the firm. Barth and Kasznik (1999) indicate that relatively larger information asymmetry is related to intangible assets and/or R&D expenditures than to tangible physical assets. Their study assumes that the degree of information asymmetry between firm managers and investors is higher for firms with greater intangible assets. Consistent with Barth and Kasznik's (1999) assumption, our study argues that such innovation efforts as R&D expenditures and internally-generated patents and estimated patent values that are not properly recorded in balance sheets also result in asymmetric

[3] Yang and Chen (2003: p. 207) note that "Individual investors are usually myopic and less rational, and are usually influenced by informal information in making their investment strategy. This implies that the efficiency assumption of a financial market will not hold in Taiwan." In Taiwan, the authors note, individual investors account for the lion's share of stock trading volume.

[4] Please see the 23rd paragraph of the Statements of Financial Accounting Standards No. 1, Summary of Generally Accepted Accounting Principle, published by Financial Accounting Standards Committee of The Accounting Research and Development Foundation of the Republic of China.

information. The degree of information asymmetry is assumed to be positively associated with the level of innovation surrogated by R&D expenditures and patents. Firms with more innovative information are expected to voluntarily disclose their information via conference calls in order to lower information asymmetry between managers and investors.

Narayanan, Pinches, Kelm and Lander (2000) explored the signaling and information asymmetry issues further by examining the effect of more and less credible announcements related to R&D on stock market prices. They found that firm R&D announcements related to government actions had greater impacts on stock market prices during the innovation stage. In contrast, the less credible—because generated internally by the management of the firm—announcements of managerial intentions regarding market share expansion—had effects throughout the course of the project.

Verrecchia (1990) finds that the likelihood of voluntary disclosure by firms decreases as the precision of information available to the public prior to the disclosure opportunity increases. Quality of information available to the public might decrease due to the lack of recognition of, and increase in the rate of, innovative activities over the past decade. We thus expect firms with more innovative activities will be more likely to disseminate private information through conference calls. This discussion yields our first testable hypothesis as follows:

**H1A: Ceteris paribus, more innovative firms are more likely to hold a conference call than less innovative firms.**

**H1B: Ceteris paribus, more innovative firms are more likely to hold frequent conference calls than less innovative firms.**

**H1C: Ceteris paribus, the more innovative firms are more likely to relay innovation and R&D-related information during conference calls.**

We further extend previous research by examining the impact of conference calls held in Taiwan on the market reaction in a short window period surrounding the occurrence of the conference call, and relate such information content (as measured by the market reaction) to the magnitude of innovation capital present in the conference call. Managers typically have superior information than outsiders with respect to the value of the firm, business investment opportunities, and potential profitability of products and processes under development. Tasker (1998a) documents that when a firm's financial statements are less informative, the firm is more likely to host conference calls to convey their private information to the investing public. Frankel, Johnson, and Skinner (1999) indicate that the elevated return variances and trading volume during the conference call period seems to show that conference calls convey substantial information to the public. Tasker (1998b) studies a small sample of technology firms with respect to the types of information they provided in their conference calls. Her results indicate that major concerns raised by participants in conference calls related to R&D issues (e.g. the content of the company's product pipeline). Nevertheless, prior studies have also documented the positive relation between R&D expenditures and market reaction (Abdel-khalik, 1975; Hirschey and Weygandt, 1985; Bublitz and Ettredge, 1989; Sougiannis, 1994, and Lev and Sougiannis, 1996). This makes sense given that Connolly and Hirschey (1984) previously documented the positive effect of R&D on profits.[5] Based on findings provided by previous studies, we propose that firms will make greater informative disclosures of innovation through conference calls as their innovation activities increase. Information containing innovation disclosures in response to demands by investors

[5] The traditional argument against capitalizing research and development expenditures is that there is too much uncertainty associated with the realization of an economic benefit from these expenditures, however (see Canibano et al., 2000).

should affect the disclosing companies' share prices. The hypotheses to be tested are given below:

**H2A: Ceteris paribus, the more innovative firms have more positive information content surrounding conference call event dates.**

**H2B: Ceteris paribus, the more innovation-related information that firms provide during conference calls results in more positive information content.**

## 5. Research Design

### 5.1 Specified models and variables for testing H1

The Probit and Ordered Probit regression models are used to test our first hypothesis regarding the relationship between conference call likelihood, frequency and innovation. Consistent with Gu and Li (2003), we also analyzed available information on conference call content to determine (a) whether R&D was discussed at all, and (b) given that it was discussed, to determine how many different facets of R&D were mentioned in the call (see Exhibit 1 for a listing of R&D facets). These content analyses measures were used to examine the effect of such disclosures on the information content of stock prices. Also, we used the resulting variables to examine the relationship between innovation activities and innovation disclosures.

[Insert Exhibit 1 Here]

Below, we present descriptions of how the variables were constructed. Variants of the dependent and independent variables were also created in order to perform sensitivity analyses on the results, and test the robustness of our results to alternate specifications of the variables. These alternate variable variants will be discussed further in the results section.

**(a) Dependent Variable: Conference call, frequency and innovation content**

**(1) Predicting Conference Call Likelihood and Frequency**

When Probit regression is used, the conference calls likelihood (CC_DUMMY) as a dummy variable is 1 if firms have ever provided conference calls during the year, and 0 otherwise. The conference calls frequency (CC_FREQ) is coded with the number of conference calls held by a firm in a year when Ordered Probit regression is used to test our expectation. The specified models are presented in Equation (1) and (2):

$$P_r(CC\_DUMMY) = \alpha_1+\beta_1[INNOVATION]+\beta_2[MGTOWN]+ \beta_3 [LDE] + \beta_4 [LOGASSET] + \beta_5 [DEPLAN] + \beta_6 [MB] + \beta_7 [PE] + \beta_8 [SG] + \varepsilon \quad (1)$$

$$P_r(CC\_FREQ) = \alpha_1+\beta_1[INNOVATION]+\beta_2[MGTOWN]+ \beta_3 [LDE] + \beta_4 [LOGASSET] + \beta_5 [DEPLAN] + \beta_6 [MB] + \beta_7 [PE] + \beta_8 [SG] + \varepsilon \quad (2)$$

where INNOVATION is surrogated by several proxies: R&D expenditures scaled by net sales, the count of the number of patents a firm receives during the year, and an estimate of the value of the patent to the firm. The methodology for estimating patent value is provided in Appendix A. The level of innovation (INNOVATION) is hypothesized to be positively associated with both conference call likelihood and frequency (CC). Other various independent control variables including managerial ownership (MGTOWN), long-term debt/equity ratios (LDE), firm size (LOGASSET), debt/equity offering plan (DEPLAN), market-to-book ratios (MB), price-earnings ratios (PE), and sales growth (SG) are further described in the following section.

**(2) Predicting Conference Call Innovation-Related Content**

One variant version of this variable (RD_CALL) was a dummy variable that had a value of 1 if R&D was discussed during a conference call, and 0 otherwise. A second version of the conference call variable was called DISC. It consisted of, for each firm in which R&D was discussed during the conference call, the number of discrete R&D topics

discussed during the call (see Exhibit 1). There were twelve possible R&D topics that could have been discussed. The specified model is presented in Equation (3) and (4):

$$MRD\_CALL = \alpha_1+\beta_1[INNOVATION]+\beta_2[MGTOWN]+\beta_3[LDE]+ \beta_4[LOGASSET] +\beta_5[DEPLAN]+ \beta_6[MB]+\beta_7[PE]+\beta_8[SG]+ \beta_9[ELE]+\varepsilon \quad (3)$$

$$MDISC = \alpha_1+\beta_1[INNOVATION]+\beta_2[MGTOWN]+\beta_3[LDE]+ \beta_4[LOGASSET] +\beta_5[DEPLAN]+ \beta_6[MB]+\beta_7[PE]+\beta_8[SG]+ \beta_9[ELE]+\varepsilon \quad (4)$$

The values for RD_CALL and DISC were established by reviewing records of the content of the conference call published in the China Times proprietary database, "The Information Winner Series". One of the authors established a list of indicators of R&D discussion based on Gu and Li (2003). The content validity, and adequacy of coverage, of this list of innovation indicators was examined by the authors of this paper and found to be sufficient. One author then reviewed the conference call content records and counted the distinct indicators of R&D content (please see Exhibit 1). A trained assistant then performed a quality control check of this author's classifications of each conference call content record to ascertain the correctness of that author's classifications of innovation-related discussion in each conference call transcript. Any areas of disagreement between the author and the assistant were then discussed and resolved.

For certain analyses, averages were taken of the RD_CALL variable and the DISC variable. In the first case, a new variable dubbed MRD_CALL was established by dividing the total number of RD_CALLS held by a firm in a given year by the total number of conference calls held by the firm in that year[6]. In the second case, a new variable MDISC was established by first summing up the total number of DISC variable values across all conference calls held by a firm in a given year, and then dividing the

[6] For example, if firm i conducted four conference calls at year t, and two of four conference calls were related to R&D information, the $MRD\_CALL_{it}$= (1+1+0+0)/4=0.5.

result by the number of conference calls held by the firm in that year[7]. These variables were created because a number of firms held more than one conference call in any given year, and therefore that firm potentially could be entered into the same annual analysis multiple times in a given year. This might give rise to spuriously high correlations between the independent variables and the dependent variables. Creating the MRD_CALL variable and the MDISC variable enabled each firm to be entered into each regression only once, with its various independent variable values averaged for that particular year. Thus, we were able to avoid the spurious correlation problem.[8]

**(b) Independent Variables**

(1) Innovation (INNOVATION): Innovation is surrogated for by R&D investments deflated by net sales (RD), patent counts (PATENT#), and estimated patent value (PATENTV)[9]. The research and development expenditures contribute to the development and establishment of new technologies, products and brands, and it is recognized as a current expense reported on the income statement. Although the spending on R&D is probably the most frequently used indicator of innovation, patent counts reported by the Taiwan Intellectual Property Office are also recognized as value-relevant supplementary information (see Seethamraju, 2000; Chin, Lin, and Chi, 2004). The R&D expenditures are regarded as innovation input while the number of patents are

[7] For example, if firm i conducted four conference calls at year t, two of four conference calls were related to R&D information, and two conference call disclosure scores are 2 and 4 points, and then $MDISC_{it}$= (2+4+0+0)/4=1.5.

[8] In order to further address the problem of potential spurious or serial (auto) correlations due to the fact that the same firms may have appeared in several different years, we also re-ran these tests using dependent and independent variable values averaged across all the years in which the firm appeared in the data set. Therefore, each firm was used only once. The results of these tests were consistent with those of the other tests presented, and are therefore not reported.

[9] A fourth method of measuring R&D effort was suggested by Balkin et al. (2000), Barth and Kasznik (1999), Barth, Kasznik and McNichols (2001), and Barron, Byard, Kile, and Riedl (2002) to measure a firm's innovation. This method uses the ratio of research and development expenditures against total operating expense. We found that this method did not yield results different than those produced by deflating total R&D expenditures by net sales. A fifth measure suggested by Balkin et al. (2000) involved constructing a composite variable of R&D expenditures and patent counts. The results of this method also did not produce results appreciably different than the methods suggested in the main text.

regarded as an innovation outcome[10]. Investments in R&D do not always result in immediate product innovation, and therefore R&D expenditures may not be efficient at capturing the effectiveness of the innovation process (see Canibano, Carcia-Ayuso, and Sanchez, 2000, p. 116). Pegels and Thirumuthy (1996) propose that patents are useful to assess the technological competitiveness of a firm's new products and processes. They indicate that patents are a good indicator of advances in technical knowledge, and their empirical results support the notion that patent counts contribute significantly to improved firm performance. Thus this study uses both as measures of firm performance. Appendix A demonstrates how the Cobb-Douglas function was used to generate an estimate of the patents' value to the firm. This value estimate was included since patent counts alone may not capture the full significance to a firm of holding the patent.

Other various control variables suggested by prior studies are presented below:

(2) Managerial ownership (MGTOWN): MGTOWN is the percentage of shares held by the CEO and executive directors. When the separation of ownership and control by the principal is exercised, and managerial ownership is low, there is a greater agency problem (e.g. Jensen and Meckling, 1976). Empirical evidence in Ruland, Tung, and George (1990) indicates that managerial ownership is negatively related to disclosure. Management has the motivation to provide voluntary disclosure of relevant important information to reduce the agency costs resulted from informational asymmetry. Hence it is expected that if managerial ownership is lower, we expect a firm is more likely to frequently and voluntarily disclose favorable information via conference calls.

(3) Long-term debt-equity ratios (LDE): LDE is the ratio of long-term liability over stockholders equity. Frankel (1999) found that the difference in debt-equity ratio

[10] Prior research also argues that patent citations, rather patent counts, are weighted more in the value of innovation (see Trajtenberg, 1990; Holthausen, Larcker, and Sloan, 1995). However, firm level patent citations data are currently unavailable to the resources of academic research in Taiwan.

between conference call firms and non-conference call firms was insignificant. Given that the management of firms that have greater levels of debt to equity may wish to diminish potential agency costs by releasing more information to the investing public, there may be a positive relationship between the use of conference calls and the LDE, however.

(4) Size (LOGASSET): firm size is measured by the logarithm of the total assets. Larger firms usually are followed by more analysts, and their institutional ownership are expected to be higher (e.g. Tasker, 1998a). The earlier studies also show that better disclosure firms are covered by more analysts and their outstanding shares are highly owned by institutional investors (e.g. Lang and Lundholm, 1993). Therefore, we expect that a big firm tends to have more frequent conference calls for better communication with analysts and institutional investors (e.g. Tasker, 1998a).

(5) Debt/equity offering plan (DEPLAN): DEPLAN is a dummy variable to indicate whether a firm has planned to offer new debt or equity in the current or following year of conference calls held. Prior research indicates that newly offering firms tend to host more conference calls in order to lower their cost of capital (see Frankel, Johnson, and Skinner, 1999; Tasker, 1998a). DEPLAN is 1 if a firm raises any capital by bonds, common or preferred stock in the current or year following the year the conference calls were held, and 0 otherwise.

(6) Market-to-book ratios (MB) and price-earnings ratios (PE): Market-to-book ratios are the market value of a firm over its book value, and price-earnings ratios are the stock price of a firm over its earnings per share. Frankel, Johnson, and Skinner (1999) and Tasker (1998a) use both ratios to control a variation of a firm's information environment and/or financial statement informativeness. However, aspects of Taiwan's financial

information environment, such as analyst following and firm-related information generated by general news coverage, lag behind those in developed markets[11]. Especially, the securities-related class action lawsuit by shareholders against Taiwan firms never reached the stage of a court hearing. Consequently, Taiwanese firms find it lest costly to brag about their operating performance, and/or opt for lax financial reporting. Therefore, in order to distinguish themselves from less innovative firms, more innovative firms are more likely to signal favorable value-added innovation information when it considers its stock price to be undervalued by the market. We expect that when market-to-book and price-earnings ratios are lower, management is expected to host conference calls to convey more innovation activities information.

(7) Sales growth (SG): sales growth is used to measure the growth rate of a company. Financial statements may not completely reflect the future perspectives of a company if a firm has a substantial growth potential. This leads to further asymmetric information. Therefore, management tends to hold more frequent conference calls to present positive perspectives to the market (see Frankel, Johnson, and Skinner, 1999; Tasker, 1998a). We expect that the sales growth is positively related to the frequency of holding conference calls.

(8) Electronics Industry (ELE): 60.92% or 173 of the sample firms consisted of members of the electronics industry. The next highest percentage membership number was 8.10% for the steel and iron industry, and 5.99% for the construction industry. In order to control for industry membership effects, a dummy variable was constructed.

[11] Both academic research (e.g. Yeh, Shu, and Huang, 2001) and some insightful business news comments (See *Taipei Times*, 18 July 2002 and Zun, 2002) provided anecdotal evidence to criticize analyst bias, earnings management, and a lack of transparency in the financial statements while Taiwan emerged as a country with relatively weak investor protections.

All firms in the electronic industry were given a dummy variable value of ELE=1. Otherwise, the ELE value was 0.[12]

**5.2 A specified model and variables for testing H2**

The ordinary least square (OLS) regression model is employed to assess the relationship between the cumulative abnormal returns (CAR) during the conference call period and the level of innovation (generically denoted as INNOVATION).

Cumulative abnormal returns show how the stock price behaved differently during the window period surrounding the conference call event than would have been expected based on the prior history of that firm's stock prices. The cumulative abnormal returns (CAR) are calculated using the market model based on different short-run periods (e.g. beginning on day t = -1 and ending on day t = 0 (i.e. t=(-1, 0))[13]. The event date, t = 0, is the date the conference call was held. The estimate period is composed of day -340 through day -41 for a maximum 300 daily return observations. For a firm to be included in a sample, it must have at least 100 daily stock returns in the estimate period. If conference calls are incrementally informative to the market, the cumulative abnormal returns driven by conference calls are expected to be positively associated with innovation variations. The specified model is presented in Equation (5) and (6):

$$MCAR=\alpha_1+\beta_1[INNOVATION]+\beta_2[MRD\_CALL]+\beta_3[LOGASSET]+\beta_4[MB]+\beta_5[SG]+\beta_6[ELE]+\beta_7[INVMILL]+\varepsilon \quad (5)$$

$$MCAR=\alpha_1+\beta_1[INNOVATION]+\beta_2[MDISC]+\beta_3[LOGASSET]+\beta_4[MB]+\beta_5[SG]+\beta_6[ELE]+\beta_7[INVMILL]+\varepsilon \quad (6)$$

[12] Yang & Chen (2003) note that, in Taiwan, the electronics industry is the most important part of Taiwan's manufacturing industry.

[13] We also test different window periods such as t=(-1,1), and (-3,3). The results in wider window period are consistent with empirical results based on t=(-1,0), and (-2, 2) as demonstrated in the later sections.

where innovation (INNOVATION) as defined above is hypothesized to be positively associated with mean cumulative abnormal returns (MCAR), after controlling for other variables including firm size, market-to-book ratios, and sales growth. The inverse Mill's ratio (INVMILL) is also used as a control variable and is defined below. In addition, we examined the effect of the innovation-related information content of the conference call on the firm's cumulative abnormal returns. If conference calls are incrementally informative to the market, the cumulative abnormal returns driven by conference calls is expected to be positively associated with innovation variations.

Again, because some firms held more than one conference call per year and thus could have appeared twice or more in the dataset during any particular year, we created a variant of the CAR dependent variable. This variant averaged each firm's cumulative abnormal returns for each year in which the firm appeared in the data set. This variable was dubbed MCAR. This procedure enabled us to have each variable enter the data set once each year, avoiding the spurious correlation problem described above.

As noted above, the inverse Mill's ratios (INVMILL) are used to control self-selection bias. Since our sample selection procedure requires conference call firms, our market reaction analysis is subject to self-selection. The self-selection bias causes our information content analysis to discount any voluntary disclosure efforts made by non-conference call firms if they did not use conference calls. Therefore, our study follows Heckman's (1978) two-step estimation procedures as suggested by Leuz and Verrecchia (2000) and calculates inverse Mill's ratios, $\lambda(.) = \phi(.)/\Phi(.)$, based on the Probit model estimation in Equation (1). The $\phi(.)$ and $\Phi(.)$ represent the probability density function and the cumulative density function, respectively, for the standard normal distribution. INVMILL is included in Equation (5) and (6) to mitigate possible self-selection bias.

All variables definition and measurement are summarized in the Exhibit 2.

[Insert Exhibit 2 Here]

**5.3 Data collection**

The study is based on the firms publicly listed on the Taiwan Stock Exchange. We collected dates, times, and names of firms holding conference calls during the period of 1997 to 2001 by using the China Times' Information Winner Series database.[14] The Taiwan Economic Journal (TEJ) database is used to identify all industrial firms with complete financial data used in this study. Patent data were collected from the Taiwan Patents Database provided by the Asia Pacific Intellectual Property Association (APIPA)[15]. Our sample selection process excludes: (1) conferences held by start-up firms for the purpose of raising capital; and (2) utilities, financial institutions and firms from other regulated industries. We identify 340 firm-years containing 534 conference calls during the 1997 to 2001 period from our sample selection process. Table 1 summarizes conference call frequency over the 5-year period.

[Insert Table 1 Here]

Panel A of Table 1 presents the number of conference calls releasing information to external investors. The conference call frequency across the years gradually increases. About 35.5 percent (108/340) firm-years hold conference calls at least twice in a year during the study period from 1997 to 2001. Two firms even held as many as six conference calls in 2001. Panel B of Table 1 shows how many of the firms that held conference calls appeared in only one year (254), in only two years (15),

[14] Conference calls were not widely popular in Taiwan prior to 1997. Only three firms conducted conference calls before that year. Therefore, our study period began with 1997.

[15] Because firm level patent citations data are currently unavailable from academic research resources in Taiwan, only the number of patents is used in the current study, and not a patent count weighted by the number of citations to the patent.

in only three years (7), in only four years (5) and in only five years (3). In all, there were 284 firms that held conference calls during the 1997 to 2001 period.

The collection of the data relating to the content of the conference calls was described above and therefore is not repeated here.

## 6. Results

### 6.1 The likelihood and frequency of conference calls and innovation

To provide evidence on the association among the likelihood and frequency of conference calls, and innovation, this study includes all publicly-listed firms that did not hold conference calls as control group firms. The conference call firms are the test group firms. The control group firms comprise all firms except for start-up firms, utilities, financial institutions and firms from other regulated industries during the study period. Based on the above procedure, the 5104 firm-years during the study period are first identified. After those firms without financial and returns data are eliminated, 2066 firm-years are obtained. The 2066 firm-years are classified into two groups: firm-years with conference calls (N=340) and firm-years without conference calls (N=1726). A firm year for firms that held conference calls is defined as any year in which a firm held at least one conference call. For example, if a firm held conference calls in 1998 and 2000, that firm would appear in the data set as having two (2) firm years. Table 2 reports descriptive statistics for the variables on which our analyses are based, tabulated by firm-years for firms with and without conference calls.

[Insert Table 2 Here]

The results in Panel A of Table 2 indicate that the mean and median innovation (i.e. RD, PATENTV and PATENT#), and firm size (LOGASSET) of conference call firms (based on firm year, n=340) are significantly higher than those of non-conference

call firms (based on firm year, n=1726), and the mean (median) managerial ownership (MGTOWN), and price-earnings (PE) ratios of conference call firms are significantly lower than those of non-conference call firms. In addition, median long-term debt equity ratios (LDE) and sales growth (SG) of conference call firms are significantly greater than those of non-conference call firms. These findings are consistent with our expectation and prior research findings, although the mean (median) difference in market-to-book (MB) ratios is not significant in the univariate analysis. Nor are the mean (median) differences for DEPLAN significant in the univariate analysis.

Panel B of Table 2 breaks the conference call firms down by RD-related conference calls (n=232) and non-RD-related (n=108) conference calls, broken down by firm years. The three innovation variables, RD, PATENTV and PATENT# were all significantly larger among the RD-related conference call firms than among the others. A related analysis, shown in Panel C of Table 2 breaks the sample of conference call firms down into the group of firms that have ever held an R&D-related conference call (n=197) and the group of firms that never held an R&D-related conference call (n=87). The RD, PATENTV and PATENT# values for the 197 firms that ever held an R&D-related conference call were significantly larger than the values for the 87 firms that had held conference calls, but whose conference calls never dealt with R&D-related topics.

Many sample firms in our study provide at least two conference calls in a year. Therefore, this research uses Probit and Ordered Probit regressions to investigate the association between the likelihood (Probit) and frequency (Ordered Probit) of conference calls and the level of innovation capital.

In evaluating the effect of our independent variables on conference calls, we found that our models (see Equations 1 and 2) explained 16% of the variation in the

determinants of conference calls. The explanatory power of the models was significant at the 1% level. The estimation equations from the Probit regression correctly classified 84%, 81%, and 79% of the conference call firm years and 78%, 83%, and 85% of the non-conference call firm years for Models 1, 2 and 3 respectively. Firms with greater innovation (as measured by RD, PATENTV, and PATENT#) were significantly more likely, at the 1% level, to provide conference calls.

Ordered probit models were used to test the effects of innovation on the frequency of conference calls within a year. The Ordered Probit method results were consistent with those produced by the Probit method. In summary, the more innovative firms are not only more likely to provide conference calls, but also are more likely to hold frequent conference calls.

In order to better understand the relationship between firm innovation efforts and the motivation to hold conference calls, we then used our analysis of the conference call transcripts to predict conference call R&D content, reasoning that firms that were more innovative would also be more likely to discuss the results of their R&D efforts during the conference calls.

We then checked to see whether the call concerned R&D, and, if so, the extent of the discussion of various R&D-related topics by restricting the sample used to only firms that had had at least one conference call (n=340) during the five year period studied. We then estimated Equations (3) and (4). In order to avoid potential spurious correlation problems that may have arisen from using the same firm in the analysis twice, we used the dependent variables dubbed above MRD_CALL and MDISC. We then used ordinary least squares regression for these tests since we were no longer using a binary dependent variable. The MRD_CALL variable was then regressed against the

three models. One model used RD as the surrogate for innovation. A second model used PATENTV as the innovation surrogate. And the third model used PATENT# as the innovation surrogate. Again, all three innovation surrogacy variables (RD, PATENTV and PATENT#) were significant at the 1% level. The adjusted $R^2$ values were 0.297, 0.302, and 0.303 respectively. We used the dependent variable dubbed MDISC to analyze the impact of firm innovative activities on the number of R&D-related topics discussed during the conference calls. Again, all the innovation variables were significant at the 1% level. The adjusted $R^2$ values for the RD, PATENTV and PATENT# variable models were 0.315, 0.308, and 0.313 respectively.[16]

The coefficient significance statistics produced by the OLS regression in estimating equations 3 and 4 are based on White (1980) heteroscedasticity-corrected standard deviation. All variance inflation factors (VIF) are less than 2, which provide evidence that our regression results are not affected by multi-collinearity. In addition, Durbin-Watson (DW) statistics are used to test residual auto-correlations. The results indicate that residual autocorrelation does not reach a level of significance. These results remain unchanged when we re-estimate the model using Belsley, Kuh, and

[16] Other analyses were also conducted to help rule out the possibility that using the same firm more than once in the data set would lead to spurious correlations between the dependent and independent variables. These other analyses, which involved restricting each firm to appear only once in the data set, and having its dependent and independent score variables averaged over the time periods in which it appeared, produced results similar to those being reported on above. This procedure helped rule out the possibility that the results were affected by spurious correlations. Also, pursuant to the suggestion of a reviewer, for which we are grateful, we also re-ran the regressions including a variable that captured the frequency of conference calls during the year. We found that this variable was negatively related to the cumulative abnormal returns variable. That is, the more frequently the firms held conference calls during the year, the lower the cumulative abnormal returns were in response to a conference call, and the information disclosed therein. This suggests that more frequent conference calls reduce the amount, or significance, of unique information presented in each call, with the result that the market response is tempered in response. The other variables in the revised model retained their previous direction and significance after the new variable was added. An analysis of the cumulative abnormal returns that compared the cumulative abnormal returns of most frequent conference call holders during a year (operationalized as those firms who held more than one call per year) and the less frequent conference call holders per year showed that cumulative abnormal returns were significantly lower for the firms that held more frequent conference calls.

Welsch (1980) influence diagnostics to exclude outliers. We apply the same diagnostic statistics to all later information content analyses.

**6.2 The information content of conference calls and innovation**

We assess information content of conference calls by investigating cumulative abnormal returns for a short event window surrounding conference call event dates. This study calculates and reports cumulative abnormal returns for 2-day window (i.e. t=-1, 0) and for 5-day window (i.e. t=-2, 2)[17]. In order to avoid potential spurious correlation problems by using the same firms data more than once in each year since many firms held more than one conference call in a single year, we averaged the cumulative abnormal return values for each year (Barron, O. E., D. Byard, C. Kile, and E. J. Riedl. 2002; Greene, W. 2000; Matsumoto, D. A. 2002).[18] Averaging the independent variable values for each year for each firm would simply yield the original values that were being used for that year. Table 3 reports summary statistics based on Equation (5) and (6), modified by averaging the cumulative abnormal returns for each year.[19]

Table 3 shows 6 models being tested in each of both Panels A and B. In these models, the three innovation surrogacy variables are being matched with either MRD_CALL or MDISC in order to shed light on the effect of the presence or absence, and the amount of, R&D disclosures on conference call information content. The

[17] The returns were downloaded from TEJ database based on a percentage format. The percentage as opposed to a decimal format (e.g., 6% versus .06) leads to an inflation of independent variable coefficients by 100 times. This does not change either the sign nor the significance of the coefficients, however.

[18] For example, on page 302 of Barron et. al.'s article, the authors indicated that "Our application of across-panel means is a typical remedy to address an unbalanced set of panel data (see Greene[2000, p.567])"

[19] In order to further eliminate the possibility that having the same firm appear more than once in the dataset would bias the results, we recalculated the regression models averaging each conference call firm's cumulative abnormal returns across the entire 5 year period studied, and also averaging the independent variables used. The sample size of test group firms equaled the number of separate firms that held a conference call at any point in the five-year time span studied. The results from this analysis were similar to those shown in Table 3. The innovation proxy variables were all highly significant. Thus, we have no reason to believe that spurious correlations due to using some firms in the sample database more than once have affected the results presented here.

remaining variables are control variables (i.e., LOGASSET, MB, SG, ELE, AND INVMILL.). The two R&D conference call information content variables (i.e., MRD_CALL and MDISC) are highly significant at the 1% level. These results held true in both Panel A, with the two-day window (-1, 0) and Panel B with the five-day (-2,2) window.

[Insert Table 3 Here]

Panel A of Table 3 shows that the coefficients on the research and development and innovation variables in the Model 1, 2 and 3 are also significantly positive (coefficient estimates for RD, PATENTV and PATENT# respectively are 0.201, 0.223, and 0.301) at the 1% level for the 2-day window (i.e. t=-1, 0). Meanwhile, the inverse Mill ratios (INVMILL) were not significant. This result shows the selection bias is not severe. In line with our expectations, these indicate that the association between the market reaction to conference calls and the level of innovation is significantly positive after controlling selection bias. In addition, the coefficient on sales growth (SG) is positive and significant at the 5% level, and market-to-book ratios (MB) are significantly negative at the 1% level. These findings show that market reactions are more positive for conference call firms with higher sales growth, and lower market to book ratios. Our findings in panel B of Table 3 for the 5-day window (i.e. t=-2, 2) are consistent with the results in panel A above.

**6.3 Conference Call Timing**

Our understanding of the findings thus far can be strengthened by developing information as to why a firm initiates a conference call at a particular point in time. Understanding this is important because variables used in the current study are probably correlated across years. Although timing of conference calls by firms is not our

research issue, understanding timing will help later researchers develop theories to predict whether firms with high information asymmetry will initiate conference calls in a particular month or year. To provide insights into the timing of conference calls, we perform alternative likelihood and regression analyses using changes in the explanatory variables in the same manner as suggested by Barth and Kasznik (1999) in their stock repurchase prediction model. The changes in the independent variables are computed by the amount/ratios at the end of the conference call event year minus those at the beginning of that year. The predicted sign of coefficients on all variables are consistent with earlier expectations. Table 4 and 5 report results based on the alternative tests described above.

[Insert Table 4 and 5 Here]

The Panel A of Table 4 shows the results of our attempts to predict MRD_CALL using the change variables. The Panel B of Table 4 also shows the results of our attempt to predict MDISC using the change variables. The results reported are generally consistent with those generated in estimating Equation (1). All the adjusted $R^2$ values shown are close to 25%. The variance inflation factors are less than 2, showing that multi-collinearity is not affecting the results shown.

The Panel A of Table 5 shows the results of our attempt to predict MCAR using a two-day time window. These results show that the change form of the three innovation surrogate variables (RD, PATENTV, and PATENT#) are all highly significant at the 1% level. Similarly, the innovation content variables MRD_CALL and MDISC, are also highly significant. The adjusted $R^2$ values range from 35% to 39% in the 6 models shown in Panel A. Similar results are shown in the 5 day time window shown in Panel B of Table 5. These results are in line with those in Table 3. These results further

reinforce our predictions that more innovative firms are more likely to hold a conference call, and to hold them more frequently, even after controlling for the timing of conducting conference calls. Further, their market reactions are more positive in response to changes in the level of innovation. Again, the variance inflation factors were all less than 2.

**6.4 Market expectation adjustments**

The findings in Table 3 imply that the market participants can predict to some extent whether a firm would utilize conference calls to make voluntary disclosures using the kind of financial data available in the annual financial statements. Prior studies suggest that cross-sectional differences in market expectations prior to the announcement of managerial decisions should be adjusted in the market reaction analysis. For example, Lanen and Thompson (1988) argue that it is not possible to effectively infer the signs of the relationship between market price and characteristics of the firm observable prior to voluntary management disclosure if market expectations are not taken into account. Therefore, in the context of the LIFO/ FIFO decision, Hand's (1993) market-based tests have incorporated market expectation adjustments into the choice of LIFO/FIFO in his research design. Barth and Kasznik (1999) also account for market expectation adjustments in their stock repurchase prediction model.

Following Lanen and Thompson (1988), Hand (1993), and Barth and Kasznik (1999), we first estimate a predicted probability of conference call firm, p, from Equation (1)[20]. Next, we multiply each independent variable by (1-p), and include such

[20] The predicted probabilities of firms holding conference calls under the different models are estimated. The mean value of predicted probability in the model 1 (i.e. R&D as an innovation proxy) 31.3% which, as expected based on Equation (1), is significantly larger than that of 11.2% for non-conference call firms at the 1% level. Further, the mean value of predicted probability in the model 2 and 3 (i.e. estimated patent value and patent counts as innovation proxies respectively) 24.7% and 20% which, as expected based on Equation (1), is significantly greater than that of 8.4% and 7.5% for non-conference call firms at the 1%

adjustments to the independent variables denoted by subscript p after dropping the inverse Mill's ratios.

Untabulated results show that the coefficients on the research and development and innovation variables in all models are all significantly positive at the 1% level for both 2-day window (i.e. t=-1, 0) and 5-day window (i.e. t=-2, 2). These results support the finding that the association between the market reaction to conference calls and the magnitude of innovation capital is significantly positive after adjusting for market expectation. The coefficients on sales growth are significant and positive at the 1% and 10% level respectively, and market-to-book ratios are significantly negative at the 10% level. These findings are consistent with Table 3 findings.[21]

## 7. Conclusion

It has been argued that current financial reporting practices which do not permit capitalizing R&D expenditures and other innovation efforts lead to information asymmetry between management and external investors. Prior studies have documented that firms use conference calls in order to enhance market participants' understanding of earnings announcements and to enhance market participants' understanding of their current innovation activities in order to lower information asymmetry. Conference calls can provide a communication channel between managers and investors, and firms can use conference calls more effectively to explain innovation efforts that are difficult to quantify. This study adds to extant literature about the conference call likelihood,

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level. These statistics show that market participants expect that test group firms are more likely to conduct conference calls than control group firms.

[21] A similar analysis was done for each of the 284 conference call firms, with each of the firm's data being averaged across each of their conference call appearances. The results of that analysis, which were done to help rule out both spurious and autocorrelation affecting the results reported, were consisted with the analyses reported in the text and therefore are not reported separately here.

frequency and information content in response to the degree of innovation as these are proxied for by R&D expenditures deflated by sales, the estimated value of patents, and the number of patents that the firm received in a year.

Our findings indicate that firms having higher R&D expenditures, and making greater innovation efforts are more likely to hold a conference call, and provide them more frequently. Frequent conference calls expose investors to a richer information environment than they would otherwise have. Further it directly provides early details of innovation events by releasing information about them publicly before these innovation activities reach full fruition at some later dates (see Kelm, Narayanan & Pinches, 1995). Given that the Taiwanese financial information reporting environment is one of the least transparent in Asia, conference calls give the innovative Taiwanese firms means to release information favorable to them while not releasing other kinds of financial information that may provide useful competitive intelligence to competitors.

Consistent with prior research, high growth firms are more likely to hold any, and more frequent, conference calls. Low price-earnings firms are also more likely to do so as well when their stock price trades at a lower multiple of earnings than do the shares of non-conference call firms. We also find supporting evidence that greater release of information about innovative activities during a conference call, as well as being more R&D intensive (as measured by R&D expenses divided by net sales), obtaining more patents, and having a higher estimated value of patents leads to greater positive abnormal returns. This result, of course, suggests that higher stock prices result from the additional innovative activities disclosed during the calls, as well as being undertaken by the firm. Additionally, our empirical results with respect to the information content of

more innovative firms holding conference calls are still robust after controlling for the effects of selection bias, market expectation, and timing of conducting conference calls.

Managers of innovative firms, therefore, should use available opportunities to provide reliable disclosure of their innovative activities to the investing public. Doing so may help support the value of the stock by reducing the information asymmetry between the managers and the investing public. The study conducted here reflects the particular Taiwanese financial information environment. It is not as transparent as that in many other Asian countries as well as the United States and other areas of the developed world. It is possible, therefore, that these results may be more muted should this study be replicated in more transparent information environments. On the other hand, the relative lack of financial information transparency in Taiwan may reflect broader aspects of the Taiwanese financial regulatory environment, including the perceived aggressiveness of Taiwan's financial statement regulatory agencies (e.g., the Taiwanese counterpart of the US SEC). Given this, it is also possible that the results found here may be more muted than they would be, given similar kinds of disclosures, in other areas of the world since investors in lower transparency/more lightly regulated financial environments may factor into stock prices a higher information uncertainty premium than would investors in more tightly regulated environments.

For managers, then, the credibility of their disclosures will affect the effectiveness of the disclosures that they make during conference calls, as well as through other media. Any potential lack of credibility should have diminished the power of the disclosure to affect the cumulative abnormal returns on the stock. For managers who are interested in making disclosures as a tool for reducing the cost of capital for the firm, it becomes important for them to develop a reputation for making disclosures that are perceived by

the investing public and analysts as reliable and relevant. Given that a major argument against capitalizing R&D expenditures is that there is considered to be a great deal of uncertainty with respect to the realization of the benefits of these expenditures (e.g., Canibano et al., 2000), managers should be careful to release information about R&D investments that they themselves believe have a high probability of being successfully brought to market. Conversely, managers may also build credibility with the market by being forthcoming about previously disclosed R&D investments that are believed to be unlikely to be successfully commercialized. Being a credible information source even in countries where financial transparency is low may provide the managers with the benefits of reducing their own corporation's cost of capital, thereby giving their own company competitive advantages vis a vis their rivals. Higher credibility, especially in the post-Enron environment (see Eichenwald, 2004), may also avoid legal complications for the firm's management, even in countries with seemingly better developed regulatory schemes like the United States.

Firms in less transparent financial markets may differ in terms of the credibility of their disclosures based on their size. That is, smaller firms would most likely have smaller analyst followings and therefore there are likely to be fewer individuals who are releasing analyses of the quality of the firms' earnings and financial statements. Larger firms, in contrast, are likely to have larger analyst followings and have a more vocal and visible following by investors. Being more visible, and under greater scrutiny, may lead these firms to be relatively more interested in presenting their disclosures as credible. This perhaps is one reason why the larger firms in our sample tended to have more positive cumulative abnormal returns than smaller firms. This result is inconsistent with that reported in the finance literature (e.g., Fama, 1991: cited in Kelm

et al., 1995). Kelm et al. (1995) argued in their study that new product introductions by larger firms provide less new information to the market than would such product introductions by smaller firms. Thus, in Kelm et al.'s (1995) development of the rationale for their study, they argued that there would be a negative relationship between firm size and market response to R&D information provision. This expectation was not confirmed in the Kelm et al. (1995) study. In contrast, the authors found that linear measures of size had no effect on wealth. Using a non-linear measure, Kelm et al. found a positive effect. A positive effect of size on our criterion variables was found here as well.[22]

The context for the Kelm et al. (1995) study was the United States. Given that the traditional expectation in the financial economics literature is that there would be a negative relationship between size and 'wealth' creation, various issues may be at play. One important issue that may affect the pattern of results is the institutional environment within which various related studies were undertaken. This study takes place in Taiwan. Given our results, it seems that larger firms in the Taiwan regulatory disclosure environment may possess more credibility, thereby triggering a larger positive market reaction to their announcements. Similar effects may be found in other nations with less transparent financial reporting environments. Firms in these environments will find their own methods to engineer disclosures that provide credibility. Also, this finding is consistent with a clientele effect for the firms in our sample. That is, actual or would-be investors in larger firms are more likely to buy additional shares in the larger firms when the latter disclose positive developments.

[22] We gratefully acknowledge the insights of the reviewers for this, and other, insights contained in the paper.

Different institutional arrangements (e.g., more rigorous disclosure standards or more vigorous enforcement regimes) may not result in the same effect of firm size on cumulative abnormal returns, however. That is, in economic/legal environments where enforcement is more vigorous and greater transparency is required, and where investors have greater confidence in the credibility of corporate disclosures, the relationship between firm size and cumulative abnormal returns may be absent or reversed since the extra credibility provided by firm size may be absent due to the more rigorous enforcement regimes. Further, the greater scrutiny that larger firms receive from analysts and others may lead to a reduced amount of new information reaching the market via conference calls for these larger, as opposed to smaller, firms. In short, the 'surprise effect' of the information released may be reduced or absent. Given the wide continuum of cultural expectations for corporate disclosure, legal requirements for disclosure, and vigorousness in enforcing disclosure requirements, much research remains to be done to explore the interaction of corporate size and conference call disclosures on cumulative abnormal returns.

Peng (2003), for example, argues that firms in different environments seek to manage their environments differently, and that different environments pose somewhat unique challenges for market participants. Whether Taiwan could be considered an emerging economy or a developed economy may be an issue, but clearly it is a nation that is moving toward the first rank of industrial countries. As such, corporations within Taiwan are making the transition from relationship-oriented means of managing their environments toward a more regulatory environment. This study provides support for the notion that firms will try to manage the uncertainty of their financial environments by providing more information to the market. Given that the status of research and

development accounting is such that such expenditures are required to be expensed, firms need other means to provide information to the market with respect to the possible and probable outcomes of such R&D. Using conference calls to provide this information to the market is one such modality. The results of this study show that provision of such information provides new information to the investing public, resulting in the cumulative abnormal returns reported here. Providing such information, therefore, represents an attempt to go past the regulatory requirements set by Taiwanese accounting standards, and reach investors through the mediated forum of conference calls. In the Peng (2003) framework, such an effort also reflects a recognition that market perceptions drive the capital provision process. In that sense, the recognition of the necessity of providing the additional information to the market reflects both the increasing normative pressure to provide the same, and a cognitive imperative to ensure that the market has the 'missing' information that it needs to properly value the stock.

In summary, it seems that firms that are more innovative are (a) more willing to disclose aspects of their innovative activities to the public, (b) are more likely to experience positive stock market returns from doing so, and (c) are more likely to hold conference calls than firms that are less innovative. Further, it seems that firms in less transparent financial information environments *may* be able to reduce their costs of capital through a pattern of credible disclosure. Explicitly evaluating the credibility of disclosures by firms in different information environments is an important step in continuing this stream of research.

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## Appendix A: Patent Value Estimation

Based on the Seethamraju's (2000) model, the Cobb-Douglas production framework is transformed as follows:[23]

$$\log SALE_t = \alpha_0 + \alpha_1 \log C_t + \alpha_2 \log L_t + \alpha_3 \log PAT_t + \alpha_4 \log RD_t + \varepsilon_t \quad (1)$$

where $SALE_t$ is output, measured as sale in year t; $C_t$ is physical measure as fixed assets at end of year t; L is labor, measured as salaries of employees in year t; PAT is the number of patent owned by a firm at the end of year t; RD is the research and development expense in year t.

Patents represent only a subset of innovation, because a firm can choose other legal forms, such as copyright and trade secrets to its intellectual property from competitors (e.g. Tabak and Barr, 1998; Balkin, Markman, and Gomerz-Mejia, 2000). The design that combines patents and RD helps better capturing firm's innovation efforts, with RD measuring investments in innovation and number of patents indicating innovation outputs (e.g. Balkin et al., 2000).

The incremental sales attributable to new patents granted in year t can be calculated as follows：

$$\Delta SALE_t = \alpha_3 \times PCHPAT_t \times SALE_t \quad (2)$$

where $\alpha_3$ is the estimated coefficients on the log PAT variable from model (1); $\Delta SALE_t$ is the incremental sale attributable to patents in year t; $PCHPAT_t$ is the percentage change in patents in year t; $SALE_t$ is the actual sales in year t.

$\Delta SALE_t$ is a series of cash flows attributable to the patents, We assume that this cash flows goes to remaining legal year n in year t, and the cost of capital is 6%.[24] Estimated market value of all patents in year t：

$$PATMV_t = \Delta SALE_t \times \frac{PATLEVEL_t}{\Delta PAT_t} \times (1 + A_{\overline{n}|6\%}) \quad (3)$$

[23] Seethamraju (2000) used number of trademarks (TM) and advertising expense (ADV) rather than patents and research and development. Furthermore, he assumed that cash flows goes to infinity, not remaining legal years.

[24] We also use costs of capital 8% and 10%, respectively, and the empirical results remain unchanged.

where *PATLEVEL* is the number of firm's patents as of the end of fiscal year t, $\Delta PAT_t$ is the number of new patents granted by the firm in year t. $A_{\overline{n}|6\%}$ is the present value of annuity for n years at 6% discounted rate.

## Exhibit 1

## Summary of Key Information Items of Disclosure about Corporate Innovation in the Conference Call Transcript

| Description of information item | Example of firm disclosure |
|---|---|
| **A. Information about strategy relating to innovation** | |
| 1.Form of R&D venture(e.g., alliance with other firms, contracting with government or other firms) | DBTEL Incorporated began manufacturing handsets on an ODM basis, devoting more and more resources to R&D. This year, DbTel will focus on its Hungary-based plant, a NT$2.4b joint venture with Motorola (US). Production is scheduled to start in Nov. with 250k units per month. The Hungarian plant is expected to churn out 500-700k handsets per month in 2001. (DBTEL Incorporated, 2000/4/2) |
| 2.Goal, objective, or plan of Innovation | Micro-Star International Co., Ltd. announced it will establish a research team for developing innovative computer systems that include motherboards, notebooks, LCD monitors, LCD PCs, book-sized PCs, workstations and servers. The company boasts state-of-the-art, cost-effective manufacturing sites in Taiwan and China as well as nimble, on-time build-to-order and configure-to-order centers in the USA, the UK, Belgium, Japan and Australia. (Micro-Star Internatinal Co.,Ltd, 1999/2/5) |
| 3.Acquisition of other firms for new technology or other innovation capabilities | Yageo Corporation announced recently that it has entered into a preliminary agreement to acquire the Discrete Ceramics and Ferrite Components businesses of Royal Philips Electronics. The acquisition of the discrete businesses of Royal Philips Electronics strengthens Yageo's global leadership in the components industry. Royal Philips Electronics' extensive worldwide customer base and the powerful research and development capabilities of these businesses will complement Yageo's strengths in the manufacture and distribution of high-quality products to customers active in a broad range of markets. (Yageo Co., Ltd., 2000/05/03) |
| 4.Amount of financing or spending planned | Hitron Technology Inc. planned to make NT$100 million investment in expanding number of research associates from 30 to 60 in wireless broadband residential gateway solutions. Hirtron Technology Inc. attempted to be a leading broadband and telecom company that designs, manufactures and markets Broadband Residential Gateway and Digital Access solutions. (Hitron Technology Inc, 2001/4/21) |
| 5.Time frame (e.g., years to complete) | Mr. In-Su Hong, the president of Sunonwealth Electric Machine Industry, indicated that it would take another six months for the mass production of slim spindle motors used in standard and portable DVD players, notebook DVD-ROMs and portable CD-RWs. (Sunonwealth Electric Machine Industry, 1999/4/15) |

| | |
|---|---|
| 6.Relation with current innovation (e.g., strategic new initiative, enhancement of existing technology) | VIA Technologies formed a special interest group with Cisco and Conexant to develop open specification technology for a new and advanced PC communication due to mass volume internet traffic. (VIA Technologies Inc., 2001/10/25) |

**B. Information about progress of innovation**

| | |
|---|---|
| 7.Human capital (e.g., turnover of star scientists and details on research teams) | With our success in the tape business, ACHEM Technology Co., Ltd. diversified into the electronic material field with multi-layer copper-clad laminates (CCL). ACHEM had recruited senior experienced CCL professionals, including Mr. Michael Amalfitano and Mr. David McGowan, for strengthening the R&D capability, developing new products and improving product quality. (ACHEM Technology Co., Ltd, 1999/12/21) |
| 8.Breakthrough or milestone of research and development | TTY Biopharm has completed various clinic trials in anti-cancer drug development and expects to receive a streamlined approval on oncology, CV, infection and GI therapeutics. TTY plans to continue to develop new anti-cancer drugs based on current dosage forms and organization of clinical trials. (TTY Biopharm Co., Ltd, 2001/9/22) |
| 9.Implementation, continuation, or termination of R&D projects | Winbond Electronics Corp. announced plans to not increase the standard DRAM (0.12 micron ) capacity and begin re-equipping its 0.13 micron capacities for mass production of 0.13 micron 512 MBit DDR SDRAM memory chips, which requires capital expenditures of NT$5 billion to NT$6 billion. (Winbond Electronics Corp., 2001/11/9) |
| 10.Continuation of available financing | SOYO Computer Inc. planned to file seasoned equity offering application for Mini DRAGON research and development. Condensed to 2.5" (H) x 7.5" (W) x 9.5" (D), the SOYO Mini DRAGON 651 will be the smallest gaming barebone machine. (SOYO Computer Inc., 1999/2/5) |

**C. Information about completion or commercialization of innovation**

| | |
|---|---|
| 11.New product launch or acceptance by market | Myson Century Inc. announced new LCD controller IC and HUB/SWITCH Controller IC. Both products employ a full CMOS technology enhanced with low cost, high speed and high noise immunity. (Myson Century, Inc., 2000/2/16) |
| 12.Patent licensing and royalty | Taiwan Semiconductor Manufacturing Company (TSMC) announced a strategic licensing agreement with National Semiconductor Corporation whereby National will gain the use of TSMC's advanced manufacturing processes to produce chips at National's site in South Portland, Maine. In exchange, National will pay TSMC an undisclosed amount over the next four years. (Taiwan Semiconductor Manufacturing Co., Ltd, 2000/8/15) |

## Exhibit 2
## Definition and measurement of variables

| Variable | Definition | Measurement |
|---|---|---|
| CC_DUMMY | A dummy variable of conducting conference call | 1 if firms have ever provided conference calls during the year, and 0 otherwise |
| CC_FREQ | The frequency of conference calls | Number of conference calls per firm-year |
| MRD_CALL | Average R&D-related calls | R&D-related calls divided by number of calls per firm-year |
| MDISC | Average R&D-related disclosure score | R&D-related disclosure score divided by number of calls per firm-year |
| CAR | Cumulative abnormal returns | Cumulative abnormal returns surrounding conference call date |
| MCAR | Average cumulative abnormal returns | Average cumulative abnormal returns surrounding conference call date per firm-year |
| RD | R&D intensity | R&D expenditures deflated by total net sales |
| PATENTV | Estimated patent value | Firm-level estimated patent value divided by beginning total assets (please see Appendix A for detailed estimation procedures) |
| PATENT# | Patent counts | Number of patents per firm-year |
| RD_CALL | A dummy variable of R&D-related call | 1 if R&D was discussed during a conference call, and 0 otherwise |
| DISC | R&D-related disclosure score | Number of discrete R&D topics discussed during the call (see Exhibit 1) |
| MGTOWN | Managerial ownership | Shares held by CEO and executive directors divided by outstanding shares |
| LDE | Long-term debt-equity ratio | Total long-term liability over stockholders equity |
| LOGASSET | Size | The logarithm of the total assets |
| DEPLAN | Debt-equity offering plan | A dummy variable of offering new debt or equity in the current or following year of conference calls held |
| MB | Market-to-book ratio | Market value over its book value |
| PE | Price-earnings ratio | Price over earnings per share |
| SG | Sales growth | $(Sales_{it} - Sales_{it-1})/ Sales_{it-1}$ |
| ELE | A dummy variable of electronic Industry | 1 if a firm industry is electronic industry, and 0 otherwise |
| INVMILL | Inverse Mill's ratio | $\lambda(.) = \phi(.)/\Phi(.)$, generated by the Probit model estimation in Equation (1). The $\phi(.)$ and $\Phi(.)$ represent the probability density function and the cumulative density function |

## Table 1
## Conference Calls Frequency Distribution by Year

**Panel A: Total conference calls**

| | Number of Calls | | | | | | | Firm-year |
|---|---|---|---|---|---|---|---|---|
| Year | 1 | 2 | 3 | 4 | 5 | 6 | Firm years | calls[a] |
| 1997 | 60 | 7 | 0 | 1 | 0 | 0 | 68 | 78 |
| 1998 | 27 | 3 | 0 | 1 | 0 | 0 | 31 | 37 |
| 1999 | 44 | 11 | 3 | 1 | 0 | 0 | 59 | 79 |
| 2000 | 49 | 16 | 10 | 7 | 3 | 0 | 85 | 154 |
| 2001 | 52 | 21 | 11 | 8 | 3 | 2 | 97 | 186 |
| Total | 232 | 58 | 24 | 18 | 6 | 2 | 340 | 534 |

[a] Firm-year calls are calculated based on number of calls by firm years. For example, 78 firm-year calls in 1997 are computed as follows: 60*1+7*2+1*4=78.

**Panel B: Number of yearly period by firms conducting conference calls**

| | Yearly period | | | | | |
|---|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 | Total |
| Firm | 254 | 15 | 7 | 5 | 3 | 284 |

## Table 2
## Descriptive Statistics

**Panel A: Comparison between conference call and non-conference call firms grouped by firm years**

| | Conference Call Firm-year (n=340) | | Non-Conference Call firm-year | | Mean Difference t-value | Median Difference z-value |
|---|---|---|---|---|---|---|
| Variables | Mean | Median | Mean | Median | | |
| RD | 0.032 | 0.017 | 0.012 | 0.007 | 9.81*** | 5.17*** |
| PATENTV | 0.858 | 0.695 | 0.325 | 0.207 | 8.93*** | 4.61*** |
| PATENT# | 1.983 | 0.124 | 0.164 | 0.010 | 14.32*** | 13.27*** |
| DISC | 2.659 | 1.263 | N/A[+] | N/A[+] | N/A[+] | N/A[+] |
| MGTOWN | 0.304 | 0.283 | 0.324 | 0.291 | -2.38*** | -1.72** |
| LDE | 0.164 | 0.095 | 0.173 | 0.066 | -0.84 | 2.07*** |
| LOGASSET | 6.764 | 6.676 | 6.306 | 6.285 | 15.59*** | 5.91*** |
| DEPLAN | 0.382 | 0 | 0.411 | 0 | -1.2 | 0.58 |
| MB | 2.812 | 2.164 | 10.189 | 2.454 | -1.17 | 0.64 |
| PE | 1.126 | 11.348 | 48.013 | 15.319 | -4.19*** | -3.23*** |
| SG | 0.526 | 0.208 | 0.45 | 0.12 | 1.32 | 2.75*** |

**Panel B: Innovation proxies comparison between RD-related and Non RD-related calls on a firm-year basis**

| | RD-related conference call by firm-years (n=232) | | Non RD-related conference call by firm-years (n=108) | | Mean Difference t-value | Median Difference z-value |
|---|---|---|---|---|---|---|
| Variables | Mean | Median | Mean | Median | | |
| RD | 0.041 | 0.026 | 0.023 | 0.011 | 9.23*** | 5.17*** |
| PATENTV | 1.024 | 0.701 | 0.698 | 0.565 | 7.89*** | 4.24*** |
| PATENT# | 2.204 | 0.527 | 1.569 | 0.082 | 15.46*** | 11.38*** |

**Panel C: Innovation proxies comparison between RD-related and Non RD-related calls on a firm basis**

| | RD-related conference call by firm (n=197) | | Non RD-related conference call by firm (n=87) | | Mean Difference t-value | Median Difference z-value |
|---|---|---|---|---|---|---|
| Variables | Mean | Median | Mean | Median | | |
| RD | 0.046 | 0.031 | 0.025 | 0.012 | 9.71*** | 5.83*** |
| PATENTV | 1.035 | 0.742 | 0.684 | 0.558 | 7.12*** | 4.39*** |
| PATENT# | 2.231 | 0.542 | 1.573 | 0.085 | 14.93*** | 10.21*** |

*** 1% significance level, ** 5% significance level, * 10% significance level.

+ N/A indicates statistics are not available because DISC were documented by non-conference call firms.

## Table 3
## Conference Calls Information Content Analysis by Firm-year

$MCAR=\alpha_1+\beta_1[INNOVATION]+\beta_2[MRD\_CALL]+\beta_3 LOGASSET]+\beta_4[MB]+\beta_5[SG]+\beta_6[ELE]+\beta_7[INVMILL]+\varepsilon$

$MCAR=\alpha_1+\beta_1[INNOVATION]+\beta_2[MDISC]+\beta_3 LOGASSET]+\beta_4[MB]+\beta_5[SG]+\beta_6[ELE]+\beta_7[INVMILL]+\varepsilon$

**Panel A (Dep. Var.- MCAR): Information content analysis based on MCAR (-1, 0)**

| Variables | Predicted Sign | Model 1 | Model 2 | Model 3 | Model 4 | Model 5 | Model 6 |
|---|---|---|---|---|---|---|---|
| Constant | | 0.223*** | 0.217*** | 0.202*** | 0.224*** | 0.217*** | 0.232*** |
| RD | + | 0.201*** | | | 0.182*** | | |
| PATENTV | + | | 0.223*** | | | 0.317*** | |
| PATENT# | + | | | 0.301*** | | | 0.332*** |
| MRD_CALL | + | 0.156*** | 0.147*** | 0.151*** | | | |
| MDISC | + | | | | 0.078*** | 0.042*** | 0.029*** |
| LOGASSET | - | 2.127*** | 2.264*** | 2.038*** | 2.189*** | 2.010*** | 2.228*** |
| MB | - | -2.134*** | -2.117*** | -2.234*** | -2.216*** | -2.263*** | -2.117*** |
| SG | + | 0.015** | 0.016** | 0.015** | 0.016** | 0.017** | 0.015** |
| ELE | + | 0.024*** | 0.023*** | 0.026** | 0.025** | 0.026** | 0.023** |
| INVMILL | ? | 0.006 | 0.007 | 0.007 | 0.006 | 0.006 | 0.007 |
| Adj. R-sq. | | 0.105 | 0.108 | 0.107 | 0.109 | 0.110 | 0.105 |
| F-statistic | | 5.017 | 4.983 | 5.010 | 5.027 | 4.998 | 5.011 |
| N | | 340 | 340 | 340 | 340 | 340 | 340 |

**Panel B (Dep. Var.- MCAR): Information content analysis based on MCAR (-2, 2)**

| Variables | Predicted Sign | Model 1 | Model 2 | Model 3 | Model 4 | Model 5 | Model 6 |
|---|---|---|---|---|---|---|---|
| Constant | | 0.193*** | 0.198*** | 0.184*** | 0.201*** | 0.194*** | 0.183*** |
| RD | + | 0.186*** | | | 0.192*** | | |
| PATENTV | + | | 0.253*** | | | 0.243*** | |
| PATENT# | + | | | 0.327*** | | | 0.302*** |
| MRD_CALL | | 0.173*** | 0.168*** | 0.152*** | | | |
| MDISC | + | | | | 0.076*** | 0.060*** | 0.051*** |
| LOGASSET | - | 2.271*** | 2.238*** | 2.372*** | 2.045*** | 2.412*** | 2.240*** |
| MB | - | -2.240** * | -2.143*** | -2.235*** | -2.378*** | -2.137*** | -2.321*** |
| SG | + | 0.009** | 0.008** | 0.010** | 0.010** | 0.011** | 0.09** |
| ELE | + | 0.083*** | 0.078*** | 0.081*** | 0.086** | 0.083** | 0.076** |
| INVMILL | ? | 0.009 | 0.010 | 0.009 | 0.010 | 0.009 | 0.010 |
| Adj. R-sq. | | 0.111 | 0.102 | 0.115 | 0.101 | 0.102 | 0.099 |
| F-statistic | | 5.013 | 5.024 | 5.036 | 4.998 | 4.979 | 5.014 |
| N | | 340 | 340 | 340 | 340 | 340 | 340 |

*** 1% significance level, ** 5% significance level, * 10% significance level.

## Table 4
## Conference Calls Innovation Content Analysis after Controlling the Timing of Conducting Conference Calls

$$MRD\_CALL = \alpha_1+\beta_1[\triangle INNOVATION] + \beta_2[\triangle MGTOWN] + \beta_3[\triangle LDE] + \beta_4[\triangle LOGASSET] + \beta_5[\triangle MB] + \beta_6[\triangle PE] + \beta_7[\triangle SG] + \varepsilon$$

$$MDISC = \alpha_1+\beta_1[\triangle INNOVATION] + \beta_2[\triangle MGTOWN] + \beta_3[\triangle LDE] + \beta_4[\triangle LOGASSET] + \beta_5[\triangle MB] + \beta_6[\triangle PE] + \beta_7[\triangle SG] + \varepsilon$$

**Panel A (Dep. Var.- MRD_CALL): The effect of change in innovation proxies on RD-related and Non RD-related calls**

| Variables | Predicted Sign | Model 1 | Model 2 | Model 3 |
|---|---|---|---|---|
| Constant | | 0.247 | 0.362 | 0.353 |
| △RD | + | 0.860*** | | |
| △PATENTV | + | | 0.731*** | |
| △PATENT# | + | | | 0.708*** |
| △MGTOWN | ? | 0.018 | 0.020 | 0.021 |
| △LDE | + | 0.276 | 0.283 | 0.296 |
| △LOGASSET | + | 2.967** | 3.002** | 3.142*** |
| △MB | - | -0.119** | -0.183** | -0.172** |
| △PE | - | -0.001 | -0.001 | -0.001 |
| △SG | + | 0.003 | 0.002 | 0.002 |
| Adj. R-sq. | | 0.243 | 0.252 | 0.247 |
| F-statistic | | 40.213 | 38.776 | 39.624 |
| N | | 340 | 340 | 340 |

**Panel B (Dep. Var.- MDISC): The effect of change in innovation proxies on RD-related and Non RD-related disclosure calls**

| Variables | Predicted Sign | Model 1 | Model 2 | Model 3 |
|---|---|---|---|---|
| Constant | | 1.417 | 1.583 | 1.242 |
| △RD | + | 1.024*** | | |
| △PATENTV | + | | 0.862*** | |
| △PATENT# | + | | | 0.801*** |
| △MGTOWN | ? | 0.024 | 0.029 | 0.030 |
| △LDE | + | 0.256 | 0.283 | 0.297 |
| △LOGASSET | + | 2.841** | 2.750** | 2.638*** |
| △MB | - | -0.124** | -0.169** | -0.174** |
| △PE | - | -0.001 | -0.001 | -0.001 |
| △SG | + | 0.002 | 0.002 | 0.003 |
| Adj. R-sq. | | 0.238 | 0.241 | 0.238 |
| F-statistic | | 39.221 | 40.123 | 38.746 |
| N | | 340 | 340 | 340 |

*** 1% significance level, ** 5% significance level, * 10% significance level.

## Table 5
## Conference Calls Information Content Analysis after Controlling the Timing of Conducting Conference Calls

$MCAR=\alpha_1+\beta_1[\triangle INNOVATION]+ \beta_2[MRD\_CALL]+ \beta_3[\triangle LOGASSET]+ \beta_4[\triangle MB]+\beta_5[\triangle SG]+ \beta_6[ELE]+\varepsilon$

$MCAR=\alpha_1+\beta_1[\triangle INNOVATION]+ \beta_2[MDISC]+ \beta_3[\triangle LOGASSET]+ \beta_4[\triangle MB]+\beta_5[\triangle SG]+ \beta_6[ELE]+\varepsilon$

**Panel A (Dep. Var.- MCAR): Information content analysis based on MCAR (-1, 0)**

| Variables | Predicted Sign | Model 1 | Model 2 | Model 3 | Model 4 | Model 5 | Model 6 |
|---|---|---|---|---|---|---|---|
| Constant | | 0.301 | 0.284 | 0.274 | 0.313 | 0.342 | 0.297 |
| △RD | + | 0.542*** | | | 0.347*** | | |
| △PATENTV | + | | 0.101*** | | | 0.089*** | |
| △PATENT# | + | | | 0.232*** | | | 0.154*** |
| MRD_CALL | + | 0.189*** | 0.136*** | 0.107*** | | | |
| MDISC | + | | | | 0.075*** | 0.034*** | 0.031*** |
| △LOGASSET | - | 1.874*** | 0.924*** | 1.113*** | 1.724*** | 1.001*** | 1.092*** |
| △MB | - | -0.384** | -0.372** | -0.402** | -0.397** | -0.401** | -0.386** |
| △SG | + | 0.003** | 0.003** | 0.002** | 0.002*** | 0.002*** | 0.003*** |
| ELE | + | 0.028** | 0.027** | 0.031** | 0.030** | 0.028** | 0.031** |
| Adj. R-sq. | | 0.352 | 0.363 | 0.387 | 0.376 | 0.380 | 0.374 |
| F-statistic | | 55.421 | 50.247 | 51.722 | 52.374 | 51.245 | 53.384 |
| N | | 340 | 340 | 340 | 340 | 340 | 340 |

**Panel B (Dep. Var.- MCAR): Information content analysis based on MCAR (-2, 2)**

| Variables | Predicted Sign | Model 1 | Model 2 | Model 3 | Model 4 | Model 5 | Model 6 |
|---|---|---|---|---|---|---|---|
| Constant | | 0.583* | 1.022 | 1.132* | 0.647 | 0.824* | 0.954* |
| △RD | + | 0.681*** | | | 0.682*** | | |
| △PATENTV | + | | 0.302*** | | | 0.123*** | |
| △PATENT# | + | | | 0.274*** | | | 0.315*** |
| MRD_CALL | + | 0.174*** | 0.165*** | 0.135*** | | | |
| MDISC | + | | | | 0.074*** | 0.069*** | 0.051*** |
| △LOGASSET | - | 2.238*** | 1.924*** | 2.021*** | 2.274*** | 1.982*** | 1.998*** |
| △MB | - | -1.452** | -1.382** | -1.447** | -1.528** | -1.438** | -1.524** |
| △SG | + | 0.004** | 0.004** | 0.004** | 0.005*** | 0.005*** | 0.004*** |
| ELE | + | 0.031** | 0.029** | 0.035** | 0.033** | 0.032** | 0.033** |
| Adj. R-sq. | | 0.375 | 0.368 | 0.371 | 0.383 | 0.386 | 0.397 |
| F-statistic | | 48.247 | 47.623 | 49.234 | 48.127 | 47.342 | 49.357 |
| N | | 340 | 340 | 340 | 340 | 340 | 340 |

******* 1% significance level, ** 5% significance level, * 10% significance level.