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INFORMATION CONTENT OF FINANCIAL REPORTING AND INFORMATION VALUE OF FINANCIAL NEWS – AN OPINION ANALYTICS APPROACH

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Abstract

This study investigates the impact of the quality of disclosures of financial reports of the listed firms in Taiwan under her first full adoption of International Financial Reporting Standards (IFRS) in 2013. We select the semi-annual reports of firms in the three main industry sectors of high technology, financial service, and biotechnology representing 80% of the capital market in the first year of mandatory adoption. The dictionary of financial reporting is developed according to opinion mining and sentiment analysis. In contrast to prior studies, we explore the gap analytics between financial reporting and financial news to explore whether the disclosure quality is related with the adoption of IFRS. Results are promising and show that the disclosures have relationship with the IFRS first adoption.

Keywords: International Financial Reporting Standards (IFRS), Opinion Analytics and Sentiment Analysis, Disclosure Quality, High-tech Industry, Bio-tech Industry, Financial Service Industry

1 INTRODUCTION

1.1 Research Background

The adoption of International Financial Reporting Standards (IFRS) has become a trend in the international capital market. The European Union (EU), Australia and Hong Kong have adopted IFRS since year 2005. Others such as Canada, Korea and Japan have performed the transition by 2011. China commits to converge with IFRSs in 2007 by adopting the new Chinese accounting standards that substantially converge with IFRS. And, Taiwan first mandatorily adopts IFRSs in 2013. As a result, apart from the US, more than 100 other countries, including major nations in Asia have adopted or converged to IFRS (Rezaee et al. 2010).

Users of financial reports often rely on such information to make investment decisions. However, majority of unsophisticated audience may find that the reports fail to meet their information needs or cannot be easily understood (Parker 1982). Management may not communicate effectively through its external financial reports due to improper or awkward wording and lack of organization. Moreover, financial reports may be the outcome of management attempting to impress readers rather than to communicate to external users (Worthington 1978).

IFRS is a set of standards that intends to restrict management accounting choices, relies more on professional judgment, and requires greater disclosure requirement to improve corporate transparency and reflect economic reality (Ashbaugh & Pincus 2001; Ball 2006; Hail et al. 2010a,b; Ding et al. 2007). Therefore, firms' financial reports tend to be longer if they are required to disclose more information. Disclosing more information and providing longer reports do not necessary indicate that the information has become more readable to users. Prior studies (e.g. Subramanian et al. 1993) show that firms with poorer performance tend to prepare longer financial reports than good-performing firms. However, it is expected that better quality of disclosure improves annual reports readability and minimizes misleading financial information.

The objective of IFRS aims to provide a single set of high quality of accounting standards. As a set of principle-based accounting standards, IFRS provides firms with more flexibility to voluntarily disclose forward-looking information in order to reduce information asymmetries with outside investors. Existing studies (e.g. Schipper 2003; Nelson 2003; Nobes 2005) suggest that principle-based accounting standards better reflect underlying economic substance than rule-based accounting standards, which emphasize on legal forms. The greater transparency that stems from financial reporting under IFRS improves the ability of outside investors to monitor any mismanagement of firms, which in turn improves the expected cash flow of these firms. Several studies confirm the economic benefits of IFRS adoption (e.g. Christensen et al. 2007).

The content of financial reports, compared to financial news, is not easily understood and readable for most users. As mentioned in the article of Parker (1982), the financial information in reports voluntarily disclosed by firms usually does not meet users' needs and is insufficient for outside investors. Thus, the majority of institutional investors tend to make investment decisions from the newspaper, news media, online discussion forum of financial experts, and so on. With the adoption of IFRS, we expect that the information gap between financial reports and financial news, especially for the news articles following up on the disclosed information of financial reports.

1.2 Research Objectives

This study focuses on comparing the disclosure quality of the semi-annual reports and its corresponding financial news. In contrast to prior studies, the disclosure quality is evaluated by term frequency weighting in information retrieval. We here define the weighting of term frequency as the number of times that each term occurs in a collection of financial reports or financial news. The much higher is the weight of each term in a collection of financial news than that in a collection of financial reports, the more important and discriminative of this term in the collection of financial news is. This criterion is judged by our finding on the greater amount of words included in per financial report than in per financial news. This study applies opinion analytics and sentiment analysis to investigate

whether the disclosure quality indeed improve after the IFRS adoption. It is expected that firms facing greater information asymmetry between management and investors will benefit more from the adoption of IFRS.

1.3 Research Issues

This study chooses Taiwan as the research setting since 2013 was the first year Taiwan have the full IFRS adoption. Thus, it provides an ideal setting to identify whether the disclosure quality of semi-annual reports improve after the mandatory adoption of IFRS. This study uses three main industry sectors as the test sample as these firms represent more than 80% of capital market. This study uses opinion analytics and sentiment analysis to discuss whether the adoption of IFRS is related with the disclosure quality.

Using opinion analytics and sentiment analysis technique, the disclosure quality of semi-annual reports and its follow-up news can be evaluated. As IFRS aims to reduce accounting choices and provides clearer information with more disclosures, the adoption of IFRS should enhance the usefulness and readability of reports through better quality of disclosure. Thus, it is expected that the information content in the semi-annual reports and its follow-up news stories of a specific company should be similar.

This study corroborates and complements those of extant research (e.g. Ding et al. 2007). This study adopts a different technique which aims to shed lights on the effect of adopting IFRS by examining its impact on the disclosure quality of the semi-annual reports and the corresponding news. This study focuses on three main industry sectors as these firms tend to have greater information asymmetry between management and outside investors. No prior studies have focused upon the effect of first year's full IFRS adoption on the disclosure quality of the semi-annual reports when firms are facing different degree of asymmetric information and the findings of this study fill this void. In addition, the evidence contributes to the issue of effective communication and extends the literature on the economic consequences of IFRS adoption by providing evidence on whether greater disclosure requirement provide more effective and clearer communication to firms with greater unreported intangible resources.

The remainder of this paper is organized into four sections. Section 2 reviews relevant literature. Section 3 develops research approach. Section 4 describes the research results, and Section 5 concludes the paper.

2 LITERATURE REVIEW

IFRS is a set of higher quality accounting standards than most domestic GAAPs. It improves the cross-border comparability of financial statements, which in turn reduces the ability of firms to distort and manipulate their reported performance through idiosyncrasies in their domestic accounting standards.

Goodwin et al. (2008) evaluate the preparedness of Australian listed firms for IFRS. These researchers examine changes in explanations from Australian GAAP to IFRS between the half-year and semi-annual reports in the first year of IFRS adoption. Switching from Australian GAAP to IFRS requires Australian firms to provide new accounting information via the firms' reporting function. Examination of changes to explanations from Australian GAAP to IFRS between the two reporting dates of the first year of IFRS reveals that 33% of firms change their explanations. They conclude that most of these firms or their auditors were unprepared for IFRS at transition. Among changes to explanations, most concerned income tax, cash flows, earnings and equity.

The listed firms in EU have been required to prepare financial reports according to IFRS from 2005. Agostino et al. (2011) investigate the market valuation of accounting information in the European banking industry before and after the adoption of IFRS, the latest version of International Accounting Standards. In a value relevance framework, Agostino et al. (2011) apply panel methods to a multiplicative interaction model, in which the partial effects of earnings and book value on share

prices are conditional on the adoption of IFRS. According to their evidence, the IFRS introduction enhanced the information content of both earnings and book value for more transparent banks. By contrast, less transparent entities did not experience significant increase in the value relevance of book value. Iatridis (2010) investigates the impact of the implementation of IFRS on key financial measures of UK firms and the volatility effects of IFRS adoption. The findings show that IFRS implementation has favorably affected the financial performance of firms. The study also demonstrates that following the fair value orientation of IFRS the transition to IFRS appears to introduce volatility in income statement figures.

The commercial application of sentiment analysis has been developed rapidly in recent years. Most of the data used in academic articles on business-related topics are usually collected from financial reports or financial news. The sentiment analysis in financial news mainly focuses on the predicting stock price movements. For example, Schumaker et al. (2012) refined the AZFinText system, a financial text system they developed in 2009, to investigate whether the sentimental characteristics in financial news articles can predict stock price movements through combining the sentiment analysis and support vector regression (SVR) approach. Their system can achieve 59% accuracy. The past literature on this issue reveals that prediction accuracies of the direction of stock prices following the release of corporate financial news rarely exceed 59%, see Groth and Muntermann (2009), and Schumaker and Chen (2009). Hagenau et al. (2013) have shown that a robust feature selection allows lifting prediction accuracies significantly above the approaches in the literature especially when combined with advanced feature extraction methods. Their research shows that using 2-word combinations feature extraction together with bi-normal separation (BNS) -based feature selection causes the accuracy up to 76%. Geva and Zahavi (2013) built a stock recommendation system incorporating both numerical market data and textual news data. They showed that integrating market data with advanced textual data processing can significantly increase the predictive power. A specific contribution in their paper is that a new sentiment analysis method, called sentiment calibration, is proposed. Their empirical results illustrated that sentiment calibration noticeably raise the predictive accuracy of the recommendation system. From these results, we find that data preprocessing techniques and semantic analysis techniques are key factors affecting the performance of the text-mining methods whether or not data-mining methods are involved. This study differing from past studies and prior research considers both financial reports and financial news as our data sources and discuss a new issue not appearing in the literature to the best of our knowledge.

2.1 The Discussion of IFRS Adoption

2.1.1 IFRS Benefits

Extant literature generally confirms the beneficial effect of IFRS adoption (e.g. Barth et al. 2008; Daske et al. 2008; Armstrong et al. 2010). Barth et al. (2008) examine whether application of IFRS is associated with higher accounting quality. Using a sample from 21 countries, they find that firms applying IFRS generally incur less earnings management, more timely loss recognition, and more value relevance of accounting amounts and that there is an improvement in accounting quality between the pre- and post-adoption periods. Daske et al. (2008) indicate that a company's adoption of IFRS creates strong economic benefits in countries with rigid regulation over financial reporting. These benefits include an increase in the stock's market value, an increase in market liquidity, and a lower cost of capital. Furthermore, firms with major differences between GAAP and IFRS standards show the greatest benefit when supported by a strong regulatory environment. These findings suggest that strong enforcement of reporting standards not only enhances transparency for investors but also increases the market position of adopters.

Hail, Leuz and Wysocki (2009) summarize the potential benefits of adoption as "greater market liquidity, a lower cost of capital and a better allocation of capital." Financial reporting comparability will also likely be enhanced. Additionally, the research reveals that multinational firms will receive a cost savings as they will no longer have to report under several sets of standards. On the negative side, studies suggest that a major impact will be the cost of transition to IFRS. According to research, the

benefits to U.S. investors may not exceed costs. Additionally, due to U.S. GAAP's high standards, financial reporting improvements will be minor.

2.1.2 Arguments of IFRS Adoption

Some research argues that the accounting standard setting bodies should focus on enhancing IFRS adoption reporting incentives as adopting common rules is insufficient to create a common business language (Jeanjean & Stolowy 2008). Kaserer and Klinger (2008) question the widespread belief that a true and fair view accounting approach provides better quality financial statements. They show that for German firms that used IFRS or US GAAP, their earnings were more associated with prior-year cash flows than with prior-year accruals. For those firms that followed German GAAP, there was no difference between earnings persistency of accruals and cash flows. They argue that true and fair view accounting, which relies on difficult-to-verify information, may not be suitable to improve accounting information quality in the context of weak corporate governance system. Chua and Taylor (2008) argue that extant evidence in support of IFRS has more to do with the manner in which standards are enforced than differences in the standards themselves and that there is lack of evidence to support the view that financial statement under different accounting regimes lack comparability.

Beneish and Yohn (2008) examined prior research related to home bias to predict the effect of IFRS adoption on investments in foreign equities by domestic investors. Their work suggests that the effect will be small, largely due to "home bias". Home bias is the idea that shareholders favor domestic over foreign investments, preferring the certainty and familiarity of financial information available from domestic firms. In addition, investors feel they have a greater understanding of domestic financial reporting, which enhances their decision making. Investors perceive a higher risk associated with foreign investments due to numerous factors, including differences in financial accounting standards, uncertainty about financial statement quality, and a lack of familiarity with anticipated future cash flows.

2.2 The Discussion of Financial Reports

To respond to the information needs of readers of financial statements, it is essential that financial reports should communicate clearly and effectively to outside users and that understandability is one of the most important characteristics of effective reporting (Courtis 1998; Schroeder & Gibson 1990). The complexity of a written document and the ability of users to interpret the meanings in an appropriate manner affect the usefulness of accounting information in making investment decisions. Therefore, to ensure successful communications between readers and preparers, users of financial reports need to understand the financial information. Prior literature concludes that financial reports are generally difficult to read with long sentences and syllable words and that large firms tend to provide less readable notes than small firms (Courtis 1995; Courtis 1998). When communicating to outsiders through semi-annual reports, clearer and more readable notes assist unsophisticated investors to interpret the information and enhance their understanding of the company.

2.2.1 Factors Affecting Disclosures Financial Reports

Meek et al. (1995) examine factors influencing the voluntary disclosures of three types of information (strategic, nonfinancial, financial) contained in the semi-annual reports of multinational corporations (MNCs) from the U.S., U.K. and Continental Europe. They discuss the factors such as company size, country (region) of origin, industry type, leverage, multi-nationality, profitability and international listing status. The result shows that company size, country/region, and international listing status are the three most important variables explaining the voluntary disclosures. Besides, industry appears to be influential in some cases. Firms in the oil, chemicals and mining industry seem particularly inclined to provide nonfinancial information, such as those related to the environment. Further, the other three independent variables do not appear to be significant in explaining voluntary semi-annual report disclosures.

Liu and Taylor (2008) provide Australian evidence on both the extent and key determinants of discretionary disclosure in company annual reports of information about top executives' share rights,

options and termination entitlement. The executive remuneration disclosure is obtained from the content analysis of annual reports of 191 Australian listed firms for the years 2003 and 2004, prior to a more detailed prescriptive regulatory environment occurring in this area when IFRS becomes effective in 2005. They test the relationships between the extent of remuneration disclosure and the following variables: shareholder activism, media attention, company size, board composition and existence of a remuneration committee and find out there are significant relationships between these determinants and the extent of disclosures of rights, options and termination benefits of executives. These results suggest that, under a relatively unregulated environment, corporate management will react to community and shareholders' expectations by revealing personally sensitive information when their company is placed in a situation of higher shareholder and public scrutiny and when it is structured to meet expectations of good corporate governance.

Miller (2002) finds an increase in disclosures during the period of increased earnings and this increase is pervasive across all types of disclosure and the market responds positively to these disclosures. From a survey of 98 preparers, Ho and Wong (2003) find that preparers of financial statements are more inclined to satisfy the information needs of external institutional finance suppliers than those of individual investors and financial analysts or stockbrokers. CFOs and CEOs have more influence on corporate disclosure policies and decisions than board chairmen and company directors. Ho and Wong (2003) suggest instead an improvement in investor relationships, developing more industry-specific disclosure guidelines and more voluntary disclosures could reduce the communication gap between management and outside investors and improve market efficiency.

2.2.2 *Disclosure Quality*

Beretta and Bozzolan (2008) discuss the quantity and quality of disclosure. They find that empirical studies do not make a clear distinction between quantity and quality: it is generally assumed that the quantity of information disclosed has an implication in determining the quality of disclosure. Therefore, measures of the quantity of disclosure are used as proxy for disclosure quality. Kothari et al. (2009) also indicate that empirical measures of disclosure quality are likely influenced also by disclosure content. Studies based on subjective ratings refer to analysts' ranking of disclosure quality provided by the Association of Investment Management and Research (AIMR). The AIMR database collects the results of annual surveys that rank firms according to the amount of disclosure provided via annual reports, quarterly reports and other published information, such as press releases and direct communications with analysts. Overall disclosure is evaluated by industry subcommittees that are made up of financial analysts (Beretta et al. 2008). Byard and Shaw (2003) examine how the quality of corporate disclosures impacts the precision of information that financial analysts incorporate into their forecasts of annual earnings. The proxy for corporate disclosure quality is also AIMR. Bens and Monahan (2004) examine the valuation implications of differences in firms' disclosure practices for a set of firms that are diversified by line of business. They also apply AIMR ratings as a measure of disclosure quality. However, Beretta et al. (2008) have described that this approach has two main drawbacks (Healy & Palepu 2001): the database includes only U.S. firms, and the overall score is based on the analysts' subjective judgment. Moreover it is not clear to an external user how the final score, and therefore the rank, is obtained.

In contrast to prior studies, a dictionary for opinion analytics and sentiment analysis is developed by a team of accounting professors and accounting graduate students. This study adopts a set of features extracted from the repository of news articles and financial reports using text-mining and statistical methods as the measure of disclosure quality.

3 RESEARCH APPROACH

This study uses three main industries in Taiwan that are semiconductor manufacturing industry, financial and insurance industry, and biotechnology industry that represent 80% of the capital market. The semiconductor manufacturing industry is the aggregate collection of firms engaged in the design and fabrication of semiconductor devices. The annual productivity of Taiwan Semiconductor Industry (TSI) occupies twenty percent of the Globe Semiconductor Industry (GSI) which is about NTD\$1.65

trillion dollars in 2012. Financial and insurance Industry encompasses a broad range of organizations that manage money, including credit unions, banks, credit card companies, insurance companies, accountancy companies, consumer finance companies, stock brokerages, investment funds and some government sponsored enterprises. The annual productivity of Taiwan financial and insurance industry is about NTD\$900 billion dollars in 2012. Biotechnology industry is the aggregate collection of companies engaged in the use of living systems and organisms to develop or make useful products, or any technological application that uses biological systems, living organisms or derivatives thereof, to make or modify products or processes for specific use. The annual productivity of Taiwan biotechnology industry is about NTD\$800 billion dollars in 2012. The firm list of these industries is taken from the website of Taiwan Stock Exchange (TSE). In 2013, there are 72 listed firms in semiconductor manufacturing industry, 38 listed firms in financial and insurance industry, and 57 listed firms in biotechnology industry.

Comparing and characterizing accounting-standard regimes, IFRS are typically labelled as principle-based standards. The convergence and subsequent change of accounting and reporting standards at the international level impact a number of constituents, including corporate management, investors, stock markets, accounting professionals and accounting standards setters and agencies. Since IFRS were drafted in part to create a single governing standard that firms around the world can follow in their accounting. It is believed financial report users can have a better understanding and comparability of a company on the same level. Many countries already have their own generally accepted accounting principles (GAAP) that achieve this, but on a limited, jurisdiction-specific basis. One of the biggest potential advantages of IFRS is the creation of a uniform set of information transparency and reporting procedures that does not change from place to place.

We develop the research approach to introduce the opinion analytics to examine the gap between semi-annual reporting and its follow-up news in the first year of IFRS mandatory adoption. We manually collect the 2013 consolidated Chinese semi-annual reports published by Taiwan 167 listed firms and financial news directly related to these reports. The news sources are from the Knowledge Management Winner (KMW) database that is marketed and maintained by the largest financial news group in Taiwan. The KMW is the largest news database composed of China Times, China Times Express and Commercial Times. We select the news in five focal areas, that is, the areas of industry, science and technology information, economy and trade, investment and wealth management and finance. The financial news stories published during an eight-day period from the financial reporting release date to seven days after that date are collected. The number of available news stories is 68, including 26 items in semiconductor manufacturing industry, 19 items in financial and insurance industry, and 23 items in biotechnology industry.

The team of professors and graduate students read the textual content of financial reports and the follow-up news. They score each news story based on the amount of extra information disclosed in financial news yet in financial reports. If three students score a news story at different points, they further discuss the difference between their opinions to reach a consistent point. The scoring criteria are summarized as follows:

- (a) Financial news corresponds to the financial reports and extends the reports.
- (b) Financial news corresponds to the financial reports and provides the cross-year or cross-firm or cross-industry analysis.
- (c) Financial news corresponds to the financial reports and provides further information to explain the notes in the reports.
- (d) Financial news corresponds to the financial reports and provides opinions on the effect on stock trends.
- (e) Financial news corresponds to the financial reports and provides further information about earnings, investments, merger and acquisition, management changes, headquarters changes, and accounting method changes.

An example is displayed in Figure 1. In this example, the article is scored two points (marked in yellow). The first point meets the criterion (e). It describes that the company purchases a new factory. The second point meets the criterion (a). In the last paragraph of the article, it provides additional information without being mentioned in financial reporting. We score financial news stories to

compare their information value with the disclosure quality of financial reporting, and further investigate the effect of IFRS on financial reporting and news.

13/12/13

中時報系新聞資料庫

中時報系資料庫

寄給朋友 列印

2013/08/15 - [工商時報/上市櫃2/B4版]

葡萄王Q2獲利新高 法人挺 稅後盈餘連4季創單季新高，上半年EPS 2.87元，券商調高目標價

【記者杜蕙蓉／台北報導】

葡萄王(1707)第二季獲利再獲捷報，稅後盈餘超過2億元，連四季 創單季新高，季增率與年增率分別為16%及45%，上半年每股稅後盈餘也以2.87元交出歷史同期新高紀錄。外資CZMB和元大證券看好該集團在傳銷市場佈局，分別給予155和180元目標價。

營運持續創新高的葡萄王，上半年保健食品的營收占比已達93%，除了母公司靈芝、樟芝系列銷量成長外，來自子公司葡眾的挹注依舊 高佔7成以上。由於保健食品占比增加，第二季毛利率續揚至88.07% 的衝高水準，累計上半年稅後盈餘3.74億元，年成長率29.96%。

由於營運穩定成長，元大投顧預估，葡萄王今年營收將達56.49億元，稅後盈餘7.17億元，每股稅後盈餘5.5元，而該股昨日股價小跌，以139.5元坐收。

葡萄王集團由於業務蒸蒸日上，繼斥資4、5億元興建平鎮新廠後，近日又以32.5億餘元買下太子建設在內湖興建的大樓。

葡萄王執行副總曾盛麟指出，內湖大樓除了保留一層做為葡萄王母公司台北總部辦公室外，其餘層樓為葡眾的營運總部，該大樓預計明年7-8月交屋，2015年可正式進駐。

展望下半年業績，葡萄王表示，葡眾今年7月已調漲多數產品報價，平均漲幅一成，雖然7月葡眾的營業額相較去年還有約三成的成長，但因4-7月是會員衝等級調升的旺季，可能還無法完全反映漲價影響，此漲價需求效應要到8、9月才會有比較明顯變化。另外，該公司下半年已確定排入上市的新產品，包括面膜及雅雅軟膏升級版，加上也開始佈局東南亞市場，初期仍只是微量以原料試水溫，業績要有大規模貢獻，還要一些時間。

本新聞內容由--時報資訊股份有限公司--取得合法授權。除經本公司同意，本網站僅供您個人及非商業目的之使用。您不得修改、拷貝、散佈、傳送、展示、執行、授權、製作衍生著作、移轉或銷售取自於本網站之任何資料、軟體、產品或服務。

Figure 1. A demonstration of how to give a score for the information in a news story

The news media de facto influence stock prices to some extent. There is also evidence that investors are not only subject to the sentiment of related news articles but also the public opinions. We are interested in why investors prefer to use the news media to make decisions than financial reporting. In this study, we not only score the financial news to examine the disclosure quality relative to the financial reporting, but also assess the effect of financial news on the stock price movements after the adoption of IFRS. If the gap of disclosure quality between financial reporting and news is narrow and the effect of the news corresponding to financial reporting on stock price movements is significant, we can deduce that the adoption of IFRS can help investors predict the financial performance of a company more accurately.

In this study, we specify a dictionary which includes names of listed firms of 2013, finance-specific and accounting-specific words and sentimental words. The finance-specific and accounting-specific words are built based on the specialized knowledge of three accounting graduate students. The way of building sentimental lexicons is based on Lin and Chen (2013). We use chi-square test to extract important features which can discriminate between positive news and negative news. Based on these features, we assign a sentiment label to each news story, i.e. positive news and negative news, by comparing the number of positive words with the number of negative words in each news story. Then, the relationship between the polarity (positive or negative) of news and movements of stock prices can be established using statistical methods.

4 RESEARCH RESULTS

Table 1 shows the average scores of news in three different industries. The table also presents the number of companies having available financial news, and lists the total number of news in each considered industry. The average scores in Table 1 reveal that the information value added by news corresponding to financial reporting is relatively limited in the first year of IFRS full mandatory adoption. We are going on creating a program for automatically scoring the financial news. It expect that opinion analysis can be done through an advanced and developed computer software program to replace the labour-extensive labelling by human experts.

	Semiconductor industry	Financial and insurance industry	Biotechnology industry	Total
The number of listed firms	72	38	57	167
The number of listed firms having financial news concerning financial statements	20	14	14	48
The number of financial news	26	19	23	68
Average score	1.62	1.05	0.83	

Table 1. Scoring financial news related to financial reporting .

Opinion analysis is conducted to investigate the effect of IFRS on financial reporting and financial news. We focus on sentimental words in the analytics of opinions. The team of professors and graduate students manually process each word appearing in the news story as if it is positive or negative based on the word meaning in the context. Then, they further categorize the news story into positive, neutral or negative news. The above-mentioned work is also executed by ourselves-created software program. The data pre-processing steps of the program are shown in Figure 2. The performance of data analysis is significantly dependent on, among all steps, an appropriate data pre-processing. Hence, in the data pre-processing steps we remove punctuation marks, URLs of the web pages, and all whitespace and auxiliary words at the start and end of each news story. Next, we parse each sentence using the Jieba Chinese words segmentation utility and remove digits and the words of length one. After that, we extract all positive and negative words and then transform the textual results into numerical data based on the selected features. The selected features are determined by chi-square method.

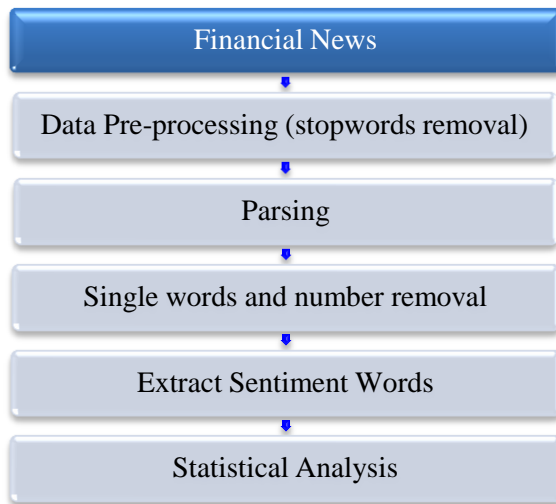


Figure 2. Flowchart of the program analysis framework

We calculate the numbers of positive words and negative words in each news story through human-aided and computer-assisted method and plot results in Figure 3(a)-(c) respectively for semiconductor industry, financial and insurance industry, and biotechnology industry. Abbreviations in Figure 3 are explained as follows: ‘Pos.’ represents the number of positive words per news story. ‘Neg.’ represents the number of negative words per news story. ‘Hum.’ and ‘Com.’ represent that all of the analysis are done using human-aided and computer-assisted methods, respectively. In Figure 3(b), we find that the numbers of positive words calculated by two methods are nearly the same for per news story. This result also appears in the case of negative words, except two news story numbered 13 and 14. Figures 3(a) and 3(c) reveal that the two methods yield very similar estimates of the number of negative words for per news story, but the computer-assisted method tends to detect more positive words compared to the method of human judge. The Pearson's correlation coefficient between the numbers of positive words per news story measured by human-aided method and computer-assisted method is 0.90. And, an extremely high correlation coefficient between two kinds of method for counting the number of negative words exists. It is 0.92.

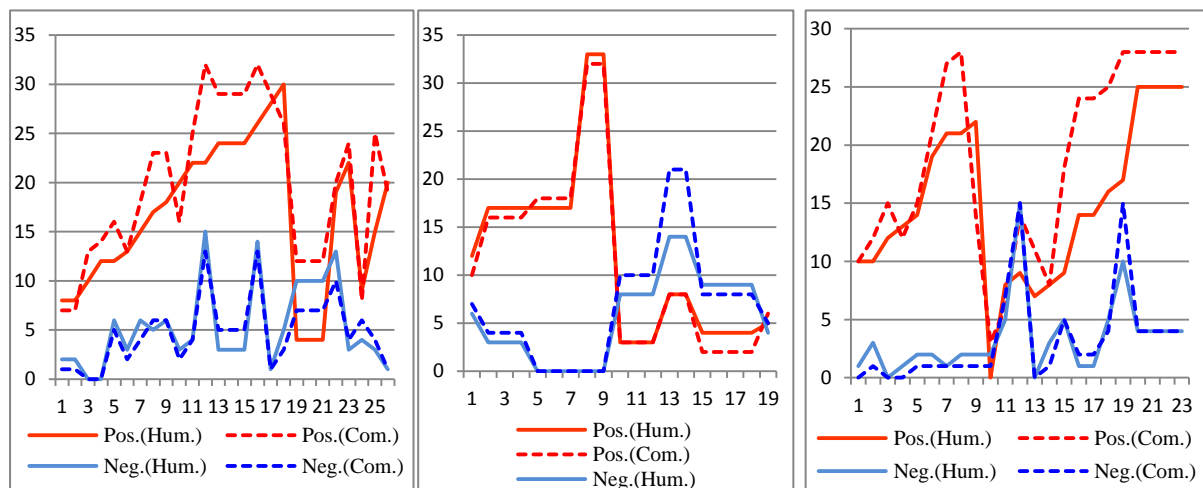


Figure 3(a). semiconductor Figure 3(b). finance and insurance Figure 3(c). biotechnolo

In this study, we not only calculate the numbers of positive words and negative words in per news story, but also score each news story and classify all news stories into three groups (positive news, negative news and neutral news) by human-aided method and computer-assisted method. In the process of manually classifying news stories, we find that there are more positive (negative) words in positive (negative) news than that in negative (positive) news. Hence, we develop a program to automatically construct polarity-tagged news based on the numbers of positive and negative words.

As far as we understand, the phi coefficient between two methods for categorizing the polarity (positive or negative) of news stories is 0.56. Although our results suggest that there is still significant room to improve, these results show that our method seems to be promising and they also stimulate our interest in the computer-assisted method. We hope that these findings can predict the firms' financial performance more effectively.

5 CONCLUDING REMARKS

This study addresses the issue of disclosure quality and IFRS mandatory adoption by investigating the impact of IFRS adoption on the content of the semi-annual reports and financial news. We adopt opinion analytics and sentiment analysis techniques to investigate whether there is any difference in the quality of disclosures of financial reporting and financial news in the high-tech, financial service, and bio-tech industry sectors.

This study adopts different techniques, such as text analytics, to evaluate the disclosure quality of semi-annual reports and sentiment analysis which aims to shed light on whether the adoption of IFRS is related with the disclosure quality of the semi-annual reports and financial news. This study focuses on high-tech, financial service, and bio-tech sectors as these companies tend to have greater information asymmetry between management and outside investors. Little prior studies have focused upon the effect of the first year's IFRS mandatory adoption on the disclosure quality of the semi-annual reports when firms are facing different degree of asymmetric information and the findings of this study fill this void. Results are promising and show that the disclosures have relationship with the IFRS first adoption.

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