THE ECONOMIC CONSEQUENCES OF FINANCIAL REPORTING ON TWITTER

Feng Xiong

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Queensland University of Technology

Principal supervisor: **Professor Ellie Chapple**

Associate supervisor: **Professor Kerrie Sadiq**

Associate supervisor: **Dr. Acklesh Prasad**

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Abstract

Financial reporting on *Twitter* has become an important corporate disclosure practice. Previous literature has established the association between corporate disclosure/financial reporting on *Twitter* and the reduction of information asymmetry. However, the stock market reaction mechanism following financial reporting on *Twitter*, including how long it takes the stock market to react to such financial reporting tweets and the scale of reaction, is still unclear. An understanding of this stock market reaction mechanism is essential to comprehend how the stock market digests financial reporting on *Twitter*. This study's main aim is to investigate how the stock market translates financial reporting on *Twitter* into the stock market's information environment.

This study investigates ASX 500 companies and is presented in three parts. Firstly, this study examines companies' adoption patterns of *Twitter* for financial reporting, followed by a review of the financial reporting content on *Twitter*. Secondly, this study constructs financial reporting event periods to compare the stock market reaction following financial reporting tweets. Thirdly, this study discusses prior controversial instances of financial reporting on social media, to highlight the regulatory challenges ahead. This study outlines the challenges of financial reporting on social media and provides suggestions accordingly.

The major findings of this study are presented as follows. First, the innovators and early adopters of *Twitter* for financial reporting are more likely to be ASX companies with larger market capital size and from industry sectors that are closer to technology. Second, this study presents the stock market reaction mechanism following financial reporting on *Twitter*, with findings suggesting that ASX

companies with small market capital size, and those that disclose multiple financial reporting tweets, could receive greater benefits in reducing information asymmetry from financial reporting on *Twitter*. This study contributes to the literature by providing insights on the stock market and regulatory impact when companies use social media tools like *Twitter* for financial reporting. Furthermore, this study expands the implications of diffusion of innovation theory and agency theory, and contributes to the corporate disclosure and social media literature. For regulators and industry practitioners, this study provides new evidence to inform regulatory policy and promote 'best practice' guidelines for financial reporting on social media.

Table of Contents

List of Figures

List of Tables

List of Abbreviations

ACCC   Australian Competition and Consumer Commission

ASIC   Australian Securities and Investments Commission

ASX   Australian Securities Exchange

DJIA   Dow Jones Industry Average

DJS   David Jones Ltd

EBPE   EB Private Equity

ICT   Information and Communication Technologies

IFR   Internet Financial Reporting

RegFD   Regulation Fair Disclosure

U.S.FINRA   United States Financial Industry Regulatory Authority Inc.

U.S. SEC   United States Securities and Exchange Commission

XBRL   eXtensible Business Reporting Language

Glossary

Bid-ask spread   This is the difference between bid price and ask price of a share. In a typical share market, investors propose the bid price and ask price that they are willing to buy and sell the share. For example, a seller may think the share he/she owns is worth $10 (ask price) while the buyer thinks it is only worth $9 (bid price). In this case, the bid-ask spread is $1. This bid-ask spread has been widely used as a proxy of information asymmetry, to represent the difference of investors' expectations towards the ideal share price (Leuz & Verrecchia, 2000).

Depth of share   This is the size of the trading order at each level of share price. For example, a buyer wants to buy 1000 shares of Commonwealth Bank of Australia at the price of $65 and this is the only buyer at the price of $65. Then the depth of share at the bid price of $65 is 1000. This depth of share has been used as a proxy of liquidity and also information asymmetry (Blankespoor, Miller, & White, 2014).

Financial reporting   Financial reporting is considered one type of corporate disclosure, which refers to the financial information as disclosed to stakeholders. Financial reporting discusses a company's financial performance. In this study, financial reporting on *Twitter* contains selected financial keywords and discusses a certain type of financial reporting.

High-visibility companies   The term 'high-visibility companies' represents companies that traditionally attract greater media coverage, in comparison to other lesser-known competitors in the same industry. One potential reason for greater media coverage may be because the larger market capital size of high-

	visibility companies attract a larger readership of any media coverage (Blankespoor et al., 2014).
Information asymmetry	This represents different information levels between stakeholders. According to Jensen and Meckling (1976), the existence of the agency relationship between principal (investor) and agent (manager) creates barriers of information between principal (investor) and agent (manager), as the manager holds more information about the firms' performance and not all information is disclosed to the investor. This eventually leads to information asymmetry between investor and manager (Jensen & Meckling, 1976).
Low-visibility companies	The term 'low-visibility companies' represents companies that traditionally attract limited media coverage, in comparison to other well-known competitors in the same industry. One potential reason for a lack of media coverage may be because the small market capital size of low-visibility companies attract a limited readership of any media coverage (Blankespoor et al., 2014).
Share trading volume	This represents the number of shares that have been traded during a specific time interval. For example, during a 15 minute interval, a buyer and a seller agree to trade 1000 shares at the price of $65 and another pair of buyer and seller agree to trade 500 shares at the price of $60. Then the share trading volume of this 15 minute interval is 1500. Share trading volume has been recognised as a proxy of information asymmetry, as investors are more likely to trade when the information asymmetry is reduced (Leuz & Verrecchia, 2000).

Statement of Original Authorship

The work contained in this thesis has not been previously submitted to meet requirements for an award at this or any other higher education institution. To the best of my knowledge and belief, the thesis contains no material previously published or written by another person except where due reference is made.

Signature: QUT Verified Signature

Date: March 2017

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Chapter 1: Introduction

Today, Twitter Inc.™ [1] (*Twitter*) represents an important part of the corporate disclosure environment (Blankespoor et al., 2014). As one of the most popular social media platforms (Rodgers, 2015), *Twitter* encourages users to obtain and share information instantly. In this setting, *Twitter* users interact with others through the production and consumption of information. Users follow or are followed by other *Twitter* users, and thus build up their own online community or network (Magro, Ryan, Sharp, & Ryan, 2009). In just 140 characters per post, *Twitter* has been used for many different business purposes, including marketing, customer service, and financial reporting (Case & King, 2011; Prokofieva, 2015).

Focusing on financial reporting on *Twitter*, this study investigates corporate disclosure on *Twitter* that represents companies' financial performance. These financial reporting tweets contain financial keywords and discuss certain types of financial reporting information. This study is conducted in three different stages (see Figure 1.1 for reference). The first stage of this study reviews the nature and extent of financial reporting on *Twitter*, including the characteristics of companies who use *Twitter* for financial reporting and the types of financial reporting information that are discussed on *Twitter*. The results from the first stage construct the initial sample of financial reporting on *Twitter*. Using this sample, the second stage examines the economic consequences (changes of information asymmetry level) following these financial reporting tweets. As this study examines the social media posts of ASX

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[1] Twitter™ is one of the most popular social media platforms. Its mission is to give everyone the power to create and share ideas and information instantly, without barriers. It has 320 million active users, and 1 billion unique visits of tweets. It is managed by Twitter Inc. For the rest of this thesis, the expression '*Twitter*' is used to represent this specific social media platform (Twitter Inc., 2016).

listed companies, it reveals the role of *Twitter* for financial reporting and how financial reporting on *Twitter* reduces stock market information asymmetry. The third stage of this study reviews stage two results in combination with previous literature and documents financial reporting incidents in order to suggest key elements for industry practitioners and regulators regarding better practice and regulation of financial reporting on social media.

Stage 1 • Exploration of the nature and extent of financial reporting on *Twitter*;

Stage 2 • Examination of economic consequences of financial reporting on *Twitter*;

Stage 3 • Provide suggestions for industry practitioners and regulators regarding better practice and regulation of financial reporting on social media.

Figure 1.1. **The three stages of this study**
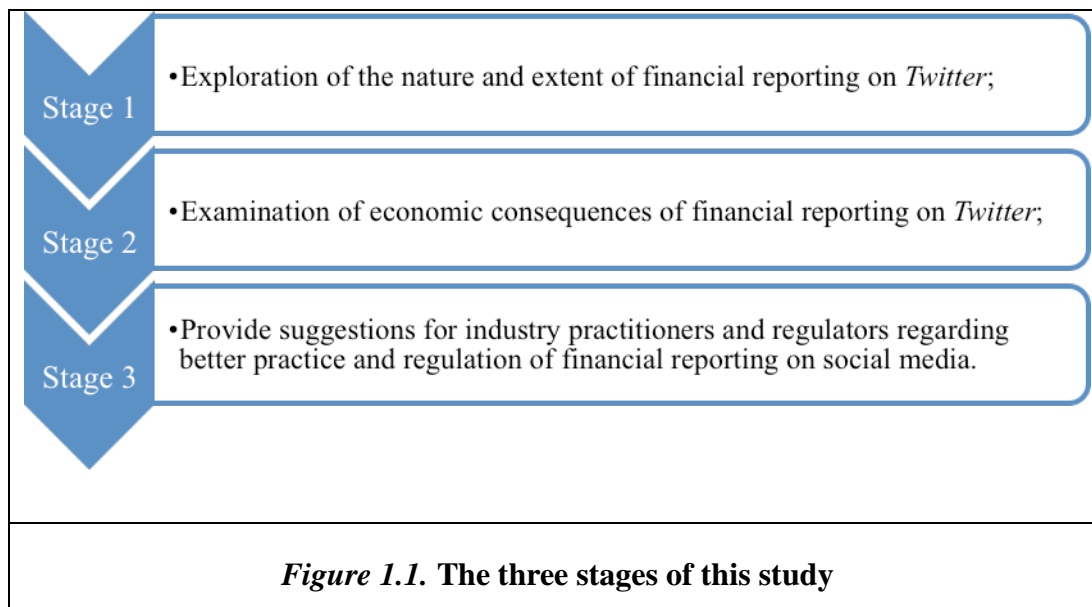
This chapter outlines the background of business use of *Twitter* (Section 1.1), the challenges of business use of social media (Section 1.2), and financial reporting regulation of social media in Australia and the United States (Section 1.3). Section 1.4 discusses the research problem, research questions and research objectives. Section 1.5 explains the research motivation; Section 1.6 describes the contributions and significance of this research; and Section 1.7 provides a summary of results. Finally, Section 1.8 outlines the remaining chapters of this thesis.

1.1 THE BUSINESS USE OF *TWITTER*

Each day, there are more than 1 billion posts (called 'tweets') on *Twitter* (Twitter Inc., 2016). Due to the new information environment created by *Twitter* use, *Twitter* is valuable to business via two main aspects. First, *Twitter* establishes a communication channel between company and stakeholder where companies disclose a range of information including marketing, job advertising, and answering consumers' enquiries (Xiong & MacKenzie, 2015). Recently, *Twitter* use has expanded to financial reporting. In Australia, low-visibility ASX companies use *Twitter* as a corporate disclosure channel to spread information to wider audiences during the ASX announcement period (Prokofieva, 2015). Second, *Twitter* contributes to the volume of information available to stakeholders and the public that aids the execution of informed business decisions. For example, *Twitter* and IBM claim that their partnership provides a rich information landscape contributing to the development of tailored business applications and solutions (Kanaracus, 2014). Furthermore, this rich information landscape on *Twitter* has attracted attention from researchers investigating whether the sentiment and content of *Twitter* affects or predicts stock market movement (see, for example, J. Bollen & Mao, 2011; Rao & Srivastava, 2012; Zhang, Fuehres, & Gloor, 2012). The utility of an established communication channel that can yield a rich information landscape is both attractive and valuable to businesses.

1.2 THE CHALLENGES OF BUSINESS USE OF SOCIAL MEDIA

Twitter use is advantageous because it is low cost and highly efficient (Etter, 2013). There is minimum start-up required to open a *Twitter* account and *Twitter* allows quick communication with stakeholders. However, there are also accompanying challenges of *Twitter* use: unexpected comments from other users (J. Lee, 2012), lack

of on-time response to rumours, and social media account hacking leading to false information (Knibbs, 2013). These challenges impose the cost of constant monitoring of the information on *Twitter* and other social media platforms. Companies are expected to respond to these challenges in a reasonable timeframe. If companies choose to adopt *Twitter* for financial reporting, they need to be aware of, and comply with, existing guidance and regulations.

In 2012, in an incident involving consumer interaction, Victoria Bitter, an Australian beverage company, failed to respond to an inappropriate comment on its social media page. In the follow-up investigation held by the Australian Competition and Consumer Commission (ACCC), Ms Sarah Court, the then commissioner of the ACCC, commented that organisations should respond quickly to social media comments (J. Lee, 2012). When asked for further comment, she also suggested "if you are a big corporate player with lots of resources that's putting a lot of effort into social media then it wouldn't have to be too long. Perhaps 24 hours or less" (J. Lee, 2012). This incident sheds light on one of the challenges that companies face when they use *Twitter* for consumer interaction: the absence of control over the content that other *Twitter* users post. Even though this incident is related to consumer interaction, it has implications for the practice of financial reporting on *Twitter*. The response of the ACCC represents the regulator's attitudes and expectations. Therefore, companies using *Twitter* for financial reporting may be under the same or even stricter expectations (Australian Securities Exchange, 2015b).

There have been a few cases, involving both unexpected and expected company information dissemination on social media, which have significantly impacted stock market movement. While these cases occurred on different social media platforms, they present similar challenges to those faced by companies when they use *Twitter*

for financial reporting. One example involves David Jones Ltd (DJS), an established Australian retailer. Between 29th June and 2nd July 2012, the stock price of DJS experienced volatility with more than 20% fluctuation. This stock price fluctuation was initiated by a surprise takeover bid offer (takeover) from EB Private Equity (EBPE) (Ryan, 2012). The news of this takeover first broke on social media, and DJS was accused of a slow response to this information, which led to the following substantial stock price fluctuation (Walters & Robin, 2012).

In July 2012, a second case of financial reporting on social media involves an executive member of Netflix Inc. (Netflix), an online media viewing website. Reed Hastings was the then CEO of Netflix, and he posted company news regularly on his personal social media page. Following his post about Netflix's breakthrough of 1 billion monthly viewing hours, the stock price of Netflix rallied on a 6.2% advance, which resulted in a 13% increase over the week (Russolillo, 2012). This incident attracted attention from the Securities and Exchange Commission (SEC), the U.S. securities regulator. On the 5th December 2012, the SEC issued a 'Wells Notice' indicating their intention to "recommend to the SEC that it institute a cease and desist proceeding and/or bring a civil injunctive action against Netflix and Mr Hastings for violation of the Regulation Fair Disclosure (RegFD)" (Securities and Exchange Commission, 2012, p. 2).

The third case concerns the dissemination of false information through hacking of a *Twitter* account that initiated unexpected stock market movement. On 23rd April 2013, $136 billion of the market value in the New York Stock Exchange vanished in just two minutes and the Dow Jones Industry Average rebounded one percent in 10 minutes. This dramatic stock market movement was attributed to the hacking of the Associated Press's (a top news agency in the U.S.) *Twitter* account. A false news

story reporting 'a bomb exposed in the White House and the president was injured' triggered this significant short-term fluctuation in the stock market (E. Lee, 2013).

The above cases reveal the different challenges from various business uses of *Twitter*, including consumer interaction and information dissemination. Traditional media has attributed the disclosure of financial-related information on social media to be a cause of significant market fluctuation. As financial reporting is under strict regulation, a brief review of the current regulation for financial reporting is warranted.

1.3 FINANCIAL REPORTING REGULATIONS ON SOCIAL MEDIA IN AUSTRALIA AND THE UNITED STATES

The Australian Securities Exchange (ASX) is the largest (and major) stock exchange in Australia. ASX listed companies are required to follow the continuous disclosure regime when they have material price sensitive information (such as financial reporting information). In the U.S., listed companies are required to follow the RegFD regime, which aims to achieve fairness regarding the spectrum of information available to the general public (Securities and Exchange Commission, 2013a). According to the size of trading volume, the world's largest two stock exchanges are in the U.S., representing more than 50% of the global top 10 securities markets' trading volume (Statista, 2013). Social media platforms including *Twitter* were first designed and developed in the U.S. Therefore, a review of U.S. regulations for financial reporting on social media, together with a parallel investigation in Australia, will contribute to better understanding of effective and productive use of *Twitter* for financial reporting.

In Australia, the continuous disclosure regime requires ASX companies to immediately disclose material information to ASX, once the company is or has become aware of such information (Australian Securities Exchange, 2015b). Material

information is defined as any information that a reasonable person would expect to have a significant impact on the price or value of the entity's securities (Australian Securities Exchange, 2015b). The Corporations Act 2001 Chapter 6CA (Section 674-678) and ASX Guidance Note 8 further clarify the continuous disclosure requirement (Quilter, 2013). Companies are required to send the material information to ASX and wait until their material information announcement has been accepted by the ASX and published on the ASX Market Announcement Platform, before they can disseminate such information more widely. Similarly in the U.S., listed companies must ensure that material and non-public information is disseminated in a manner that is 'reasonably designed to provide broad and non-exclusionary distribution of the information to the public' (Securities and Exchange Commission, 2013a, p. 7). Otherwise, an 8-K form, including the financial reporting content (both material and non-material information), must be filed with the SEC by the listed company.

The continuous disclosure requirement in Australia means that any financial reporting on *Twitter* will not be new information to the stock market, as all material information must be first released on the ASX market announcement platform before it can be disseminated via other corporate disclosure channels. However, this does not necessarily mean that using *Twitter* for financial reporting is devoid of benefits. Investors may not pay attention to the ASX market announcement platform at all times. Using *Twitter* for financial reporting provides an alternative for investors to obtain financial information.

The research design of this study acknowledges the crucial role of the continuous disclosure regime in Australia in modelling the information environment, particularly how it affects the use of *Twitter* for financial reporting. The ASX announcement is a valuable source of data for this study. For example, the second stage of this study

analyses ASX announcements corresponding to specific financial reporting tweets. The third stage provides recommendations for accommodating financial reporting on social media under the current setting of continuous disclosure regime in Australia.

The different regulatory settings of financial reporting between Australia and the U.S. reflect differing attitudes by regulators towards using *Twitter* and other social media platforms for financial reporting. In Australia, the ASX recommends listed companies consider *Twitter* as simply an information dissemination channel in which companies only place a web link to the relevant release on *Twitter* (i.e. not the direct information itself) after receiving permission from the ASX to further disseminate this information (Australian Securities Exchange, 2013c). Despite this conservative use of social media for financial reporting, ASX listed companies are required to actively monitor social media platforms, especially their social media pages, and be aware of potential leakage of confidential information and market-sensitive rumours (J. Lee, 2012). In contrast, the SEC gives U.S. listed companies permission to disclose price sensitive information on *Twitter* or other social media platforms, provided the listed companies have already advised stakeholders that they intend to use *Twitter* or other social media platforms as the priority disclosure channel. The SEC encourages listed companies to take advantage of the fast pace of social media and disclose material information to a broader audience (Securities and Exchange Commission, 2013b).

Due to the different institutional settings in the U.S. and Australia, it is expected that the market reaction following financial reporting on *Twitter* will be more significant in the U.S. market as compared to the Australian market, as financial reporting on *Twitter* in the U.S. may contain new information that has never been released before. In contrast, ASX listed companies are required to first report all material information

to the stock exchange, and then wait for permission to further disseminate the related financial reporting information in other channels. As the financial reporting posts on *Twitter* are composed entirely of existing (relatively old) information in the Australian market, it is expected that the stock market reaction following financial reporting on *Twitter* in the Australian stock market will be less significant than the U.S.

The results of this study present the reduction of information asymmetry following financial reporting on social media in the Australian market. The results show that even though financial reporting on *Twitter* is composed of existing information, it is still able to improve the information environment of the stock market.

Although the SEC shows an open attitude towards financial reporting on social media, and the U.S. Financial Industry Regulatory Authority Inc. has issued a series of guidance reports regarding communication on social networking websites (Financial Industry Regulatory Authority, 2010, 2011), industry practitioners still have legitimate concerns. These concerns include potential legal consequences following corporate disclosure on social media platforms (including *Twitter*), so practitioners require a continuously updated series of guidelines specifically regarding the use of social media for financial reporting, in addition to the existing financial reporting regulations (Garcia & Conroy, 2013; Sandler, 2013). These concerns from practitioners call for further investigation into instigating changes of the existing regulatory framework to accommodate the current practice of financial reporting on *Twitter* and other social media platforms.

1.4 RESEARCH PROBLEM

1.4.1 Summary of the Research Problem

Anecdotal evidence suggests the increasing business use of *Twitter*, including financial reporting, despite a lack of understanding of this practice. Therefore, a formal investigation of the nature and extent of financial reporting on *Twitter* is warranted. Considering the identified challenges of using *Twitter* for financial reporting as discussed in Section 1.2, an examination of the economic consequences following financial reporting on *Twitter* is essential. This will enable companies to decide whether the benefits of this practice outweigh the challenges, and provide information for regulators to develop informed regulations accommodating this practice. As *Twitter* is a new corporate disclosure channel, there is also a need to consider whether the existing regulatory framework accommodates this current practice of financial reporting on *Twitter* and other social media platforms.

1.4.2 Research Questions

To address the above research problem, this study considers the following research questions:

1. What is the nature and extent of financial reporting on *Twitter* by Australian listed companies?

2. What are the economic consequences of financial reporting on *Twitter*?

3. What are the elements that industry practitioners and regulators should focus on, to achieve better practice and regulation of financial reporting on social media?

1.4.3 Research Objectives

In response to the above research questions, the following research objectives are developed:

1. Search and identify ASX companies with valid *Twitter* accounts.

2. Use data coding framework and thematic analysis approach to filter and collect financial reporting tweets.

3. Use statistical analysis to examine whether companies with specific corporate characteristics are more likely to be innovators and early adopters of *Twitter* for financial reporting.

4. Use thematic analysis approach to categorise financial reporting tweets by financial keywords, financial reporting themes, and sentiments.

5. Based on descriptive statistics, explore whether companies with specific corporate characteristics and preferences in their use of *Twitter* for financial reporting have different financial reporting behaviour, such as the disclosure of specific types of financial reporting information.

6. Use event study methodology to examine whether the level of information asymmetry, as represented by the proxies of bid-ask spread and share trading volume, is reduced significantly following the disclosure of financial reporting information on *Twitter* by ASX listed companies.

7. Compare the results of the current study with previous literature.

8. Discuss previous incidents involving the use of social media to disseminate false financial reporting information and the inappropriate use of social media for financial reporting, which present challenges of financial reporting on social media.

9. Review findings from previous literature and the results from this current study to suggest elements that contribute to better practice of the use of *Twitter* for financial reporting, and may be used to build appropriate financial reporting regulations that accommodate the current practice of financial reporting on social media.

1.5 RESEARCH MOTIVATION

The increasing use of *Twitter* in the business world, especially for financial reporting, establishes a strong motivation for this study. The challenges of financial reporting on *Twitter* warrant investigation into how *Twitter* has been used for financial reporting, the changes in information asymmetry following financial reporting tweets, how this popular corporate disclosure practice could better be managed under the current regulation, and recommendations for future regulation.

Financial reporting is one of many types of corporate disclosure to address information asymmetry and to reduce agency costs[2] (Healy & Palepu, 2001). The agency relation arises from the principal (shareholder) delegating decision-making power to the agent (manager) (Jensen & Meckling, 1976). Due to this separation of ownership and control, Jensen and Meckling (1976) indicate that agency conflict arises when both principal and agent pursue maximum benefits for their self-interests. As Healy and Palepu (2001) further point out, corporate disclosure reduces the agency conflict by allowing the principal to monitor the agent's resource management effort and provides more information for potential investors to achieve an optimal allocation of capital into adequate investment opportunities. Accordingly, as corporate disclosure reduces information asymmetry, it is necessary to identify effective corporate disclosure channels. This study examines *Twitter* as the corporate disclosure channel.

Technological innovation presents a great opportunity in reducing the cost of information dissemination, as well as broadening the supply and access of such information (Healy & Palepu, 2001). For example, the development of corporate disclosure channels began with the traditional annual report in print (Botosan, 1997)

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[2] As Jensen and Meckling (1976) suggested, agency costs include (1) monitoring expenditures by the principal; (2) bonding expenditures by the agent; and (3) residual loss.

and conference calls (Tasker, 1998), and expanded to wider business press coverage by distinct media outlets (Kothari, Li, & Short, 2009; Bushee, Core, Guay, & Hamm, 2010). Recently, information and communication technologies (ICT) have contributed to expanding corporate disclosure channels, for example, Internet Financial Reporting (IFR) (Bui & Sankaran, 2009; Poon & Yu, 2012) and eXtensible Business Reporting Language (XBRL) (Yoon, Zo, & Ciganek, 2011) technologies. At present, social media is attracting attention from both listed companies and financial traders, as companies utilise these fast-speed communication channels for information dissemination and traders use the rich information from these media outlets to predict future stock market movement (J. Bollen & Mao, 2011; Rao & Srivastava, 2012; Zhang et al., 2012). A review of the economic impact of financial reporting on *Twitter* is thus both warranted and timely.

As discussed in Section 1.2, there have been several incidents and cases attributing the use of *Twitter* for financial reporting to a subsequent significant stock market fluctuation. These incidents present the challenges of financial reporting on *Twitter* and other social media platforms, and provide impetus for a review regarding whether the existing financial reporting regulations are adequate to accommodate this current practice. Based on the empirical findings from this present study and previous literature, this study discusses how the current legislative framework can better accommodate this practice and provides suggestions for future regulation.

1.6 CONTRIBUTIONS

This study contributes to the development of literature and related theories. This study also informs professional practitioners and regulators to conduct better practice of financial reporting on social media and to improve regulation that accommodates the current practice. First, this study presents the practice of financial reporting on

Twitter by ASX listed companies. Second, this study reviews the characteristics of financial reporting content on *Twitter*. Third, this study examines the market response mechanism following financial reporting tweets. Fourth, this study articulates the discussion of financial reporting regulation literature. Finally, this study expands the implications of several theories used to develop the predicted observations and hypotheses in the present study.

1.6.1 Research Contributions

Previous literature has investigated the practice of financial reporting on *Twitter*; however, further review of the characteristics of those companies that have adopted *Twitter* for financial reporting and an examination of their financial reporting content on *Twitter* has yet to be undertaken. For example, in a study of ASX 200 companies in the Australian context, Prokofieva (2015) examines and reveals the association between increased disclosure on *Twitter* and reduced information asymmetry. She finds that 55% of ASX 200 companies use *Twitter*. In addition, she finds that not all information on *Twitter* that is disclosed by companies during the ASX announcement period is related to the content of the ASX announcement, and some companies tend to disclose more information than usual during these ASX announcement periods.

In a previous study of U.S. IT firms, Blankespoor et al. (2014) investigate the potential effect of additional corporate disclosure on *Twitter* in reducing information asymmetry. They find that more than 70% of U.S. IT firms' tweets contain hyperlinks, and once firms start distributing news on *Twitter*, they continue using the channel. Moreover, the number of tweets significantly increases during a three-day news event window[3], which is strongly driven by hyperlink tweets. Since Prokofieva

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[3] Blankespoor et al. (2014) use event methodology to examine the effectiveness of financial reporting on *Twitter*. A firm's press release and earnings announcement were considered events in Blankespoor

(2015) and Blankespoor et al. (2014) provide some insights into how companies practise financial reporting on *Twitter*, a further examination of the characteristics of these companies is relevant. This understanding is essential for future regulation, as early regulation may choose to first trial on specific industries that are more willing to adopt this practice. Moreover, a review of the financial reporting content on *Twitter* is needed to understand the financial information that companies are currently disclosing on *Twitter* and to evaluate the relevance of this financial reporting information, both of which are critical for the production of future regulation.

The above discussion of recent literature establishes the literature gap that motivates this study to investigate the stated research questions with the following approaches. This first stage of this study uses statistical analysis to reveal the association between corporate characteristics (including market capital size and industry sector) and the use of *Twitter* for financial reporting. The results reveal potential factors that encourage companies to adopt *Twitter* for financial reporting. It contributes to the literature of technology adoption, as *Twitter* is a social media platform. Furthermore, this first stage reviews the financial reporting content on *Twitter*, through thematic analysis of financial reporting tweets. These results present the types of financial reporting information that companies are more likely to disclose. These contribute to a further understanding of this practice, as well as to the corporate disclosure literature, especially in the domain of *Twitter*.

Previous literature focuses on investigating the association between financial reporting on *Twitter* and the changes in information asymmetry. Using bid-ask spread and depth of share as proxies for information asymmetry, Blankespoor et al.

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et al. (2014) study, from which one day before and one day after such an event constituted a three-day event window.

(2014) find that an increase of tweet volume during the event period is associated with lower bid-ask spread and greater depth of share. However, such a relationship between the additional information dissemination on *Twitter* and the reduction of information asymmetry mainly applies to low visibility companies. To explain this observation, Blankespoor et al. (2014) argue that the traditional information dissemination mechanism pays attention to the big corporates, which means that the financial reporting media outlets tend to give more coverage to listed firms with larger market capital sizes. This is why enhanced disclosure on social media mainly benefits low-visibility companies. In addition, Blankespoor et al. (2014) present that financial reporting on *Twitter* is positively related to the share liquidity.

While Blankespoor et al. (2014) focus on IT firms and the tweets on their *Twitter* accounts, Prokofieva (2015) sets her study in the Australian context, investigating ASX 200 companies and the impacts of tweets from their *Twitter* accounts on the stock market. In this study, Prokofieva (2015) reveals the association between corporate disclosure on *Twitter* and the reduction of information asymmetry. She shows that 'low-visibility' companies benefit more from *Twitter* disclosure, as represented with a larger scale of association between corporate disclosure on *Twitter* and reduced information asymmetry.

Since both of these studies reveal the associations between financial reporting on *Twitter* and the reduction of information asymmetry, an understanding of how the stock market responds to financial reporting on *Twitter,* from the angle of market microstructure, is warranted. The second stage of this study examines the market reaction following financial reporting on *Twitter* by using an event methodology and comparative approach. Such findings enhance the understanding of the role of social media for financial reporting in terms of how it reduces stock market information

asymmetry. It contributes to literature development in market microstructure, especially in the domain of *Twitter*. However, this study does not intend to reveal and discuss the engagement of the investment community on social media.

1.6.2 Theoretical Contributions

In addition to the contributions to literature development in corporate disclosure, especially financial reporting on *Twitter*, this study expands the implications of several theories. First, this study expands the implication of Rogers (2003) diffusion of innovation theory into the social media arena. According to Rogers (2003), the innovators and early adopters of new innovations have greater access to resources and are more familiar with new innovations due to their proximity. Investigating financial reporting on *Twitter*, the results of this study confirm the significant association between market capital size and the adoption of *Twitter* for financial reporting. This study shows that companies from Information Technology and Telecommunication industry sectors are more likely to adopt *Twitter* for financial reporting. Second, the findings of the market reaction mechanism following financial reporting on *Twitter* expand the implications of Fama (1970) efficient market hypothesis. According to Fama (1970), in a semi-strong efficient stock market, the stock market movement follows incoming new information. Through the use of comparative event methodology, this study shows the reduction of information asymmetry following financial reporting on *Twitter*, in the ASX stock market. This finding supports Fama's (1970) discussion.

This study also contributes to the development of research methodology in this topic area. First, this study has developed a financial reporting thematic analysis framework that captures different types of financial reporting information on *Twitter*. This framework is developed through thematic analysis of financial reporting content

on *Twitter* disclosed by ASX listed companies. It can be used for future studies to analyse the changes of financial reporting content on *Twitter*. Second, this study has adopted the comparative event methodology approach that not only expands the research scope of financial reporting on *Twitter* into market microstructure, but also promotes the use of comparative event methodology in future studies.

1.6.3 Practical Contributions

The results of this study benefit a range of stakeholders, including companies that are using or planning to use *Twitter* or other social media platforms for financial reporting, staff members who are responsible for investor relationships or social media management, and regulators.

For companies, this study provides evidence regarding the current practice of financial reporting on *Twitter* that is useful for companies to make informed decisions about future business uses of *Twitter*, including adjustment of their financial reporting strategies to achieve a more efficient outcome. For professional staff responsible for investor relations and financial reporting on *Twitter*, this study presents the potential challenges of using *Twitter* and other social media platforms for financial reporting, enabling professional staff to grasp required procedures in the case of unexpected rumours on social media or unexpected stock market movements. As this study provides a better understanding of these challenges, it will assist more informed management, including clear guidance, to accommodate development of this new financial reporting practice.

For regulators, this present study contributes to the understanding of the use of unregulated technology to disseminate material corporate information. Regulators can make informed decisions when drafting new regulatory framework based on the findings from this present study. The third stage of this study focuses on the current

challenges of financial reporting on social media and whether the existing regulatory framework is adequate to accommodate these challenges. A comparison of different approaches and attitudes towards corporate disclosure on social media between Australia and the U.S. contributes to the development of regulations that fit into the practice of corporate disclosure on social media by Australian companies. At the same time, this discussion of challenges in regulation settings benefits other countries interested in regulating corporate disclosure, including financial reporting on social media.

1.7   SUMMARY OF RESULTS

Referring back to Figure 1.1, the three stages of this study answer the three research questions, respectively. This study examines 5,637 tweets in 191 ASX 500 companies' *Twitter* accounts. Due to a different research methodology approach, previous literature identified 4,516 observations with 85 IT firms (Blankespoor et al., 2014), and 3,516 observations with 109 ASX companies (Prokofieva, 2015), to investigate whether the existence of announcement-related tweets during these event periods change companies' information environment.

In the first stage of this study, the timing of the first financial reporting tweet in each corporate *Twitter* account reveal the continuous trend of *Twitter* adoption for business uses, especially in financial reporting. A review of the corporate characteristics of the ASX 500 companies shows a significant association between *Twitter* adoption for financial reporting and corporate characteristics, including market capital size and industry sector. These findings answer the first research question: 'What is the nature and extent of financial reporting on *Twitter* by Australian listed companies?'

Stage two of this study examines the stock market reaction following 128 ASX announcements with corresponding financial reporting tweets. This study measures the stock market reaction to financial reporting on *Twitter*. The results indicate that the stock market favours more financial reporting information on *Twitter* (instead of less). Consistent with previous literature (Blankespoor et al., 2014; Prokofieva, 2015), this study finds that small market capital size companies benefit in terms of a reduction of information asymmetry from financial reporting on *Twitter*, in comparison to companies with large market capital size. These findings answer the second research question of this study: 'What are the economic consequences of financial reporting on *Twitter*?'

The third stage of this study provides meaningful discussion regarding the challenges of using social media for financial reporting and how current regulations may accommodate this practice. These findings answer the third research question of this study: 'What are the elements that industry practitioners and regulators should focus on, to achieve better practice and regulation of financial reporting on social media?'

1.8 THESIS OUTLINE

Chapter One introduces the thesis, provides the background of this current research topic, the research problem, research motivation, and outlines the research contributions and summary of results. Chapter Two reviews prior literature of corporate disclosure, the economic impact of financial reporting on different corporate disclosure channels, the commercial implications of social media, and recent empirical studies of financial reporting on social media. Chapter Three provides the contextual background to the theories that support this study by detailing the agency theory, information asymmetry, information economic theory, and adverse selection issue. Chapter Three outlines how the theoretical framework is

framed around the research topic of financial reporting on *Twitter* in order to develop two predicted observations and three hypotheses, which assist in answering the research questions. Chapter Four describes the research methodology of this study, including the approach to identify companies' *Twitter* accounts and collect financial reporting tweets, as well as the setup of comparative event methodology. Chapter Five presents the results and findings of this study, as arranged around the three research questions. Chapter Six presents the challenges of financial reporting on social media, beginning with two significant cases/incidents in Australia and the U.S., then discusses the challenges related to financial reporting on social media as developed from these significant cases/incidents. In addition, Chapter Six reviews the findings from previous literature and this current study, together with previous discussion of the related challenges, and provides suggestions and recommendations for industrial practitioners and regulators. Chapter Seven discusses the results and findings, in alignment with key contributions of the study, the applications of theory and practice, the validity and reliability of research methodology, the limitations of this study, and recommendations for future research.

Chapter 2: Literature Review

This chapter first focuses on corporate disclosure (including voluntary disclosure and financial reporting) and the effectiveness of voluntary disclosure on different corporate disclosure channels (including social media and *Twitter*). Based on agency theory (Jensen & Meckling, 1976), this literature review begins with a discussion of corporate disclosure, including mandatory and voluntary disclosure. This is followed by a review of previous studies that examine the effectiveness of different corporate disclosure channels in reducing information asymmetry. In the second part of this chapter, a review of different business uses of *Twitter* is provided, followed by a discussion of relevant literature that investigates the effectiveness of corporate disclosure on *Twitter* in reducing information asymmetry. As shown in Figure 2.1, the review of current literature in this chapter presents the gaps in the literature, which correspond to the research questions.

This chapter reviews literature on the following topics: agency theory and corporate disclosure (Section 2.1); effectiveness of voluntary disclosure in reducing information asymmetry (Section 2.2); the use of *Twitter* in the business world (Section 2.3); and the effectiveness of *Twitter* as a corporate disclosure channel (Section 2.4). Section 2.5 concludes by summarising the literature related to this study.

Figure 2.1. **Outline of literature review**
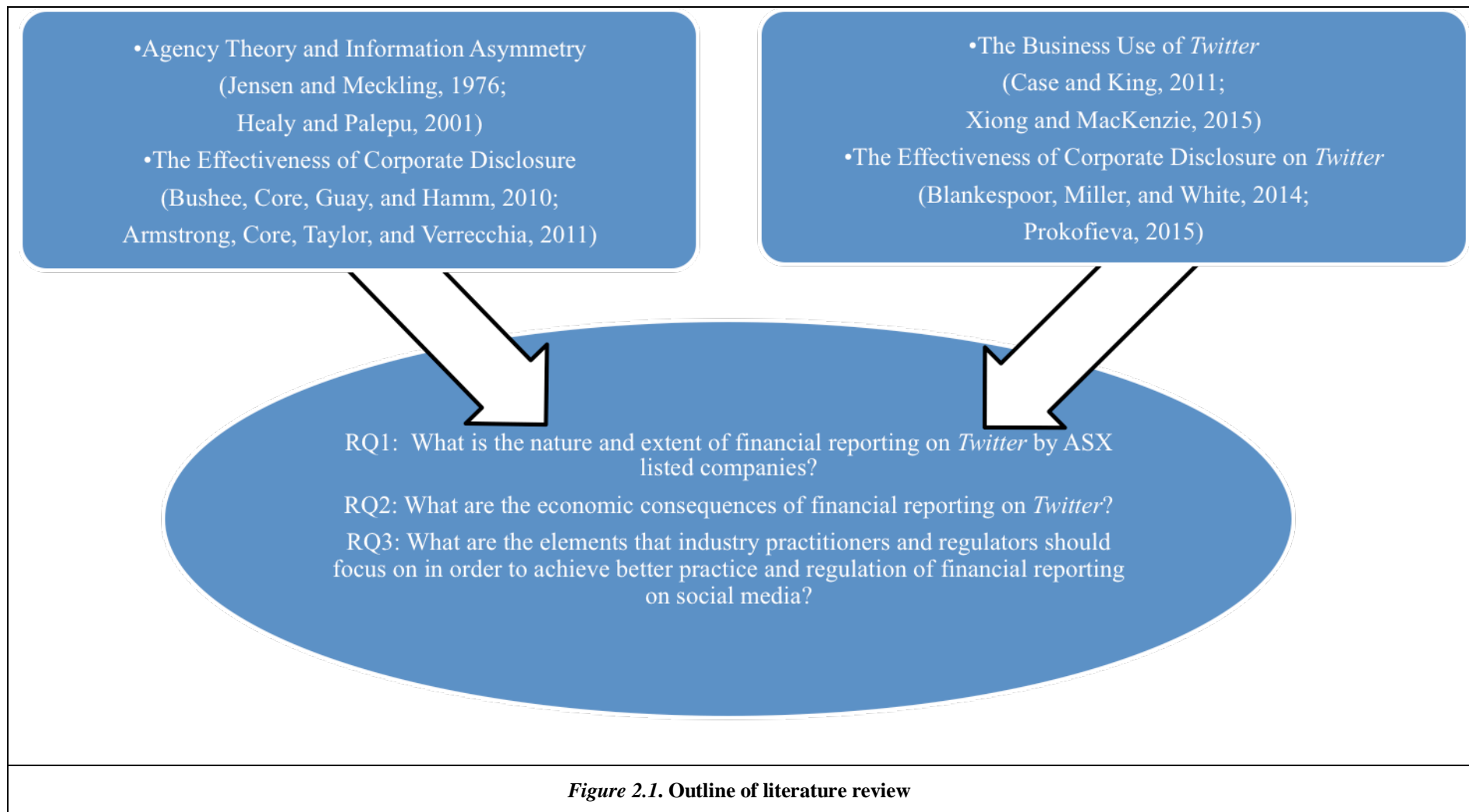
2.1 AGENCY THEORY AND CORPORATE DISCLOSURE

The separation of ownership and control within the company introduces agency conflicts between the manager and stakeholder (Jensen & Meckling, 1976). Information asymmetry is an outcome of the agency relationship between the manager (agent) and shareholder (principal). The manager holds more information about the firm's performance and not all of the information is disclosed to investors, which leads to information asymmetry (Jensen & Meckling, 1976). Healy and Palepu (2001) propose that corporate disclosure, by reducing information asymmetry, is one solution to agency conflict. However, there are many distinct types of corporate disclosure using alternative disclosure channels, each with different scales of impact on diversified firms, stakeholders and stock markets.

Listed companies in various stock markets are required to disclose information according to the local corporations legislation and listing rules. For example, companies listed on the ASX are required to lodge routine periodic financial reports, as well as to update material information with ASX in a timely manner (Australian Securities Exchange, 2015b). All corporate disclosure resulting from regulation or legislation is considered mandatory disclosure. In contrast, any corporate disclosure not required under the current regulation or legislation is voluntary disclosure. Both forms of disclosure are associated with the reduction of information asymmetry apparent in measures such as a lower cost of capital, higher analysts' ratings and larger trading volumes (Diamond & Verrecchia, 1991; Leuz & Verrecchia, 2000; Bui & Sankaran, 2009; Kothari et al., 2009; Armstrong, Core, Taylor, & Verrecchia, 2011; Lambert, Leuz, & Verrecchia, 2012). This review of the literature focuses on the impact of voluntary disclosure, as corporate disclosure on *Twitter* is not currently

required in Australia. Thus, *Twitter* remains a voluntary corporate disclosure channel.

2.2 EFFECTIVENESS OF VOLUNTARY DISCLOSURE IN REDUCING INFORMATION ASYMMETRY

Voluntary disclosure can further be differentiated by source, based on who discloses such information, including business press (Bushee et al., 2010), company manager and analysts (Kothari et al., 2009), and the company itself (Reddy & Gordon, 2010). Previous literature has shown that voluntary disclosure from these parties may have different impact in reducing information asymmetry. For example, Bushee et al. (2010) use bid-ask spread and depth of the share price as proxies of information asymmetry. They find that around the earnings announcement season, press coverage that includes new and useful information that has not previously been publicly released or has not been widely disseminated, is associated with a reduction of information asymmetry. They also argue that greater business coverage enables broader dissemination of information and leads to greater impact, rather than simple press-generated information[4] alone. Through content analysis of the disclosure report by management, analysts and news reports, Kothari et al. (2009) find that news statements by management do not materially affect the firm's cost of capital, suggesting that such statements may not be credible. In terms of sustainability reports, Reddy and Gordon (2010) find that sustainability reports voluntarily prepared by the company provided additional information to the stakeholders. Their study shows that voluntary sustainability reports significantly explains the abnormal returns of New Zealand listed companies. These studies show that voluntary disclosure from different parties, by providing extra information to stakeholders,

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[4] Press-generated information represents information or news generated from other media channels, instead of a unique written report (Bushee et al., 2010).

leads to the reduction of information asymmetry. In this study, the focus is on voluntary disclosure of financial reporting information on *Twitter* by ASX listed companies.

The above literature supports the claim from Healy and Palepu (2001) that an increased level of corporate disclosure reduces information asymmetry, as presented in different proxies. This claim applies to a variety of distinct communication channels and varying content of corporate disclosure. However, the existence of this association between corporate disclosure and information asymmetry depends on other factors, such as share market competitiveness [5] and the stock market information environment.

For example, in a study involving the number of shareholders to proxy for market competition level, Armstrong et al. (2011) show that the information asymmetry level is positively related to the cost of capital [6] when the market is imperfect. However, this relationship is insignificant when the market is perfectly competitive. When the market is perfectly competitive, there are infinite shareholders, and each shareholder does not believe their trading behaviour will affect others. Therefore, an increase in information asymmetry will not change the cost of capital, as even the most well informed traders do not believe their trading activities based on superior information could change the share price, nor the cost of capital. This study from Armstrong et al. (2011) indicates that the degree of market competitiveness is an

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[5] Share market competitiveness refers to how difficult it is to compete with other investors in order to conduct the share trade at the trader's ideal trading price.
[6] The cost of capital rises with increasing information asymmetry, as now investors request a larger risk premium to compensate for the increased information asymmetry (Levitt, 1998). This compensation is based on the possibility that managers may be hiding material information from potential investors, which could affect investors' return due to the missing information. A number of empirical studies have demonstrated that the cost of equity capital can be tapered through reducing information asymmetry (for example, Leuz & Verrecchia, 2000; Armstrong et al., 2011; Lambert et al., 2012).

important conditioning variable in examining the impact of corporate disclosure on the cost of capital.

In another study that investigated voluntary disclosure within the annual report, Botosan (1997) reveals that for companies with a low analyst's rating, the increased level of voluntary disclosure is negatively related to the cost of equity capital. However, this negative relation became insignificant when listed firms received a high analyst's rating. One explanation for companies' low analyst's ratings is irregular and incomprehensible corporate disclosure. Therefore, when there is an increase in voluntary disclosure, investors may better understand the company's performance, which eventually leads to a lower cost of equity capital. This study from Botosan (1997) also indicates that the information environment is an important conditioning variable in determining the relation between information asymmetry and voluntary disclosure. In addition to share market competitiveness and information environment within the stock market, it must also be noted that other prospects related to listed companies, such as the level of environmental reporting, impact the effectiveness of voluntary disclosure (Blacconiere & Northcut, 1997; Freedman & Patten, 2004).

The above discussion reveals the effectiveness of voluntary disclosure in reducing information asymmetry and identifies other endogenous and exogenous factors, such as the market efficiency level, market competitiveness and environmental reporting, associated with changes in information asymmetry. This present study focuses on how the stock market responds to voluntary disclosure of financial reporting on *Twitter*. As *Twitter* is a new social media outlet, this chapter reviews the current use of *Twitter* in the business world before analysing prior literature investigating the impact of financial reporting on *Twitter*.

2.3 THE USE OF *TWITTER* IN THE BUSINESS WORLD

Technological innovations provide a great opportunity to reduce the cost of corporate information dissemination and increase the supply and accessibility of such information (Healy & Palepu, 2001). For example, corporate disclosure channels range from traditional annual reports on paper (Botosan, 1997) and conference calls (Tasker, 1998) to business press coverage (Kothari et al., 2009; Bushee et al., 2010). More recently, the development of information and communication technologies (ICT) has introduced more efficient corporate disclosure channels, as ICT provides faster transmission and wider dissemination of information. These channels include internet financial reporting (IFR) (Bui & Sankaran, 2009; Poon & Yu, 2012) and XBRL (Hodge, Kennedy, & Maines, 2004). Different from previous ICT, *Twitter* is a social media platform that utilises 'push' technology, which sends information directly to users. Traditional ICT, including electronic annual reports on a company's website, employ the traditional 'pull' technology, which calls investors to take the initiative to obtain the information. As traditional ICT provide static financial reporting information, this change in delivering dynamic information through *Twitter* calls for further investigation regarding the business uses of *Twitter*, especially financial reporting information dissemination.

Created in March 2006 as a micro-blogging service, *Twitter* encourages users to share their views by posting tweets within the 140-character limit in each tweet. The mechanism of *Twitter* is: once a tweet is posted on *Twitter*, the tweet appears on the *Twitter* page of the user who posts the tweet; at the same time, the followers of this user can access this tweet via their own *Twitter* page 'newsfeed' and this tweet is accessible to the general public via the *Twitter* search function (unless the tweet is set as personal or the account of the original poster is set as locked and only viewable by

approved followers). Since 2012, there has been a steady increase in the use of *Twitter* by internet users (Duggan, Ellison, Lampe, Lenhart, & Madden, 2015). A recent report (Bruns & Burgess, 2015) suggests that there are as many as 1.8 to 2 million *Twitter* users in Australia, and around 200 million in the world. The characteristics of instant sharing and the opportunities to interact between users have expanded the business use of *Twitter* into news distribution, marketing/promotion, customer service and human resources management/recruitment (Case & King, 2011). In a recent Australian study, Prokofieva (2015) identifies that 55% of ASX 200 companies have active *Twitter* accounts for corporate disclosure.

The development of *Twitter* has made it a popular corporate financial information disclosure channel. In a study of 80 Fortune 500 companies that have *Twitter* accounts, Heaps (2009) reveals that 55% of companies use *Twitter* for investor relations (IR), and 68% of companies conduct IR on *Twitter* by providing links to their company's earnings releases. Prior literature shows that companies use *Twitter* to communicate with a broad range of stakeholders, including consumers, business partners and investors (Hong, 2012; Swani, Brown, & Milne, 2014). Dave Hogan (Director of Investor Relations and Corporate Communications for First Financial Bankshares[7]) comments that evidence indicates a growing number of institutional investors and analysts consider social media to be a new way to search for corporate information (Hogan, 2011).

Twitter offers a fast, free, and interactive way to disclose corporate information, which shortens the information accessibility delay and arguably reduces information asymmetry. *Twitter* is a valuable information dissemination channel. For large and high-growth companies, it generates greater coverage of news to satisfy the

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[7] A U.S. based banking institution with $US 5.22 billion in assets.

information demand from investors. For small market capital size companies that have traditionally lacked attention from the business press, the fast speed and low cost features of *Twitter* are beneficial for corporate disclosure during earnings announcement periods (Blankespoor et al., 2014). Despite the threat of account hacking, which the Associated Press experienced in 2013 (Knibbs, 2013), companies like Zillow Inc. (an online real estate company in the U.S.) have decided to disclose material information including updated earnings on social media, including *Twitter* (Holzer & Bensinger, 2013). This initiative of using social media for corporate disclosure was first recorded back in 2009, when Dell Inc. and Exxon Mobil Corp. indicated their intentions to disclose material corporate news on social media (Tuna, 2009).

The development of *Twitter* as a corporate disclosure channel has been documented in Australia. For example, in a study involving ASX 100 companies, Xiong and MacKenzie (2015) show that the business use of *Twitter* include human resource management, consumer service enquiries and corporate social responsibility. Regarding financial reporting, Prokofieva (2015) observes the association between financial reporting on *Twitter* and information asymmetry. Prokofieva (2015) reveals that small market capital size companies derive more benefits from financial reporting on *Twitter*, in comparison to large market capital size companies, consistent with prior literature (Blankespoor et al., 2014). This indicates that *Twitter*, as a low-cost and highly efficient communication channel, benefits companies with limited resources by increasing their visibility.

Prior literature has briefly discussed the nature and extent of financial reporting on *Twitter*. For example, in the discussion of control variable selection, Prokofieva (2015) discusses that 'high-tech' companies are more likely to employ aggressive

accounting techniques and be involved in a wider internet financial reporting practice since they operate in a constantly changing business environment (L. H. Bollen, Hassink, de Lange, & Buijl, 2008). Prokofieva (2015) claims that as some industries are perceived to have a higher than average risk, companies operating in those industries are under additional reporting obligations (Dewan, Shi, & Gurbaxani, 2007). Although the results from Prokofieva (2015) do not directly test the above claims, the results still show that companies with the above characteristics had larger abnormal bid-ask spread, which is a proxy for information asymmetry. These results show the necessity for companies to conduct financial reporting in multiple corporate disclosure channels, including *Twitter*, to reduce information asymmetry. Moreover, Prokofieva (2015) reviews the content of financial reporting tweets. In the selected sample of ASX announcements accompanied with tweets, the majority of announcements are periodic reports (22.725%) and progress reports (38.026%), which indicates that the tweets are categorically similar.

In another study of financial reporting tweets from a broad range of stakeholders, Sprenger, Sandner, Tumasjan, and Welpe (2014) reveal that close to 70% of sampled financial reporting tweets document 'Earnings' related financial information. To identify the sentiments expressed in financial reporting tweets, previous studies have adopted various approaches. For example, Blankespoor et al. (2014) categorise the sentiments of news based on the market reaction instead of the content of the actual financial reporting tweets, and find the proportions between positive and negative news to be similar (between 30 and 40% in each category). Following the adoption of the Naive Bayesian Text Classification method, Sprenger et al. (2014) determine the sentiments of financial reporting tweets through the calculation of probabilities of sentiments for each word. As reported by Sprenger et al. (2014), the training set data

show that roughly half of all messages are considered to be hold signals (i.e., a neutral sentiment). For the remaining financial reporting tweets, buy signal is observed more than twice the frequency (35.2%) as sell signal (15.2%).

The above discussion presents the development of *Twitter* in different business practices, including financial reporting. From the regulators' perspective, the SEC recognises *Twitter* and other social media platforms as legitimate channels for financial reporting (Securities and Exchange Commission, 2013b), which has further encouraged the business use of *Twitter* for financial reporting. Following SEC approval, Bloomberg[8] has utilised the function of looking up tweets in its news platform. On the Bloomberg platform, tweets are sorted by company and topic, including tweets from 'companies, chief executives and other news-makers, in addition to certain economists and financial bloggers', and tweets can be searched for by using keywords and automatic alerts set up (Alden, 2013). In addition to releasing corporate news on social media, financial institutions, such as Bank of America, Morgan Stanley, Citigroup Inc. and Goldman Sachs Group Inc., plan to loosen restrictions on social media communication between staff members (Holzer & Bensinger, 2013). In contrast, the use of *Twitter* for financial reporting in Australia has not been encouraged to the same extent as in the U.S., due to the Australian continuous disclosure regime. Jurisdictional differences suggest that further study to reveal the current practices of financial reporting on *Twitter*, including how the stock market reacts to disclosure of financial information on *Twitter*, is warranted.

This section has discussed various business uses of *Twitter* and outlines the potential value of *Twitter*, not just as a communication tool between companies and

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[8] Bloomberg is a provider of financial news and it has many different services, including a message board platform for investment banks and other financial institutes.

stakeholders, but also as a corporate disclosure channel for financial reporting. Section 2.4 reviews three influential papers that examine the effectiveness of *Twitter* as a corporate disclosure channel.

2.4 THE EFFECTIVENESS OF *TWITTER* AS A CORPORATE DISCLOSURE CHANNEL

Prior research regarding corporate disclosure on *Twitter* focuses on two aspects. First, researchers focus on the information content within the tweet (Blankespoor et al., 2014; Prokofieva, 2015). Second, researchers focus on the general sentiment of the information content within the tweet (Sprenger et al., 2014). Both also apply to the use of *Twitter* for financial reporting. Three related key studies are reviewed, followed by a discussion regarding how this current study contributes to the literature of financial reporting on *Twitter* (see Table 2.1 for a summary and comparison of these three key studies). In discussing the first aspect, both Blankespoor et al. (2014) and Prokofieva (2015) apply the following model to examine the association between corporate disclosure on *Twitter* and the reduction of information asymmetry:

Change in (abnormal) information asymmetry (dependent variables) = '*Twitter* activity' (independent variable) + control variables.

2.4.1 Blankespoor et al. (2014)

Blankespoor et al. (2014) investigate the association between additional news dissemination on *Twitter* and reduction of information asymmetry. Using a sample of 85 IT firms, they identify 4,516 press releases and earnings announcements as the event periods with which to conduct event studies. They find that more than 70% of U.S. IT firms' tweets contained hyperlinks, and once firms start distributing news via *Twitter*, they continue using this channel. In their study, Blankespoor et al. (2014) use three independent proxies to measure the independent variable of '*Twitter* activity' around the selected event period. These three proxies are: 1) tweets with

hyperlinks to the press release and earnings announcement; 2) the abnormal number of tweets with hyperlinks to other content; and 3) the clicks of these hyperlinks. They use abnormal bid-ask spread and abnormal depth of share as measures for information asymmetry and liquidity as the dependent variables. In reference to Bushee et al. (2010), Blankespoor et al. (2014) develop other control variables to construct an OLS regression analysis between independent variables and dependant variables. The results of OLS regression show that additional dissemination of firm-initiated news via *Twitter* is associated with reduced information asymmetry, as represented by a lower abnormal bid-ask spread and a higher abnormal depth of share. Furthermore, reduced information asymmetry is mainly observed for firms that are not highly visible, which indicates that companies that traditionally lack media attention can receive greater benefits from the use of *Twitter* for news dissemination.

Since depth of share measures both share liquidity and information asymmetry, the results indicate that the abnormal number of tweets during the event period is positively associated with share liquidity, observed only for companies that are not highly visible. Blankespoor et al. (2014) argue that the traditional financial reporting media tend to give more coverage to listed companies with larger market capital size, and thus there is no added benefit from coverage on *Twitter*. However, low-visibility companies that do not attract traditional coverage receive significant benefits from corporate disclosure on *Twitter* during earnings announcement periods. These key points from Blankespoor et al. (2014) and the differences to Prokofieva (2015) are presented in Table 2.1.

Table 2.1

A Comparison of Prior Literature (Blankespoor et al., 2014; Prokofieva, 2015) and this Current Study

	Blankespoor et al. (2014)	Prokofieva (2015)	This current study
Country	United States	Australia	Australia
Sample	85 IT firms with 4,516 press release and earnings announcement event periods	109 ASX 200 companies with 3,516 ASX announcement event periods	82 ASX 500 companies with 128 ASX announcement event periods
Independent Variables	'*Twitter* activities' • Tweets with hyperlinks to the press release and earnings announcement. • Abnormal number of tweets with hyperlinks to other content. • Clicks of these hyperlinks.	'*Twitter* activities' • Tweets that are closely related to the content of the ASX announcements. • Abnormal number of tweets. • Whether the tweets are 'retweeted'.	'*Twitter* activities' Tweets that disclosed financial reporting related information and also shared the same information content as the ASX announcements.
Dependent Variables	• Information asymmetry: ○ Abnormal bid-ask spread ○ Abnormal depth of share • Liquidity: ○ Abnormal depth of share	• Information asymmetry: ○ Abnormal bid-ask spread	• Information asymmetry: ○ Abnormal bid-ask spread ○ Abnormal share trading volume
Prediction/Hypothesis (as relevant to this current study)	• P1: DAITs (*Twitter*) play a muted role in reducing information asymmetry for firms that are highly visible. • P2: Firms that are not highly visible receive less coverage through traditional channels and, therefore, a new channel (*Twitter*) will have greater value for these firms.	H1: There is a negative association between information asymmetry and additional dissemination of ASX announcements via *Twitter* by Australian-listed companies. H2: The hypothesised negative association between information asymmetry and additional dissemination of ASX announcements via *Twitter* is stronger in listed Australian companies with lower visibility than in listed Australian companies with higher visibility.	H2: The level of information asymmetry is smaller in ASX companies with both ASX announcement and financial reporting tweets than ASX companies with only the ASX announcement.
Methodology/Model	Event methodology approach with OLS regression analysis involving independent	Event methodology approach with OLS regression analysis involving independent variables,	Event methodology and comparative combined approach with Wilcoxon Signed

	variables, dependent variables and control variables. Model: Change in (abnormal) information asymmetry (dependent variables) = '*Twitter* activity' (independent variable) + control variables.	dependent variables and control variables. Model: Change in (abnormal) information asymmetry (dependent variables) = '*Twitter* activity' (independent variable) + control variables.	Rank Test (WSRT) analysis involving comparison of dependent variables. Model: Level of information asymmetry in event period (with both ASX announcement and financial reporting tweet) < level of information asymmetry in control period (with only ASX announcement).
Findings	Additional '*Twitter* activities' is associated with reduced information asymmetry (lower abnormal bid-ask spread and higher abnormal depth of share) and increased liquidity (higher abnormal depth of share). These results are mainly observed for firms that are not highly visible.	A negative association between *Twitter* activity during the event period and the information asymmetry level. This observation is stronger for companies that are less visible to the business press or financial analysts' coverage.	The level of information asymmetry is smaller for event period with both ASX announcement and financial reporting tweet, in comparison to control period with only ASX announcement. This observation of lower information asymmetry is more obvious for ASX companies with smaller market capital size and event periods with multiple financial reporting tweets. The ASX stock market responds to financial reporting tweets via different mechanisms, according to the timing of ASX announcement and financial reporting tweet.

2.4.2 Prokofieva (2015)

Prokofieva (2015) investigates the association between dissemination of ASX announcement related information on *Twitter* and reduction in information asymmetry. Using 109 ASX 200 companies, she identifies 3,516 ASX announcement periods as the event periods to conduct event studies. In this study, she selects three proxies to measure the independent variable of '*Twitter* activity'. These three proxies are: 1) tweets that are closely related to the content of the ASX announcements; 2) the abnormal number of tweets; and 3) whether the tweets are 'retweeted'. She identifies the high-visibility companies (S&P/ASX 100) have a higher proportion of tweets in comparison to low-visibility companies (non-S&P/ASX 100) during the ASX announcement periods. She uses the abnormal bid-ask spread to proxy for information asymmetry, the dependent variable. Through the OLS regression analysis between the independent, dependent, and control variables, the results show a negative association between *Twitter* activity during event period and information asymmetry. Furthermore, this observation is stronger for companies that are less visible to the business press or financial analysts' coverage. The comparison indicates that corporate disclosure on *Twitter* results in further dissemination of ASX announcements to investors, which leads to reduction in information asymmetry. This finding is similar to the prior literature (Blankespoor et al., 2014), see Table 2.1.

2.4.3 Further Development of the Blankespoor et al. (2014) and Prokofieva (2015) Studies – What Makes this Current Study Unique?

The above two key studies present the current stage of literature regarding the impact of firm-initiated news on *Twitter* in reducing information asymmetry. An understanding of the stock market reaction mechanism following financial reporting on *Twitter* is warranted. To address this gap in the knowledge as to how the stock market responds to financial reporting on *Twitter*, this study presents several

innovative approaches compared to prior literature (Blankespoor et al., 2014; Prokofieva, 2015) (see Table 2.1 for a summary and comparison of key literature and this current study). First and most importantly, this study uses the stock market microstructure mechanism to examine the impact of financial reporting on *Twitter*. Prior literature uses event methodology and OLS regression analysis to construct the association between news dissemination on companies' *Twitter* accounts and changes in information asymmetry. In contrast, this study adopts a comparative approach in addition to event methodology, and uses the Wilcoxon Signed Rank Test to compare the changes in information asymmetry following financial reporting tweets. This comparison is conducted between financial reporting event periods where there is a financial reporting tweet, and corresponding control periods where there is no financial reporting tweet.

Second, the approach to identify financial reporting on *Twitter* in this study is different from Blankespoor et al. (2014) and Prokofieva (2015), who select a range of proxies to measure the '*Twitter* activity', which include tweets with links to press release and earnings announcements, tweets that are closely related to the content of ASX announcements, and the abnormal number of tweets within the event periods. To collect data for the above proxies, prior literature (Blankespoor et al., 2014; Prokofieva, 2015) first identify the relevant press release, earnings announcements, and ASX announcements, from the time of the first tweet in the sample companies' *Twitter* accounts, then apply content analysis to the companies' tweets. In contrast, this study follows a different approach. This study first conducts content analysis to identify financial reporting tweets, then identifies relevant matching ASX announcements. One advantage of this approach is it ensures that most financial reporting tweets are captured. Furthermore, there is no need to review every ASX

announcement, as some of these ASX announcements did not accompany financial reporting on *Twitter*. Both previous studies (Blankespoor et al., 2014; Prokofieva, 2015) mention that the tweets they collect either have a link to press release or earnings announcements, or are closely related to ASX announcements. They do not specify whether these tweets contain actual information within the press release, earnings announcement, or ASX announcement. For example, Table 2.2 shows two examples of tweets. According to the thematic analysis framework applied in this study (see Table 4.3 in Chapter Four), the first tweet is categorised as Investor Relationship (IR), while the second tweet is categorised as Financial Reporting (FR), rationalised by the content linked to material information in the first tweet, compared to the second tweet showing actual financial reporting information. In this current study, only tweets that include actual financial reporting information are selected as financial reporting tweets. This approach of collecting financial reporting on *Twitter* is innovative as it allows examination of the economic consequences following financial reporting tweets that provide actual financial reporting information.

Table 2.2

Sample of Tweets

Tweets	Time	Categories
Limited AGM 2010 - Transcript of Chairman and Chief executive addresses and presentation slides - http://tiny.cc/u4khe	26th May 2010 10:26:29	IR
announces underlying earnings of $6.3 billion - www.riotinto.com/annualresults2009	11th Feb 2010 17:09:26	FR

Third, to examine the economic consequences following financial reporting on *Twitter*, this study applies the Wilcoxon Signed Rank Test (WSRT) to compare the changes in information asymmetry between the event period and the control period, after controlling the effects of changes in the market trading behaviour and the different scale of market effect regarding various categories of ASX announcements.

The use of WSRT as the data analysis approach in this current study is different from the OLS regression analysis as applied in prior literature (Blankespoor et al., 2014; Prokofieva, 2015), as this study adopts a comparative approach to examine the changes in information asymmetry between the event period and the control period following financial reporting tweets. The use of OLS regression analysis cannot serve the purpose of comparing different trading data between event period and control period, as required in this current study.

Fourth, to capture the economic consequences of financial reporting on *Twitter*, this study uses different proxies of information asymmetry as compared to previous studies (Blankespoor et al., 2014; Prokofieva, 2015). Prior literature identifies event periods as exhibiting a press release, earnings announcement or ASX announcement. The abnormal bid-ask spread and abnormal depth of share are calculated based on the differences of related trading data between the event period and 'pre-period'. The OLS regression analyses are conducted following the collection of the above data to construct the association between the news dissemination on *Twitter* and the two proxies of information asymmetry, abnormal bid-ask spread and abnormal depth of share. In this study, the event period and control period are identified, followed by calculation of the difference in the information asymmetry level between these two periods, after controlling for the other stock market effects. This study uses the WSRT to compute the changes in weighted average bid-ask spread and percent of share trading volume to measure the economic consequences following financial reporting on *Twitter*.

In summary, this current study identifies financial reporting on *Twitter* that contains actual financial information, and examines the economic consequences of these financial reporting tweets from the stock market microstructure lens, which is an

innovative approach compared to prior literature (Blankespoor et al., 2014; Prokofieva, 2015).

2.4.4 Sprenger et al. (2014)

Sprenger et al. (2014) present a methodology to collect stock-related information from a mixed group of *Twitter* users, including companies, media press and individuals. They collect over 400,000 tweets that contain the relevant stock ticker symbols (such as '$AAPL' for Apple Inc.) and manually code 2,500 tweets as the training set of samples to compute the probabilities of sentiments of each word. These probabilities are used to categorise types of tweets and their sentiments. In their study, Sprenger et al. (2014) use the Naive Bayesian Text Classification approach to automatically classify tweets based on the probabilities of words as obtained from the previous training set. They use the t-test to compare the abnormal return and abnormal share trading volume between event periods with substantial increases in message volume and control periods. In addition, they examine different stock market reactions following positive and negative sentiments among different corporate news categories. The results show significant market reaction, including larger stock return and share trading volume on the event days where there are substantial increases in message volume, in comparison to control periods. Furthermore, they show that the sentiments of financial-related news on *Twitter* are associated with the direction of stock return on the trading days, that is, when the sentiment of news on the event day is positive, the stock return is positive, and vice versa.

2.4.5 Further Development of the Sprenger et al. (2014) Study – What Makes This Current Study Unique?

Sprenger et al. (2014) use event methodology with daily trading data and a three-five day event window to present changes in the stock return and share trading volumes,

before and after a substantial increase of message volume that is related to the specific stock on *Twitter*. As this current study proposes to examine the stock market reaction following financial reporting on *Twitter*, this current study specifically selects financial reporting tweets from companies' *Twitter* accounts, which is different from the approach of Sprenger et al. (2014). Furthermore, as this current study proposes to examine the economic consequences of financial reporting on *Twitter* from the lens of stock market microstructure, it uses 15-minute interval trading data to capture the changes in stock market behaviour following financial reporting on *Twitter*. This use of trading data is different from previous studies (Blankespoor et al., 2014; Sprenger et al., 2014; Prokofieva, 2015), which utilises daily trading data.

2.5 CONCLUSION

This chapter reviews the fundamental agency theory and relevant literature to indicate the need for corporate disclosure to reduce information asymmetry. Along with the development of technology, the revolution of corporate disclosure outlets and their effectiveness in reducing information asymmetry are also examined. Moreover, this chapter presents how the business use of *Twitter* has grown from consumer interaction into corporate disclosure. Following discussion of how the stock market uses the financial information detailed on *Twitter*, this chapter provides a review of recent literature that investigated corporate disclosure on *Twitter*. This review of recent studies presents a gap in the literature that calls for further exploration of the financial reporting content of tweets to determine in what way the stock market reacts to this disclosure. In Chapter Three, the related theories are discussed to develop relevant predicted observations and hypotheses.

Chapter 3: Theoretical Framework and Hypothesis Development

3.1 INTRODUCTION

The previous chapter presents recent studies investigating financial reporting on social media, and outlines the need to further investigate the stock market reaction mechanism following financial reporting tweets. Accordingly, this study comprises three stages to answer the corresponding three research questions. The first research question is to review the nature and extent of financial reporting on *Twitter*. The second research question is to examine the economic consequences of these financial reporting tweets. The third research question is to discuss how future development of reporting regulation can be better approached to accommodate financial reporting on social media. This chapter provides a discussion of how the following theories may be applied to answer these research questions, and assists in developing clear predicted observations and hypotheses for the present study. In this chapter, the discussion focuses on the implications of diffusion of innovation theory (Rogers, 2003), agency conflict (Jensen & Meckling, 1976), information asymmetry (Healy & Palepu, 2001), and information economic theory (Allen, 1990). Applying these theories, two predicted observations and three hypotheses are developed to answer the research questions.

Twitter is a social media communication platform that is low cost, highly efficient, and encourages user interaction; hence this thesis investigates the challenges arising from the increasing use of *Twitter* for financial reporting. Rogers' (2003) diffusion of innovation theory provides a theoretical lens to explain why listed companies first

adopt *Twitter* for financial reporting. This informs research question one: 'What is the nature and extent of financial reporting on *Twitter* by ASX listed companies?' The first stage of this study develops a predicted observation and two hypotheses stemming from an application of Rogers' (2003) diffusion of innovation theory.

Stage two of this study investigates the economic impact of these financial reporting tweets by reviewing the mechanism regarding how information is transformed into stock market movement. In this study, the agency theory (Jensen & Meckling, 1976), information asymmetry discussion (Healy & Palepu, 2001), and information economic theory (Allen, 1990) are used as the theoretical cornerstones for developing related hypotheses from research question two, which investigates the economic consequences of financial reporting on *Twitter*. These theories explain how information affects the stock market, particularly in the Australian context.

As discussed in Chapter One, previous incidents of real or fake financial reporting tweets have caused unexpected fluctuations in the stock market (Russolillo, 2012; E. Lee, 2013). This is a serious challenge to the efficient practice of financial reporting on *Twitter*. Such incidents and challenges can be explained by Akerlof's (1970) adverse selection theory. In his theory, Akerlof (1970) shows that in any product market, the existence of bad or undesirable product (lemons) in the market damages the pricing of good products, if the product buyer cannot distinguish between the bad and good products. A similar phenomenon can be observed in the practice of financial reporting on *Twitter*, where fake financial reporting tweets reduce the trustworthiness of the factual tweets. Based on these observed incidents and challenges, the third stage of this study develops a predicted observation regarding whether the existing financial reporting regulations are adequate to accommodate the current practice of financial reporting on social media. Moreover, the adverse

selection debate from Akerlof (1970) calls for an evaluation of regulation to ensure the maintenance of good practice of financial reporting on social media and minimisation of bad or undesirable financial reporting. Therefore, the third stage of this study involves a discussion of the existing challenges of financial reporting on social media, with a view to developing enhanced regulation. This discussion answers research question three of this study: 'What are the elements that industry practitioners and regulators should focus on, to achieve better practice and regulation of financial reporting on social media?'

Figure 3.1 outlines the relations and interactions between various theories in this study. According to Jensen and Meckling (1976), the separation of power between principal and agent introduces agency conflict and information asymmetry between corporate manager and investor. One way to reduce information asymmetry, according to Healy and Palepu (2001), is to encourage enhanced corporate disclosure. Hence, this study investigates how corporate disclosure operates to reduce information asymmetry, thus establishing the theoretical framework foundation. As *Twitter* is a new but established corporate disclosure channel, based on the above discussion this study argues that corporate disclosure on *Twitter* could reduce information asymmetry.

3.2 *TWITTER* ADOPTION PATTERN AND DIFFUSION OF INNOVATION THEORY

Financial reporting on *Twitter* is gaining momentum in today's business world (Alden, 2013). Moreover, the challenges of conducting financial reporting on *Twitter*, as presented in previous incidents, have called for further understanding of this practice (Grundfest, 2013). To understand companies' adoption behaviour of *Twitter*, this study applies the diffusion of innovation theory (Rogers, 2003) and develops predicted observation and hypotheses accordingly.

Agency Theory (Jensen & Meckling, 1976)

Information Asymmetry (Healy & Palepu, 2001)

In every level of corporation, the existance of agency relation initiaties agency problem, which is represented in the way that principals (investors) cannot effectively administrate agents (managers) (Jensen & Meckling, 1976). Due to information asymmetry between principals and shareholders, corporate disclosure is needed to reduce information gap (Healy & Palepu, 2001).

Difussion of Innovation (Rogers, 2003)		**Information Economic Theory (Allen, 1990)**	**Advese Selection Issue (Akerlof, 1990)**
The trending development of *Twitter* and adopters from various stages show different characteristics.	**Financial Reporting on *Twitter***	Efficient market is in need of information, which holds value to stakeholders. Therefore, it is necessary to construct regulated information disclosure, to compromise information asymmetry.	The sellers of good quality products are at disadvantage, because consumers are only willing to pay the average price if they cannot ascertain the product quality, whether it is good or bad. This adverse selection issue also applies to financial reporting on *Twitter*.

P1: The use of *Twitter* technology for financial reporting has increased over time.¶

- H1a: There is a positive association between ASX companies' market capital sizes and the adoption of *Twitter* for financial reporting.¶

H1b: ASX companies from certain industry sectors are close to technology more likely to adopt Twitter for financial reporting.¶

¶

H2: The level of information asymmetry is smaller in ASX companies with both ASX announcement and financial reporting tweets than ASX companies with only ASX announcement. ¶

¶

P2: The current framework of corporate disclosure regulation is not adequate to manage the practice of financial reporting on social media.¶

Figure 3.1. **Theories Interaction and Development of Predicted Observations and Hypotheses**

The diffusion of innovation theory (Rogers, 2003) summarises the process of technology adoption and discusses factors that affect the technology adoption process. According to Rogers (2003, p. 11), diffusion is "the process by which an innovation is communicated through certain channels over time among the members of social system". As *Twitter* is a new communication platform, companies' adoption of *Twitter* for financial reporting is part of the process for *Twitter* itself to become recognised as a valid corporate disclosure channel for companies over time. According to Rogers (2003), there are four main elements that influence the spread of a new idea: the innovation itself, communication channels, time, and the social system. Although prior literature documents the adoption of *Twitter* for general business uses including human resource management and corporate promotion (Xiong & MacKenzie, 2015), the innovation that this present study investigates specifically regards the use of *Twitter* for financial reporting. As discussed in Chapter Two, the popularity of *Twitter* adoption for financial reporting has increased (Holzer & Bensinger, 2013). Regulators have acknowledged this practice, if not encouraged it (Australian Securities Exchange, 2013c; Securities and Exchange Commission, 2013b). There is strong evidence of support from mass media, organisations, and government/regulators, which implicitly forms a positive social system that encourages the adoption of *Twitter* for financial reporting.

In addition, potential adopters consider the relative advantage of innovation prior to their adoption decisions (Rogers, 2003). Specifically, potential adopters evaluate whether the perceived benefits from innovation adoption outweigh the costs of adopting such innovation. Although *Twitter* is widely recognised for its low cost and highly efficient characteristics, companies are also concerned about the potential regulatory consequences of using it for financial reporting purposes (Jones &

McMakin, 2009). Another challenge to adopting *Twitter* for financial reporting is the lack of understanding about how the stock market may react to such information.

Based on the above discussion, this study argues that companies will observe a slow start to *Twitter* adoption for financial reporting, and that the adoption will continue to increase. This is similar to the adoption pattern discussed in the diffusion of innovation theory, which is outlined by Rogers (2003) (see Figure 3.2). Once the individual adopters reach a certain number, the innovation adoption among companies becomes self-sustaining. This means that individual adopters can observe and learn the innovation adoption experience from early adopters, regardless of the knowledge requirement for adoption. Based on the above discussion, this study posits the following predicted observation:

P1: The use of *Twitter* technology for financial reporting has increased over time.

Figure 3.2. **Diffusion of Innovation Adoption Pattern (Rogers, 2003)**
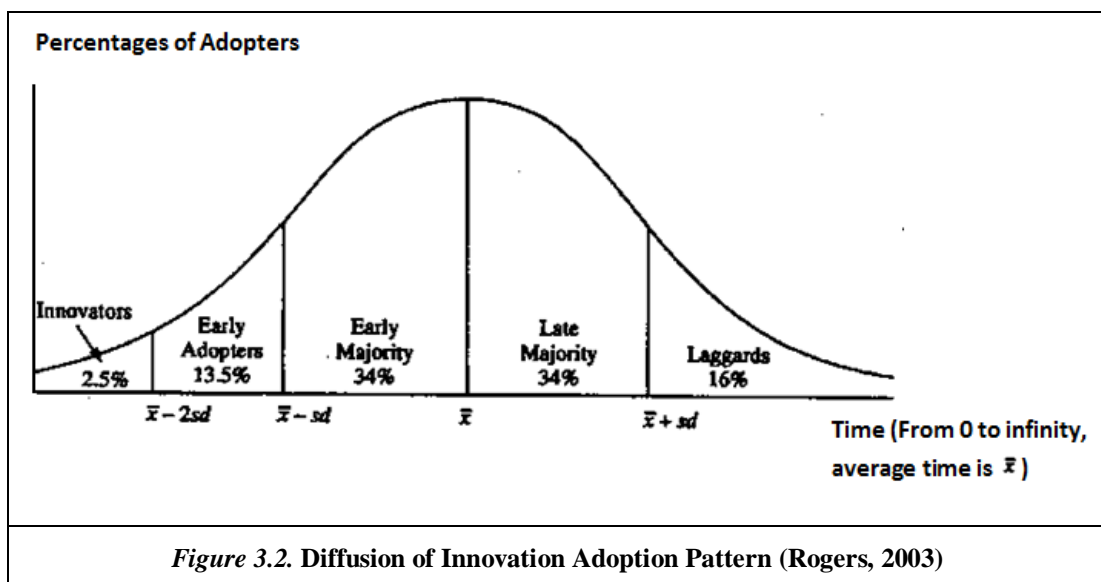
According to the diffusion of innovation theory (Rogers, 2003), there are five categories of adopters in the diffusion process: innovators, early adopters, early majority, late majority, and laggards. Figure 3.2 shows the adoption patterns and

proportions of these five types of adopters. As the vertical axis presents the time it takes for full adoption, the area under the bell shape curve presents successive groups of adopters of the new innovation. In the diffusion of innovation theory, Rogers (2003) categorises these five types of adopters based on their characteristics, including the willingness to take risk, social status, financial liquidity, whether they are close to a scientific source, and their interaction with other peers, especially other innovators. For example, innovators are usually willing to take risks and are open-minded towards new innovations. In comparison to other groups of adopters, innovators have better financial liquidity, which suggests they have the resources to try innovations, while not affecting their existing business operations. Furthermore, some innovators may belong to specific industry sectors that are close to the innovations, such as technology or telecommunication services. These innovators have greater knowledge and understand the characteristics, especially the benefits of these innovations, compared to companies in other industry sectors. In contrast, late majority or laggards of innovation are sceptical towards innovations; they are risk-averse towards change. They have low social status and small financial liquidity. They focus more on 'tradition', which means they only contact likeminded peers. Therefore, companies that are not willing to take on potential risk, have fewer resources to adopt new innovations, and do not know (or are not willing) to understand the characteristics and benefits of any upcoming innovation will become the late majority or laggards (Rogers, 2003).

Prior literature has investigated corporate and business applications of the diffusion of innovation theory, such as how ties between adopters are associated with the adoption of a tax regime (Brown, 2011). In a recent study, Chang (2010) uses the diffusion of innovation theory to investigate the life cycle of the *Twitter* hashtag. To

review the practice of financial reporting on *Twitter*, this study is interested in the corporate characteristics of the companies that adopted *Twitter* for financial reporting, which addresses the first research question of this study.

According to the above discussion of innovators' characteristics (Rogers, 2003), the innovator and early adopters of *Twitter* for financial reporting are willing to take risks. Innovators and early adopters that first use *Twitter* for financial reporting face various challenges, including regulatory consequences for inappropriate practices of financial reporting on this new corporate disclosure channel, and unexpected stock market fluctuations (Jones & McMakin, 2009). Furthermore, innovators and early adopters require resources and financial liquidity to operate and monitor the use of *Twitter* for financial reporting. For example, large corporations are expected to attend to consumer related disputes on *Twitter* and other social media platforms within 24 hours (J. Lee, 2012). In the case of financial reporting disclosure on *Twitter*, the potential damage to companies can be significantly larger than simple company-consumer *Twitter* interactions if the stock market is misled. Therefore, since the stock market responds to financial reporting information at a fast pace, immediate responses from companies are usually expected if companies choose to conduct financial reporting on social media. Innovators and early adopters of *Twitter* adoption for financial reporting may consider appointing a designated social media investor relation officer, which requires extra resources in the company budget. This argument is consistent with the findings in Hedlin (1999), who examines how Swedish companies use internet for investor relation. Hedlin (1999) surveys 20 companies listed on the Stockholm Exchange. These 20 companies are randomly selected, from three groups of most traded companies, small and medium-sized companies, and the high-techs and newly started companies. The results indicate that

larger corporations tend to have a higher use of internet techniques and provide richer and more sophisticated content, including graphics and downloadable content that can be used as input in computer-based analysis. In addition, as *Twitter* is a new social media platform that encourages user interaction and information sharing, it is a corporate disclosure platform that demands relevant training in its use. To receive benefits from the use of *Twitter* for financial reporting, companies must understand the mechanisms of *Twitter*, including how to maintain strong relations with stakeholders, deciding what content to disclose in order to attract new followers, and discerning ways to reduce the impact of any rumours or inappropriate content. This further understanding of *Twitter* could be obtained through appropriate training at a later stage, yet it requires innovative thinking when *Twitter* first became available. The innovators and early adopters of *Twitter* for financial reporting are expected to belong to the technology or communication industries or be close to technology or scientific sources (Rogers, 2003). Companies with these corporate characteristics are more likely to be innovators and early adopters of *Twitter* for financial reporting.

Based on the above discussion, this study argues that those companies with sufficient financial liquidity and resources (large enterprises), and those that are in or close to the technology related industry sectors are more likely to form the innovators and early adopters of *Twitter* for financial reporting. This is consistent with key literature (Blankespoor et al., 2014) that selected technology related companies as sample companies for the same reason. Accordingly, this present study develops the following hypotheses:

> **H1a: There is a positive association between ASX companies' market capital sizes and the adoption of *Twitter* for financial reporting.**

H1b: ASX companies from certain industry sectors that are close to technology are more likely to adopt *Twitter* for financial reporting.

Together with the first predicted observation, these hypotheses are used to answer the first research question of this present study. The first research questions asks, 'What is the nature and extent of financial reporting on *Twitter* by Australian listed companies?' The first predicted observation is developed to outline the trend of financial reporting on *Twitter* by Australian listed companies. The hypotheses are developed to examine whether the corporate characteristics of ASX companies (including market capital size and industry sectors) have associations with *Twitter* adoption for financial reporting.

3.3 AGENCY THEORY, INFORMATION ASYMMETRY, AND THE USE OF *TWITTER*

The separation of power between principal and agent introduces agency conflict, which creates two main issues: 1) the principal is not able to oversee the agent's actions when the desires and goals differ between the principal and agent; and 2) the principal and agent have distinct attitudes towards risk (Jensen & Meckling, 1976). According to Jensen and Meckling (1976), the barrier of information transmission between principal and agent creates these two issues, represented as information asymmetry between the manager and the stakeholder. For example, the principal of a listed company, such as a major shareholder, wants to receive a great return from his/her investment through the form of constant dividend distribution. In contrast, his/her agent in the company, such as the CEO, may hold a different view of the company's development. The CEO may prefer to direct the company's profit towards product research and future business development, instead of constant dividend distribution. This example shows that desires and goals may differ significantly between principal and agent. In this circumstance, investment into

research and development may generate higher and more sustainable dividends in the future, but it could also lead to investment failure.

Efficient and on-time communication between manager and shareholder can solve the above conflict. If the managers establish a communication channel where they can constantly communicate their management strategy/philosophy with the shareholder, such barriers of information as presented in the above example should be reduced. Corporate disclosure is widely used to address information asymmetry, and thus minimise the information gap between manager and shareholder (Healy & Palepu, 2001). Corporate disclosure provides information for potential investors to achieve optimal allocation of capital to sound investment opportunities (Healy & Palepu, 2001).

The information environment in today's business world is overwhelming (Prokofieva, 2015). While investors have access to a range of different media outlets to obtain company information, including financial reports, analysts' reports, and financial related news in other media channels (Healy & Palepu, 2001), investors are challenged to read and digest all of this information and evaluate the legitimate news in a timely manner. The introduction of *Twitter*, a low cost and highly efficient corporate disclosure channel, provides an important media outlet (Alden, 2013). First, *Twitter* is a micro-blogging style social media platform, which promotes short message communication, as each post on *Twitter* cannot exceed 140 characters. Therefore, financial reporting on *Twitter* is likely limited to the disclosure of key financial information only. Companies can select key financial information to share with investors in the first instance. It is a popular practice for companies to post key information on a *Twitter* post, which also includes a hyperlink that directs *Twitter* users to more detailed information, including financial reporting (Blankespoor et al.,

2014). In this setting, it is possible for investors to read and digest key financial information in a short period of time and seek further information if interested (Australian Securities Exchange, 2013c). Second, *Twitter* provides a certification service where companies can register their corporate *Twitter* accounts then undergo the certification process with *Twitter*. Once the certification process is completed, the corporate *Twitter* account has a specific symbol, which indicates that the *Twitter* account is owned by a certified body. Investors are guaranteed to receive legitimate information from the company if they follow the certified corporate *Twitter* accounts (unless the *Twitter* account is hacked or inappropriately used by staff members). Third, as *Twitter* encourages user interaction, companies can directly discuss company performance with shareholders. Through the use of *Twitter*, companies can communicate real-time financial information with investors, which means that agents are able to update principals with company performance and their proposed actions. From the investors' perspective, it is possible to monitor company performance in real-time, and evaluate whether investors' desires and goals are undertaken by agents as expected (Grundfest, 2013; Securities and Exchange Commission, 2013a). Fourth, as following a *Twitter* account does not require a pre-existing relationship, the recipients of financial information on *Twitter* can go beyond the existing group of stakeholders. For companies that use *Twitter* for financial reporting, they can feasibly expand the audience group beyond their existing followers when their followers forward the financial reporting information further into their social network. This wider audience group has been discussed in prior literature, with both Blankespoor et al. (2014) and Prokofieva (2015) finding that financial reporting on *Twitter* has increased awareness of small enterprises that typically lack attention from traditional media reporting.

Under this existing agency conflict, an efficient communication channel permits agents to communicate with principals, and for principals to monitor agents' actions. In the era of overwhelming information, *Twitter* meets a need for companies to directly disclose essential financial information to investors. At the same time, investors can monitor company performance through regular updates on companies' *Twitter* accounts.

3.4 INVESTOR RELATIONS, ACCESS TO INFORMATION, AND CORPORATE DISCLOSURE ON TWITTER

The previous section discusses how corporate disclosure can reduce information asymmetry and why *Twitter* can be considered a valuable corporate disclosure channel. In addition to this argument, the establishment of successful investor relations between a company and its investors is also essential. Through a review of previous literature, Brennan and Tamarowski (2000) argue that the establishment of good investor relations, via an increase of disclosure level and accessibility, can improve attention and coverage by financial analysts and investors. Furthermore, when company disclosure is more accessible, if follows that there are subsequently more financial analysts interested in the company. This leads to greater stock liquidity and less information asymmetry, as investors are more willing to trade since they now know more about the company (Chang, D'Anna, Watson, and Wee, 2008). As the cost of information is lower and investors are more confident that the company is not hiding material information, the cost of equity capital will reduce accordingly. Therefore, the Brennan and Tamarowski (2000) study underpins the necessity to conduct financial reporting on social media, which not only renders financial reporting information more accessible to investors and financial analysts, but also illustrates how open-minded a listed company is regarding sharing company information with stakeholders.

Since its adoption, use of the internet to improve investor relations has become increasingly popular (Hedlin, 1999; Chang et al., 2008). Hedlin (1999, p.374) argues that there are three stages of using the internet as a vehicle to conduct investor relations, which are: 1) establishing a web presence; 2) using the internet to communicate financial information; and 3) taking advantage of the unique features and possibilities of the medium (p.374). At the implementation (start-up) stage of corporate disclosure on the internet, companies typically have a limited idea of what strategies they should apply and they mainly focus on consumers rather than investors, which generally results in a corporate website of little interest to investors (Hedlin, 1990). According to Hedlin (1999), between 1995 and 1999, Swedish companies were at the first stage; whereas by 2009, most Swedish companies were in the second stage of development. When discussing the potential obstacles regarding the development of internet usage for investor relations, Hedlin (1999) points out that disclosing new information first on the internet, and presenting more information on the internet than via traditional media, would constitute a violation of existing listing rules of the Stockholm Stock Exchange. In Australia, Chang et al. (2008) examine the disclosure quality of the corporate websites of 290 ASX 300 companies, based on a check list developed from previous literature (Hedlin, 1999; Deller, Stubenrath and Weber, 2009) and guidelines from The Australasian Investor Relations Association (AIRA) that suggest best practice in the communication of company information to investors and the market generally. They find that companies with higher investor relations scores usually have larger market capital sizes and share trading volume, as well as more analyst following and higher institutional holdings. This evidence contributes to the evidence that effective investor relations improve corporate

disclosure quality, which eventually leads to enhanced market exposure, increased analyst coverage and institutional following.

The above literature shows that the improvement of investor relations, represented as an increase of corporate disclosure level and more accessible disclosure content, lead to information asymmetry reduction, represented as greater stock liquidity and reduced cost of capital. Therefore, the use of *Twitter* as a corporate disclosure platform to improve investor relations is appropriate. This study focuses on the role of social media for corporate disclosure (financial reporting) from the aspect of increasing information level.

While Twitter provides a new information dissemination approach for corporate disclosure, the mechanism regarding how financial reporting on Twitter affects the stock market, in terms of how information assists investors' decision making, remains unexplored. Section 3.5 discusses this issue.

3.5 THE META-THEORY OF INFORMATION ECONOMICS, FINANCIAL REPORTING, AND *TWITTER*

In the stock market, investors allocate their capital as an investment to the entities that they believe will perform well in the future. Investors always face the challenge of deciding which company to invest in. As discussed by Jensen and Meckling (1976), the existence of an agency relation between manager and investors creates barriers of information, referred to as information asymmetry. This can lead to inadequate investment decisions (Healy & Palepu, 2001). Allen (1990) argues that information has economic value, as it assists investors in making informed investment decisions, which may also increase investors' investment returns. The above benefits of corporate disclosure in reducing information asymmetry have been recorded among several different existing corporate disclosure channels in prior

literature, including business press, analyst's reports and internet disclosure (Bui & Sankaran, 2009; Kothari et al., 2009). With the development of *Twitter*, this present study aims to investigate whether financial reporting on *Twitter* achieves a similar benefit, that is, whether financial reporting on *Twitter* leads to the reduction of information asymmetry.

ASX companies in Australia must follow the continuous disclosure regime, which regulates disclosure of material and price-sensitive information (Australian Securities Exchange, 2015b). Pursuant to this regulation, financial reporting on *Twitter* should correspond to a prior ASX announcement. However, this does not necessarily mean that financial reporting on *Twitter* does not provide new information for investors. As discussed by Solomon, Soltes, and Sosyura (2014), there are two views regarding the function of corporate disclosure on social media. From the information view, corporate disclosure introduces new information to the stock market, reducing information asymmetry (Bushee et al., 2010). From the salient view, corporate disclosure attracts investors' attention and boosts their trading activities (Barber & Odean, 2008). These two views apply to financial reporting on *Twitter*. First, following the information view discussion, financial reporting on *Twitter* disseminates new information to the group of investors that have not received such information from the traditional ASX announcement. With an overwhelming amount of information available from various sources, some investors may be too busy to keep up to date with traditional channels. Second, following the salient view discussion, investors are reminded of existing financial reporting information, and companies can further attract external attention through financial reporting tweets (Trinkle, Crossler, & Bélanger, 2015). Together with the discussion of information value by Allen (1990), this study argues that financial reporting on *Twitter* could

inform investors' decisions, which affects stock market movements. Following this argument, the stock market reacts to financial reporting on *Twitter*. Section 3.5 discusses factors that can affect this posited relationship.

3.6   EFFICIENT MARKET HYPOTHESIS, CONTINUOUS DISCLOSURE AND *TWITTER*

To review how the stock market reacts to financial reporting on *Twitter*, this section first reviews how the stock market responds to the release of information in general. According to Fama's (1970) efficient market hypothesis, whether the share price reveals existing information or not depends on the level of stock market efficiency. The efficient market hypothesis (Fama, 1970) suggests that there are three different types of efficient markets: strong, semi-strong, and weak. As per Fama (1970), in a weak efficient market, future share price cannot be predicted through the analysis of a previous share price movement. The share price does not fully reflect all existing information, not to mention private information, which is controlled by certain parties for private trading. The share price in a weak efficient market follows a random walk, as it cannot be predicted. In a strong efficient market, the share price is determined after considering all available information, including hidden private information. The stock market reaction is fully informed under a strong efficient market regime (Fama, 1970).

According to Fama (1970), the share price in a semi-strong efficient market only reflects public information, as private information is not available. Therefore, when private information becomes public or when new public information becomes available, the share price adjusts accordingly (Fama, 1970). In Australia, ASX listed companies are required to publish material information consistently, under the continuous disclosure regime (Australian Securities Exchange, 2013b). Therefore, the ASX is a semi-strong efficient stock market, for the following two reasons. First,

under the current continuous disclosure regime, ASX companies are able to rely on certain exceptions if they want to keep certain material information as confidential, such as an ongoing discussion of merger and acquisition proposal. This indicates the existence of private information, which is not known to the ASX stock market. Although there are exceptions for private information, it is still a violation to trade on this private information (Australian Securities Exchange, 2015b). Such private information has not been incorporated into the share trading activity, which can be detected through the share price movement. In this case, the arrival of private information or new public information, which has not been revealed to the share market previously, will lead to follow-up stock market movement. Second, prior literature (Hsu, 2009; Russell, 2015) has argued that under the continuous disclosure regime, the ASX stock market responds to the release of corporate disclosure. Both the continuous disclosure regime setting and findings from previous empirical studies support the argument that the ASX is a semi-strong efficient stock market.

In a typical stock market, both buyer and seller post the share prices that they are willing to trade, and a trade will then be formed and executed if there is a mutual agreement about the proposed share price. The proposed share price represents an investor's assessment or expectation of the entity's future performance. It is normal for investors to have different assessments or expectations towards the same entity. This may be due to different levels of information held by the investors. These differences in information levels are also commonly interpreted as information asymmetry (Healy & Palepu, 2001). For the proposed share price, the difference between the buying and selling prices is called the bid-ask spread. This bid-ask spread value has been used as a proxy to measure information asymmetry in previous studies (Leuz & Verrecchia, 2000; Sidhu, Smith, Whaley, & Willis, 2008). In

addition, when the level of information asymmetry is reduced and the investors come closer to mutual agreement regarding the company's future performance, it is more likely for investors to trade on a larger scale (Healy & Palepu, 2001). This is represented as higher share trading volume (Blankespoor et al., 2014). Therefore, this present study selects the bid-ask spread and share trading volume as proxies for information asymmetry.[9]

As the ASX is a semi-strong efficient stock market, it is expected that the ASX stock market reacts to new information (Fama, 1970). When companies disseminate financial reporting information on *Twitter*, it enriches the information environment of the stock market, which leads to the reduction of information asymmetry. This phenomenon has been captured in prior literature (Blankespoor et al., 2014; Prokofieva, 2015), which demonstrates that the increase of *Twitter* activities during the announcement period is associated with the reduction of information asymmetry.

Based on the above discussion, this present study proposes the following hypothesis, from the lens of market microstructure:

> **H2: The level of information asymmetry is smaller in ASX companies with both ASX announcement and financial reporting tweets than ASX companies with only the ASX announcement.'**

This hypothesis is developed to answer the second research question of this study: 'What are the economic consequences of financial reporting on *Twitter?*' Through discussion of the role of corporate disclosure in reducing information asymmetry and the value of information, this study argues that the level of information asymmetry will be reduced, following financial reporting on *Twitter*.

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[9] A detailed discussion behind the reason for choosing these two proxies is provided in Chapter Four.

3.7 THE ADVERSE SELECTION ISSUE AND REGULATION FOR FINANCIAL REPORTING ON SOCIAL MEDIA

As discussed in Chapter One, the practice of financial reporting on *Twitter* faces significant challenges, such as fake tweets from stolen *Twitter* accounts (Knibbs, 2013) and unidentified information from media (Ryan, 2012). To address these challenges, an updated and adequate regulatory framework is needed. The discussion regarding the adverse selection issue by Akerlof (1970) sheds light on this issue.

According to Akerlof (1970), the sellers of good quality used cars are at a disadvantage, as consumers are only willing to pay the average price if they cannot ascertain the used cars' quality, whether it is good or bad. Even if the used car is of good quality, consumers will not pay the expected premium price, which is the true value of a good quality used car. This is the consequence of information asymmetry between consumers and the sellers of used cars. This adverse selection issue also applies to financial reporting on social media. While the 'good quality used car' represents legitimate financial reporting on social media, the 'bad and undesirable used car' includes faked/rumoured financial reporting information on social media. In this circumstance, investors do not give as much credit to financial reporting on social media as they are originally willing to, as they are afraid of false information. Furthermore, false financial information on social media could trigger a serious market fluctuation, which damages the company's goodwill, as well as stock market integrity (Ryan, 2012; Knibbs, 2013). Incorrect information damages the information environment of the stock market because some investors receive incorrect information. In this circumstance, the cost of obtaining and distributing information for both companies and investors could be significant (Grossman & Stiglitz, 1980). For example, it will cost the company more resources to clarify the rumour with legitimate information, and in the worst case, the investors may have already

suffered significant loss (see the David Jones case in Ryan, 2012). These challenges could impose severe financial losses on both companies and investors.

Financial reporting on social media directly links companies with investors through the dissemination of financial information, which reduces the information asymmetry between investors and managers (Healy & Palepu, 2001). The benefits of information asymmetry reduction have also been reviewed in prior literature, including lower cost of capital and greater analyst's ratings (Bui & Sankaran, 2009; Kothari et al., 2009; Bushee et al., 2010). Therefore, in order to encourage and expand the use of social media for financial reporting, the adverse selection issue within the practice of financial reporting on social media needs to be addressed. To solve this adverse selection issue, Akerlof (1970) suggested government intervention, including adequate regulation. Adequate regulation reduces the possibility of market failure, protects ill-informed investors, reduces social waste, and monitors the behaviour of management (Walker & Fisse, 1988). This approach of regulation setting to tackle the issue of adverse selection also applies to financial reporting on social media.

In Australia, there are two main sources of regulation for continuous corporate disclosure: Chapter 6CA of the Corporations Act 2001 and ASX Listing Rule 3.1. The Corporations Act 2001 focuses more on the ideal information disclosure environment for investors, and the ASX Listing Rule gives more attention to the material and continuous disclosure aspects. These regulations aim to achieve an equitable and efficient information environment for investors, allowing investors to make informed judgments on investment decisions (Australian Securities Exchange, 2015b). These regulations require ASX listed companies not to report false or misleading financial information. At the same time, a reasonable level of corporate

disclosure should always be maintained. More importantly, there is no hidden information that disadvantages uninformed shareholders (Australian Securities Exchange, 2013a). Under this background, adequate precautionary guidance based on these existing regulations is needed in order to ensure that financial reporting on social media is legitimate. One significant challenge of creating regulation is the constantly changing environment of the regulatory setting (Latimer, 2013), as explored in the discrete cases discussed in Chapter One. Considering the adverse selection issue (Akerlof, 1970), this study argues that there is still room for improvement in regulation of financial reporting on social media. Based on the above discussion, this study develops the following predicted observation:

P2: The current framework of corporate disclosure regulation is not adequate to manage the practice of financial reporting on social media.

This predicted observation is developed to construct the background of answering research question three of this current study: 'What are the elements that industry practitioners and regulators should focus on, to achieve better practice and regulation of financial reporting on social media?' This study further discusses areas of improvement for future regulation, based on results and findings from this current study and previous literature, as well as relevant example cases and financial reporting regulations.

3.8 SUMMARY

This chapter discusses the agency theory (Jensen & Meckling, 1976), information asymmetry (Healy & Palepu, 2001), diffusion of innovation theory (Rogers, 2003), information economic theory (Allen, 1990), efficient market hypothesis (Fama, 1970), and adverse selection issue (Akerlof, 1970) in order to articulate the theoretical foundation of this study. Under the agency conflict between manager and

stakeholder (Jensen & Meckling, 1976), the barriers of information create information asymmetry. To solve information asymmetry, an efficient communication channel to distribute corporate disclosure is essential (Healy & Palepu, 2001). Consistent with this demand, this present study predicts that the use of *Twitter* for financial reporting has been increasing. Moreover, this study predicts that the innovators and early adopters of *Twitter* for financial reporting disclosure have different corporate characteristics, in comparison to late majority and laggards that have not adopted *Twitter* for financial reporting. Two hypotheses are developed to test this prediction. Following the discussion that financial reporting on *Twitter* may introduce new information to shareholders, this study also hypothesised that information asymmetry will subsequently be reduced. This study also discusses how inaccurate financial reporting information on *Twitter* could damage its credibility and the importance of protecting uninformed investors from the effects of such disadvantage. Based on a brief exploration of the current challenges of financial reporting on *Twitter* and the existing regulations on *Twitter*, this study predicts that the current framework of corporate disclosure regulation is not adequate to manage the practice of financial reporting on social media. The next chapter discusses the research design of this study, which explains how this study examines the above predicted observation and hypotheses.

Chapter 4: Research Design

4.1 OVERVIEW OF METHODOLOGY

According to Edmondson and McManus (2007), the choice of methodology should be based on the stage of knowledge development, which could be nascent [10], intermediate [11], or mature [12]. While prior literature has revealed the increasing use of *Twitter* in the business world (Bennett, 2015), a comprehensive understanding of financial reporting on *Twitter* is still essential (Sprenger et al., 2014). This study argues that the knowledge development of financial reporting on *Twitter* is currently at the intermediate stage. This means that the practice of financial reporting on *Twitter* has been introduced in the literature, and previous studies have tried to explain the relationship between financial reporting on *Twitter* and the reduction of information asymmetry (Blankespoor et al., 2014; Prokofieva, 2015). However, as discussed in Chapter Two, a review of the stock market reaction following financial reporting on *Twitter* from the lens of stock market microstructure is warranted. This study examines the stock market reaction mechanism following financial reporting on *Twitter*.

In this study, research methods are chosen to suit the nature of the current knowledge level regarding financial reporting on *Twitter*. A mixed method approach with both qualitative and quantitative methodologies is applied. At the first stage and to answer

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[10] Tentative answers to novel questions of how and why, often merely suggesting new connections among phenomena (Edmondson & McManus, 2007).

[11] Provisional explanations of phenomena, often introducing a new construct and proposing relationships between it and established constructs (Edmondson & McManus, 2007).

[12] Well-developed constructs and models that have been studied over time will increase prevision by a variety of scholars, resulting in a body of work consisting of points of broad agreement that represent cumulative knowledge gained (Edmondson & McManus, 2007).

research question one, this study identifies and examines the nature and extent of financial reporting tweets through thematic analysis. This is followed by binary regression analysis to reveal the corporate characteristics (including market capital size and industry sector) of early adopters that use *Twitter* for financial reporting. Based on the thematic analysis, this study identifies the targeted financial reporting tweets, which constitute the event sample for the second stage methodology. At the second stage and to answer research question two, this study uses event methodology and a comparative approach to quantitatively examine the economic consequences following these financial reporting tweets through the use of bid-ask spread and share trading volume as information asymmetry proxies. The results show the stock market reaction mechanism. An understanding of this stock market reaction mechanism assists the development of future regulation, as discussed in the third stage of methodology within this chapter. At the third stage and to answer research question three, based on the findings of this study and previous literature, this study adopts normative reasoning to comment on the current challenges of financial reporting on social media under existing regulations, and discusses the key areas that industry practitioners and future regulators should focus on. Further discussion of the methodologies is provided in the rest of the chapter. Table 4.1 lists the detailed steps taken to answer the three research questions and associated predicted observations and hypotheses in this study.

Table 4.1

Research Questions and Research Steps

RQ	Research Questions	Predicted Observation/ Hypotheses	Research Steps
1	What is the nature and extent of financial reporting on *Twitter* by ASX listed companies?	P1: The use of *Twitter* technology for financial reporting has increased over time.	• Identify and locate corporate *Twitter* accounts by searching corporate website and *Twitter* (www.twitter.com). • Collect tweets from verified corporate *Twitter* accounts via an external *Twitter* website (www.twimemachine.com). • Filter and categorise tweets into financial reporting related tweets, through thematic analysis process. • Based on the timings of the first financial reporting tweet from each corporate *Twitter* accounts, analyse trends and adoption patterns of ASX listed companies in using *Twitter* for financial reporting.
		H1a: There is a positive association between ASX companies' market capital sizes and the adoption of *Twitter* for financial reporting. H1b: ASX companies from certain industry sectors that are closed to technology are more likely to adopt *Twitter* for financial reporting.	• Identify the 'innovators and early adopters' who first adopt *Twitter* for financial reporting. • Collect corporate characteristic data from DatAnalysis Premium database, examine whether the 'innovators and early adopters' of *Twitter* for financial reporting have different corporate characteristics (including market capital size and industry sectors), in comparison to the 'late majority and laggards' that have not adopted *Twitter* for financial reporting.
			• Review the financial reporting types and sentiments of financial reporting tweets, through thematic analysis process.

2	What are the economic consequences of financial reporting on *Twitter*?	H2: The level of information asymmetry is smaller in ASX companies with both ASX announcement and financial reporting tweets than ASX companies with only the ASX announcement.	• Compare financial reporting tweets with the corresponding ASX announcement to identify the initial sample of event periods. • Review the initial sample of event periods with established sampling criteria to reach the final sample of event periods. • Identify the control periods with established sampling criteria. • Collect financial data from SIRCA database for both event and control periods. • Use the Wilcoxon Signed Rank Test to examine whether the level of information asymmetry for event period is significantly lower than the control period, following the financial reporting tweets.
3	What are the elements that industry practitioners and regulators should focus on in order to achieve better practice and regulation of financial reporting on social media?	P2: The current framework of corporate disclosure regulation is not adequate to manage the practice of financial reporting on social media.	• Discuss the previous incidents related to financial reporting on social media, both in Australia and the U.S. • Identify the challenges of financial reporting on social media from the previous incidents. • Review the findings of previous literature and results of the first two research questions, to present the current development of financial reporting on *Twitter*. • Based on the challenges and the current practice of financial reporting on social media, provide suggestions for industry practitioners, companies, and regulators to address the identified challenges.

4.2 STAGE 1 – THE NATURE AND EXTENT OF FINANCIAL REPORTING ON *TWITTER*

To answer research question one, the first stage of this study examines the nature and extent of financial reporting on *Twitter*. It includes the identification of corporate *Twitter* accounts and collection of tweets, followed by the categorisation of financial reporting tweets. A further examination of these financial reporting tweets to identify their characteristics is conducted through thematic analysis. This study reviews corporate characteristics (including market capital size and industry sector) of innovators and early adopters of *Twitter* for financial reporting, as well as preferences of financial reporting on *Twitter* among listed companies with different market capital sizes and from various industry sectors.

4.2.1 Data Collection of Financial Reporting Tweets

The data collection process involved the identification of *Twitter* accounts and the collection of financial reporting tweets. Figure 4.1 illustrates the two different approaches taken to determine the targeted corporate *Twitter* accounts. In the first approach, ASX listed companies' webpages were explored to identify the word or symbol of '*Twitter*', which denoted a link to the corporate *Twitter* account. These ASX listed companies' webpages were obtained through the ASX website (www.asx.com.au). All of the webpages were registered under each listed company's profile as they appeared on the ASX website. Following the first approach, if there was no identifiable link to the corporate *Twitter* account, then a search of the *Twitter* website (www.twitter.com) was conducted. A previous study (Xiong & MacKenzie, 2015) identified that some ASX companies were using *Twitter* without advertising their *Twitter* accounts on their corporate webpages. This second *Twitter* account search involved the use of the individual ASX company's business name on the *Twitter* website. In the process of *Twitter* account identification, only the verified

corporate *Twitter* accounts were selected, as financial reporting from the ASX listed companies are regulated under the current continuous disclosure regime (Australian Securities Exchange, 2013a). In this present study, the definition of a verified *Twitter* account is either advertised on the corporate website or the corporate website is mentioned in the *Twitter* account description. The selected financial reporting tweets were sourced only from the verified corporate *Twitter* accounts. This ensured that all financial reporting content was most likely legitimate. As discussed in Chapter One, there have been cases where faked tweets were disseminated as a consequence of hacking *Twitter* accounts. Therefore, this study collected tweets only from verified corporate *Twitter* accounts, to ensure that all of the tweets were written and disseminated by the listed companies.

Figure 4.1. Twitter **Account Identification Process**
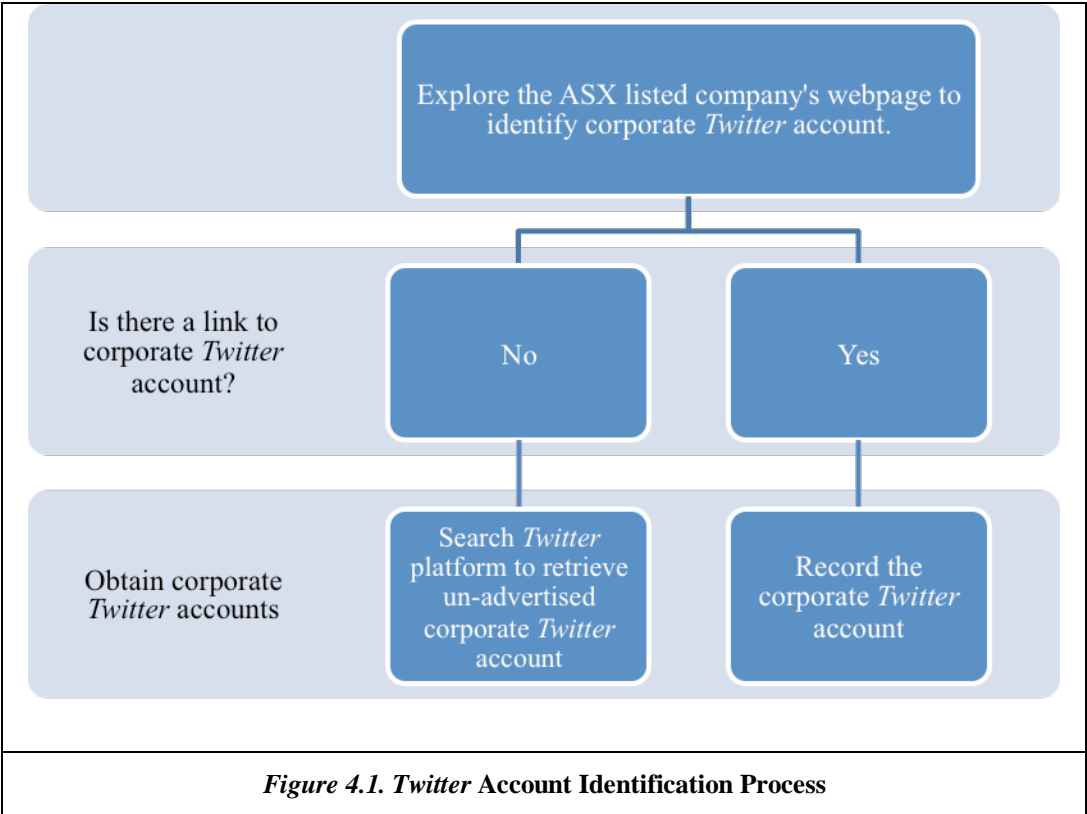
The initial sample size is the Top 500 ASX companies. This study identified 233 verified corporate *Twitter* accounts, in which 42 had no content or the content was not in English. Through thematic analysis approach (as discussed in following

sections) the final sample of ASX 500 companies using *Twitter* for financial reporting is 82.

The above approaches and selection criteria of *Twitter* accounts are adequate and appropriate, for two reasons. First, they fit the research aim of this study, which is to examine financial reporting on *Twitter* and reveal the economic consequences following these financial reporting tweets. Collecting tweets from the verified *Twitter* accounts ensures that all financial reporting tweets are from listed companies, which makes it possible to examine the nature and extent of financial reporting on *Twitter* by ASX companies and the stock market reaction following these financial reporting tweets. Second, it is recorded that *Twitter* followers highly regard information disseminated on corporate *Twitter* accounts, as they understand the credibility of such accounts (Maertelaere, Li, & Berens, 2012). According to Maertelaere et al. (2012), communication on *Twitter* between companies and stakeholders initiates a positive impact on firm value. Therefore, the financial reporting tweets in this study were collected from selected verified corporate *Twitter* accounts.

Following the identification of verified corporate *Twitter* accounts, historical tweets from these selected *Twitter* accounts were collected. Previous studies (Blankespoor et al., 2014; Sprenger et al., 2014) use a range of different techniques to retrieve historical tweets, including API coding to collect tweets from the original source in *Twitter*. As this study is focused on financial reporting from ASX companies' *Twitter* accounts, this study uses an external *Twitter* website (www.twimemachine.com) for collecting tweets. This external *Twitter* website provides easy access for users to search the most recent 3200 *Twitter* posts of any *Twitter* account. In this present study, the date range of the financial reporting tweet sample is from July 2008 (the

earliest) to November 2013 (the latest). To retrieve the historical tweet, each verified corporate *Twitter* account name was typed into this website, and the tweets from the verified corporate *Twitter* account were downloaded.

This study collected 64,933 tweets from the 191 verified corporate *Twitter* accounts, which have content in English. Through the thematic analysis process (discussed later) 5,637 tweets were retained after the filtering process, and 880 financial reporting tweets were identified. Section 4.2.2 reviews how these collected tweets were further categorised as financial reporting related or not.

4.2.2 Data Analysis of Financial Reporting Tweets

The data analysis of financial reporting tweets contains three steps. In the first step, all of the collected tweets were filtered to construct a smaller sample of tweets. In the second step, the first thematic analysis framework was used to identify financial reporting tweets from the previous filtered tweets. In the third step, these financial reporting tweets were further explored with a second thematic analysis framework to reveal their characteristics.

In the first step, a filter was used to reduce the number of sampling tweets that need to be examined. This filtering process is appropriate and valid for the following reasons. First, *Twitter* has been developed as a new communication channel that covers many different aspects of business communication, which includes but is not limited to consumer service enquiry, marketing, and human resource management. As the aim of this study is to examine the nature and extent of financial reporting on *Twitter*, any tweet that was not related to financial reporting on *Twitter* was excluded. The filtering process reduced the number of sample tweets and excluded irrelevant tweets. Second, to reduce the sampling tweets and retain as many financial reporting related tweets as possible, this study adopted a data-coding framework (see Table 4.2)

as a filter. This data coding framework is valid as it was developed as per Vause (2005). Vause (2005) discusses the areas of financial reporting statements that investors should focus on, especially the use of financial ratios for company performance evaluation. The data-coding framework constitutes the keywords from these financial ratios. Therefore, the data-coding framework included most of the frequently used keywords when discussing company performance, which makes it a valid filter to retain as many financial reporting tweets as possible. While 64,933 tweets were collected from 191 verified corporate *Twitter* accounts in this study, the use of a filter reduced the sampling tweets down to 5,637.

Table 4.2
Data Coding Framework Developed from Vause (2005)
Assets, Accruals, Cash, Cash Flow, Capital, Dividends, Cost, Debt, Equity, Earnings, Employee, Expenditure, Expense, Interest, Inventory, Liabilities, Margin, Price, Profit, Remuneration, Receivable, Revenue, Return, Salary, Sales, Share, Stock, Tax, Wage.

While the filtering process in step one eliminated more than 90% of tweets that were not likely to disclose financial reporting information (as they did not contain keywords from the above data coding framework), there remained tweets that were related to other types of communication, such as customer service enquiries. To exclude these irrelevant tweets, a corporate disclosure thematic analysis template, as developed by Xiong and MacKenzie (2015), was used to further categorise these filtered tweets based on their content (see Table 4.3). Following this process of corporate disclosure thematic analysis, the tweets that reviewed under the categories of financial reporting and potential financial reporting constituted the final sample of tweets for this study (see Appendix A for an example of corporate disclosure thematic analysis). According to the definition of financial reporting and potential financial reporting within the template, only the tweets that discuss financial

reporting related information were categorised in these groups. Following this process, 880 financial reporting tweets were identified.

Tweet post themes	Definitions
Table 4.3 *Corporate Disclosure Thematic Analysis Framework*	
Human Resource Management (HRM)	Changes in or new appointments of staff, as well as announcements related to company's staff, such as receiving the award of 'best mining team 2012'. In addition, this category includes the news that any staff give a speech in public.
Customer Service Enquiries (CSE)	@ another user, customer service related, such as answering enquiries or in a set of conversation threads.
Corporate Promotion (CP)	Promotion of products and services of listed companies.
Investor Relation (IR)	Company announcement related to an investor relation corporate announcement, such as the update of AGM and dividend policy (with no specific financial content).
Corporate Social Responsibility (CSR)	Corporate social responsibility issues, such as company donation to charity, or becoming sponsors of Olympic or Aboriginal events.
Market News (MN)	Announcement about markets, such as a change of central bank interest rate.
Event Tweet (ET)	Tweets that promote specific company events, such as lucky draw for customers etc.
Financial Reporting (FR)	Specific financial reporting information, such as profit amount, dividend policy etc. This kind of financial reporting information directly shows the financial aspect of listed companies.
Potential Financial Reporting (PFR)	Different from financial reporting information, potential financial reporting information does not directly indicate financial aspects of listed companies.
Company News (CN)	Corporate announcements that cannot be categorised into the above themes.
Meaningless Tweets and Retweets (MTR)	Anything else that does not belong to the above seven themes, such as 'Merry Christmas' or 'Thank God it's Friday'.

In the third step, financial reporting tweets were further examined to reveal their characteristics. Through a pilot test of the financial reporting tweets from the Top 20 ASX companies, a financial reporting thematic analysis template (see Table 4.4) was developed to identify the characteristics of financial reporting tweets. While previous

literature (Sprenger et al., 2014) identifies sixteen specific earnings events covered by financial reporting on *Twitter* in the U.S. context (see Table 4.5), the pilot test in this study showed several differences. The pilot test identified six additional financial reporting events that were not covered in the previous U.S. study (Sprenger et al., 2014). For example, there was no clear category in the previous U.S. study that covered the theme of 'Issue New Capital/Change of Capital'. In contrast, eight earnings events from the Sprenger et al. (2014) U.S. study did not appear in the results of the pilot test for the present study, for example, 'Jurisdiction' and 'Government Action' under 'Legal Issue'. Therefore, a new financial reporting thematic analysis template that includes fourteen categories of financial reporting information was developed, based on the results from the pilot test and previous U.S. study (Sprenger et al., 2014). This new thematic analysis template was used to cover the need to examine the financial reporting themes for Australian sample companies on *Twitter*.

Following the establishment of this financial reporting thematic analysis template, all of the financial reporting tweets were examined according to this template. In addition, this study examined the sentiments of the financial reporting tweets. Financial reporting tweets that included a comparison of financial performance between the current period and a future period were categorised as positive if the comparison claimed that the company's financial performance was better in the future period, including an increase of profit or cost reduction. In contrast, such a financial reporting tweet was categorised as negative if the comparison claimed that the company's financial performance would be poorer in the future period. This categorisation of positive and negative sentiment was also applied to the comparison of financial performance between the historical period and current period.

Additionally, if the financial reporting tweet did not present any comparison of financial performance, then the sentiment of this financial reporting tweet was categorised as neutral (see Appendix B for an example of financial reporting theme and sentiment analysis).

In summary, this study first identified corporate *Twitter* accounts and collected their historical tweets through an external *Twitter* website. A filter and a framework from a previous study (Xiong & MacKenzie, 2015) were used to capture and retain the relevant financial reporting tweets. Finally, a new template was developed as a data management tool to identify and organise the financial reporting tweets according to their characteristics (Crabtree & Miller, 1999). The use of the above filter and templates support the credibility of this study (Fereday & Muir-Cochrane, 2008). Section 4.3 discusses the approach utilised to review the market reaction following the financial reporting tweets.

Table 4.4

Financial Reporting Thematic Analysis Template

Themes	Explanation of themes
Earnings	News about earnings announcement, including profit.
Analyst Rating	Tweets about the change of analyst rating/comments on firms' performance.
Change of/Maintain Interest Rate	Banks announce their actions on the interest rates of their products, most likely after the interest rate review by the Reserve Bank of Australia.
Dividend Distribution	Announcements of a dividend or any discussion related to the dividend issue.
Issue New Capital/ Change of Capital	When companies issue new shares or employees exercise their share options.
Operational/Capital Income Expenditure	When companies purchase or sell assets.

Market/Price Settlement	Companies settle price with customers/stakeholders.
Award New Contract	New contract signed between companies and other stakeholders.
Operational Performance	Companies discuss company performance, such as an increase in productivity.
Joint Venture	Announcements about the establishment of joint venture, or any news related to the joint venture.
Merger and Acquisition	Tweets discussing the merger and acquisition behaviour of companies.
Stock Related	Discussion/updates about the performance of companies' share price or share performance.
Market Related	Discussion/updates about the performance of the stock market in general.
Others	Tweets that do not belong to the above themes.

Table 4.5

Earnings Event Template from Sprenger et al. (2014)

Event Categories	Event Detail
Corporate Governance	CEO
	Other Executive
Financial Issues	Earnings
	Analyst Rating
	Financial Other
Operations	Labor Issues
	Product Development
	Operational Performance
	Marketing
	Contract
Restructuring Issues	Joint Venture
	Merger and Acquisition
Legal Issues	Jurisdiction
	Government Authorities
Technical Trading	Stock Related
	Market Related

4.3 STAGE 2 – THE ECONOMIC CONSEQUENCES OF FINANCIAL REPORTING ON *TWITTER*

To answer research question two, the second stage of this study is to examine the economic consequences following financial reporting on *Twitter*. In this study, each individual financial reporting tweet is considered a separate event. Following the event methodology approach, this study examines the follow-up stock market reaction after the disclosure of each financial reporting tweet. The following subsections discuss how the research design of this study differs from previous studies regarding the use of event methodology, the comparative approach, and the selection of proxies and data analysis method in examining the stock market reaction following financial reporting on *Twitter*.

4.3.1 The General Use of Event Methodology and Comparative Approach

Previous literature on information asymmetry (Healy & Palepu, 2001) and efficient market hypothesis (Fama, 1970) suggests that when new information arrives in the stock market, information asymmetry between manager and shareholder is reduced, and the stock market reacts to this extra information through the adjustment of the share price. In order to capture stock market reaction following financial reporting on *Twitter*, this study considered each financial reporting tweet to constitute a single event. The event methodology and the comparative approach were used to identify the corresponding control periods for each financial reporting event. In this subsection, the component of event methodology is first discussed, followed by the component of the comparative approach.

Event methodology has been widely used in peer-reviewed empirical research (See for example, Leuz & Verrecchia, 2000; Bushee et al., 2010; Reddy & Gordon, 2010; Blankespoor et al., 2014). For example, Leuz and Verrecchia (2000) used event

methodology to investigate the economic effect of increased disclosure. In order to detect the impact of tightened accounting standards, Leuz and Verrecchia (2000) used the monthly average of bid-ask spread to proxy for information level, and compared the changes of this proxy before and after the adoption of tightened financial statement standards. In the Australian context, Reddy and Gordon (2010) applied event methodology to evaluate the effect of environmental disclosure on listed companies. In their study, abnormal return was used as the dependent variable proxy of economic effect. Reddy and Gordon (2010) considered the environmental disclosure publication date as the event day; they compared whether the environmental disclosure assisted in improving companies' abnormal returns.

Depending on the research aim, the choice of event in event methodology is different across studies. As discussed in Chapter Two, in previous studies that investigated corporate disclosure/financial reporting on *Twitter*, Blankespoor et al. (2014) selected earnings announcement and press release as an event, while Prokofieva (2015) selected the ASX announcement. As the research aim of this current study is to investigate the economic consequences following financial reporting on *Twitter*, a single financial reporting tweet is chosen as the event. This unique selection of event made this current study different from previous studies. As presented in Figure 4.2, a traditional event methodology approach involves the identification of 'pre-period', 'pre-event window' and 'post-event window'. For example, in a study of U.S. IT firms, Blankespoor et al. (2014) selected earnings announcement and press release as events, identified the length of 'pre-event window', 'event day' and 'post-event window' as one trading day, and the 'pre-period' window as one to sixty trading days before the 'event day'.
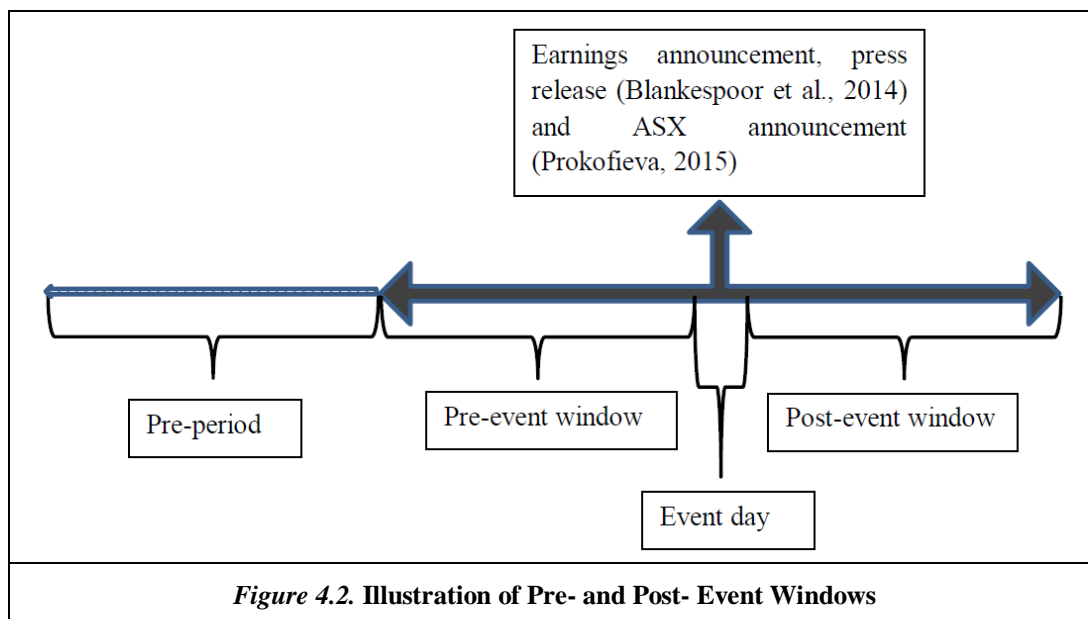
Figure 4.2. **Illustration of Pre- and Post- Event Windows**

To construct the association between corporate disclosure on *Twitter* and reduction of information asymmetry, Blankespoor et al. (2014) first collected the data of '*Twitter* activity' and information asymmetry during a three-day event window, which included the one trading day of 'pre-event window', one trading day of the 'event day' (the trading day when the event occurred), and one trading day of the 'post-event window'. Blankespoor et al. (2014) then collected the data of '*Twitter* activity' and information asymmetry within the 59 trading day 'pre-period window', in order to construct the data of abnormal '*Twitter* activity' and abnormal information asymmetry. After the collection of the above variables and other control variables, Blankespoor et al. (2014) ran OLS regression analysis to demonstrate the association between abnormal '*Twitter* activity' and the reduction of information asymmetry during the event period. In another study investigating Australian companies, Prokofieva (2015) followed a similar approach. She first selected the ASX announcement as the event. She then assigned the length of 'pre-event window', 'event day' and 'post-event window' as one trading day, and the 'pre-period' window as two trading days after the previous ASX announcement and two trading days before the selected ASX announcement. Prokofieva (2015) collected

data of '*Twitter* activity', information asymmetry, and other identified control variables of the three-day event window and 'pre-period window', then used this data to construct the association between '*Twitter* activity' and reduced information asymmetry through OLS regression analysis.

4.3.2 The Use of Event Methodology in Current Study

This study adopts a different event methodology approach. As this study selects the financial reporting tweet as a single event and the focus is the stock market reaction following the financial reporting tweet, this study is more interested in the 'post-event' window. While previous studies have selected press releases, earnings announcements and ASX announcements to construct a three-day event window (Blankespoor et al., 2014; Prokofieva, 2015), this study constructs a one-day event window. Previous studies do not specify the time of the event, which means that the market reaction following the event as captured in the three-day event window could be as short as one trading day (if the event happened right before the market close in the event day) or as long as two trading days (if the event happened right after the market open in the event day). In this study, the use of a one-day event window is adequate, as this one-day event window is flexible enough to capture the market reaction following financial reporting tweets for one trading day, regardless of the release time of the financial reporting tweet. For example, if a financial reporting tweet was released on 11:30:00 on day T, then this one-day event window captured the market reaction from 11:30:00 on day T to 11:30:00 on day T+1, provided both T and T+1 were trading days.

In reference to Figure 4.2, this study uses a one-day event window that only includes the 'post-event window', which means that the lengths of both 'pre-event window' and 'event day' were 0, as the focus of this study is to review the stock market

reaction following financial reporting tweets. While previous studies (Blankespoor et al., 2014; Prokofieva, 2015) set up a 'pre-period' to construct abnormal information level, this study sets up a 'pre-period' to control for the changes in stock market trading behaviour[13]. This study defines the 'pre-period' as extending from 14 days to 120 days before the selected financial reporting tweet, which is similar to Frino, Lecce, and Segara (2011). As the second part of the research design in this current study adopts and further develops the comparative approach from Frino et al. (2011), the setup of a 'pre-period window' in reference to Frino et al. (2011) is adequate. Since the 'post-event window' data is the key component under investigation in this current study, selection criteria are applied to manage the financial reporting event periods, in order to ensure the adequacy and accuracy of the 'post-event window' data.

One key aspect of event methodology is to ensure that the market reaction following the event is only attributed to the selected event. This aspect is difficult to manage in practice, as the information environment is constantly changing. The observed stock market reaction following the selected event may not be fully attributed to the selected event. Therefore, this study imposes criteria to maximise the possibility of capturing the stock market reaction attributed to the selected financial reporting tweets. First, this study further reduces the sampling financial reporting tweets through comparison between financial reporting tweets and their corresponding ASX announcements. According to the current continuous disclosure regime in Australia, ASX listed companies must first report material information to ASX and then wait for ASX's confirmation of release before they can further disseminate such material

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[13] Further explanation of controlling the changes in market trading behaviour is provided in Section 4.3.5.

information through other corporate disclosure channels. Under this regulatory setting, it is expected that each financial reporting tweet should correspond with a prior ASX announcement, especially for 'price sensitive' information. According to ASX, based on the criterion as to whether such an announcement will have a significant impact on the share itself or the stock market in general, each ASX announcement is categorised by ASX as 'price sensitive' information or not. If ASX believes that the ASX announcement may initiate a significant impact, then such an announcement is categorised as 'price sensitive' information. In this study, only the financial reporting tweets that correspond with 'price sensitive' ASX announcements are retained as valid financial reporting tweet events. This criterion ensures that the financial reporting tweet events are more likely to generate observable significant stock market movements, as they contain 'price sensitive' information.

The second criterion requires that each event period only constitutes one 'price sensitive' ASX announcement. This criterion is similar to previous studies (Blankespoor et al., 2014; Prokofieva, 2015), in which an ASX announcement (Prokofieva, 2015) and earnings announcement or press release (Blankespoor et al., 2014) constitutes an individual event. Such criterion is to assure that the observed stock market reaction is most likely attributed to the selected 'price sensitive' ASX announcement. In other words, if there are multiple pieces of 'price sensitive' ASX announcements, it is difficult to argue which piece of 'price sensitive' ASX announcement initiates the observed stock market reaction. In order to maximise the likelihood of capturing the stock market reaction following a financial reporting tweet, this study imposes the criterion that only one piece of 'price sensitive' ASX announcement can exist during one trading day time frame before and after the financial reporting tweet and corresponding 'price sensitive' ASX announcement.

For example, an ASX company releases two 'price sensitive' announcements in the same day T, with the first announcement 'Announcement A' disclosed before the stock market opening, and the second announcement 'Announcement B' disclosed after the stock market closing (see Figure 4.3 for illustration). There is one financial reporting tweet corresponding with 'Announcement B', yet there is no financial reporting tweet corresponding with 'Announcement A'. Under this scenario, this study still considers the selected financial reporting tweet and 'Announcement B' to constitute a valid observation in the sample to investigate the stock market reaction following the selected financial reporting tweet, as the stock market has one whole trading day T to react to 'Announcement A', and one whole trading day T+1 to react to the selected financial reporting tweet and 'Announcement B'. In this case, the financial reporting event period is 'trading day T+1'. However, if there is a 'price sensitive' 'Announcement C1' in the next trading day T+1 (before the market opens or during the market trading period), then this financial reporting tweet and 'Announcement B' will not form a valid observation in the sample, as the one trading day stock market reaction following the financial reporting tweet in T+1 will be affected by the 'price sensitive' 'Announcement C1'. If a 'price sensitive' 'Announcement C2' in the next trading day T+1 is released after stock market closing (without the existence of 'Announcement C1'), then this study still considers the selected financial reporting tweet and 'Announcement B' to constitute a valid observation in the sample to investigate the stock market reaction following the selected financial reporting tweet. This is because the stock market has one whole trading day T+1 to react to the selected financial reporting tweet and 'Announcement B', and one whole trading day T+2 to react to 'Announcement C2'. While there are other scenarios, the key focus of the second criterion is to ensure that the one-day

event window following the financial reporting tweet is not affected by other 'price sensitive' announcements or financial reporting tweets (except the tweets corresponding to the same ASX announcement as the selected financial reporting tweet).

The above discussion presents the use of event methodology in this study, especially the setup of a one-day 'event period', in comparison to previous literature (Blankespoor et al., 2014; Prokofieva, 2015). The next subsection discusses the use of the comparative approach between event periods and control periods to investigate the stock market reaction in the 'post-event window' following the financial reporting   tweets.
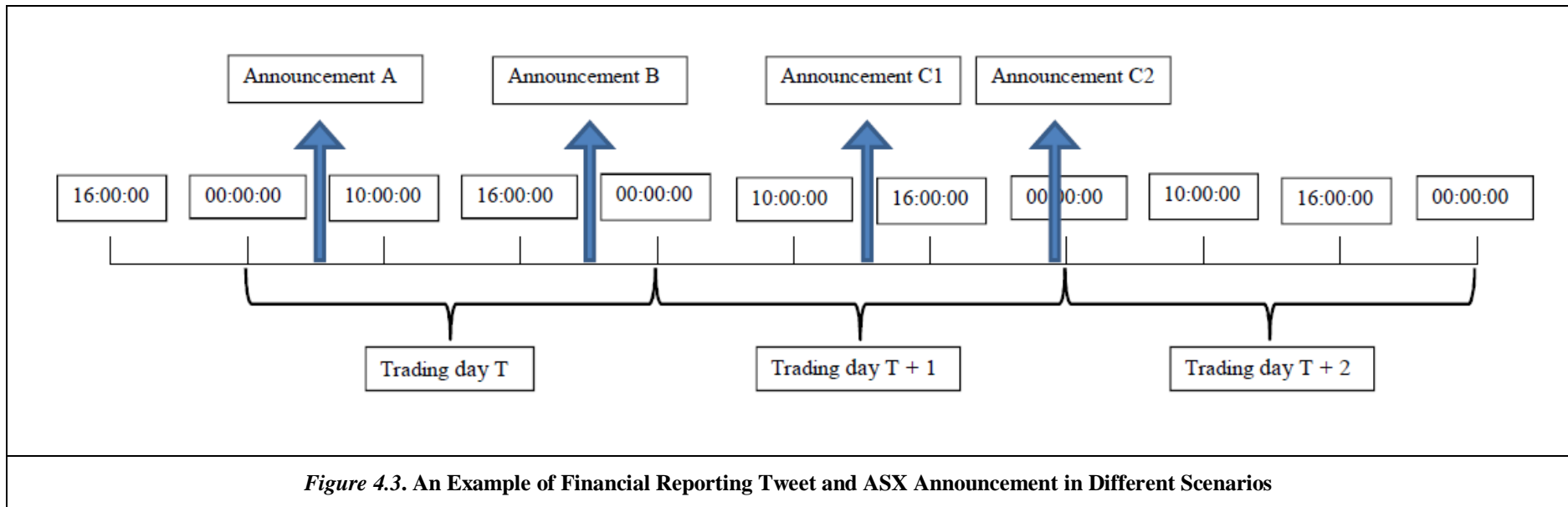
Figure 4.3. **An Example of Financial Reporting Tweet and ASX Announcement in Different Scenarios**

4.3.3 The Use of Comparative Approach

The second component of the research methodology involves the comparative approach. Previous studies (Blankespoor et al., 2014; Prokofieva, 2015) have used the event methodology approach and OLS regression analysis to reveal the association between corporate disclosure/financial reporting on *Twitter* and reduced information asymmetry. As discussed in Chapter One, the second research question of this study is to review the economic consequences following financial reporting on *Twitter*. In previous literature (Blankespoor et al., 2014; Prokofieva, 2015), corporate disclosure/financial reporting on *Twitter* was considered the independent variable, and information asymmetry was considered the dependent variable. An OLS regression analysis is then used to construct the association between these two variables. If this study follows this same approach, the second research question will not be addressed, as the focus of this research question is to review the stock market reaction following financial reporting tweets, from the lens of stock market microstructure. Therefore, the more appropriate approach is to review the intra-day trading activity following these financial reporting tweets, instead of the construction of association between financial reporting on *Twitter* and the changes in information asymmetry. To do so, this current study uses a comparative approach in addition to event methodology. The combined use of event methodology and the comparative approach provides a new means to understand the economic consequences following financial reporting on *Twitter*, such as how long it takes for the stock market to react following the financial reporting tweet and the scale of such stock market reaction.

The comparative approach is first utilised by Frino et al. (2011). In a study examining how trading halt could affect the change of stock market information environment, Frino et al. (2011) adopt the event methodology to treat each trading halt as an individual event, and the comparative approach to review the trading halt effect by comparing the event periods with

trading halt and control periods without trading halt. To isolate the change of market information environment that is not due to the trading halt, Frino et al. (2011) select corresponding control periods that have similar levels of information as their corresponding event periods. Furthermore, in order to control for the day and time effect, these selected control periods must be at the same time and day as their corresponding event periods. This comparative approach provided an ideal setting to examine the impact of a trading halt on the market information environment.

This study adopts and further develops the comparative approach as in Frino et al. (2011) to examine the stock market reaction following financial reporting on *Twitter*. Similar to Frino et al. (2011), this study imposes three sets of criteria for the selection of control periods in order to construct an ideal comparative setting. First, the selected control period must adhere to the same criteria of the event period, as presented in the previous discussion. This means that the length of the selected control period is also one trading day. In brief, these criteria include that the control period must contain only one 'price sensitive' ASX announcement and ensure that there is no other 'price sensitive' ASX announcement within the one trading day timeframe before and after the selected ASX announcement (see previous discussion of financial reporting event identification in Figure 4.3; with the exception that the control period does not have a financial reporting tweet). Second, such a 'price sensitive' ASX announcement in the control period must be within the same category of ASX announcement as in the event period. This is to ensure that the stock market reaction is likely to be similar between the event period and its corresponding control period. As each ASX announcement is categorised by ASX regarding the type of information that is included, this study matches the event periods with their corresponding control periods based on the type of information as recorded by ASX. Third, the control period must be at a similar time and day as its corresponding event period, in order to control for the time and day effect (Frino et al., 2011).

For example, if both the financial reporting tweet and the corresponding ASX announcement are disclosed before the stock market opening, then in the selected corresponding control period, the same category of 'price sensitive' ASX announcement was observed through the ASX platform before the stock market opening. The above criteria for the control period ensures that the market reaction in the control period is most likely attributed to the one 'price sensitive' ASX announcement, which is in the same category of ASX announcement as the one in its corresponding event period. Moreover, these criteria for both the event period and control period ensure that the market reaction following the financial reporting on *Twitter* is comparable.

The above discussion explains that this study uses a new methodology that is different from previous studies (Blankespoor et al., 2014; Prokofieva, 2015), incorporating both event methodology and a comparative approach. To improve the validity of the research design of this study, specific criteria for selecting event periods and control periods are discussed, including the further reduction of the sampling tweets. The following subsection presents an example of identifying a financial reporting event period and its corresponding control period.

4.3.4 An example of financial reporting event period and corresponding control period construction

Table 4.6 outlines the steps used to construct a financial reporting event period and its corresponding control period. The first step of constructing a financial reporting event period is to identify the related financial reporting tweet. Table 4.7 presents an example of a financial reporting tweet that underwent the filtering and thematic analysis processes as discussed in the stage one methodology presented in Section 4.2. In reference to Table 4.2, the financial keywords in the example of a financial reporting tweet are 'cash' and 'cost'. In reference to Table 4.3, the corporate disclosure theme in the example of a financial reporting

tweet is 'financial reporting (FR)'. In reference to Table 4.4, the financial reporting theme in the example of a financial reporting tweet is 'financial issues – earnings'. The sentiment of this financial reporting tweet is 'positive', as it discusses an upcoming cost reduction, which is positive financial reporting information.

Table 4.6	
Steps to Construct Financial Reporting Event Period and Control Period	
Steps	**Actions**
1.	Collect financial reporting tweets, as identified from previous research question one result.
2.	Collect all ASX announcements related to the listed company from the SIRCA database. The search time is from one day before the date of selected financial reporting tweet to one day after the financial reporting tweet.
3.	Compare content of the financial reporting tweet and corresponding ASX announcement (if there is one).
4.	Retrieve all tweets disclosed by the listed company from www.twimemachine.com. The search time is from one day before the date of selected financial reporting tweet to one day after the selected financial reporting tweet.
5.	The retrieved tweets from step four undergo thematic analysis, in reference to thematic analysis framework as outlined in Table 4.4, in order to identify any missing 'financial reporting' and 'potential financial reporting' tweets.
6.	The content of all identified 'financial reporting' and 'potential financial reporting' tweets are compared to the ASX announcements collected in step two.
7.	Identify the financial reporting control period that corresponds to the financial reporting event period.

Table 4.7					
Financial Reporting Tweet Example					
Tweet	**Date (DD/MM/ YYYY)**	**Time**	**Corporate disclosure theme**	**Financial reporting theme**	**Sentiment**
CFO Guy Elliott: By the end of 2014, we will have achieved sustainable annual **cash cost** reductions of $3 billion http://t.co/1nRfkU6z $RIO	14/02/2013	19:43:29	FR	Financial Issues - Earnings	Positive

The second step is to collect all ASX announcements on 14th Feb 2013, as well as one day before the date of the selected financial reporting tweet and one day after the financial reporting tweet disclosure. Table 4.8 presents all ASX announcements during this three-day period. These ASX announcements are identified via the SIRCA database. As discussed in the previous subsection, one selection criterion of the financial reporting event period is that

there can be only one 'price sensitive' ASX announcement in the proposed financial reporting event period. As shown in Table 4.8, 14th Feb 2013 is a Thursday and there is no record of a 'price sensitive' ASX announcement on the day before (13th Feb 2013) or after (15th Feb 2013). Furthermore, there is only one 'price sensitive' ASX announcement on the date of 14th Feb 2013. In this case, the selection criterion of only one 'price sensitive' ASX announcement in a single financial reporting event period is met. For this selected financial reporting tweet on the 14th Feb 2013, the financial reporting event period is 15th Feb 2013. As the financial reporting tweet was disclosed at 19:43:29 and the ASX trading hour is from 10:00:00 to 16:00:00, the stock market was closed when the financial reporting tweet was disclosed. All stock market reaction following the financial reporting tweet should be observed on the next trading date, which was 15th Feb 2013. Therefore, the financial reporting event period is 15th Feb 2013.

Table 4.8					
ASX Announcements around Financial Reporting Event Period					
Company	**Headlines**	**Dates**	**Times**	**ASX Announcement Categories**	**Price sensitive (Y/N)**
RIO	Becoming a substantial holder	1/02/2013	17:19:07	[2001]	N
BOC	JORC Compliant Resource Update	7/02/2013	17:11:44	[11001]	Y
RIO	Rio Tinto welcomes ACT decision on rail network access	11/02/2013	10:06:05	[11001]	Y
RIO	**Rio Tinto results for the year ended 31 December 2012**	**14/02/2013**	**17:00:44**	**[3004,3009,3010, 3015,3019,10001, 10002,10003]**	**Y**
RIO	New chief executives of Iron Ore and Copper	14/02/2013	17:05:14	[12008]	N
RIO	Rio Tinto full year results - presentation slides	14/02/2013	19:02:30	[3003]	N
MND	Notice of Award for $260m Rio Tinto Construction Contract	25/02/2013	11:40:10	[11001]	Y

The third step is to review and compare the content of the financial reporting tweet and the corresponding ASX announcement (if one exists). In this example, the highlighted ASX announcement in Table 4.8 corresponds to the financial reporting tweet in Table 4.7. Table 4.9 shows the front page of the highlighted ASX announcement, which contains the same information (highlighted text) as disclosed in the financial reporting tweet. Based on the above information, this set of financial reporting tweet and financial reporting event period can be confirmed.

Following the confirmation of the financial reporting event period, which constitutes a financial reporting tweet and its corresponding ASX announcement, the next step is to review the *Twitter* activity around this financial reporting event period. To do so, all of the tweets disclosed by the company on 14th Feb 2013, including one day before and one day after, are collected and analysed. As discussed in stage one methodology in Section 4.2, all tweets are collected through an external *Twitter* website (www.twimemachine.com) and underwent the filtering and thematic analysis process. All tweets collected through the external *Twitter* website are first saved in a separate file prior to the filtering process. Therefore, the required tweets from 13th Feb 2013 to 15th Feb 2013 are accessed from this separate file. These collected tweets underwent the thematic analysis process (without filtering), in reference to Table 4.3 to categorise their corporate disclosure themes, and Table 4.4 to categorise financial reporting themes (if applicable). The results are shown in Table 4.10.

Table 4.9

Comparison between Financial Reporting Tweet and Corresponding ASX Announcement

Tweet	Date (DD/MM/ YYYY)	Time
CFO Guy Elliott: By the end of 2014, we will have achieved sustainable annual cash cost reductions of $3 billion http://t.co/1nRfkU6z $RIO	14/02/2013	19:43:29

RioTinto

120 Collins Street
Melbourne 3000
Australia
T +61 (0) 3 9283 3333
F +61 (0) 3 9283 3707
ABN 96 004 458 404

Media release

Rio Tinto results for the year ended 31 December 2012

14 February 2013

Rio Tinto chief executive Sam Walsh said "Today I am setting out how we can build on our strengths and improve this great company. Under my leadership, Rio Tinto will have an unrelenting focus on pursuing greater value for shareholders. To do this we need to run the business as owners not managers and my immediate priority is to build more focus, discipline and accountability throughout the organisation. Demonstrating this commitment, we will deliver our capital reduction and cost savings targets and improve performance across our business."

- **Reinforcing capital allocation discipline**
  - Pursuing greater value for shareholders by investing capital only in assets that, after prudent assessment, offer attractive returns that are well above our cost of capital.
  - Balancing the use of capital between returns to shareholders and capital expenditure, while aiming to maintain a strong balance sheet with a single A credit rating.
- **Improving performance at existing businesses**
  - Targeting cumulative cash cost savings of more than $5 billion by the end of 2014, equivalent to an annual run rate of $3 billion by 2014, assuming stable market and operating conditions.
  - Reducing capital expenditure on approved and sustaining projects to approximately $13 billion in 2013.
  - Lowering exploration and evaluation spending by $750 million (pre-tax) in 2013 compared with 2012.
- **Delivering approved growth projects with two significant milestones in 2013:**
  - Phase one Pilbara iron ore expansion to 290 Mt/a has been accelerated and is now scheduled for completion during the third quarter of 2013. Phase two expansion to 360 Mt/a to be operational by the first half of 2015.
  - Oyu Tolgoi copper-gold mine now being commissioned with first commercial production scheduled by the end of June 2013. Discussions with the Government of Mongolia regarding the continuing implementation of the Investment Agreement are ongoing.

2012 financial results

2012 underlying financial results reflect record iron ore production and shipments and a second half recovery in copper volumes. This was in the context of lower average market prices in 2012 which reduced underlying earnings by $5.3 billion compared with 2011:
- Underlying earnings[1] of $9.3 billion.
- Net loss of $3.0 billion after impairments of $14.4 billion, primarily relating to aluminium businesses as well as coal assets in Mozambique.
- 15 per cent increase in full year dividend to 167 cents per share.

Twelve months to 31 December (All amounts are US$ millions unless otherwise stated)	2012	2011	Change
Underlying earnings[1]	9,303	15,549	-40%
Net (loss) / earnings[1]	(2,990)	5,826	-151%
Cash flows from operations	16,450	27,388	-40%
Capital expenditure	17,418	12,298	+42%
Underlying earnings per share – US cents	503.1	808.5	-38%
Basic (loss)/earnings per share from continuing operations – US cents	(161.3)	303.5	-153%
Ordinary dividends per share – US cents	167.0	145.0	+15%

The financial results are prepared in accordance with IFRS and are unaudited. [1]Underlying earnings is the key financial performance indicator which management uses internally to assess performance. It is presented here to provide greater understanding of the underlying business performance of the Group's operations attributable to the owners of Rio Tinto. Net earnings and underlying earnings relate to profit attributable to owners of Rio Tinto. Underlying earnings is defined and reconciled to net earnings on page 12.

Table 4.10

Record of Tweets around Financial Reporting Event Period

Tweets	Dates (DD/MM/ YYYY)	Time	Corporate disclosure themes	Financial reporting themes	Sentiments
Sam Walsh on Rio Tinto's Growth Strategy, Outlook via @BloombergTV http://t.co/ksKl0Gxl	16/02/2013	0:09:02	HRM	N/A	N/A
Video: Rio Tinto's chief exec Sam Walsh is looking to the future & pursuing greater value for shareholders http://t.co/Yo7DxwGK $RIO	15/02/2013	22:55:19	HRM	N/A	N/A
Chief exec: We will build a stronger, more sustainable company, delivering greater value for our shareholders http://t.co/1nRfkU6z $RIO	14/02/2013	20:07:39	PFR	N/A	N/A
Chief executive Sam Walsh: We are well placed to take advantage of strong growth in long-term demand http://t.co/1nRfkU6z $RIO	14/02/2013	19:58:14	PFR	N/A	N/A
CFO Guy Elliott: We are increasing our dividend by 15%, demonstrating our confidence in the long-term outlook http://t.co/1nRfkU6z $RIO	14/02/2013	19:55:00	FR	Financial Issues – Dividend Distribution	Positive
CFO Guy Elliott says we expect 2012 to have been our peak year of capital investment http://t.co/1nRfkU6z $RIO	14/02/2013	19:48:46	PFR	N/A	N/A
CFO Guy Elliott: By the end of 2014, we will have achieved sustainable annual cash cost reductions of $3 billion http://t.co/1nRfkU6z $RIO	14/02/2013	19:43:29	FR	Financial Issues - Earnings	Positive
Chief exec: We'll only invest in assets that offer attractive returns that are well above our cost of capital http://t.co/1nRfkU6z $RIO	14/02/2013	19:39:42	HRM	N/A	N/A

Chief exec: I've made it clear to everyone they must run the business like owners, not managers http://t.co/1nRfkU6z $RIO	14/02/2013	19:38:00	HRM	N/A	N/A
Sam Walsh: I will drive an unrelenting focus on pursuing greater value for our shareholders http://t.co/1nRfkU6z $RIO	14/02/2013	19:36:45	HRM	N/A	N/A
Chief executive Sam Walsh: Core strategy unchanged, but changes in delivery under my leadership http://t.co/1nRfkU6z $RIO	14/02/2013	19:35:48	HRM	N/A	N/A
Rio Tinto full year results live webcast will begin at 8.30am GMT / 7.30pm AEDT http://t.co/1nRfkU6z $RIO	14/02/2013	19:12:36	IR	N/A	N/A
New chief executives of Iron Ore and Copper http://t.co/vlRrgeLi $RIO	14/02/2013	17:15:32	N/A	N/A	N/A
Rio Tinto results for the year ended 31 December 2012 http://t.co/Xs7nUhOv $RIO	14/02/2013	17:13:50	IR	N/A	N/A
Gove alumina refinery to continue operating as the gas to Gove project progresses http://t.co/rcBcxntu	13/02/2013	11:49:44	PFR	N/A	N/A
RT @eurekaprizes: Enter the @RioTinto Eureka Prize for Commercialisation of Innovation http://t.co/lvrLPBjf	11/02/2013	15:00:22	ET	N/A	N/A
Rio Tinto welcomes Australian Competition Tribunal decision on third party access to its rail network http://t.co/RTZTnf4y	11/02/2013	10:18:42	CN	N/A	N/A
China is Rio Tinto's largest market and we wish everyone a happy new year in 2013 #GongXiFaCai	10/02/2013	19:33:01	MTR	N/A	N/A

This step to examine all tweets in the financial reporting event period is essential for three reasons. First, as discussed in stage one methodology in Section 4.2, the filtering process significantly reduces the number of tweets that required thematic analysis. Although this is recognised as a limitation that potentially reduces the financial reporting tweet sample (see Chapter 7), this filtering process is essential to improve the efficiency of this study while retaining as many financial reporting tweets as possible. In contrast, a detailed examination of *Twitter* activities around the financial reporting event period does not require the same amount of effort in comparison to examination of all the tweets disclosed by all sample companies, as there are only a limited number of tweets that needed to be examined within the financial reporting event period (18 in this example). This approach of focusing on *Twitter* activity only around the event period has also been adopted by previous literature (Blankespoor et al., 2014; Prokofieva, 2015). Therefore, this study argues that it is essential to examine the *Twitter* activity around the financial reporting tweets in detail. Second, a review of *Twitter* activity around the financial reporting event period follows previous literature, as they have both paid attention to the *Twitter* activity around the press release and earnings announcements (Blankespoor et al., 2014) and ASX announcement periods (Prokofieva, 2015). While Blankespoor et al. (2014) review the abnormal number of tweets with hyperlinks, Prokofieva (2015) investigates the abnormal number of tweets and whether tweets disclosed ASX announcement related content. This study focuses on the financial reporting tweets that disclosed the content of ASX announcements, which were covered by the current corporate disclosure regulations, especially for 'price sensitive' information. Therefore, a record of *Twitter* activity around the financial reporting event period is essential to review whether there are other financial reporting related tweets. Third, this study further identifies whether the listed company under examination discloses multiple financial reporting tweets. Although previous studies (Blankespoor et al., 2014; Prokofieva, 2015)

have shown an association between the abnormal number of tweets during an event window and the reduction of information asymmetry, they did not specifically classify the depth of coverage of financial reporting tweet. This study covers this aspect and provides evidence showing that multiple financial reporting tweets generate an enhanced effect in terms of reducing information asymmetry (see Chapter Five), which has important implications for future regulation development, as the current regulation does not encourage this practice (see Chapter Six).

In the sixth step, the content of the 'financial reporting' tweet is compared with the corresponding ASX announcement. The content of a further financial reporting tweet, which was disclosed at 19:43:29 on 14th Feb 2013, also matches the corresponding ASX announcement (as highlighted in Table 4.11). Therefore, this financial reporting event period involving the financial reporting tweets and corresponding ASX announcement on 14th Feb 2013 is considered to have multiple financial reporting tweets. In this example, there is no need to examine whether other 'potential financial reporting' tweets disclose the same content as the corresponding ASX announcement, as this financial reporting tweet event period has already been classified as having multiple financial reporting tweets.

The next step is to identify the corresponding financial reporting control period. As discussed in the previous subsection, the selection criteria for the control period includes: first, only one piece of 'price sensitive' ASX announcement; second, the 'price sensitive' ASX announcement in the control period must be in the same category as the ASX announcement in the event period; third, no financial reporting tweet in the control period; and fourth, the disclosure time of the ASX announcement in the control period should be similar to the ASX announcement in the event period. Table 4.12 shows a list of ASX announcements that belong to the same categories as the ASX announcement in the financial reporting event period. The ASX announcement on 3rd August 2006 is highlighted, as this is the ASX

announcement that is closest in time to the ASX announcement on 14th Feb 2013. The other similar categories of ASX announcements either have more than one 'price-sensitive' ASX announcement at its date of disclosure, or have a financial reporting tweet during the three-day period that did not fit the selection criteria of the control period. However, this ASX announcement on 3rd August 2006 did not constitute the corresponding control period. A comparison of the ASX announcements between 3rd August 2006 and 14th Feb 2013 shows that these two ASX announcements are not in the same category, even though they shared the same ASX announcement category codes. While the ASX announcement on 3rd August 2006 presented the half-year result, the ASX announcement on 14th Feb 2013 presented the full-year result. Table 4.13 shows a list of ASX announcements that covered the full-year result. The ASX announcement on 13th Feb 2008 is highlighted, as this is the ASX announcement that is closest in time to the ASX announcement on 14th Feb 2013. The other similar categories of ASX announcements either have more than one 'price-sensitive' ASX announcement at its date of disclosure, or have a financial reporting tweet during the three-day period that does not fit the selection criteria of control period. Furthermore, this ASX announcement on 13th Feb 2008 was more adequate, as the selected ASX company tended to disclose the full-year result around February. Since the ASX announcement on 13th Feb 2008 was disclosed at 17:00:00, which is after ASX trading hours, the chosen financial reporting control period is the 14th Feb 2008 (Thursday). Table 4.14 shows the ASX announcements around 13th Feb 2008, which indicate that there is no 'price sensitive' information one day before or one day after the selected ASX announcement. Furthermore, there is no record of a financial reporting tweet around this control period that fit the corresponding ASX announcement on 13th Feb 2008. In this example, the financial reporting event period is 15th Feb 2013 and the financial reporting control period is 14th Feb 2008.

Table 4.11

Comparison of Additional Financial Reporting Tweets and Selected ASX **Announcement**

Tweet	Date (DD/MM/ YYYY)	Time
CFO Guy Elliott: By the end of 2014, we will have achieved sustainable annual cash cost reductions of $3 billion http://t.co/1nRfkU6z $RIO	14/02/2013	19:43:29
Corresponding ASX Announcement		

Rio Tinto

120 Collins Street
Melbourne 3000
Australia
T +61 (0) 3 9283 3333
F +61 (0) 3 9283 3707
ABN 96 004 458 404

Media release

Rio Tinto results for the year ended 31 December 2012

14 February 2013

Rio Tinto chief executive Sam Walsh said "Today I am setting out how we can build on our strengths and improve this great company. Under my leadership, Rio Tinto will have an unrelenting focus on pursuing greater value for shareholders. To do this we need to run the business as owners not managers and my immediate priority is to build more focus, discipline and accountability throughout the organisation. Demonstrating this commitment, we will deliver our capital reduction and cost savings targets and improve performance across our business."

- **Reinforcing capital allocation discipline**
  - Pursuing greater value for shareholders by investing capital only in assets that, after prudent assessment, offer attractive returns that are well above our cost of capital.
  - Balancing the use of capital between returns to shareholders and capital expenditure, while aiming to maintain a strong balance sheet with a single A credit rating.
- **Improving performance at existing businesses**
  - Targeting cumulative cash cost savings of more than $5 billion by the end of 2014, equivalent to an annual run rate of $3 billion by 2014, assuming stable market and operating conditions.
  - Reducing capital expenditure on approved and sustaining projects to approximately $13 billion in 2013.
  - Lowering exploration and evaluation spending by $750 million (pre-tax) in 2013 compared with 2012.
- **Delivering approved growth projects with two significant milestones in 2013:**
  - Phase one Pilbara iron ore expansion to 290 Mt/a has been accelerated and is now scheduled for completion during the third quarter of 2013. Phase two expansion to 360 Mt/a to be operational by the first half of 2015.
  - Oyu Tolgoi copper-gold mine now being commissioned with first commercial production scheduled by the end of June 2013. Discussions with the Government of Mongolia regarding the continuing implementation of the Investment Agreement are ongoing.

2012 financial results

2012 underlying financial results reflect record iron ore production and shipments and a second half recovery in copper volumes. This was in the context of lower average market prices in 2012 which reduced underlying earnings by $5.3 billion compared with 2011:
- Underlying earnings[1] of $9.3 billion.
- Net loss of $3.0 billion after impairments of $14.4 billion, primarily relating to aluminium businesses as well as coal assets in Mozambique.
- 15 per cent increase in full year dividend to 167 cents per share.

Twelve months to 31 December (All amounts are US$ millions unless otherwise stated)	2012	2011	Change
Underlying earnings[1]	9,303	15,549	-40%
Net (loss) / earnings[1]	(2,990)	5,826	-151%
Cash flows from operations	16,450	27,388	-40%
Capital expenditure	17,418	12,298	+42%
Underlying earnings per share – US cents	503.1	808.5	-38%
Basic (loss)/earnings per share from continuing operations – US cents	(161.3)	303.5	-153%
Ordinary dividends per share – US cents	167.0	145.0	+15%

The financial results are prepared in accordance with IFRS and are unaudited. [1]Underlying earnings is the key financial performance indicator which management uses internally to assess performance. It is presented here to provide greater understanding of the underlying business performance of the Group's operations attributable to the owners of Rio Tinto. Net earnings and underlying earnings relate to profit attributable to owners of Rio Tinto. Underlying earnings is defined and reconciled to net earnings on page 12.

Table 4.12

Previous ASX Announcements Matching the Selected ASX Announcement Based on Category Codes of Selected ASX Announcement (3004)

Company	Headlines	Dates	Time	ASX Announcement Categories	Price sensitive (Y/N)
RIO	2005 Half year results	3/08/2005	16:00:35	[3004,10001,10002,10003]	Y
RIO	2005 Half year report to shareholders	17/08/2005	17:07:04	[3004,16002]	N
RIO	**Half Yearly Report/Half Year Accounts**	**3/08/2006**	**16:00:04**	**[3004,3009,3010,3015,3019,10001,10002,10003]**	**Y**
RIO	2006 Half year report to shareholders	14/08/2006	16:07:22	[3004,3009,3010,3015,3019,16002]	N
RIO	2007 Half year results	2/08/2007	16:00:00	[3004,10001,10003]	Y
RIO	2007 Half year results - corrected page 18a	2/08/2007	18:00:00	[3004]	N
RIO	2008 half year results	26/08/2008	16:00:00	[3004,3009,3010,3015,3019,10001,10002,10003]	Y
RIO	Letter to shareholders	8/09/2008	10:54:00	[3004,16002]	N
RIO	2009 Half year results	20/08/2009	16:15:00	[3004,3009,3010,3015,3019,10001,10002,10003]	Y
RIO	Half year results 2010	5/08/2010	16:15:00	[3004,3009,3010,10001,10002,10003]	Y
RIO	Rio Tinto 2010 interim results presentation	5/08/2010	18:37:00	[3004]	N
RIO	Rio Tinto announces record first half earnings	4/08/2011	16:15:00	[3004,10001,10002,10003]	Y
RIO	Presentation - Rio Tinto 2011 interim results	4/08/2011	18:18:00	[3004]	N
RIO	Presentation - 2011 interim results - analyst forum	5/08/2011	15:17:00	[3004]	N
RIO	Rio Tinto announces first half underlying earnings of $5.2bn	8/08/2012	16:15:20	[3004,3009,3010,3015,3019,10001,10002,10003]	Y
RIO	Presentation - Rio Tinto 2012 interim results	8/08/2012	18:05:28	[3004]	N
RIO	**Rio Tinto results for the year ended 31 December 2012**	**14/02/2013**	**17:00:44**	**[3004,3009,3010,3015,3019,10001,10002,10003]**	**Y**

Table 4.13

Historical ASX Announcements Matching the Category Codes of the Selected ASX Announcement (3003)

Company	Headline	Date	Time	ASX Announcement Categories	Price sensitive (Y/N)
RIO	Preliminary Final Report	3/02/2005	17:00:16	[3003,10001,10002,10003]	Y
RIO	Full Year Results 2005	2/02/2006	17:00:23	[3003,10001,10002,10003]	Y
RIO	Preliminary Final Report	1/02/2007	17:01:21	[3003,10001,10002,10003]	Y
RIO	**2007 Full Year Results**	**13/02/2008**	**17:00:00**	**[3003,10001,10002,10003]**	**Y**
RIO	Annual Results 2008	12/02/2009	17:00:00	[3003,10001,10002,10003]	Y
RIO	Annual Results 2009	11/02/2010	17:01:00	[3003,10001,10002,10003]	Y
RIO	Rio Tinto Annual Results 2010	10/02/2011	16:57:00	[3003,10001,10002,10003]	Y
RIO	Rio Tinto Annual Results 2010 - presentation slides	10/02/2011	19:15:00	[3003]	N
RIO	Rio Tinto Annual Results 2011	9/02/2012	16:59:00	[3003,10001,10002,10003]	Y
RIO	Rio Tinto Annual Results 2011 - presentation slides	9/02/2012	19:01:00	[3003]	N
RIO	**Rio Tinto results for the year ended 31 December 2012**	**14/02/2013**	**17:00:44**	**[3004,3009,3010,3015,3019,10001,10002,10003]**	**Y**

Table 4.14

Historical ASX Announcements Around the Time Period of Selected ASX Announcement

Company	Headline	Date	Time	ASX Announcement Categories	Price sensitive (Y/N)
RIO	BHP: Letter to Shareholders	12/02/2008	8:58:00	[1009,16002]	N
RIO	Rio Tinto strengthens Oyu Tolgoi management team	13/02/2008	8:50:00	[12008]	N
RIO	Rio Tinto agrees to sell Greens Creek interest for US$750m	13/02/2008	9:07:00	[7002]	Y
RIO	**2007 Full Year Results**	**13/02/2008**	**17:00:00**	**[3003,10001,10002,10003]**	**Y**
RIO	Becoming a substantial holder from AAI	13/02/2008	17:01:00	[2001]	N
RIO	Rule 2.10 of the City Code disclosure - 15Feb08	18/02/2008	10:33:00	[2006,6007,6009]	N
RIO	Press Release: 2008 iron ore price negotiations	19/02/2008	8:27:00	[11002]	N
RIO	Rule 2.10 of the City Code disclosure - 19Feb08	20/02/2008	10:57:00	[2006,6007,6009]	N

4.3.5 Selection of Proxies and Data Analysis Method

As discussed in Chapter Two, this study adopts a unique research methodology approach in comparison to previous literature (Blankespoor et al., 2014; Prokofieva, 2015). While previous literature constructs the association between news dissemination on *Twitter* and reduced information asymmetry, this study examines the economic consequences following financial reporting on *Twitter*, through comparison of information asymmetry between an event period, which includes a financial reporting tweet, and a control period, which has no financial reporting tweet. In previous studies, Blankespoor et al. (2014) and Prokofieva (2015) select a range of proxies to represent '*Twitter* activity', the independent variable in their studies. They collect the trading data within each event window to construct an OLS regression analysis to examine the association between '*Twitter* activity' and reduced information asymmetry. In contrast, this study does not have an independent variable, as it is not designed to require similar regression analysis necessitating independent and dependent variables. In this section, the selection of variables is reviewed, followed by a discussion of the data analysis method.

To identify the association between corporate disclosure and the reduction of information asymmetry, previous literature uses a range of different proxies to capture the changes in information asymmetry, including stock liquidity[14] (Diamond & Verrecchia, 1991; Healy, Hutton, & Palepu, 1999), cost of capital[15] (Botosan,

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[14] Stock liquidity is known as stock trading volume. Investors are willing to trade when they are confident of the existing level of information that they can assess. In contrast, a high level of information asymmetry stops investors from trading, which reduces the stock trading volume or stock liquidity.

[15] Cost of capital represents the cost of equity capital, which depends on the current financial health of listed firms. Investors expect to receive a rate of return that is usually more than the normal bank interest rate when they invest in equity capital.

1997; Armstrong et al., 2011), abnormal returns[16] (Reddy & Gordon, 2010), and analysts' rating[17] (Kothari et al., 2009). In previous related literature that investigates and establishes the association between the corporate disclosure/financial reporting on *Twitter* and the reduction of information asymmetry, both Blankespoor et al. (2014) and Prokofieva (2015) use bid-ask spread as the dependent variable. Bid-ask spread has been widely used to proxy for information asymmetry.

In the basic form of the stock market, the trading of shares involves buying and selling activities. Investors inject their information or expectations of prospective companies into the companies' share prices through trading activities. Each investor posts his/her proposed share price through his/her order to the stock exchange and waits for a counterpart who proposes the same share price. If an agreement is formed on the proposed share price, a buy-sell trade can be activated. Accordingly, share price bid-ask spread represents the difference in investors' expectations towards the ideal share price, which is generally described as information asymmetry (Leuz & Verrecchia, 2000). Therefore, the bid-ask spread will be minimised when information asymmetry is reduced. This present study selects bid-ask spread as the first proxy of information asymmetry. Moreover, as information asymmetry increases the possibility of adverse selection within the share trading activities between buyers and sellers, traders are less likely to trade in this circumstance (Leuz & Verrecchia, 2000). Following increased financial reporting, investors come closer to mutual agreement regarding companies' future performance and the share trading volume should also increase, as buyer and sellers would now have a more realistic view of the share price (Leuz & Verrecchia, 2000) and be more willing to trade

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[16] The difference between stock return and average market return during the same period of time.
[17] A rating score given by analysts, based on firms' financial health and future performance, etc.

(Healy & Palepu, 2001). This study selects share trading volume as the second proxy of information asymmetry. This study uses bid-ask spread and sharing trading volume as the proxies of information asymmetry. If the financial reporting on *Twitter* reduces information asymmetry, then the bid-ask spread would be expected to decrease and the share trading volume would increase.

To review the stock market reaction following financial reporting on *Twitter*, this study adopts the data analysis approach of the Wilcoxon Signed Rank Test (WSRT). In contrast, previous studies (Blankespoor et al., 2014; Prokofieva, 2015) use OLS regression analysis to examine the relationship between corporate disclosure/financial reporting on *Twitter* and the reduction of information asymmetry. As the second research question of this study examines the economic consequences of financial reporting on *Twitter*, this study uses the WSRT data analysis approach to compare the immediate stock market reaction following the financial reporting tweet between the identified event period and control period. WSRT is designed to examine repeated measures under two different conditions, with identical participants. In this study, as each financial reporting tweet constitutes its own financial reporting event period, and each ASX company has disclosed the same category of 'price sensitive' ASX announcement in both the event period and the control period, the use of WSRT is appropriate. The market reaction in both event period and control period is deemed to constitute repeated measures under two different conditions (with and without financial reporting disclosure on *Twitter*). Furthermore, as the market reaction in both the event period and control period are from the same ASX listed companies, the requirement of identical participants is also met. WSRT is a non-parametric test that does not require normal distribution of independent and dependant variables. This means that the original trading data

between the event period and control period could be saved in its original shape. This feature prevents data modification prior to data analysis, which could lead to a loss of meaning behind the data. WSRT has also been used in a previous study (Frino et al., 2011) in a similar research context that involved event methodology and comparative setting.

As the information environment is constantly changing, the stock market reaction following the same piece of information in an ASX announcement for the same stock could be significantly different between two different trading days. This change of stock market reaction is called 'static market reaction', which is due to the change of the stock market reaction manner. For example, the stock market reaction speed following the ASX announcement could be faster due to the advance of trading technology, such as algorithm trading. In contrast, the stock market reaction speed could be slower, if the industry sector that the stock falls in is not the market favourite during that certain period of time.

Previous literature (Blankespoor et al., 2014; Prokofieva, 2015) use the 'pre-period window' within their event methodology approach to calculate the abnormal '*Twitter* Activity' and information asymmetry. In contrast, this study uses a 'pre-period window' to capture and isolate the 'static market reaction' from the market trading data in the event period and control period. This treatment of 'static market reaction' through the use of a 'pre-period window' is also utilised by Frino et al. (2011). Frino et al. (2011) use a 'pre-period window' that extend from 14 days to 140 days before the event period and control period. The comparison of trading data between the event period and control period becomes more accurate after isolating the 'static market reaction' as calculated from the 'pre-period window' data. This study follows the same approach of 'pre-period window' definition as per Frino et al. (2011) to

capture and isolate the 'static market reaction', and to capture the 'pre-period window' data from 14 days to 140 days before the event period and control period.

The following formulae, listed as equations (1) to (4), explain the transformation of 'post-event window' data to eliminate 'static market reaction' by using 'pre-period window' data. This is followed by an explanation of data items that are used in the present study (see Table 4.15).

- *NewEventSpread = EventSpread - 'Static Market Reaction' = EventSpread - (PreEventSpread – PreControlSpread)*

$$(1)$$

- *NewEventVolume = EventVolume - 'Static Market Reaction' = EventVolume – (PreEventVolume – PreControlVolume)*

$$(2)$$

- *DifSpread = NewEventSpread – ControlSpread*

$$(3)$$

- *DifVolume = NewEventVolume – ControlVolume*

$$(4)$$

Specifically, this study uses weighted average bid-ask spread and share trading volume as the measures for information asymmetry, which is consistent with the previous study of Frino et al. (2011). However, treatments of these two measures in this study are different from Frino et al. (2011), who set up the control period through the identification of similar information levels, where both the event period and control period have similar information levels before the announcement of trading halt in the event period. In Frino et al. (2011), it is possible and reasonable to directly compare the differences of bid-ask spread and share trading volume between event period and control period, as the values of bid-ask spread and share trading volume are at similar levels immediately prior to the trading halt in the event period.

Therefore, the comparison of the actual values of bid-ask spread and share trading volume between event period and control period is appropriate (Frino et al., 2011).

Table 4.15

Data Item Explanation

Name of Data Item	Explanation of Data Item
EventSpread	The bid-ask spread during the event period, net of daily average bid-ask spread.
ControlSpread	The bid-ask spread during the control period, net of daily average bid-ask spread.
EventVolume	The percentage of the trading volume during the event period, in comparison to the daily trading volume.
ControlVolume	The percentage of the trading volume during the control period, in comparison to the daily trading volume.
PreEventSpread	The mean of the bid-ask spread during the pre-event period, net of daily average bid-ask spread.
PreControlSpread	The mean of the bid-ask spread during the pre-control period, net of daily average bid-ask spread.
PreEventVolume	The mean of the percentage of the trading volume during the pre-event period, in comparison to the daily trading volume.
PreControlVolume	The mean of the percentage of trading volume during the pre-control period, in comparison to the daily trading volume.
NewEventSpread	The bid-ask spread during the event period, minus the 'static market reaction' component.
NewEventVolume	The percentage of trading volume during the event period, minus the 'static market reaction' component.
DifSpread	The difference in the bid-ask spread between the event period and the control period, minus the 'static market reaction' component.
DifVolume	The difference in the percentage of the trading volume between the event period and the control period, minus the 'static market reaction' component.

In contrast, the settings of the event period and the control period in this study are different. This study selects the control period based on the category and release time of ASX announcement in the event period and the control period. Under this setting, the values of bid-ask spread and share trading volume between the event period and the control period are not designed to be similar. Therefore, instead of comparing the actual values of bid-ask spread and share trading volume, this study transforms these original values for further analysis. For bid-ask spread, the present study computes the daily average bid-ask spread and calculates bid-ask spread for each specific time interval, net of the computed daily average bid-ask spread. For trading volume, the

present study computes the daily total share trading volume and calculates the percentage of trading volume for each specific time interval.

The above modification treatments for bid-ask spread and share trading volume are adequate and align with the purpose of this present study for two major reasons. First, as the event period and its corresponding control period were not supposed to have similar information levels, a comparison of the values of bid-ask spread and share trading volume between these two periods without further data transformation is inadequate. This study applies transformation treatments of bid-ask spread and share trading volume in the event period so that the values of these two measures are comparable with the control period. Second, even though an ASX company discloses the same information at similar times in both the event period and control period, the stock market reaction following the ASX announcement could still be significantly different, due to distinct stock market expectation towards the specific ASX announcement and the general sentiment and attention from the stock market during the selected period. For example, provided the ASX announcements in both the event period and control period concern financial year performance, if the ASX announcement in the event period exceeds the stock market expectation, while the ASX announcement in the control period meets the stock market expectation, then the stock market reaction following the same category of ASX announcement (financial year performance) between the event period and control period are likely to be different. The ASX announcement in the event period surprises the stock market while the same category of ASX announcement in the control period does not surprise the stock market, which leads to a different stock market reaction following the same category of ASX announcement, even though these two ASX announcements are released around the same time. Therefore, the above data

transformation treatments incorporate these special concerns and ensure that the comparisons between the event period and control period are much more likely to be fair, so that any distinct differences in the information asymmetry can be attributed to financial reporting on *Twitter*. These data transformation treatments of bid-ask spread and share trading volume are adequate and appropriate for solving the second research question, which examines the stock market reaction following financial reporting on *Twitter*, from the lens of stock market microstructure with the observation of intra-day stock market trading activity. A practical example is provided in the next subsection to further illustrate these data transformation treatments.

4.3.6 An Example of Data Transformation for Financial Reporting Event Period and Corresponding Control Period

The previous subsection discusses the model and reasoning for data transformation in the financial reporting event period and corresponding control period. This subsection presents how to conduct the proposed data transformation using an actual example. Similar to the previous example showing how to construct the financial reporting event period and corresponding control period, several steps are required. Table 4.16 presents these steps in detail.

Table 4.16	
Data Transformation Steps for Financial Reporting Event Period and Corresponding Control Period	

Steps	Actions
1	Collect trading data in financial reporting event period and corresponding control period, as well as the 'pre-period window' for these two periods, from the SIRCA database. Trading data includes bid-ask spread and share trading volume.
2	Calculate the daily average bid-ask spread and daily total share trading volume for financial reporting event period and corresponding control period, as well as the 'pre-period window' for these two periods.
3	Compute the bid-ask spread difference and % of share trading volume in financial

	reporting event period and corresponding control period, as well as the 'pre-period window' for these two periods.
4	Calculate the bid-ask spread difference and % of share trading volume of the 'static market reaction', based on the data from the 'pre-period window' for both the financial reporting event period and corresponding control period.
5	Transform the bid-ask spread difference and % of share trading volume of the financial reporting event period into the same baseline of the corresponding control period, by incorporating the values of 'static market reaction'.

The first step is to collect trading data within the financial reporting event period and corresponding control period. To interpret the data transformation process, the same example is used, where the financial reporting event period is 15th Feb 2013 and the corresponding control period is 14th Feb 2008. Table 4.17 presents a selection of the raw trading data in these two periods.

Table 4.17

Raw Trading Data in Financial Reporting Event Period and Corresponding Control Period

Financial Reporting Event Period				
#Instrument	Dates	Time	Share Trading Volume	Weighted Average Bid-Ask Spread
RIO	2013/02/15	10:00:00 AM	415,285	0.0206
RIO	2013/02/15	10:15:00 AM	334,185	0.0203
RIO	2013/02/15	10:30:00 AM	278,443	0.0132
RIO	2013/02/15	10:45:00 AM	218,105	0.0139
RIO	2013/02/15	11:00:00 AM	129,032	0.0182
Financial Reporting Control Period				
#Instrument	Dates	Time	Share Trading Volume	Weighted Average Bid-Ask Spread
RIO	2008/02/14	10:00:00 AM	176,058	0.0655
RIO	2008/02/14	10:15:00 AM	138,739	0.0883
RIO	2008/02/14	10:30:00 AM	133,957	0.0847
RIO	2008/02/14	10:45:00 AM	88,330	0.0868
RIO	2008/02/14	11:00:00 AM	78,894	0.0361

The second step is to calculate the weighted average bid-ask spread on the daily average and the daily total share trading volume. The third step is to calculate the weighted average bid-ask spread difference and the percentage of share trading volume in each time interval. Table 4.18 presents the combined result of steps two and three.

Table 4.18

Transformed Trading Data for Financial Reporting Event Period

#Instrument	Date	Time	% Share Trading Volume	Weighted Average Bid-Ask Spread Difference
RIO	2013/02/15	10:00:00 AM	0.131358	0.004124
RIO	2013/02/15	10:15:00 AM	0.105706	0.003824
RIO	2013/02/15	10:30:00 AM	0.088074	-0.00328
RIO	2013/02/15	10:45:00 AM	0.068988	-0.00258
RIO	2013/02/15	11:00:00 AM	0.040814	0.001724

The fourth step is to calculate the bid-ask spread difference and percentage of share trading volume of the 'static market reaction', based on the data from the 'pre-period window' for both the financial reporting event period and the corresponding control period. This example selects the percentage of share trading volume for illustrative and explanatory purposes. Table 4.19 presents the results of the percentage of share trading volume in the 'pre-period window' before the event period and control period, as well as the values of the 'static market reaction'.

Table 4.19

Transformed Trading Data in 'Pre-Period Window' before Financial Reporting Event Period and Corresponding Control Period

#Instrument	Time	% Share Trading Volume (14/02/2008) Control Period	% Share Trading Volume (15/02/2013) Event Period	Static Market Reaction (15/02/2013 – 14/02/2008)
RIO	10:00:00 AM	0.092968	0.090302	-0.002670
RIO	10:15:00 AM	0.055172	0.060064	0.004892
RIO	10:30:00 AM	0.04383	0.048130	0.004300
RIO	10:45:00 AM	0.040676	0.043653	0.002977
RIO	11:00:00 AM	0.046243	0.039939	-0.006300

The fifth step is to transform the bid-ask spread difference and the percentage of share trading volume in the financial reporting event period into a comparable baseline to the corresponding control period, by incorporating the values of 'static market reaction'. Table 4.20 presents the process of data transformation of the percentage of share trading volume, from the previous value in Table 4.19 to the adjusted value.

Table 4.20

Transformation of Trading Data for Financial Reporting Event Period

#Instrument	Date	Time	% Share Trading Volume (a)	Static Market Reaction (b)	Adjusted % Share Trading Volume (a-b)
RIO	2013/02/15	10:00:00 AM	0.131358	-0.002670	0.134025
RIO	2013/02/15	10:15:00 AM	0.105706	0.004892	0.100814
RIO	2013/02/15	10:30:00 AM	0.088074	0.004300	0.083774
RIO	2013/02/15	10:45:00 AM	0.068988	0.002977	0.066011
RIO	2013/02/15	11:00:00 AM	0.040814	-0.006300	0.047118

The above discussions have outlined how to reach an adjusted value of the trading data in the financial reporting event period, through data transformation by incorporating the values of 'static market reaction'. The next part is the data analysis of trading data between the adjusted value in financial reporting event period and the trading data in the corresponding control period, by using the Wilcoxon Signed Rank Test (See Chapter Five).

4.3.7 Source of Data

This study acquired four main sets of data: the financial reporting tweet; the trading data including weighted average bid-ask spread and share trading volume; the corporate characteristics of the ASX companies; and the ASX announcements that correspond to the financial reporting tweets.

The first set of data, financial reporting tweets, is collected through an external *Twitter* website (www.twimemachine.com) available to the general public. These collected tweets are filtered and categorised through the thematic analysis process in order to obtain the final sample of financial reporting tweets. The second set of data is the trading data of each selected financial reporting event period, corresponding control period and their own 'pre-period window', which is retrieved via the SIRCA Australia Equities database (www.sirca.com.au). In addition, this study retrieves additional measures that represent corporate characteristics, such as market capital

size and industry sector. The data for these additional measures is accessed from DatAnalysis Premium (www.datanalysis.morningstar.com.au). The fourth set of data required for the present study is the ASX announcements. The ASX announcements are retrieved from the SIRCA ASX Announcement database (www.sirca.com.au).

4.4 STAGE 3 – DISCUSSION OF THE CURRENT REGULATION OF FINANCIAL REPORTING ON SOCIAL MEDIA

Following the above discussion of the collection and examination of financial reporting tweets, and investigation of the economic consequences following financial reporting tweets, this study next reviews the current regulation regarding the practice of financial reporting on social media. First, this study reviews the two iconic cases regarding corporate disclosure or rumours on social media, which enlighten the current challenges that companies face when they practise financial reporting on social media. Second, this study also discusses the findings of previous literature that are relevant to financial reporting on *Twitter*, as well as the results from the first and second research questions in this study. Based on discussion of these two aspects, this study suggests how the current regulatory setting could be further improved to accommodate the current practice of financial reporting on social media. In addition, this study also provides suggestions for better corporate practice. Throughout the discussion, views from industry professionals, research academics and regulators are incorporated. These discussions and suggestions are provided in Chapter Six.

4.5 CONCLUSIONS

This chapter explains the steps that have been taken, whether they be research methodology or data transformation, in order to answer the three research questions, as discussed in Chapter One. First, this chapter outlined detailed research steps, including how to collect and analyse financial reporting tweets, followed by the new

research methodology to investigate the stock market reaction following financial reporting tweets. These records of detailed research steps can benefit future replicative research in other stock markets. Second, this chapter provides clear discussion of why this present study selected a new methodology unique to previous literature. As this new methodology combines the event methodology and comparative approach, it introduces a new aspect of stock market microstructure to examine the stock market reaction following a financial reporting tweet. Third, this chapter presents how this study adopted and further developed the comparative approach from Frino et al. (2011). The selections of bid-ask spread and share trading volume, in addition to the data transformation treatments, ensures that the comparison of stock market reaction between the event period and corresponding control periods was valid. A practical example is provided to illustrate the process of identifying the financial reporting event period and corresponding control period, as well as the data transformation process. In the next chapter, the results and their association with the predicted observations, hypotheses, and research questions are presented and discussed.

Chapter 5: Results

This chapter presents and discusses the results of this study. Section 5.1 records the outcome of investigating the first research question, which is to explore the nature and extent of financial reporting on *Twitter*. Section 5.1 reviews the adoption of *Twitter* for financial reporting by ASX companies, including descriptive statistics, such as the number of ASX companies that use *Twitter* for financial reporting, as well as how the industry sectors that they belong to and their market capital sizes may affect their adoption behaviours of *Twitter* for financial reporting. Section 5.1 further examines the content of financial reporting tweets, including financial keywords, financial themes, and sentiments.

Section 5.2 examines the changes in information asymmetry following financial reporting on *Twitter,* which addresses the second research question of this study. It illustrates the subsequent economic consequences following financial reporting on *Twitter*, comprising partial answers for research question three. The research methodology utilised to assess this particular research question involves a normative reasoning approach requiring examination of previous incidents and literature. As such, it is discussed in detail in Chapter Six.

5.1 THE NATURE AND EXTENT OF FINANCIAL REPORTING ON *TWITTER*

5.1.1 The Adoption of *Twitter* for Financial Reporting

This study investigates the nature and extent of financial reporting on *Twitter* by ASX 500 companies. Table 5.1 shows the distribution of *Twitter* accounts by ASX companies' GCIS industry sectors and market capital sizes. As indicated in Table 5.2, 191 ASX 500 companies hosted accessible *Twitter* accounts, yielding a *Twitter*

adoption rate of 38.2% among ASX 500 companies. This is comparable with Prokofieva (2015), who identifies that 54.5% (109/200) of ASX 200 companies have *Twitter* accounts. Analysis provided later in the chapter shows that ASX companies with larger market capital size are more likely to adopt *Twitter* and use *Twitter* for financial reporting.

Table 5.2 shows the sample statistics of the final ASX 500 *Twitter* accounts and their tweets (including the financial reporting tweets). As indicated in Table 5.2, although 191 ASX 500 companies host accessible *Twitter* accounts, only 82 *Twitter* accounts are recognised as disclosing financial reporting related information. This selection rate of *Twitter* accounts (82/500=16.4%) is less than one third of Prokofieva's (2015) study. Such distinct reduction of the selection rate of *Twitter* accounts is due to the strict selection criteria of sampling *Twitter* accounts. In this study, ASX companies must disclose financial reporting related information on their *Twitter* accounts in order for their *Twitter* accounts to be selected into the final sample of financial reporting *Twitter* accounts. This comparison of adoption rates also indicates that the use of *Twitter* for financial reporting is not a common practice among smaller ASX 500 companies. This brief observation is further examined later in this chapter. In addition, Table 5.2 shows that this study collected 64,933 tweets from the 191 sample *Twitter* accounts, prior to 30th November 2013. The use of the filter (in step one of data analysis) reduced the tweet sample size to 5,637. The use of a thematic analysis framework (in step two of data analysis) further reduced the final sample size of financial reporting tweets to 880. These 880 financial reporting tweets, which contained financial keywords and discussed financial reporting information, were posted by 82 ASX 500 companies' *Twitter* accounts.

5.1.1.1 *The Development of Twitter Adoption for Financial Reporting*

This study explores the *Twitter* adoption pattern for financial reporting by ASX 500 companies. Figure 5.1 presents the cumulative adoption of *Twitter* for financial reporting based on the posting times of the first financial reporting tweets from the final sample of 82 *Twitter* accounts. This upward trend of adoption shows that the practice of financial reporting on *Twitter* has been gaining momentum in Australia. This observation of the increasing use of *Twitter* for financial reporting supports the first predicted observation of this study that 'the use of *Twitter* technology for financial reporting has increased over time'. Consistent with Rogers diffusion of innovation theory (Rogers, 2003), the adoption of new technology, which in this present study is represented by financial reporting on *Twitter*, will continue to increase over time. The support of this predicted observation also partly answers research question one of this study: 'What is the nature and extent of financial reporting on *Twitter* by ASX listed companies?' According to Rogers (2003), these 82 ASX companies are considered as the innovators and early adopters of *Twitter* for financial reporting, as *Twitter* is still a new technology and the adoption rate of *Twitter* for financial reporting is currently 16.4%.

Table 5.1

Distribution of Twitter Accounts and Companies' Market Capital

	Twitter Adoption				**Market Capital ($Million)**				
	# of	**% of**	**# of**	**% of**	**Mean**	**Std. Deviation**	**Minimum**	**Median**	**Maximum**
GICS Industry Sector	**Firms**	**Firms**	*Twitter*	**Firms**					
Consumer Discretionary	72	14.40%	43	22.51%	1277.68	1889.66	102.83	645.34	12309.86
Energy	44	8.80%	8	4.19%	2333.91	5548.06	116.73	407.25	30814.26
Financials	115	23.00%	34	17.80%	5619.40	18567.15	107.97	547.97	125440.30
Health Care	34	6.80%	12	6.28%	2211.47	5906.62	117.35	290.37	33461.93
Industrials	70	14.00%	30	15.71%	1566.20	2731.58	107.39	421.15	14842.98
Information Technology	30	6.00%	22	11.52%	686.12	1285.28	118.76	264.70	6057.05
Materials	89	17.80%	27	14.14%	3019.29	13169.85	103.72	353.41	120085.13
Staples	18	3.60%	5	2.62%	5997.18	13440.79	144.89	633.83	42684.41
Telecommunication Services	13	2.60%	8	4.19%	5821.78	17206.96	137.60	539.06	62961.96
Utilities	15	3.00%	2	1.05%	2118.90	2254.27	123.36	1263.40	8381.36
Total	500	100.00%	191	100.00%	3060.91	11515.66	102.83	427.15	125440.30

Table 5.2

Sample Statistics

	No. of Firms
Firms listed in the S&P/ASX 500 as on 30th November 2013	500
Firms with *Twitter* accounts	233
Exclude firms without content	(42)
Firms with *Twitter* accounts that have content	191
Final sample of firms with *Twitter* accounts that disclose financial reporting information	82
	No. of Tweets
Tweets generated from the final sample of firms	64933
Filtered tweets	5637
Financial reporting information tweets	880
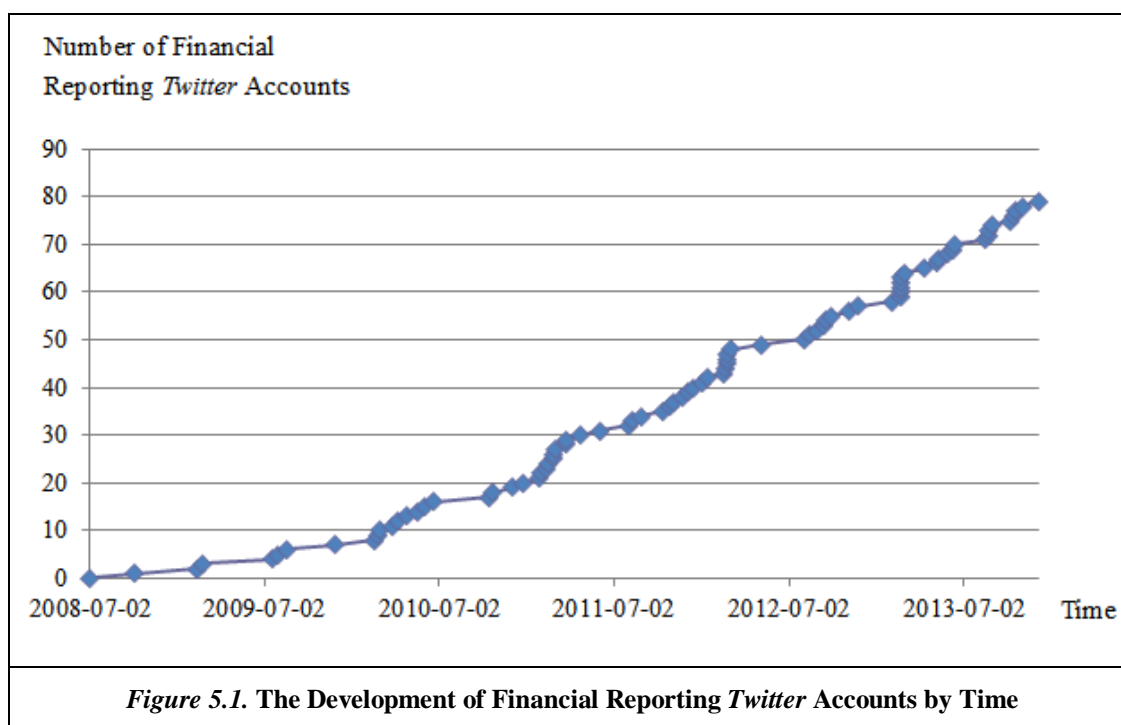
Figure 5.1. **The Development of Financial Reporting *Twitter* Accounts by Time**

5.1.1.2 The Factors Affecting Twitter Adoption for Financial Reporting

This study examines whether ASX companies with certain corporate characteristics are more likely to adopt *Twitter* for financial reporting, such as market capital size and industry sector. For market capital size[18], the results of binary regression analysis

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[18] This study used the natural logarithm value of market capital number to represent the market capital size, as the top 10 ASX 500 companies had relatively larger market capital size, which would affect the following analyses and interpretation.

(see Table 5.3) show that larger listed companies are more likely to adopt *Twitter* for financial reporting. The odds ratio of *Twitter* adoption for financial reporting increases by a multiplicative factor of 1.422, with a one unit increase of the natural log value of a listed company's market capital. This association between *Twitter* adoption for financial reporting and market capital size is also recorded for the listed companies that had already adopted *Twitter* for other business uses distinct from financial reporting (see Table 5.4), where the odds ratio of *Twitter* adoption for financial reporting disclosure increases by a multiplicative factor of 1.191, with a one unit increase of the natural log value of the listed company's market capital. Based on the above discussion, this study argues that larger listed companies are more likely than smaller companies to adopt *Twitter* for financial reporting, regardless of whether these listed companies have already adopted *Twitter* for other business uses. The above findings of the association between market capital size and the adoption of *Twitter* for financial reporting support Hypothesis 1a of this study, which states that 'there is a positive association between market capital size and the adoption of *Twitter* for financial reporting'. These findings are consistent with the previous discussion of the diffusion of innovation theory (Rogers, 2003), as companies with greater financial liquidity typically have more resources with which to innovate.

Table 5.3

Binary Logistic Regression Results I

(Dependent Variable: Twitter Adoption for Financial Reporting Among ASX Listed Companies; Independent Variable: Market Capital Log Value)

Variables	B	S.E.	Wald	Df	Sig.	Exp(B)	95% C.I.for EXP(B)	
							Lower	Upper
Constant	-8.853	1.593	30.865	1	.000	.000***		
Market Capital Logarithm Value	.352	.076	21.161	1	.000	1.422***	1.224	1.652

χ2 (1, N=500) = 21.043, p < .001; Adjusted R-Square: 0.9519;
*, **, *** p < 0.10, p < 0.05, p < 0.01, respectively.

Table 5.4

Binary Logistic Regression Results II

(Dependent Variable: Twitter Adoption for Financial Reporting Among ASX Listed Companies with Twitter Accounts; Independent Variable: Market Capital Log Value)

Variables	B	S.E.	Wald	Df	Sig.	Exp(B)	95% C.I.for EXP(B)	
							Lower	Upper
Constant	-3.914	1.824	4.604	1	.032	.020**		
Market Capital Logarithm Value	.175	.088	3.993	1	.046	1.191**	1.003	1.414

χ2 (1, N=191) = 4.071, p < .05; Adjusted R-Square: 0.9771;
*, **, *** p < 0.10, p < 0.05, p < 0.01, respectively.

For the industry sector, Table 5.5 shows the distribution of ASX 500 companies that adopted *Twitter* and used *Twitter* for financial reporting, as categorised by industry sectors. On average, 38% of ASX 500 companies have valid *Twitter* accounts with accessible information in English. In addition, 16% of ASX 500 companies use *Twitter* for financial reporting. Provided the listed companies had already adopted *Twitter*, 43% of these listed companies are also using *Twitter* for financial reporting. The comparison of *Twitter* adoption rates for financial reporting shows that while listed companies from certain industry sectors are less likely to use *Twitter* for financial reporting (such as Consumer Discretionary), others are more likely to disclose financial reporting information on *Twitter* once they adopted *Twitter* (such as Energy and Utilities). Table 5.6 presents the results of several chi-square tests for independence, which show that ASX companies from various industry sectors presented significantly different *Twitter* adoption behaviours for financial reporting. For example, the results of chi-square tests on ASX 500 companies with all industry sectors show significant association between *Twitter* adoption for financial reporting and the industry sectors these ASX companies belong to, as $\chi^2(9, n=500)=21.291$, $p<0.05$, Cramer's V=0.206.

These different behaviours were further examined through several binary regression analyses. In these binary regression analyses, each industry sector was coded into an individual dummy variable, and the market capital size was represented by its natural logarithm value. Tables 5.7 and 5.8 present the results of these binary regression analyses.

Table 5.5

Adoption Rates of Twitter and for Financial Reporting

GICS Industry Sectors	Companies	Twitter Adoption		Adoption of Twitter for Financial Reporting		
	# of companies	# of companies	% of companies	# of companies	% of companies /Twitter	% of companies /Total
Consumer Discretionary	72	43	60%	7	16%	10%
Consumer Staples	18	5	28%	3	60%	17%
Energy	44	8	18%	6	75%	14%
Financials	115	34	30%	19	56%	17%
HealthCare	34	12	35%	2	17%	6%
Industrials	70	30	43%	13	43%	19%
Information Technology	30	22	73%	10	45%	33%
Materials	89	27	30%	15	56%	17%
Telecommunication Services	13	8	62%	6	75%	46%
Utilities	15	2	13%	1	50%	7%
Total	500	191	38%	82	43%	16%

Table 5.6

Chi-Square Tests for Independence on Twitter Adoption for Financial Reporting based on Industry Sector (Full Sample of Industry Sector and Reduced Sample of Industry Sector)

		Full Industry Sectors			
		Model (I)			
Variables		**Pearson Chi-Square**			**Cramer's V**
	Value	**df**	**Asymp. Sig. (2-sided)**	**Value**	**Approx. Sig.**
GICS Industry Sectors	21.291**	9	.011	.206**	.011
Number of Ob. : 500					
		Model (II)			
Variables		**Pearson Chi-Square**			**Cramer's V**
	Value	**df**	**Asymp. Sig. (2-sided)**	**Value**	**Approx. Sig.**
GICS Industry Sectors			N/A (Assumption violated)		
Number of Ob. : 191					
		Reduced Industry Sectors			
		Model (I)			
Variables		**Pearson Chi-Square**			**Cramer's V**
	Value	**df**	**Asymp. Sig. (2-sided)**	**Value**	**Approx. Sig.**
GICS Industry Sectors	20.388***	7	.005	.202***	.005
Number of Ob. : 500					
		Model (II)			
Variables		**Pearson Chi-Square**			**Cramer's V**
	Value	**df**	**Asymp. Sig. (2-sided)**	**Value**	**Approx. Sig.**
GICS Industry Sectors	23.437***	7	.001	.350***	.001
Number of Ob. : 191					

*, **, *** p < 0.10, p < 0.05, p < 0.01, respectively.

Cramer's V criteria for effect size is: for R-1 or C-1 equal to 1 (two categories): small=.01, medium=.30, large=.50.

Notes: Model (I) examines all ASX 500 companies; Model (II) only examines 191 ASX 500 companies that have already adopted *Twitter*.

Table 5.7 presents the results of binary regression analyses, which investigated the adoption of *Twitter* for financial reporting among all ASX 500 companies. Table 5.7 shows that ASX companies from the industry sectors of Information Systems and Telecommunication Services were more likely to adopt *Twitter* for financial reporting.[19] This finding supports Hypothesis 1b of this study, which states that 'ASX companies from certain industry sectors that are close to technology are more likely to adopt *Twitter* for financial reporting'. This finding that ASX companies from the industry sectors of Information Systems and Telecommunication Services were more likely to adopt *Twitter* for financial reporting is also consistent with the previous discussion from Rogers (2003), who argues that innovators and early adopters are willing to take risks, are close to scientific sources, and prefer interaction with other peers, especially other innovators. In this study, the term 'scientific source' as previously discussed by Rogers (2003) is represented by *Twitter* adoption. Information Systems companies have a reputation for innovation (Blankespoor et al., 2014), and the ASX companies from the Information Systems and Telecommunication Services industry sectors are either close to the software/technology practices or have a close relationship with relevant stakeholders. Therefore, the above finding that ASX companies from the industry sectors of Information Systems and Telecommunication Services are more likely to adopt *Twitter* for financial reporting disclosure is consistent with the diffusion of innovation theory (Rogers, 2003).

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[19] This phenomenon was also observed when the natural logarithm value of market capital was replaced with the true value of market capital.

Table 5.7
Binary Logistic Regression – Twitter Adoption for Financial Reporting (For All ASX Companies)

Dependent Variables	Independent Variables	Consumer Discretionary	Energy	Financial	Health Care	Industrials	Information Systems	Materials	Consumer Staples	Telecommunication Services	Utilities
	Constant	.000***	.000***	.000***	.000***	.000***	.000***	.000***	.000***	.000***	.000***
		(.000)	(.000)	(.000)	(.000)	(.000)	(.000)	(.000)	(.000)	(.000)	(.000)
	Market Capital Log Value	1.495***	1.495***	1.495***	1.495***	1.495***	1.495***	1.495***	1.495***	1.495***	1.495***
		(.000)	(.000)	(.000)	(.000)	(.000)	(.000)	(.000)	(.000)	(.000)	(.000)
Consumer Discretionary		X	.679	.645	1.749	.456	.153***	.510	.714	.130***	1.934
			(.522)	(.363)	(.507)	(.124)	(.001)	(.176)	(.664)	(.004)	(.555)
Energy			X	.951	2.577	.671	.225**	.752	1.052	.192**	2.851
				(.923)	(.275)	(.470)	(.014)	(.597)	(.950)	(.025)	(.357)
Financial				X	2.712	.706	.237***	.791	1.107	.202**	2.999
					(.204)	(.400)	(.003)	(.554)	(.887)	(.012)	(.307)
HealthCare					X	.260**	.087***	.292	.408	.074***	1.106
						(.095)	(.004)	(.122)	(.367)	(.006)	(.937)
Industrials						X	.335**	1.120	1.567	.286*	4.246
							(.033)	(.792)	(.541)	(.058)	(.185)
Information Systems							X	3.341**	4.674**	.852	12.666**
								(.016)	(.049)	(.821)	(.024)
Materials								X	1.399	.255**	3.791
									(.644)	(.036)	(.219)
Consumer Staples									X	.182*	2.710
										(.054)	(.419)
Telecommunication Services										X	14.861**
											(.024)
Utilities											X

χ2 (10, N=500) = 44.175, p < .001; Range of Tolerance: .680 to .964; Range of VIF: 1.037 to 1.471; Adjusted R-Square: 0.1255;

Previous literature has identified different business uses of *Twitter*, including corporate promotion, human resource management, and financial reporting (Xiong & MacKenzie, 2015). This study refines the investigation to whether ASX companies differentiate adoption behaviours of *Twitter* between financial reporting and other business uses. To do so, a chi-square test for independence on the 191 ASX 500 companies that have already adopted *Twitter* is employed. A review of Table 5.6 (Model (II) under 'full industry sectors') shows that the proposed chi-square test to examine the association between *Twitter* adoption for financial reporting and industry sector did not meet the criteria of the chi-square test for independence, due to the sample reduction in several industry sectors. Therefore, several industry sectors are merged in this study. First, the industry sectors of Consumer Discretionary and Consumer Staples are combined to form a new sector named Consumers, as the companies in these two industry sectors show similar characteristics, which are strongly related to the consumers with their products and services. Second, the industry sectors of Energy and Utilities were merged to form a new sector named Sensitive, as companies from these two industry sectors are both obligated to provide additional information when events related to mining and oil and gas production occur (Australian Securities Exchange, 2010). Following these two transformations of industry sectors, the results of Table 5.6 (under the heading 'reduced industry sectors') show that there is a significant association between *Twitter* adoption for financial reporting and industry sector. As $\chi^2(7, n=191)=23.437$, $p<0.01$, Cramer's V=0.350 (see Model (II) under 'reduced industry sectors), a chi-square test for independence indicates significant association between *Twitter* adoption for financial reporting and industry sectors, for the ASX companies that

have already adopted *Twitter* for other business purposes. [20] To further understand how ASX companies from different industry sectors differentiate *Twitter* adoption for financial reporting and for other business use, several binary regression analyses were conducted with the new merged industry sectors. Table 5.8 shows that ASX companies from the Health Care industry sector and the combined industry sector of Consumers were less likely to adopt *Twitter* for financial reporting, even though these listed companies had already adopted *Twitter* for other business uses.[21] This finding is consistent with the diffusion of innovation theory (Rogers, 2003), which suggests that late majority or laggards of innovation are sceptical towards innovations; they are typically risk-averse towards change. In addition, late majority or laggards of innovation focus on traditional methods, which keep them in contact with likeminded peers. The results show that ASX companies from the industry sector of Health Care and the combined industry sector of Consumers had relatively high adoption rates of *Twitter* for general business uses (see Table 5.5). In contrast, these companies were less likely to adopt *Twitter* for financial reporting, even though they had already adopted *Twitter* for other business uses. This observation indicates that financial reporting on *Twitter* could be a risky practice for these companies. While ASX companies within the Health Care and Consumers sectors may be innovators and early adopters for *Twitter* in terms of practising consumer interaction or marketing, they may become risk-averse and avoid the use of *Twitter* for financial reporting.

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[20] Following this transformation of industry sector, the significant association between *Twitter* adoption for financial reporting and the industry sectors that ASX companies belong to still exists (See Model (I) under 'reduced industry sectors').
[21] This phenomenon was also observed when the natural logarithm value of market capital was replaced with the true value of market capital.

Table 5.8

Binary Logistic Regression – Twitter Adoption for Financial Reporting (For ASX Company with Twitter Account)

Dependent Variables	Independent Variables	Consumers	Sensitive	Financial	Health Care	Industrials	Information Systems	Materials	Telecommunication Services
	Constant	.016** (.049)	.125 (.358)	.068 (.218)	.013** (.046)	.049 (.144)	.059 (.158)	.076 (.220)	.194 (.450)
	Market Capital Log Value	1.144 (.176)	1.144 (.176)	1.144 (.176)	1.144 (.176)	1.144 (.176)	1.144 (.176)	1.144 (.176)	1.144 (.176)
Consumers		X	.131*** (.010)	.240*** (.005)	1.277 (.775)	.334** (.033)	.278** (.024)	.216*** (.004)	.084*** (.006)
Sensitive			X	1.833 (.435)	9.740** (.030)	2.545 (.241)	2.121 (.371)	1.648 (.533)	.642 (.683)
Financial				X	5.312* (.052)	1.388 (.531)	1.157 (.804)	.899 (.840)	.350 (.245)
Health Care					X	.261 (.119)	.218* (.087)	.169** (.041)	.066** (.016)
Industrials						X	.833 (.749)	.647 (.420)	.252 (.126)
Information Systems							X	.777 (.669)	.303 (.198)
Materials								X	.390 (.300)
Telecommunication Services									X

$\chi2$ (8, N=191) = 26.528, p < .01; Range of Tolerance: .673 to .894; Range of VIF: 1.118 to 1.486; Adjusted R-Square: 0.2035.

The above discussion indicates that listed companies with larger market capital size are more likely to adopt *Twitter* for financial reporting, regardless of whether they have already adopted *Twitter* for other business uses. Furthermore, listed companies from various industry sectors presented different *Twitter* adoption patterns for financial reporting. For example, while some listed companies (such as Information Systems and Telecommunication Services) are more likely to adopt *Twitter* for financial reporting, others (such as Health Care and Consumers) are less likely to do so even if they have already adopted *Twitter* for other business uses. In summary, these findings support Hypotheses 1a and 1b of this study, and answer the first research question of this study: 'What is the nature and extent of financial reporting on *Twitter* by ASX listed companies?'

5.1.2 The Content of Financial Reporting on *Twitter*

This subsection discusses the content of financial reporting tweets as disclosed by ASX companies that include financial keywords and financial reporting themes, in addition to the sentiments of these financial reporting tweets.

5.1.2.1 Financial Reporting Keywords

Figure 5.2 illustrates the use of financial keywords across all industry sectors. The vertical axis on the left represents the percentages of companies and tweets that cover different financial keywords, and the vertical axis on the right represents the number of industry sectors that cover the specific financial keywords. For example, the financial keyword 'profit' was mentioned by ASX companies in nine out of ten industry sectors. On average, more than 60% of companies mentioned the financial keyword 'profit' at least once in their financial reporting tweets and more than 30% of financial reporting tweets in the final sample contained the specific financial

keyword 'profit'. The results in Figure 5.2 indicate that 'profit', 'revenue' and 'sales' were among the most popular financial keywords. Figure 5.3 shows the coverage of financial keywords by each individual industry sector. Here the vertical axis on the right represents the number of financial keywords that are covered by the companies in each industry sector, and the vertical axis on the left indicates the percentage of companies that cover different financial keywords. For example, companies from the Materials industry sector discussed 21 out of 23 financial keywords in their financial reporting tweets. At the same time, nearly 30% of companies in the Materials industry sector discussed at least one financial keyword. The results of *Twitter* adoption for financial reporting are also incorporated in Figure 5.3, with the vertical axis on the left also indicating the percentage of *Twitter* adoption for financial reporting in comparison to the total number of companies and companies with *Twitter* accounts. As illustrated in Figure 5.3, listed companies belonging to the industry sectors that were more likely to adopt *Twitter* for financial reporting, such as Materials and Energy, covered more financial keywords. This indicates that companies in these industry sectors are more likely to adopt *Twitter* for financial reporting, and they tend to disclose more types of financial reporting information. In contrast, Information Technology and Telecommunication Services companies show different disclosure behaviours and adoption patterns. Although the adoption rates of *Twitter* for financial reporting were relatively high for companies in these two industry sectors, the number of financial keywords that were covered by these two industry sectors were smaller than average. This indicates that while companies from Information Technology and Telecommunication Services industry sectors had high adoption rates of *Twitter* for financial reporting, they tended to only disclose certain types of financial information.

Figure 5.2. Comparison of Financial Keywords Appearance and Coverage by Industry Sectors
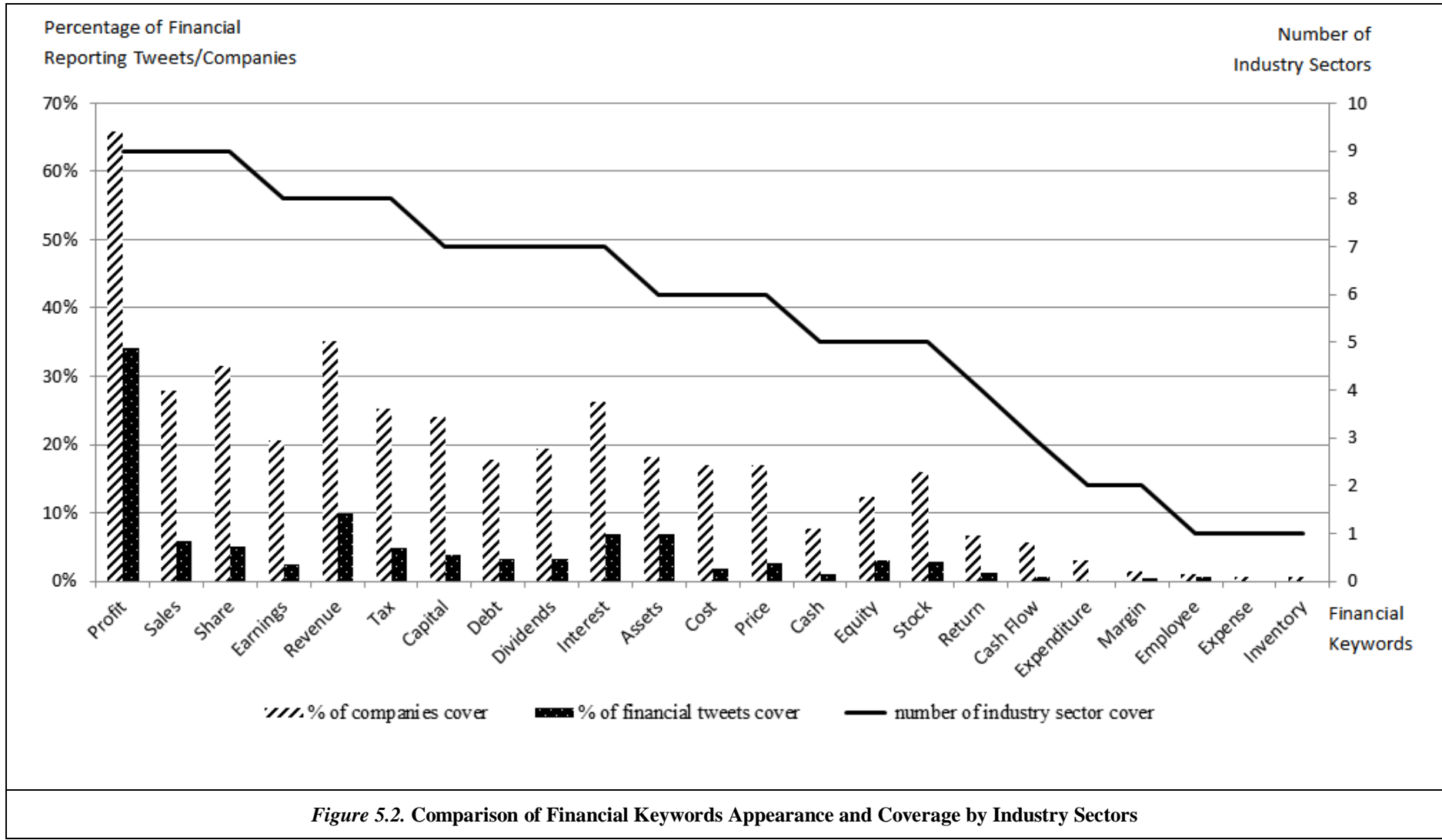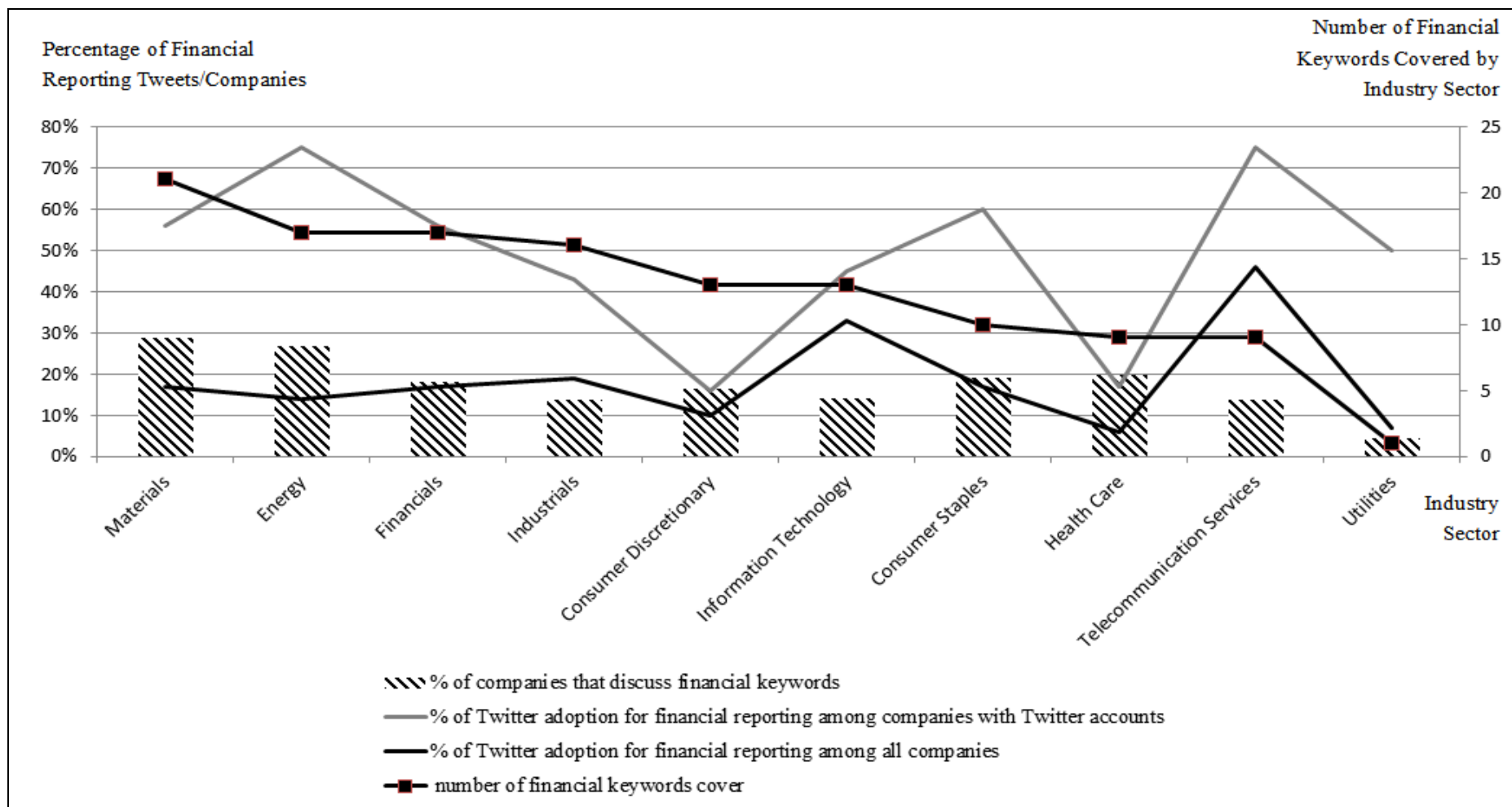
Figure 5.3. **Comparison of Keywords Appearance and *Twitter* Adoption across Industry Sectors**

This variation in financial reporting coverage is consistent with previous literature and contributes to the literature development. First, as discussed in Chapter Two, 'high-tech' companies are more likely to adopt new financial reporting technology (L. H. Bollen et al., 2008; Prokofieva, 2015). Therefore, the finding of high adoption rates of *Twitter* for financial reporting among Information Technology and Telecommunication Service companies fits the previous literature and theory. Second, the low financial reporting coverage among these Information Technology and Telecommunication Service companies provides further understanding in regard to the practice of financial reporting on *Twitter* amongst these companies. The observed low financial reporting coverage on *Twitter* shows that Information Technology and Telecommunication Service companies are hesitant to disclose a wide range of financial reporting information. One potential explanation is that Information Technology and Telecommunication Service companies have relatively small market capital sizes, in comparison to, for example, Material companies that covered much more diverse financial reporting information. This means that although Information Technology and Telecommunication Service companies understand the operation of *Twitter* and its benefits for financial reporting, they could still be lacking resources to manage a broad range of financial reporting information. This observation contributes to a further understanding of Rogers (2003) diffusion of innovation theory, which suggests that the innovators and early adopters of innovations have larger resources and are close to innovation. The observations regarding Information Technology and Telecommunication Service companies show that innovation adoption is still challenging for companies close to innovation but that lack resources. This argument can be further examined in a future study involving a larger sample of companies and/or interviews with managers from

relevant companies. Third, this finding that Materials and Energy companies disclosed a broader range of financial reporting information fits previous literature. This result suggests that some industries are perceived to have a higher than average risk, and they are therefore under additional reporting obligations (Dewan et al., 2007). As previously discussed, 'Energy' companies are obligated to provide additional information when events related to mining and oil and gas production occur (Australian Securities Exchange, 2010). As Material and Energy companies are obligated to provide extra information, they may be motivated to disclose a broader range of financial reporting information on *Twitter*. In summary, Figure 5.3 shows that Material and Energy companies disclosed a broader range of financial reporting information, while the Information Technology and Telecommunication Service companies were hesitant to do so, despite circumstances of high adoption rates of *Twitter* for financial reporting. The above findings align with prior literature and existing regulations, and expand understanding of this practice of financial reporting on *Twitter* among ASX companies from various industry sectors.

5.1.2.2 Financial Reporting Themes

While a financial keyword provides a good indication concerning the context of financial reporting on *Twitter*, the meaning underlying these financial reporting keywords require further interpretation, as they can be used in many different contexts. Therefore, this study further examined the financial reporting themes (as discussed in Table 4.4, Chapter Four). Similar to Figure 5.2, Figure 5.4 shows the coverage of financial reporting themes. The vertical axis on right represents the number of industry sectors that cover each individual financial reporting theme, and the vertical axis on the left indicates the percentages of financial reporting tweets and companies that cover each individual financial reporting theme. 'Earnings' and

'Operational Performance' were among the top two most mentioned financial reporting themes, followed by 'Operation/Capital Income/Expenditure' and 'Issue New Capital'. This observation is in line with the frequent mentions of the financial keywords 'Profit', 'Sales' and 'Share'. For example, the 'Profit' keyword is related to 'Earnings', the 'Sales' keyword is related to 'Operational Performance', and the 'Share' keyword is related to 'Issue New Capital'.

Similar to Figure 5.3, Figure 5.5 illustrates the coverage of financial reporting themes by companies in each individual industry sector, and the findings are similar to those in Figure 5.3. In Figure 5.5, the vertical axis on the right represents the number of financial reporting themes that are covered by the companies in each industry sector, and the vertical axis on the left indicates the percentage of companies that cover different financial reporting themes. Figure 5.5 shows that Material, Financial and Industrial companies disclosed the widest range of financial reporting information. This finding has already been discussed in detail, and aligns with Prokofieva (2015), who claimed that Financial companies disclose more types of financial information on *Twitter* as part of the response to stricter reporting requirements. She categorised the Financial sector as one of the highly regulated industries subjected to additional reporting regulation, which formed one of the control variables in the OLS regression model (Prokofieva, 2015). In addition, the results of *Twitter* adoption for financial reporting are also incorporated in Figure 5.5, with the vertical axis on the left also indicating the percentage of *Twitter* adoption for financial reporting in comparison to the total number of companies and companies with *Twitter* accounts. The results in Figure 5.5 show that financial reporting coverage by Information Technology and Telecommunication Services companies remains low (small to medium), despite the

above average adoption rate of *Twitter* for financial reporting, which is similar to the previous discussion surrounding Figure 5.3.

The above discussion and comparison between Figures 5.2 and 5.4, as well as Figures 5.3 and 5.5, show that the use of the financial keyword data coding framework (see Table 4.2) as a filter assisted in retaining financial reporting tweets. Moreover, the use of the financial reporting thematic analysis framework (see Table 4.4) provides a better understanding regarding how companies from different industry sectors conduct financial reporting on *Twitter* in various ways. While regulators may use these results to inform future regulation, future studies can also use the financial reporting thematic analysis framework developed in this study to understand financial reporting on *Twitter* in other countries.

Percentage of Financial Reporting Tweets/Companies

Number of Financial Keywords Covered by Industry Sector

///// % of financial reporting tweets cover   ▧▧▧ % of companies cover   —— number of industry sector cover

Figure 5.4. **Comparison of the Financial Reporting Themes Appearance and Coverage by Industry Sectors**

Figure 5.5. Comparison of the Financial Reporting Themes Discussion and Coverage by Financial Reporting Themes

5.1.2.3 Financial Reporting Sentiments

The above discussion shows the adoption of *Twitter* for financial reporting and the content of the financial reporting tweets. As discussed in Chapter Two, just as the information disclosed on *Twitter* may affect the stock market, so might the sentiments of these financial reporting tweets (Sprenger et al., 2014). Accordingly, this study examines the sentiments of financial reporting tweets. Figure 5.6 shows the distributions of sentiments by both number of companies and number of tweets. The vertical axis on the left represents the percentage of companies and financial reporting tweets that cover the specific sentiments. While more than 80% of ASX companies disclose positive financial information on *Twitter*, on average 58% of all these financial reporting tweets are categorised as positive. Figure 5.7 shows the coverage of sentiments among various industry sectors. While more than 90% of financial reporting tweets disclosed by Telecommunication Services companies are aligned with positive sentiments, more than 75% of the financial reporting tweets from Energy companies are neutral. Figures 5.6 and 5.7 show that companies in general are more likely to disclose positive financial reporting tweets. However, companies from different industry sectors have distinct approaches in their practices of financial reporting on *Twitter*.

This finding of financial reporting sentiments contributes to further understanding of financial reporting on *Twitter*. Although previous literature has also investigated the sentiments of financial reporting tweets, this present study categorises sentiments through content analysis of the information within the financial reporting tweets. This content analysis approach is different to prior literature. For example, Blankespoor et al. (2014) use the market reaction during the event periods to determine whether the tweets during the event periods are positive, neutral, or

negative. If there is a positive abnormal return or earnings surprise during the event period, then the tweets are positive, and vice versa.

Sprenger et al. (2014) utilise a different approach. They assesse the sentiments of financial related tweets in a training sample, then compute and assign a probability to each word. Each word has three probabilities: positive, neutral or negative. Following the Naive Bayesian Text Classification approach, each financial related tweet is assessed for sentiment based on the probabilities of all the words within that tweet.

As this current study applied a different sentiment analysis approach, the findings of financial reporting sentiment in this study differ from the results in previous studies (Blankespoor et al., 2014; Sprenger et al., 2014). For example, Blankespoor et al. (2014) found that the proportions of positive and negative news were similar (between 30 and 40% in each category). Sprenger et al. (2014) reported that roughly half of all the messages that were related to the stock in the training sample were considered to be hold signals (i.e., the neutral sentiment), and buy signals were observed more than twice as frequently (35.2%) as sell signals (15.2%) in the rest of the financial related tweets. In regard to the source of tweets, the financial related tweets as investigated by Sprenger et al. (2014) were from a wide range of different stakeholders including listed companies, investment analysts, and media. In contrast, this current study only collected financial reporting tweets from ASX companies' *Twitter* accounts. Therefore, the findings in this study are expected to be different to prior literature (Blankespoor et al., 2014; Sprenger et al., 2014).
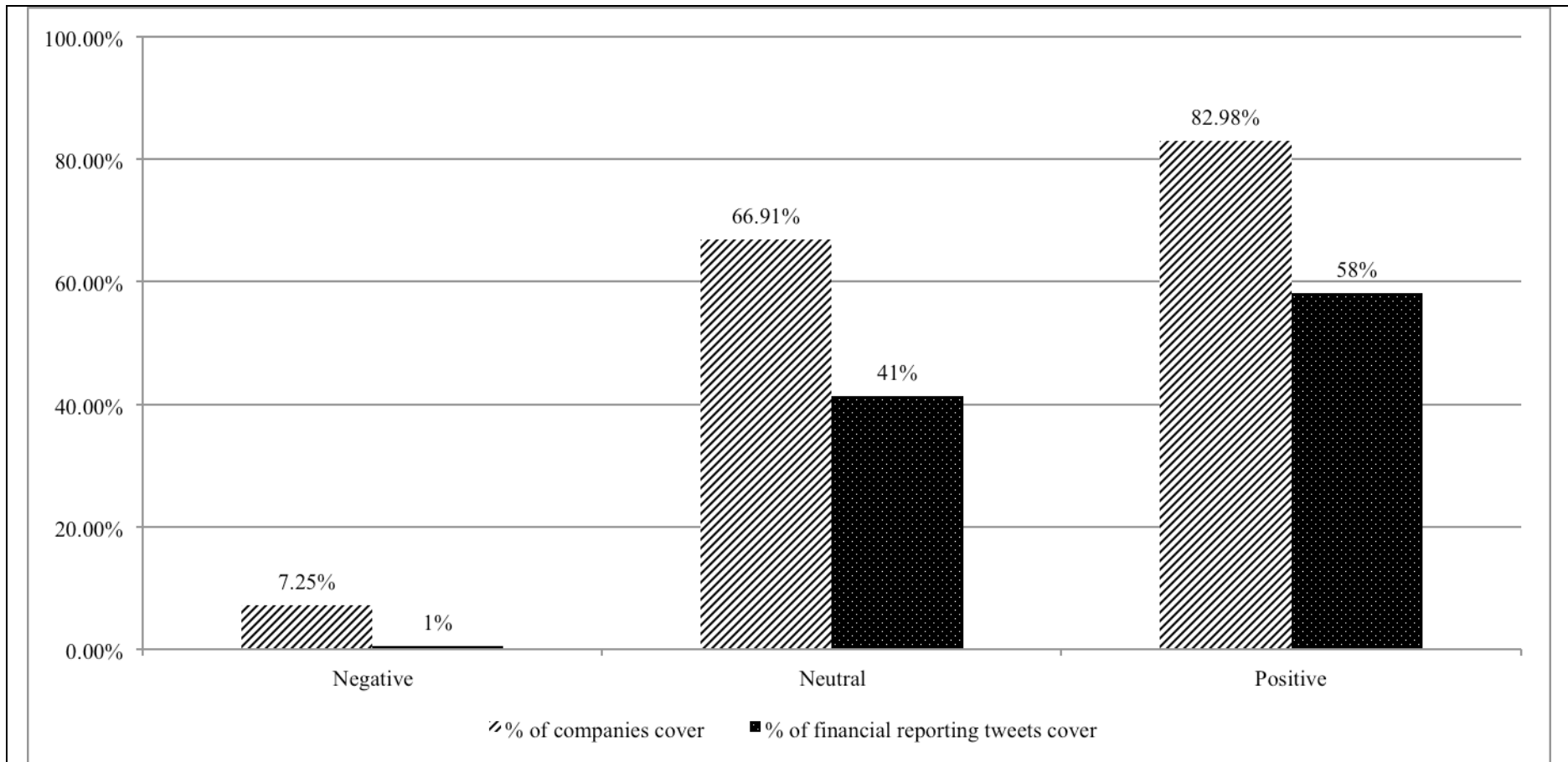
Figure 5.6. **Comparison of Financial Reporting Tweets Sentiments' Distribution Between Number of Tweets and Companies**
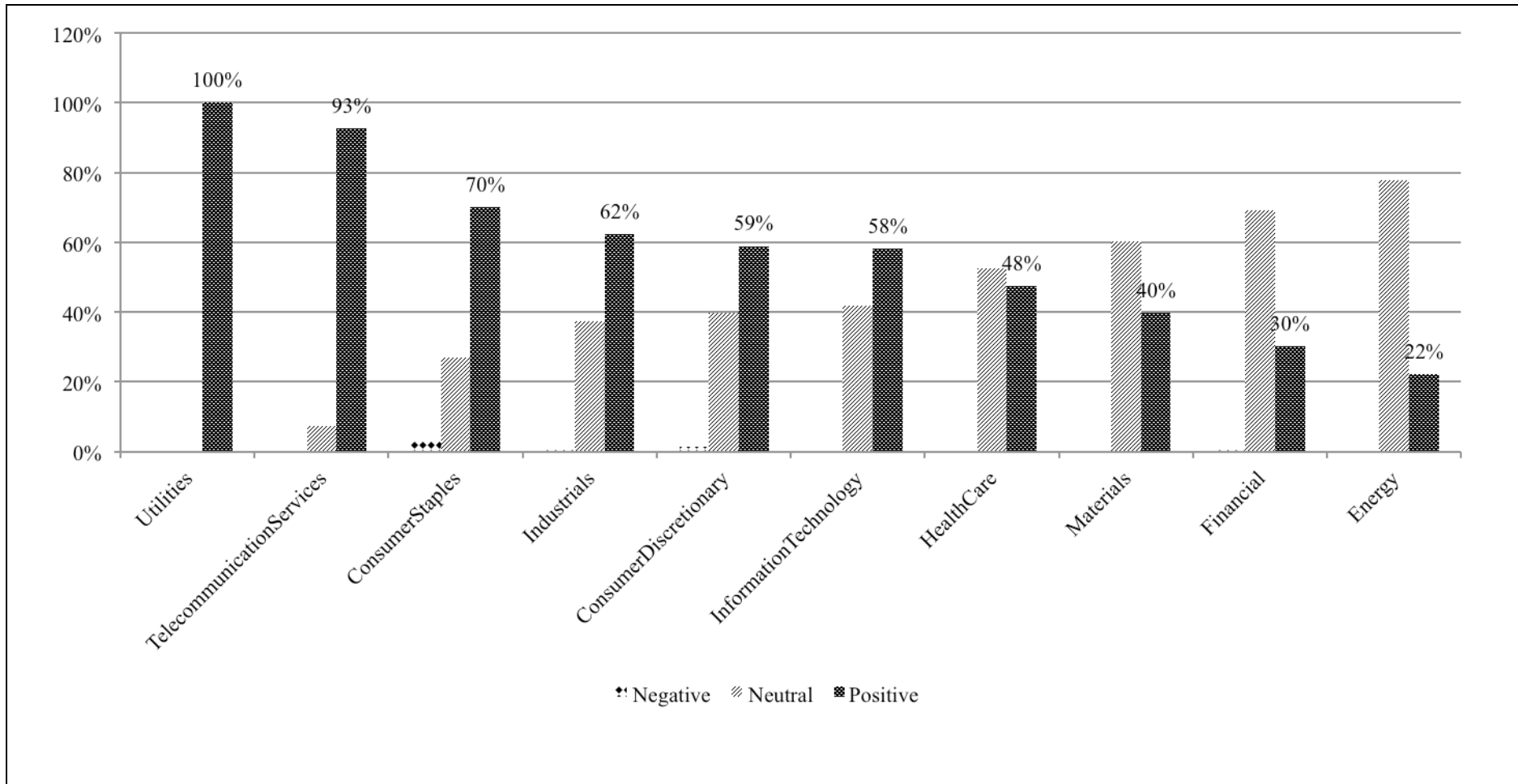
Figure 5.7. **Percentage of Financial Reporting Tweets Covering Sentiments by Industry Sectors**

The above observation that ASX companies are most likely to disclose non-negative financial information on *Twitter* is worrisome. Although ASX encourages the use of *Twitter* or other social media platforms to disseminate financial reporting information, they do not encourage selective disclosure (Australian Securities Exchange, 2013a). These observations of selectivity in financial reporting on *Twitter* should be of interest to regulators and are discussed in Chapter Six.

In summary, the adoption of *Twitter* for financial reporting has been gaining momentum, as represented by the increasing use of *Twitter* for financial reporting by ASX companies. This finding supports the first predicted observation of this study that 'the use of *Twitter* technology for financial reporting has increased over time'. In addition, this study finds that companies with larger market capital size are more likely to adopt *Twitter* for financial reporting. This finding supports Hypothesis 1a of this study: 'there is a positive association between ASX companies' market capital sizes and the adoption of *Twitter* for financial reporting'. Companies from certain industry sectors, such as Information Technology and Telecommunication Services, are more likely to adopt *Twitter* for financial reporting. Materials companies maintained a high adoption rate of *Twitter* for financial reporting and disclosed a wide range of different financial information on *Twitter*. These findings support Hypothesis 1b of this study: 'ASX companies from certain industry sectors that are close to technology are more likely to adopt *Twitter* for financial reporting'. Moreover, this study presented the sentiments of financial reporting tweets, which show that companies are more likely to disclose non-negative financial reporting tweets. Cumulatively, these findings answer the first research question of this study: 'What is the nature and extent of financial reporting on *Twitter* by ASX listed companies?'

5.2 THE ECONOMIC CONSEQUENCES FOLLOWING FINANCIAL REPORTING ON *TWITTER*

5.2.1 The Impact on Information Asymmetry in General

5.2.1.1 Sample Description

To answer the second research question of this study, 'What are the economic consequences of financial reporting on *Twitter*?', this study examines a full sample of 183 financial reporting tweets and a matched sample of 128 financial reporting events (see Table 5.9). Based on the timing of these financial reporting tweets and ASX announcements, these financial reporting events were further categorised into four different scenarios, as illustrated in Table 5.10. For example, if both the financial reporting tweet and ASX announcement were disclosed outside of the ASX trading hours, then this financial event was categorised as a 'Scenario A' financial reporting event.

Table 5.9	
Sample Selection for Research Question 2	
	No. of Tweets
Full Sample of Financial Reporting Tweets	183
Matched Sample of Financial Reporting Tweets	128
Categories of Financial Reporting Events (See Table 5.10 for discussion of Scenarios A – D)	
A	60
B	37
C	14
D	17
Total	128

Table 5.10

Categorisation of Financial Reporting Events based on Timing of ASX announcements and
Financial Reporting Tweets (Averaged Time Difference Provided in Bracket)

Timing of Financial Reporting Tweet	Timing of ASX Announcement	
	Outside of Trading Hours	Within Trading Hours
Outside of Trading Hours	A	C
	(0:25:26)	(7:34:03)
Within Trading Hours	B	D
	(3:15:31)	(1:25:49)

Scenario A: Both ASX announcement and financial reporting tweet were observed outside the ASX stock market trading hours.
Scenario B: ASX announcement was observed outside the ASX stock market trading hours while financial reporting tweet was observed within the ASX stock market trading hours.
Scenario C: ASX announcement was observed within the ASX stock market trading hours while financial reporting tweet was observed outside the ASX stock market trading hours.
Scenario D: Both ASX announcement and financial reporting tweet were observed within the ASX stock market trading hours.

This categorisation approach recognises the possibility of separating distinct stock market reactions following financial reporting tweets with different timings. For example, if an ASX announcement is disclosed before the market opened, such as 9am, then the market reaction following the financial reporting tweet that replicates the information of this ASX announcement will differ depending whether the disclosure timing of this financial reporting tweet is either 9.30am or 2pm.

As discussed in Chapter Three, ASX is a semi-strong efficient stock market, which means that the ASX stock market will respond to new public information. In the above example, if the ASX announcement is disclosed at 9am, then the stock market will respond to such an announcement once it starts trading at 10am. If the financial reporting tweet is disclosed at 9.30am, then the stock market reaction from 10am includes two components. The first component is the market reaction towards the ASX announcement at 9am. The second component is the market reaction towards the financial reporting tweet at 9.30am (if there is one). This is designated scenario A. In contrast, if the financial reporting tweet is disclosed at 2pm, then the market

reaction from 10am to 2pm will not include the component of market reaction affiliated with the financial reporting tweet, as the financial reporting tweet is not disclosed until 2pm. In this example, the market reaction from 2pm should include the market reaction towards the financial reporting tweet (if there is one), as well as the market reaction towards the ASX announcement. This is designated scenario B. Therefore, this present study categorises the financial events into four different scenarios, based on the timings of financial reporting tweets and ASX announcements.

5.2.1.2 Change in Information Asymmetry – The Percentage of Trading Volume

As discussed in Chapter Three, the reduction of information asymmetry encourages investors to conduct more trades (Leuz & Verrecchia, 2000; Healy & Palepu, 2001). Therefore, this study investigates the changes in trading volume and bid-ask spread following financial reporting tweets. Tables 5.11 and 5.12 present the changes of the trading volume percentages following financial reporting tweets between the four scenarios of financial reporting events. Table 5.11 covers the results of the Wilcoxon Signed Rank Tests for scenarios A and C. For scenario A, there are 60 events, and for scenario C, there are 14 events. As this study investigates the stock market reaction following financial reporting tweets, each 15 minutes is set as a time interval. As discussed in previous chapters, this study investigates the changes of trading volume and weighted average bid-ask spread (the proxy of information asymmetry). The 'Difference (Event – Control)' columns record the differences of '% Trading Volume' and 'Weighted Average Bid-Ask Spread' between the event periods and their corresponding control periods. The 'Effect Sizes' columns present how strong such differences are. Table 5.12 is similar to Table 5.11 and covers the results of Wilcoxon Signed Rank Tests for scenarios B and D. For scenarios B and D,

dependant on the time interval, there are 13 to 27 samples for scenario B, and 9 to 17 samples for scenario D.

For scenario A, where both ASX announcements and financial reporting tweets were disclosed outside trading hours, 75-90 and 90-105 minutes following the market open, the percentages of trading volume were 0.822% and 1.05% higher (significant at the 1% and 5% level) than those in the corresponding control intervals. Similarly, such increases in the percentages of trading volume were also observed in scenarios B (210-240 minutes after the financial reporting tweet) and D (30-45 minutes after the financial reporting tweet). However, this increase in the percentage of trading volume was not recorded in scenario C.

The above findings of significant increase in the percentages of share trading volume support Hypothesis 2 of this study, which states that 'the level of information asymmetry is smaller in ASX companies with both ASX announcement and financial reporting tweets than ASX companies with only ASX announcement'. Further, the above findings also show that the stock market reacts to financial reporting tweets with different mechanisms, which is when the share trading volume will increase significantly. This also indicates the ASX stock market observes the information on financial reporting tweets in different ways, based on the timing of ASX announcements and financial reporting tweets (represented as different scenarios in this study). A review of the reaction times following the financial reporting tweets between these four scenarios shows that the stock market had the fastest reaction through the increase of share trading volume under scenario D, where both ASX announcements and financial reporting tweets were disclosed within the market trading hours. This shows that the stock market pays real-time attention to financial reporting tweets during trading hours. In addition, the stock market responded to

financial reporting tweets through the increase of trading volume in scenario A, with a relatively fast mechanism. Therefore, this study argues that the stock market first captures the financial reporting tweets that are disseminated before the stock market opens, then moves on to review relevant information in other channels, such as the full ASX announcement documents, and then conducts trading activities accordingly. This observation is more apparent in scenario B, where the ASX announcement was disclosed before or after the market trading hours, and the financial reporting tweet was disseminated within market trading hours. Under scenario B, the stock market reacted to the financial reporting tweet with a significant delay. Such an observation can be interpreted as the financial reporting tweets serving to alert/remind the stock market about the existence of a financial reporting announcement. As a result, the stock market moves on to further investigate this ASX announcement and responds through trading activity accordingly.

For scenario C, the ASX announcement was disclosed during the market trading hours, and the financial reporting tweet was disseminated outside the market trading hours. Based on the findings in Table 5.11, this study argues that as there were long delays between the ASX announcements and the following financial reporting tweets, the stock market may have already fully responded to the ASX announcement. In this case, even though the follow-up financial reporting tweet may alert/remind the stock market regarding the existence of the ASX announcement, the stock market does not respond further as the financial reporting information has already been fully digested by the stock market during the previous day's trading. As shown in Table 5.10, scenario C has the largest averaged time difference between ASX announcements and financial reporting tweets, representing a large lag time that will negate the effectiveness of the tweet.

5.2.1.3 Change in Information Asymmetry – The Weighted Average Bid-Ask Spread

Tables 5.11 and 5.12 present the changes in weighted average bid-ask spread under each financial reporting event scenario. Consistent with Hypothesis 2, which states that 'the level of information asymmetry is smaller in ASX companies with both ASX announcement and financial reporting tweets than ASX companies with only ASX announcement', the results in Tables 5.11 and 5.12 show that the information asymmetry, as represented by the weighted average bid-ask spread, decreased significantly following the financial reporting tweets. For example, at 15-30 minutes after the stock market open, the weighted average bid-ask spread of the financial reporting event period is 0.078 and 0.066 (in absolute value terms) smaller than those in the corresponding control intervals (significant at the 5% level and for scenarios A and B). For scenario D, the records of weighted average bid-ask spread of financial reporting event periods were also significantly smaller than those in the corresponding control periods, after 6 hours 15 minutes following the financial reporting tweets.

In scenarios A and B, the stock market responded to the financial reporting tweets in a timely manner. However, in scenario D, the reductions of weighted average bid-ask spread were relatively late (6 hours and 15 minutes following the financial reporting tweets). The above results are consistent with findings in prior literature. For example, both previous studies (Blankespoor et al., 2014; Prokofieva, 2015) revealed the association between financial reporting on *Twitter* and the reduction of bid-ask spread. In addition, these results align with the previous discussion of corporate disclosure, which argues that corporate disclosure can assist in reducing information asymmetry (Leuz & Verrecchia, 2000; Healy & Palepu, 2001).

Table 5.11

Wilcoxon Signed Rank Test Result for Scenarios A and C

Scenarios		A					C			
	Number of Events	% Trading Volume Difference (Event-Control)	Effect Size	Weighted Average Bid-Ask Spread Difference (Event-Control)	Effect Size	Number of Events	% Trading Volume Difference (Event-Control)	Effect Size	Weighted Average Bid-Ask Spread Difference (Event-Control)	Effect Size
10:00	60	0.00224	0.06255	-0.00110	0.05309	14	0.01078	-0.17830	0.00161	-0.06525
10:15	60	0.00924	0.02933	**-0.00078***	0.16800	14	0.01664	-0.04623	0.00163	-0.05339
10:30	60	-0.00457	0.03852	0.00039	0.03495	14	-0.00285	-0.15188	-0.00128	-0.14830
10:45	60	-0.00265	0.08799	0.00028	0.01949	14	-0.00376	-0.00593	-0.00039	-0.13643
11:00	60	-0.00097	0.00813	0.00055	0.11626	14	0.00973	-0.04623	0.00113	-0.24320
11:15	60	**0.00822****	0.22016	0.00000	0.12768	14	-0.01069	-0.19150	0.00008	-0.01780
11:30	60	**0.0105***	0.17846	-0.00050	0.08803	14	-0.01741	-0.16016	-0.00021	-0.06525
11:45	60	-0.00031	0.08941	**0.00060****	0.26007	14	-0.00874	-0.19150	0.00060	-0.01780
12:00	60	0.00080	0.01520	-0.00018	0.07191	14	**-0.00676***	-0.34999	0.00036	-0.26693
12:15	60	0.00473	0.12333	0.00048	0.04234	14	0.005715	-0.21538	-0.000123	-0.19873
12:30	60	0.00191	0.02721	0.00030	0.13508	14	-0.01282	-0.28395	-0.00007	-0.01780
12:45	60	-0.00052	0.02792	-0.00010	0.01814	14	0.00051	-0.00660	0.00012	-0.11270
13:00	60	0.00103	0.01025	**0.00079****	0.21975	14	-0.00288	-0.03302	-0.00062	-0.02966
13:15	60	0.00097	0.01732	-0.00034	0.03629	14	0.01322	-0.16509	-0.00027	-0.14830
13:30	60	0.00168	0.06608	**-0.00052***	0.18749	14	-0.00916	-0.24433	-0.00062	-0.19575
13:45	60	-0.00107	0.01520	-0.00070	0.09879	14	-0.00199	-0.19150	0.00062	-0.12457
14:00	60	0.00163	0.03357	-0.00054	0.03696	14	-0.00095	-0.00660	-0.00043	-0.04152
14:15	60	-0.00007	0.05972	-0.00019	0.02150	14	0.00005	-0.11226	0.00037	-0.07711
14:30	60	**0.00328***	0.15443	-0.00101	0.02688	14	-0.00361	-0.17830	0.00193	-0.26693
14:45	60	**-0.00426****	0.23359	-0.00083	0.08736	14	0.01219	-0.07264	0.00059	-0.26693
15:00	60	-0.00104	0.06608	-0.00069	0.03427	14	-0.00262	-0.17830	-0.00040	-0.11270
15:15	60	0.00285	0.01732	-0.00057	0.06720	14	0.00529	-0.17830	0.00077	-0.24320
15:30	60	**-0.00416***	0.15302	-0.00041	0.03763	14	0.01388	-0.07264	-0.00010	-0.06525
15:45	60	0.00036	0.07032	-0.00014	0.02150	14	-0.01765	-0.16509	-0.00019	-0.02966
16:00	60	-0.00609	0.08870	**0.00316****	0.24932	14	-0.00641	-0.01981	0.00038	-0.07711

Table 5.12

Wilcoxon Signed Rank Test Result for Scenarios B and D

Scenarios			B % Trading Volume		Weighted Average Bid-Ask Spread		D	% Trading Volume		Weighted Average Bid-Ask Spread	
Time	Interval	Number of Events	Difference (Event-Control)	Effect Size	Difference (Event-Control)	Effect Size	Number of Events	Difference (Event-Control)	Effect Size	Difference (Event-Control)	Effect Size
N0215	-9	13	-0.01286	-0.29467	0.00047	-0.03426	10	0.01075	-0.07977	-0.00037	-0.19373
N0200	-8	15	0.00601	-0.09333	0.00052	-0.02074	10	-0.00770	-0.03419	-0.00023	-0.17094
N0145	-7	17	**-0.01962***	-0.29632	-0.00023	-0.05277	12	0.01934	-0.06405	-0.00178	-0.28823
N0130	-6	17	-0.00206	-0.09336	0.00044	-0.14207	15	**-0.01984***	-0.34219	0.00024	0.00000
N0115	-5	20	0.00415	-0.10625	0.00012	-0.05313	15	0.02280	-0.07259	0.00100	-0.29035
N0100	-4	24	0.00309	-0.11959	-0.00101	-0.07423	15	0.00418	-0.13480	0.00035	-0.22813
N0045	-3	26	0.00794	-0.22717	-0.00004	-0.03698	16	0.00264	-0.19196	-0.00012	-0.05485
N0030	-2	29	0.01797	-0.21153	-0.00024	-0.12919	17	0.00936	-0.10960	-0.00040	-0.04465
N0015	-1	32	**0.00122***	-0.20803	-0.00013	-0.18699	17	0.00961	-0.26385	-0.00031	-0.07712
	0										
P0015	1	37	0.01393	-0.01314	-0.00009	-0.06928	17	-0.00008	-0.11765	-0.00073	-0.03653
P0030	2	37	0.00961	-0.07975	**-0.00066***	-0.22006	17	**0.01331***	-0.34506	-0.00028	-0.06088
P0045	3	36	-0.01274	-0.17029	0.00001	-0.03889	16	0.00032	-0.09139	-0.00095	-0.10978
P0100	4	36	0.00326	-0.05928	0.00010	-0.08886	17	-0.02240	-0.14200	-0.00029	-0.02024
P0115	5	36	0.00220	-0.00554	-0.00090	-0.07590	17	-0.00383	-0.23135	-0.00032	-0.21506
P0130	6	36	0.00639	-0.04808	-0.00038	-0.00365	17	0.01052	-0.10959	0.00057	-0.23135
P0145	7	36	0.00563	-0.08886	**-0.00056***	-0.23888	16	-0.00451	-0.11879	-0.00018	-0.05480
P0200	8	36	0.00269	-0.02593	-0.00109	-0.07778	16	-0.01154	-0.08220	-0.00029	0.00000
P0215	9	35	-0.00566	-0.08032	-0.00007	-0.14677	16	-0.00674	-0.10059	-0.00048	-0.10978
P0230	10	34	-0.00269	-0.05493	0.00045	-0.14407	16	0.00206	-0.07319	-0.00052	-0.07319
P0245	11	34	-0.00913	-0.18348	-0.00042	-0.00521	16	-0.00573	-0.07319	-0.00102	-0.22857
P0300	12	34	0.01080	-0.11508	0.00016	-0.09228	16	-0.00745	-0.11879	-0.00015	-0.13718
P0315	13	34	-0.00328	-0.03420	-0.00015	-0.09641	16	0.00081	-0.01821	-0.00020	-0.02740

P0330	14	34	**0.00329***	-0.20215	**0.00080***	-0.20215	16	-0.01078	-0.10059	0.00010	-0.06399
P0345	15	34	**0.00448***	-0.22495	0.00044	-0.14200	16	-0.00568	-0.07319	0.00023	-0.10059
P0400	16	34	0.00241	-0.02183	**0.00024***	-0.21246	16	0.00185	-0.05480	-0.00053	-0.16458
P0415	17	33	-0.00217	-0.15940	0.00068	-0.06708	16	0.00557	-0.10059	0.00015	-0.12799
P0430	18	33	0.00222	-0.04284	-0.00014	-0.15066	16	-0.00088	-0.05480	0.00053	-0.22857
P0445	19	33	0.00027	-0.03853	0.00010	-0.15288	16	-0.00186	-0.00919	0.00012	-0.05480
P0500	20	33	0.00406	-0.10229	0.00019	-0.19030	16	**-0.01499***	-0.30158	-0.00165	-0.18279
P0515	21	32	-0.00256	-0.05138	0.00019	-0.11925	16	0.00913	-0.10978	-0.00005	-0.03659
P0530	22	31	-0.00140	-0.07963	-0.00021	-0.07709	16	0.00154	-0.11879	0.00108	-0.26517
P0545	23	30	0.01312	-0.16602	0.00077	-0.09424	16	0.00169	-0.10978	0.00000	-0.21938
P0600	24	29	0.00683	-0.00420	0.00026	-0.07813	15	-0.01543	-0.18659	0.00005	-0.03104
P0615	25	29	0.00231	-0.06395	0.00049	-0.00420	15	-0.00663	-0.20740	**-0.00031***	-0.31111
P0630	26	24	-0.00429	-0.16498	-0.00009	-0.09079	15	-0.01533	-0.03104	-0.00017	-0.15555
P0645	27	24	0.01661	-0.13611	-0.00002	-0.01645	15	0.00736	-0.15555	-0.00024	0.00000
P0700	28	23	0.01341	-0.21084	-0.00006	-0.08065	13	-0.01045	-0.17141	**-0.00045****	-0.51402
P0715	29	22	0.00538	-0.07101	-0.00008	-0.18347	12	-0.00504	-0.11206	-0.00144	-0.32027
P0730	30	21	0.00433	-0.00802	-0.00017	-0.16896	12	-0.00267	-0.04797	**-0.00152***	-0.40029
P0745	31	21	0.00324	-0.10462	0.00022	-0.12607	10	**-0.00466***	-0.48992	**-0.00095***	-0.37611
P0800	32	21	0.00129	-0.22791	-0.00011	-0.11002	10	-0.01192	-0.14825	**-0.00134***	-0.39891
P0815	33	20	0.00278	-0.02356	0.00036	-0.17124	9	0.00330	-0.04196	-0.00012	-0.29321
P0830	34	20	0.01058	-0.35418	0.00308	-0.34232	9	0.01336	-0.34908	**-0.00136****	-0.62838
P0845	35	20	-0.00396	-0.14167	-0.00001	-0.17709	9	0.00945	-0.06977	-0.00076	-0.32103

Time: 'N0015' stands for 'negative 0015', which stands for the time period that is 15 minutes before the financial reporting tweet. 'P0015' stands for 'positive 0015', which stands for the time period that is 15 minutes after the financial reporting tweet.

Interval: The number of time interval based on the time different with financial reporting tweet (1 for every 15minutes).

A comparison of the change in share trading volume and bid-ask spread indicates that the ASX stock market responds to financial reporting tweets following ASX announcements via different mechanisms. For example, under the scenarios A and B, the bid-ask spread decreased faster than the increase of trading volume. However, for scenario D, the increase of trading volume was faster than the decrease of bid-ask spread. These two different observations indicate that the ASX stock market reacts to financial reporting tweets with different mechanisms. If the ASX announcement is disclosed outside the market trading hours (scenarios A and B), the follow-up financial reporting tweet serves to remind/alert the stock market about the existence of this ASX announcement. The stock market then moves on to seek further information and reaches a more desirable level of common understanding regarding companies' future performance (as represented by the smaller bid-ask spread), prior to commencing trade accordingly (as represented by the larger share trading volume). If the ASX announcement is disclosed within trading hours (scenario D), the financial reporting tweet first attracts investors' attention and motivates investors to commence trade accordingly, before they move on to seek further information, including the ASX announcement. This significant lag of market reaction between share trading volume and bid-ask spread should be investigated in future research. Similar to the previous discussion of the percentage of share trading volume, there was no significant change in the weighted average bid-ask spread level in scenario C, which could be related to the significant delay of the financial reporting tweet following the ASX announcement.

In summary, the above findings of stock market reaction following the financial reporting tweets show that the stock market reads and responds to financial reporting tweets through different mechanisms (as represented by the change in weighted

average bid-ask spread and share trading volume) according to the timings of ASX announcements and financial reporting tweets. The next subsection discusses the different stock market reaction following financial reporting tweets as dependant on the companies' market capital sizes and the frequency of financial reporting tweets.

5.2.2 The Effect of Market Capital Size and Financial Reporting Tweet Frequency on the Change in Information Asymmetry

As discussed in previous literature (Blankespoor et al., 2014; Prokofieva, 2015), 'low-visibility' companies or companies with small market capital size can receive greater benefits through corporate disclosure on *Twitter*, when compared to 'high-visibility' companies or companies with large market capital sizes. In addition, more corporate disclosure during the announcement periods can generate a greater effect on reducing information asymmetry, in comparison to less corporate disclosure (Prokofieva, 2015). To investigate whether similar phenomenon can be observed from the stock market microstructure lens, this study further separates the financial reporting events in scenario A, based on whether the company disclose more than one financial reporting tweet in the event period and the company's market capital size.

Table 5.13 presents the statistics of Wilcoxon Signed Rank Tests conducted on financial reporting events under scenario A, based on whether ASX companies disclose single or multiple financial reporting tweets following the corresponding ASX announcement. Table 5.13 covers the results of Wilcoxon Signed Rank Tests for single and multiple financial reporting tweets events under scenario A. There are 44 single financial reporting tweet events and 16 multiple financial reporting tweet events.

For financial reporting tweets, 75-90 minutes following the market open, the percentages of trading volumes are 0.797% and 1.572% higher (significant at the 5% level) than those in the corresponding announcement control periods (for single and multiple financial reporting tweets respectively). Furthermore, there are more records of higher percentages of trading volume for the financial reporting events with multiple financial reporting tweets than those with a single financial reporting tweet. These findings show that financial reporting on *Twitter* assists in reducing information asymmetry, both for multiple and single financial reporting tweets. These findings support Hypothesis 2 of this study, which states that 'the level of information asymmetry is smaller in ASX companies with both ASX announcement and financial reporting tweets than ASX companies with only ASX announcement'. For financial reporting events with multiple financial reporting tweets in scenario A, 15-30 minutes following the stock market open (interval 2), the weighted average bid-ask spread is 0.292 smaller (significant at the 5% level) than those in the corresponding control period. However, such observation of weighted average bid-ask spread reduction is only recorded in the financial reporting events with multiple financial reporting tweets, not those with a single financial reporting tweet.

The above finding, that financial reporting events with multiple financial reporting tweets generate more records of information asymmetry reduction (including the increase of share trading volume and weighted average bid-ask spread reduction) than a single financial reporting tweet, is important. First, these findings are consistent with prior literature, as both Blankespoor et al. (2014) and Prokofieva (2015) reveal that an abnormal number of tweets (with or without hyperlinks) during the event period is significantly associated with the reduction of bid-ask spread. Second, as this current study only focuses on the financial reporting tweets, the

above findings of this study emphasise the importance of disclosing more financial reporting information on *Twitter*.

Distinct from the above findings and discussion, for financial reporting events with a single financial reporting tweet under scenario A, there was a record of larger weighted average bid-ask spread at two hours after the disclosure of the financial reporting tweet (see Table 5.13). One explanation of this observation is that the stock market may be confused about the limited financial information that is presented in the financial reporting tweet, which leads to a diminished information environment. As discussed in Chapter Three, in a stock market that is less informed, the value of the bid-ask spread will increase. In summary, the approach of disclosing multiple financial reporting tweets generates greater benefits for companies in reducing information asymmetry, represented as smaller weighted average bid-ask spread and higher percentages of share trading volume.

This study further reviewed the stock market reaction mechanism following financial reporting tweets between companies with different market capital sizes. To do so, this study separated the companies within scenario A into two groups of companies based on small and large market capital size. The distinction is based on the ranking of market capital size of each company. This approach is similar to the separation of 'high-visibility' and 'low-visibility' companies according to their market capital size in previous studies (Blankespoor et al., 2014; Prokofieva, 2015). Table 5.14 presents the statistics of the WSRT on the financial reporting events with multiple financial reporting tweets under scenario A, based on market capital sizes of ASX companies. There are 23 multiple financial reporting tweet events with large market capital sizes and 21 multiple financial reporting tweet events with small market capital sizes.

Table 5.13

Wilcoxon Signed Rank Test Result for Single and Multiple Financial Reporting Tweet Under Scenario A

Time	Number of Events	A – Single Financial Reporting Tweet % Trading Volume Difference (Event-Control)	Effect Size	Weighted Average Bid-Ask Spread Difference (Event-Control)	Effect Size	Number of Events	A – Multiple Financial Reporting Tweets % Trading Volume Difference (Event-Control)	Effect Size	Weighted Average Bid-Ask Spread Difference (Event-Control)	Effect Size
10:00	44	0.00119	0.06096	0.00074	0.02488	16	0.03352	0.02774	-0.00094	0.09141
10:15	44	0.00889	0.09952	0.00050	0.09082	16	-0.00412	0.20530	**-0.00292***	0.35650
10:30	44	-0.00763	0.07340	0.00070	0.14307	16	0.01049	0.04994	-0.00035	0.23766
10:45	44	0.00185	0.07837	0.00036	0.07215	16	0.00347	0.08323	0.00009	0.10055
11:00	44	0.00612	0.04976	0.00056	0.07215	16	-0.01592	0.17201	0.00059	0.24680
11:15	44	**0.00797***	0.18287	0.00054	0.13062	16	**0.01572***	0.31628	-0.00008	0.11883
11:30	44	0.00889	0.14929	-0.00031	0.03981	16	0.01050	0.27189	**-0.00183***	0.38392
11:45	44	-0.00105	0.02115	**0.00096****	0.28489	16	**0.00270***	0.29408	-0.00046	0.17368
12:00	44	-0.00014	0.01990	-0.00026	0.03608	16	0.00485	0.03884	0.00001	0.15540
12:15	44	0.00559	0.06593	0.00076	0.12814	16	0.00615	0.21640	-0.00114	0.19196
12:30	44	0.00143	0.03359	0.00040	0.12565	16	0.00283	0.23859	-0.00046	0.14625
12:45	44	-0.00017	0.03359	0.00032	0.03359	16	-0.00200	0.03884	-0.00131	0.00914
13:00	44	-0.00040	0.03235	**0.00106***	0.23388	16	0.00064	0.09433	-0.00009	0.15540
13:15	44	0.00089	0.12192	-0.00021	0.03857	16	**0.00421***	0.34957	-0.00132	0.00000
13:30	44	0.00124	0.05598	0.00002	0.15302	16	0.00479	0.11652	-0.00142	0.25595
13:45	44	0.00021	0.01244	-0.00021	0.12938	16	0.00457	0.13872	-0.00068	0.02742
14:00	44	0.00109	0.01120	-0.00014	0.01493	16	0.00059	0.10543	-0.00097	0.09141
14:15	44	0.00015	0.11694	0.00001	0.00498	16	-0.00117	0.10543	-0.00053	0.08227
14:30	44	0.00102	0.12316	-0.00115	0.05474	16	0.00807	0.26079	-0.00071	0.06399
14:45	44	**-0.00415****	0.28737	-0.00054	0.14555	16	-0.00511	0.08323	-0.00050	0.03656
15:00	44	0.00051	0.01617	-0.00053	0.11818	16	**-0.00843***	0.29408	-0.00078	0.20110
15:15	44	0.00363	0.02239	-0.00075	0.04479	16	0.00118	0.00555	**0.00049***	0.32907
15:30	44	-0.00451	0.16297	-0.00065	0.12192	16	-0.00377	0.08323	0.00025	0.19196
15:45	44	-0.00075	0.10823	-0.00024	0.01742	16	-0.00014	0.04994	0.00039	0.14625
16:00	44	-0.00277	0.02612	**0.00149****	0.16048	16	-0.01278	0.24969	**0.00803****	0.44790

For companies with small market capital, 90-105 minutes following the market open, the percentage of trading volumes was 1.688% higher (significant at the 5% level) than those in the corresponding control period. However, this increase in trading volume was only recorded for small market capital size companies, not for large market capital size companies. This observation is consistent with previous studies (Blankespoor et al., 2014; Prokofieva, 2015), who found that the benefits of corporate disclosure on *Twitter* in reducing information asymmetry were more significant for 'low-visibility' companies, or companies with small market capital sizes.

Similar to earlier discussion, for companies that disclosed only a single financial reporting tweet, there were records of higher weighted average bid-ask spreads. Table 5.14 shows that 60-75 and 105-120 minutes following the stock market open, the weighted average bid-ask spreads were 0.072 and 0.0288 larger (significant at the 5% level) than those in the corresponding control period (for large and small market capital size companies respectively). These observations further demonstrate that the dissemination of a single financial reporting tweet may damage the information environment as such a financial reporting tweet only provides limited information. The results in Table 5.14 show that the information environment for companies with small market capital sizes was less exposed to such damage, which is represented by fewer records of increase in weighted average bid-ask spread. Therefore, this study argues that small market capital size companies receive greater benefits from disclosing multiple pieces of financial information on *Twitter,* which is consistent with previous literature (Blankespoor et al., 2014; Prokofieva, 2015).

Table 5.14

Wilcoxon Signed Rank Test Result for Large and Small Market Capital Size Companies Under Scenario A – Multiple

| | A – Multiple Financial Reporting Tweets – Large | | | | | A – Multiple Financial Reporting Tweets – Small | | | | |
| | % Trading Volume | | Weighted Average Bid-Ask Spread | | | % Trading Volume | | Weighted Average Bid-Ask Spread | | |
Time	Number of Events	Difference (Event-Control)	Effect Size	Difference (Event-Control)	Effect Size	Number of Events	Difference (Event-Control)	Effect Size	Difference (Event-Control)	Effect Size
10:00	23	-0.00270	0.04933	-0.00139	0.03588	21	0.00056	0.07240	0.00102	0.02413
10:15	23	-0.00065	0.22871	-0.00120	0.18386	21	0.00382	0.04559	0.00004	0.02413
10:30	23	-0.00014	0.02242	0.00025	0.02691	21	-0.00862	0.14213	0.00168	0.23866
10:45	23	0.01320	0.20180	0.00065	0.23319	21	-0.00618	0.03486	0.00011	0.08849
11:00	23	0.01086	0.15247	**0.00072***	0.31840	21	-0.00766	0.04559	-0.00073	0.13140
11:15	23	0.00396	0.15696	0.00012	0.07175	21	0.01473	0.23866	0.00153	0.19576
11:30	23	0.00289	0.00897	0.00006	0.00448	21	**0.01688***	0.29766	-0.00117	0.08313
11:45	23	0.00098	0.17489	0.00001	0.12108	21	-0.01170	0.07777	**0.00288****	0.48537
12:00	23	0.00835	0.19732	-0.00007	0.17489	21	-0.00277	0.10995	-0.00082	0.08849
12:15	23	0.00671	0.13005	0.00039	0.17938	21	0.01053	0.03486	0.00134	0.09922
12:30	23	-0.00372	0.08072	0.00051	0.08072	21	0.00956	0.03486	0.00100	0.14213
12:45	23	0.00128	0.11660	0.00015	0.07624	21	-0.00112	0.02950	0.00343	0.13140
13:00	23	-0.00008	0.00897	**0.00027***	0.30046	21	-0.00326	0.12604	0.00089	0.15822
13:15	23	0.00259	0.00448	-0.00012	0.16144	21	-0.00033	0.23866	-0.00053	0.07777
13:30	23	0.00173	0.02242	-0.00011	0.14350	21	-0.00077	0.08849	0.00058	0.12067
13:45	23	0.00009	0.05381	-0.00020	0.05381	21	0.00720	0.04559	-0.00040	0.19576
14:00	23	0.00183	0.07175	-0.00035	0.04036	21	0.00124	0.04559	-0.00024	0.06168
14:15	23	0.00170	0.21525	-0.00051	0.04484	21	-0.00758	0.08313	0.00124	0.06168
14:30	23	0.00096	0.08072	-0.00044	0.16592	21	0.00838	0.14213	0.00039	0.07240
14:45	23	**-0.00395***	0.31391	-0.00112	0.24216	21	**-0.00635***	0.25475	0.00055	0.07777
15:00	23	-0.00546	0.04484	-0.00085	0.07624	21	0.00364	0.08849	0.00013	0.16358
15:15	23	**-0.00935***	0.25561	-0.00084	0.12108	21	0.01048	0.22794	0.00047	0.05631
15:30	23	0.00628	0.04484	-0.00006	0.03588	21	**-0.02141***	0.26548	-0.00147	0.21721
15:45	23	**-0.00553***	0.32736	0.00012	0.11211	21	0.01784	0.08313	-0.00016	0.10995
16:00	23	-0.01637	0.13902	0.00106	0.17489	21	0.00950	0.10458	0.00356	0.16894

5.3 CONCLUSION

This chapter presented a discussion of the results of this study. First, it established that the adoption of *Twitter* for financial reporting has increased over time in support of the first predicted observation of this study. Furthermore, this study found that ASX companies with larger market capital sizes and from Information Technology and Telecommunication Services industry sectors were more likely to adopt *Twitter* for financial reporting. These findings support the first and second hypotheses of this study. The content of financial reporting tweets mainly focuses on 'profit' related financial reporting themes and half of these tweets contain positive sentiments, while most of the other half are neutral. These findings answer the first research question of this study: 'What is the nature and extent of financial reporting on *Twitter* by ASX listed companies?'

Regarding the economic consequences following financial reporting on *Twitter*, this study found that the stock market reaction following financial reporting on *Twitter* differs significantly due to the timing of ASX announcements and financial reporting tweets. The effect of financial reporting tweets in reducing information asymmetry was most prominent when the ASX announcement was disclosed outside the stock market trading hours (scenarios A and B). Under these two scenarios, the information asymmetry was reduced significantly following the financial reporting tweets. However, there was no record of a reduction of information asymmetry when the ASX announcement was disclosed during the stock market trading hours, and the financial reporting tweet was released outside stock market trading hours (scenario D). This may be due to the long time lag between the ASX announcement and the financial reporting tweet.

Moreover, the specific stock market reaction mechanisms are different in various scenarios. For ASX companies that only disclose one financial reporting tweet following the ASX announcement, the levels of information asymmetry following the financial reporting tweet may increase instead of decrease, as limited financial information is presented in the financial reporting tweet (each tweet can only include 140 characters), which may lead to further uncertainty in the stock market. For ASX companies with different market capital sizes, the findings of this study suggest that companies with small market capital sizes can receive greater benefits from financial reporting on *Twitter* in terms of information asymmetry reduction, in comparison to companies with large market capital sizes. These findings support Hypothesis 2 that 'the level of information asymmetry is smaller in ASX companies with both ASX announcement and financial reporting tweets than ASX companies with only ASX announcement'. Discussion of the findings related to Hypothesis 2 also addressed the second research question of this study: 'What are the economic consequences of financial reporting on *Twitter*?'

Chapter 6: Financial Reporting on Social Media – Challenges and Suggestions

The results and discussion chapter outlined the findings of research questions one and two. This chapter addresses research question three: 'What are the elements that industry practitioners and regulators should focus on in order to achieve better practice and regulation of financial reporting on social media?' To do so, this chapter first discusses the existing challenges and opportunities of financial reporting on social media, as developed from previous incidents, findings from the literature (Blankespoor et al., 2014; Prokofieva, 2015), and results from this study. As the U.S. and Australian contexts provide very different reporting regulatory frameworks pertaining to real-time company information, this chapter further reviews the current regulation for financial reporting on social media in both Australia and the U.S., then explains whether this current setting of regulations is adequate to accommodate the challenges presented in discussion.

Suggestions are then provided to industry practitioners in order to tackle the challenges raised by the current practice of financial reporting on social media, regulation requirements, and the results and findings from previous literature and this study. For the regulator, this chapter provides suggestions for the development of a regulatory framework in the future to achieve a balance between facilitating the growth of this new financial reporting channel and ensuring adequate investor protections are in place.

6.1 CHALLENGES OF FINANCIAL REPORTING ON SOCIAL MEDIA

Since the adoption of social media for financial reporting, there have been several incidents involving unexpected stock market reaction as a direct result of this practice. The challenges of financial reporting on social media are multi-faceted, and dependent on the poster of the information (e.g., corporate, media, financial analysts and retail investors); the characteristics of the information (whether it is public or private, material or immaterial, fact or rumour); and the channel of information disclosure (whether it is first disclosed on social media, whether the social media channel is well-known to investors or not, etc.). Any combination of the above elements creates new challenges for financial reporting on social media.

Arguably, the most crucial element is the specific characteristics of the financial reporting information. If the financial reporting information is already known to the public, then disclosure of such information on social media should be stress-free, as no regulation requirement is imposed on public information (unless such information is misleading/rumour). However, if the information is material, further investigation is needed, as reporting regulations impose strict regulation on material information, both in Australia and the U.S. (Australian Securities Exchange, 2013a; Securities and Exchange Commission, 2013a). In this section, two significant incidents related to financial reporting on social media are discussed. One incident regards the spread of a rumour on social media (a blog) in Australia, while the other incident concerns whether financial reporting information dissemination on social media (Facebook) is considered material and public in the U.S.

6.1.1 The David Jones Incident

David Jones Ltd (DJS) is Australia's oldest department store. Between 29th June 2012 and 2nd July 2012, the stock price of DJS underwent extreme volatility during a

two-day period, with a fluctuation over 20%. This incident happened following a surprise takeover bid offer (takeover) from EB Private Equity (EBPE) (Ryan, 2012). On the first trading day, DJS released limited information regarding this offer. On the second trading day, the stock price of DJS returned to normal after the release of an announcement by DJS indicating that the offer was retracted by EBPE. Full coverage of this incident was provided by Walters and Robin (2012). This incident has attracted great interest from academics (Ramsay, 2012), professional practitioners (Ellem, 2012), and regulators (Australian Securities & Investments Commission, 2012). The focus of discussion largely centres on whether DJS complied with the continuous disclosure requirements and whether they could have handled the situation better.

For a retail investor who only follows ASX announcements, a review of the ASX announcements from DJS indicates that DJS released the first announcement to confirm the takeover at 10:01AM on 29th June 2012. Later in the afternoon at 02:11PM, DJS released the second announcement with more information regarding the offer. Between these two announcements, the stock price of DJS surged more than 20%. Following the second ASX announcement, the stock price of DJS plunged significantly. Retail investors that also pay attention to social media (in addition to the ASX announcement) would have witnessed an entirely different story. According to Walters and Robin (2012), the information concerning the surprise offer was first disclosed by a blogger in Newcastle, England. This means that the retail investors who also paid attention to social media could have captured this information and traded with this information advantage before the stock market opened. The first announcement from DJS at 10:01AM confirmed this takeover and reinforced the credibility of this previous rumour of takeover. Before the second announcement

from DJS at 02:11PM, more details about this takeover had been continuously leaked through social media and other media channels. A false market was formed with unaccredited material information, meaning that the DJS stock was trading in an unstable information environment. In this scenario, retail investors who paid attention to social media would once again trade DJS stock with a distinct information advantage.

The above discussion regarding investors with or without access to social media presents a potential information gap between retail investors, when unqualified rumours are disclosed on social media. For this particular incident, there were concerns about whether DJS had failed to comply with the continuous disclosure regime, both from academics and practitioners (Ramsay, 2012; Walters & Robin, 2012), as well as regulators (David Jones Ltd, 2012b). ASX sent an enquiry letter to DJS after the release of the second announcement by DJS on 29th June 2012. In this letter, ASX asked DJS two major questions: first, why the information in the second announcement was not disclosed in the first announcement, if DJS had already known such information; and second, why a trading halt was not requested.

The responses from DJS to ASX (David Jones Ltd, 2012b) were two-fold. First, DJS explained the principles on which they were acting when they faced this incident. Second, DJS specifically explained what happened when they decided to release the first and second announcements. According to DJS, the takeover was in fact received much earlier on 28th May 2012, through an email dated 22nd May 2012. This shows that the DJS board had witheld this takeover information for nearly one month. DJS argued that such expression of interest of takeover was 'highly conditional, uncertain and incomplete'. Further, DJS emphasised that they had tried to contact EBPE and had conducted an online search of EBPE information, yet had been unable to obtain

any meaningful information (David Jones Ltd, 2012b). Based on the above expression of interest and unresponsive contact, DJS claimed that they considered the takeover was 'not deemed to be material for the purpose of Listing Rule 3.1'. Therefore, DJS believed they could apply the exception of Listing Rule 3.1A when they decided not to disclose such material information. Furthermore, DJS argued that their actions were to 'strike a balance between encouraging timely disclosure of material information and preventing premature disclosure of incomplete or indefinite matters' (David Jones Ltd, 2012b, p. 2), as required in Guidance Note 8 of Continuous Disclosure. To further explain their release of staggered announcements during this incident, DJS provided the following rationale. First, on the morning of 29th June 2012, DJS noticed that the information related to the expression of interest of takeover was likely to have been known by several third parties, including financial market participants and property market participants (David Jones Ltd, 2012b). Based on this understanding, DJS released the first announcement before the market opened. On the afternoon of 29th June 2012, DJS became aware that the details of the takeover, which were available on the UK blog site, had been picked up by international media outlets (David Jones Ltd, 2012b). These outlets intended to publish such information. Furthermore, Sydney Morning Herald Online[22] had already reported EBPE's name and the proposed value. Based on this understanding, DJS released the second announcement with full coverage of all the information that the DJS board was aware of at that time.

In defence of the limited information presented in the first announcement, DJS argued that they did not know the precise content of knowledge in the stock market against the takeover. Furthermore, DJS claimed that they were trying to minimise the

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[22] An Australian local newspaper.

possibility of disclosing speculative and misleading information, which could then lead to a false market. DJS expressed that they did not wish to give more credibility to the rumour until they received more detail from EBPE. In defence of the 'late' release of the second announcement, DJS argued that they wanted to ensure the public information in relation to the takeover was not misunderstood and was correctly reported.

The above response from DJS outlines two key challenges for listed companies when they face an unexpected leak of material information or rumour on social media. First, what constitutes material information? Second, what should companies do when the flow of information is not under their control? In the first part of their response, DJS stated that they did not consider the takeover to be material information. Interestingly, when they released their first announcement through ASX, this first ASX announcement was marked as material by the ASX. More importantly, the stock price of DJS fluctuated by more than 20%, which shows that the stock market responded dramatically to this takeover information. Therefore, the identification of material information remains the first and biggest challenge for listed companies. In the second part of their response, DJS argued that they did not know how much takeover information the market possessed and they wanted to prevent a false market. However, there are concerns that DJS was forced to release the first two announcements once they realised that the market had obtained such information (Ramsay, 2012; Walters & Robin, 2012). The 'wait and see' approach by DJS to assess the scale of rumour, then act accordingly, shows how little listed companies can do when it is not possible for them to actively manage the information flow. In the first announcement, DJS chose to provide limited information. The first announcement (David Jones Ltd, 2012a) stated that:

> "…no usual public information is available (for this takeover) … the Directors do not believe they currently have relevant information to enable them to qualify or value the approach… (the directors) recommend that shareholders treat any related market comment cautiously."

However, the stock market jumped nearly 20% following the takeover rumour despite the directors' recommendations in the first announcement.

In a news report by Ryan (2012), Greg Medcraft, the then Chairman of ASIC, addressed the need to review the trading halt mechanism if a company was not satisfied with the current price signal in the stock market. As previously discussed by DJS, the expression of interest of takeover from EBPE was 'highly conditional, uncertain, and incomplete'. While DJS emphasised the fact that they considered this takeover to be 'not material', the stock market clearly did not concur, as the stock price of DJS surged nearly 20%. What's more, the ASX marked the first announcement from ASX as 'price sensitive', which means that the ASX may hold a different point of view in considering such takeover as material.

One potential explanation for DJS being unwilling to place a trading halt is that they were afraid of corporate goodwill damage (Ramsay, 2012). However, the fact that DJS did call for a trading halt at 01:44PM on 2nd July 2012 eliminated the need for any such explanation. Therefore, why didn't DJS call for a trading halt earlier? In the enquiry letter from ASX to DJS, which was issued after the second announcement on 29th June 2012, the ASX suggested DJS use a trading halt if DJS believed that was appropriate. Why didn't DJS take up the ASX's suggestion? What's more, since the 29th June 2012 was a Friday, it left DJS with an extra 48 hours with which to work out this issue over the weekend before the market re-opened on 2nd July 2012. Clearly, knowing when to call a trading halt is a key issue facing listed companies.

The above discussion of the DJS incident reveals the existence of different challenges for listed companies against stock market rumour, including: what constitutes material information; what information a company should disclose when information flow can no longer be managed; and identifying the ideal time to call a trading halt. In the age of social media, the spread of rumour can be significantly faster than traditional media, which necessitates a similarly rapid and appropriate response. Such requirements not only apply to listed companies, but also to regulators. As stated by Greg Medcraft in the Ryan (2012) news report:

> "It has been clear for some time that the guidance needs to be updated particularly with the impact of social media and making sure social media doesn't send the wrong price signals to the market… Social media is now a fact of life and that in itself will shape change."

6.1.2 The Netflix Challenge

Another iconic event of financial reporting on social media occurred in the U.S. Coincidentally, it happened around the same time as the DJS incident. In this incident, the financial reporting information was not a rumour, but fact. The focus of this incident is a Facebook post by a listed company's CEO, which initiated a discussion regarding the definition of 'material information', how to determine whether a social media platform is a valid corporate disclosure channel, and the involvement of the U.S. Securities and Exchange Commission (SEC).

On 3rd July, 2012, Reed Hastings (2012), CEO of Netflix Inc. (Netflix), an online media streaming platform including TV and drama, posted on his own Facebook page:

> "Congrats to Ted Sarandos, and his amazing content licensing team. Netflix monthly viewing exceeded 1 billion hours for the first time ever in June.

> When House of Cards and Arrested Development debut, we'll blow these
> records away. Keep going, Ted, we need ever more!"

Following this post on Facebook, the share price of Netflix rallied on a 6.2% advance, which resulted in a 13% increase over the week (Russolillo, 2012). As written in the Russolillo (2012) report, equity analysts commented that this viewership of Netflix would make it the most-watched TV channel. The share trading volume of Netflix reached more than three times the daily average following these bullish comments. This incident attracted the SEC's attention, as on 5th December, 2012, the SEC issued a 'Wells Notice' (Securities and Exchange Commission, 2012, p. 2) indicating their intention to "recommend to the SEC that it institute a cease and desist proceeding and/or bring a civil injunctive action against Netflix and Mr Hastings for violation of the Regulation Fair Disclosure (RegFD)".

This issue of a 'Wells Notice' also attracted interest from academics and practitioners (Bensinger, 2013; Grundfest, 2013). Grundfest (2013), then Professor at Stanford Law School, published a letter to the SEC on 30th Jan 2013, claiming that the SEC should not sue Netflix, based on his nine arguments. On 2nd April 2013, the SEC issued the final report regarding the investigation of Netflix. In this report, the SEC dismissed the proposed action. Furthermore, the SEC acknowledged the use of social media for financial reporting (Securities and Exchange Commission, 2013a, p. 8):

> "We appreciate the value and prevalence of social media channels in
> contemporary market communications, and the Commission supports
> companies seeking new ways to communicate and engage with shareholders
> and the market."

A review of both the SEC report (Securities and Exchange Commission, 2013a) and the letter to the SEC from Grundfest (2013) reveals conflicting levels of understanding between regulators and academics regarding several key issues of financial reporting on social media: first, whether the information from Mr Hastings' Facebook post was material and non-public information (or not); second, whether such disclosure behaviour was selective to certain groups of people; and third, whether the general public were aware that they could expect material information about Netflix from Mr Hastings' Facebook page.

In answering the first question about material information, the SEC did not clearly answer whether the information contained in Mr Hastings' Facebook post was material or not. Instead, the SEC listed prior applications of the concept of 'viewing hours', a common concept featured in previous press releases and letters to shareholders of Netflix. Mr Hastings also explained in a previous earnings conference call that 'viewing hours' is 'a measure of an engagement and scale in terms of the adoption of our service and use of our service' (Securities and Exchange Commission, 2013a, p. 4). In addition to this previous discussion of 'viewing hours', the SEC pointed out that Netflix's stock price increased dramatically after Mr Hastings posted the financial reporting information on his Facebook page.[23] Based on the above facts and discussion, the information in Mr Hastings' Facebook post was likely to be material, even though the SEC did not give their opinion on this issue. However, Grundfest (2013) held a different view. In his letter to SEC, Grundfest (2013) argued that this information of '1 billion hours' had been covered

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[23] 'Netflix's stock continued a rise that began when the market opened on July 3, increasing from $70.45 at the time of Hastings's Facebook post to $81.72 at the close of the following trading day.'(Securities and Exchange Commission, 2013a, p. 4)

and discussed prior to Mr Hastings' Facebook post. One example as referred to by Grundfest (2013, p. 8) is:

> "On June 27, 2012, a week prior to the Posting, in testimony before the House of Representatives' Subcommittee on Communications and Technology, Netflix's General Counsel stated that 'Netflix delivers close to a billion hours of streaming movies and TV shows to its consumers every month'[24]."

Furthermore, Grundfest (2013) commented that it would be extremely difficult for the SEC to argue that the information in Mr Hastings' post was material, as similar information already existed in the market prior to the post. This discussion about material information represents two different approaches as to whether specific information is considered material. From one perspective, information is deemed to be material if the stock market reacts with significant movement following the disclosure of this information. From another perspective, information is deemed not to be material if such information has been discussed in other public channels. The above discussion presents the first major challenge of financial reporting on social media.

Regarding the second issue surrounding selective disclosure, whilst the SEC acknowledged that Mr Hastings had more than 200,000 subscribers to his Facebook account, the regulator's concern was that this still constituted 'selectivity' in terms of audience. The SEC further argued that this financial reporting practice did not comply with the RegFD, which required a 'broad, non-exclusionary distribution of

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[24] Hearing of the Energy and Commerce Committee, Subcommittee on Communications and Technology, U.S. House of Representatives, at 1 (2012) (testimony of David Hyman, Gen. Counsel of Netflix, Inc.), available at http://energycommerce.house.gov/sites/republicans.energycommerce.house.gov/files/Hearings/CT/20120627/HHRG-112-IF16-WState-HymanD-20120627.pdf.

information to the public' (Securities and Exchange Commission, 2013a). To counter, Grundfest (2013) argued that the viewership of Mr Hasting's Facebook page was in fact larger than that of the Wall Street Journal, which is considered to have achieved broad dissemination. Furthermore, Grundfest (2013) argued that the use of Mr Hastings' Facebook page instead of the Wall Street Journal to disseminate information allowed stakeholders of Netflix to locate relevant information in a faster manner.

These conflicting views between the SEC and Grundfest represent an ongoing discussion regarding the efficiency of social media. While social media allows fast speed transmission of information to users, with low maintenance cost, it is difficult to review whether users actually read the information as per the poster's wish. Therefore, although the viewership of Mr Hasting's Facebook page is larger than that of the Wall Street Journal, it is extremely difficult to show that the larger number of viewers of Mr Hastings' Facebook page would be more interested in, and potentially able to use the information contained within the '1 billion hour' post, than if it was published on the Wall Street Journal page.

The second issue identifies the use of social media for financial reporting as potentially constituting selective disclosure. The third issue follows on from this. Stakeholders can be overwhelmed by the range of social media platforms, and not know which to follow to maximise updates of relevant financial reporting information. At the beginning of the Netflix investigation report, the SEC expressed their concern regarding this issue (Securities and Exchange Commission, 2013a, p. 1):

> "Neither Hastings nor Netflix had previously used Hastings' personal
> Facebook page to announce company metrics, and Netflix had not

previously informed shareholders that Hastings's Facebook page would be used to disclose information about Netflix."

In response to the concern that not all stakeholders may have received the information, Grundfest (2013) argued that the '1 billion hour' post in Mr Hasting's Facebook page was quickly circulated through traditional media, such as Forbes, Bloomberg, etc. (Grundfest, 2013, p. 13). However, the circulation of information did not change the fact that those stakeholders without access to Mr Hastings' Facebook page were still at an information disadvantage. They could not receive the material information at its initial release and were dependent on its subsequent broad-range dissemination.

Following the SEC report, Netflix notified their investors through regulatory filing that they might use social media channels to disclose material information, while still relying on the traditional disclosure outlets. These social media channels include *Twitter*, the official Netflix Facebook page, and the Facebook page of CEO Reed Hastings, as well as their blogs (Bensinger, 2013). This regulatory filing prevents Netflix from further violation of RegFD, as Netflix has now taken reasonable steps (regulatory filing) to notify their investors that they planned to use social media for disclosure. However, the number of social media channels that Netflix considers using may still be too numerous for a typical consumer to stay abreast of any new information (Netflix, 2015). This is, in fact, another concern of the SEC, that it could be a 'virtually impossible task' for investors to 'keep pace with a changing and expanding universe of potential disclosure channels' (Securities and Exchange Commission, 2013a).

The above discussion of the Netflix incident reveals the existence of different challenges for listed companies in disclosing financial reporting information on

social media. These challenges include: what constitutes material information; how to determine whether a social media platform can be used as a valid public channel that is well known for financial reporting; and how to reduce the 'selective disclosure' concern on social media as it may disadvantage certain investors who do not pay attention to social media or lack of time in tracking too many social media platforms for financial reporting.

The discussion of DJS and Netflix incidents in this section presents some of the challenges of financial reporting on social media. In Section 6.2, a review of the results from previous literature and findings from research questions one and two in this present study are conducted, in order to present other challenges and opportunities in the practice of financial reporting on social media.

6.2 THE CHALLENGES AND OPPORTUNITIES AS DEVELOPED FROM PREVIOUS LITERATURE AND THE PRESENT STUDY

As discussed in Chapter Two, the development of literature regarding financial reporting on social media has mainly focused on the association between corporate disclosure/financial reporting on social media and changes in information asymmetry. Research questions one and two of this present study provided further understanding of the nature and extent of financial reporting on *Twitter*, as well as the stock market reaction mechanism following financial reporting tweets. Several challenges and opportunities posed by financial reporting on social media are now presented and discussed. These challenges include: companies using *Twitter* for financial reporting that do not advertise their *Twitter* accounts; companies with small market capital size and from certain industry sectors that either do not have the resources to understand and operate financial reporting on social media or do not have full understanding of this practice; and different market reaction mechanisms

depending on the timing of financial reporting on *Twitter*, number of financial reporting tweets on *Twitter*, and companies' market capital sizes.

The first observation from the results in research question one is that not all ASX companies who own a *Twitter* account for financial reporting advertise their *Twitter* accounts. This creates the first challenge, wherein relevant stakeholders may not receive essential financial reporting information in a timely manner. According to the findings of research question one in this present study, the adoption of *Twitter* for financial reporting has continuously increased. As the adoption rate of financial reporting on *Twitter* is 16.4%, the adoption of this practice has just reached the adopter group of early majority (Rogers, 2003). Moreover, the result of binary regression analysis from research question one indicates that the innovators and early adopters of financial reporting on *Twitter* are most likely to be the ASX companies with large market capital size and from certain industry sectors. Thus it is necessary to promote the practice of financial reporting on social media.

Accordingly to Rogers (2003), a failed innovation may be due to the weakness of the innovation, competition from other innovation, or that such innovation has not been fully understood by the public. For financial reporting on social media, one prominent weakness is that due to its fast speed and low cost characteristics, the flow of information can be difficult to manage, as seen in the previous incident of DJS (Ryan, 2012). From the aspect of competition, as social media represents web 2.0 technology, social media must compete either with other corporate disclosure channels including RSS feed and XBRL reporting, or internal competition within social media platforms, including *Twitter*, Facebook, LinkedIn, and many other platforms.

Based on the findings from research question one, the major concern of failed innovation in the practice of financial reporting on social media is the observation that innovators and early adopters of financial reporting on *Twitter* are ASX companies with large market capital size and from certain industry sectors. First, the observation that large market capital size companies are more likely to adopt *Twitter* for financial reporting indicates that even though *Twitter* or other social media platforms are branded as low cost and highly efficient corporate disclosure channels, companies still face obstacles in adopting this practice. As discussed in Chapter Five, there are several potential obstacles that stop ASX companies with small market capital size from adopting *Twitter* for financial reporting. One is the level of resources required to understand and operate this practice, another is the legislative consequences of disclosure regulation violation. Second, the findings from research question one indicate that ASX companies from certain industry sectors (Health Care and Consumers) are less likely to adopt *Twitter* for financial reporting, even though these companies have already adopted *Twitter* for other business uses. This observation indicates that the innovation of financial reporting on social media has not been fully understood across all industry sectors. More importantly, this practice may be perceived as inadequate in certain industry sectors, or in the 'closed and over-connected network' (Rogers, 2003).

The above discussion outlines the first challenge of financial reporting on social media - that it is necessary to promote this practice. Companies with small market capital size have insufficient resources to understand and operate this practice, and companies from certain industry sectors do not have full understanding of this practice. To address this challenge calls for efforts from industry practitioners,

company managers, and regulators. The relevant discussion is presented in Sections 6.4 and 6.5.

An examination of the financial reporting content on *Twitter* presents the second challenge of financial reporting on social media, namely, what is the role of financial reporting on social media? The results from research question one indicate that ASX companies have a preference to disclose non-negative financial reporting information. This practice leads to the concern of selective disclosure. Traditionally, the concern of selective disclosure represents the disclosure of information to a selective group of stakeholders, instead of the general public. This aspect of selective disclosure was presented in the previous incident of Netflix, where the SEC questioned whether the Facebook page of Reed Hasting constituted a 'broad, non-exclusionary distribution of information to the public' (Securities and Exchange Commission, 2013a).

The results from research question one present another aspect of selective disclosure, which is the disclosure of financial reporting information that is in favour of the company's performance. For example, the results from research question one show that more than 80% of ASX companies disclosed positive financial reporting tweets while more than 50% of all examined financial reporting tweets were positive. This observation should raise concern among the various stakeholders, including industry practitioners, company managers and regulators. This observation leads to an important topic: what is the role of financial reporting on social media? This is the second challenge of financial reporting on social media.

As discussed in Chapter Two, previous literature (Blankespoor et al., 2014; Prokofieva, 2015) has identified the association between corporate disclosure/financial reporting on *Twitter* and the reduction of information

asymmetry, as represented by the reduction of bid-ask spread. Moreover, the results from research question two in this present study showed similar findings, where the information asymmetry was reduced following financial reporting on *Twitter*. The results from research question two further outline the market reaction mechanism following financial reporting on *Twitter*. These observations as discussed in Chapter Five also present several challenges that are multi-faceted. First, while the stock market reacts to financial reporting on *Twitter* based on the timing of both an ASX announcement and subsequent financial reporting on *Twitter*, the results show that the ASX stock market responds to financial reporting on *Twitter* at a faster pace if the ASX announcement is disclosed outside market trading hours. This indicates that financial reporting on social media may serve to remind/alert stakeholders of the existence of a relevant announcement, especially for off-market announcements. Further, there is no record of information asymmetry reduction when there is a long delay (lag) between the ASX announcement and the financial reporting tweet. This indicates that timeliness of financial reporting on *Twitter* is essential. Therefore, listed companies should have dedicated staff disseminating financial reporting on Twitter, once the ASX announcement is released by ASX. This staff requirement necessitates further training and salary resources, which may be a challenge for listed companies with limited resources.

Second, this study observes that ASX companies with small market capital size receive greater benefit (reduction of information asymmetry) from financial reporting on *Twitter*, in comparison to ASX companies with large market capital size. This observation was also captured by previous studies (Blankespoor et al., 2014; Prokofieva, 2015). Since the results from research question one show that companies with small market capital size are less likely to adopt *Twitter* for financial reporting

on *Twitter*, this presents a conflict where the beneficial party (companies with small market capital size) are currently not taking advantage of financial reporting on *Twitter* to reduce information asymmetry. Third, the results of this study show that for financial reporting events with multiple financial reporting tweets, there are more records of information asymmetry reduction, in comparison to financial reporting events with only one financial reporting tweet. This observation indicates the need to disseminate more financial reporting information on social media. The implication of these findings will be discussed together with the current regulations in Section 6.4. .

This section has reviewed several challenges, as developed from findings in previous literature and results in this study. These challenges include companies being unaware of the importance of advertising a corporate social media account, as well as a lack of resources and understanding required to operate financial reporting on social media. The observations of diversified stock market reaction following financial reporting on *Twitter* (based on the timing of release, number of financial reporting tweets on *Twitter*, and the companies' market capital size) also represents significant challenges, especially under the current regulation of financial reporting on social media. Section 6.3 presents the current legal status of financial reporting on social media, both in Australia and the U.S.

6.3 THE LEGAL STATUS OF FINANCIAL REPORTING ON SOCIAL MEDIA IN AUSTRALIA AND THE U.S.

While financial reporting on social media is a new practice, it is not exempt from the current regulations. A discussion of the current regulations in Australia and the U.S. reveals different approaches (and attitudes) towards this practice.

In Australia, ASX listed companies are required to submit all material information to the ASX on a continuous disclosure basis. This is bound by both the ASX Listing

Rule 3.1 and Section 674 of the Corporations Act (Australian Securities Exchange, 2015b). Continuous disclosure is fundamental to market integrity, ensuring the stock market is efficient so that listed companies can secure capital for development (Gibson & Price, 2013). Under the ASX Listing Rule 15.7, listed companies are required to give material information to ASX, then wait for acknowledgement from ASX that such information has been released to the market. Only then can listed companies further disseminate this information.

For the general use of social media, the ASX requires listed companies to monitor social media and also encourages the use of social media for information dissemination. For the purpose of media monitoring, the ASX requires listed companies to monitor social media channels, in a similar approach to that used for an investor's blog, chat site, newspaper, and major news wire services such as Reuters and Bloomberg (Australian Securities Exchange, 2015b). This monitoring requirement is seen by ASX as a precaution enabling rapid action in the instance of false rumours or a leak of material information. While ASX acknowledges that listed companies cannot comment on all rumours, and that it may not be within listed companies' policies to comment on any rumours, the ASX states that listed companies must respond to rumours if the rumours would have a material effect on the entity's market price or trade volumes, or have already initiated a false market environment. For the purpose of information dissemination, ASIC encourages listed companies to use social media for communication with stakeholders (Gibson & Price, 2013, p. 5):

> "Companies may also use social media to their advantage as a method of keeping investors up-to-date with company information and events. That can complement continuous and periodic disclosure releases, disseminating

information to a wider audience. The legal obligation is to send material

price information first to the ASX and we strongly recommend that

companies wait for it to be posted there before they tweet it. Don't put more

(or less) information in the feed than the release. A link to the release is

safest. Non price-sensitive information of course does not need to go through

ASX."

The above discussion shows that ASX listed companies must comply with the

current continuous disclosure regime when they conduct material financial reporting

on social media. The recommendation from ASIC seems slightly conservative, in

comparison to the U.S. SEC regulations, as discussed below.

Listed companies in the U.S. must follow the RegFD. According to the Securities

and Exchange Commission (2013a, p.1) the aim of RegFD is to:

"…prohibit public companies, or persons acting on their behalf, from

selectively disclosing material, non-public information to certain securities

professionals, or shareholders where it is reasonably foreseeable that they

will trade on that information, before it is made available to the general

public."

Under this aim, the SEC emphasises the need to ensure that material and non-public

information is disseminated in a manner that is 'reasonably designed to provide

broad, non-exclusionary distribution of the information to the public' (Securities and

Exchange Commission, 2013a, p. 7). This requirement of 'broad and non-

exclusionary distribution of information' is essential, as listed companies in the U.S.

are not expected to mandatorily file the 8-K form if the above requirement is met.

This regulatory setting is different from Australia, in which ASX listed companies

must pre-lodge material information with the ASX. However, the SEC does raise a

concern regarding whether financial reporting on social media would fit this requirement (as discussed in previous Sections). Following the investigation of Netflix, the SEC released a press release that stated that the SEC encouraged listed companies to use social media channels to disclose material information, provided that investors and stakeholders were notified about which specific social media channels they should expect to find material information (Securities and Exchange Commission, 2013b).

The above discussion illustrates the current regulations regarding the use of social media for financial reporting in Australia and the U.S. The U.S. regulators appear to be more open to this new practice of financial reporting on social media, which appears largely to be the result of their unique regulatory setting. While listed companies in the U.S. are allowed to choose their own disclosure platform without mandatory submission to the SEC, ASX listed companies must submit material information to ASX first. In reference to the discussion of the challenges that companies face (Section 6.2), this study argues that the current framework of corporate disclosure regulation is not adequate to manage the practice of financial reporting on social media. For example, the David Jones incident shows that companies are not constantly monitoring social media and responding to rumours in a fast manner as suggested by the ASX. While ASIC recommended continuous monitoring of media outlets, including social media, for material information leakage, the lack of experience and resources of conducting such a practice make it impossible for listed companies to do so. As further illustration, the current study shows that companies receive greater benefit if they disclose multiple financial reporting tweets in comparison to a single financial reporting tweet. In contrast, ASX suggests companies adopt a more conservative financial reporting practice on social

media, which is to only repeat key information contained within the release with a link to the full release.

The above discussion confirms the second predicted observation in this study that 'the current framework of corporate disclosure regulation is not adequate to manage the practice of financial reporting on social media'. This also partly addresses the third research question, and establishes the importance of proposing suggestions for future regulation development. In Section 6.4, suggestions are provided to industry practitioners, company managers, and regulators based on the previous discussion of challenges, findings from previous literature and this current study, and the current regulatory setting.

6.4 SUGGESTIONS FOR INDUSTRY PRACTITIONERS REGARDING FINANCIAL REPORTING ON SOCIAL MEDIA

In principle, listed companies are required to follow the specific regulations in their own jurisdictions. To address the key challenges for financial reporting on social media (as presented in Section 6.2), this section provides further suggestions. These suggestions cover two aspects: the first is to deal with material information, both on traditional media outlets and social media platforms; and the second is to deal with the practice of financial reporting on social media specifically. Table 6.1 shows suggestions for industry practitioners and regulators, corresponding with the challenges and related evidence.

Table 6.1

Suggestions for Industry Practitioners and Regulators to Address Challenges

No.	Suggestion	Challenge	Evidence
For Industry Practitioner			
1	Follow the existing corporate disclosure/financial reporting regulations.	Current financial reporting on social media may violate related financial reporting regulation.	SEC reminds users of the existence of the 2008 Guidance on the Use of Company Websites; ASIC emphasises the challenges of this practice.
To deal with material information			
2	Maintain a continuous record of market reaction following corporate disclosures, especially concerning different scales of market reaction following various categories of material information.	The identification of material information, which forms a reference for future disclosure management.	DJS argues their announcement is immaterial while the ASX marked the announcement as material. Netflix CEO's statement about 'viewing hours' appeared in other media on previous occasions.
3	Be prepared to lodge announcement with ASX.	Leakage of material information.	DJS incident shows that companies may not have full control of the information flow.
4	Involve dedicated staff for constant monitoring of social media accounts, including regular commentators, especially during disclosure of material events.	Not aware of the discussion of material information in the social media arena.	DJS incident shows that companies may not have real-time understanding of information environment when making decision about material information disclosure.
5	Educate companies on the need to monitor social media accounts.	Not aware that the leakage of material is possible, regardless of companies' adoption of social media for financial reporting.	Potential or existing stakeholders may have already utilised social media and be actively seeking company's response regarding financial reporting information (Barouch, 2015).
6	Be ready to call a trading halt.	Unexpected stock market reaction following rumours.	Both DJS and Netflix incident show significant market reaction following financial reporting on social media.
7	Change attitude and be prepared to place a trading halt if there is a false market.	Hesitate to call trading halt.	DJS incident shows that companies may consider trading halt when it is already too late.
The practice of financial reporting on social media			
8	Notify stakeholders about companies' proposed use of social media for financial reporting, including which specific social media platform(s).	The social media platform does not constitute a 'broad and non-exclusionary distribution of the information to the public'.	In the Netflix incident, SEC argues that shareholders cannot receive timely essential information if they don't know or follow the Facebook account of Netflix CEO.

9	Promote the use of financial reporting on social media among companies with small market capital sizes. This includes the development of a manual, where innovators and early adopters of this practice can share their experience, and regulators can clarify the regulatory implications.	Financial reporting on social media is more popular among companies with large market capital size while companies with small market capital size are the ones that receive greatest benefits.	Results of research question one show that companies with small market capital size and from certain industry sectors are less likely to adopt Twitter for financial reporting.
10	Companies should try to balance the amount of good and bad news, while discussing this issue with regulators to reach a consensus regarding the function of social media for financial reporting.	ASX encourages disclosing both good and bad news equally, and the function of social media for financial reporting is still up for discussion.	Results of research question one show that half of financial reporting tweets are positive while the other half is predominantly neutral.
11	Disclose multiple financial reporting tweets rather than single tweets.	ASX encourages companies to only disclose key information contained within the announcement and attach a web-link to full statement of the announcement.	Results of research question two show that companies with multiple financial reporting tweets have more records of information asymmetry reduction.
For regulators			
1	Clear guidance from regulators regarding the function of social media for financial reporting, including whether non-negative disclosure is considered a 'cherry-picking' issue.	ASX encourages disclosing both good and bad news equally, and the function of social media for financial reporting is still up for discussion.	Results of research question one show that half of the financial reporting tweets are positive while the other half is predominantly neutral.
2	Clear guidance from regulators regarding the monitoring requirement of financial reporting on social media, especially for companies with small market capital size.	Despite the existing monitoring requirement of social media in general, companies may also face higher expectations once they become familiar with financial reporting on social media.	In the previous incident, ACCC states that companies with large market capital are expected to respond to inquiries on social media faster as they hold more resources, similar to the companies that are familiar with the use of social media.
3	Regulation needs to adjust accordingly to accommodate financial reporting on social media, based on research findings.	ASX encourages companies to only disclose key information contained within the announcement and attach a web-link to full statement of the announcement.	Previous literature and this current study demonstrate that the reduction of information asymmetry is more obvious for multiple financial reporting tweets on *Twitter*.
4	Regulator adopts a more open attitude towards financial reporting on social media and conducts constant update of regulation for this practice through a wide range of consultation with academics and industry practitioners.		

To address the issue of identifying material information, action must be taken to maintain a continuous record about the market reaction following corporate disclosures, especially concerning different scales of market reaction towards various categories of material information. In addition, to accommodate significant stock market reaction following unexpected rumours, regular monitoring of traditional media outlets and social media platforms for unexpected rumours or information leaks is necessary. Companies must also be ready to release confidential information when needed. At the same time, as discussed in the DJS incident, companies must be prepared to place a trading halt if there is a false market.

To manage the practice of financial reporting on social media, a few suggestions are also provided. First, as discussed in the Netflix incident, listed companies should notify stakeholders about their proposed use of social media for financial reporting. Second, to promote the practice of financial reporting on social media, especially among companies with small market capital size, industry practitioners are encouraged to develop a manual, where innovators and early adopters of this practice can share their experience. Third, in response to the concern of selective disclosure of non-negative financial reporting on social media as identified in this current study, a general consensus should be reached between industry practitioners, company managers, and regulators, with regard to the function of social media for financial reporting. Companies should also assess the balance between good and bad news in their financial reporting on social media. Fourth, since this study has shown that companies disclosing multiple financial reporting tweets and companies with small market capital sizes can receive greater benefits from financial reporting on *Twitter*, companies are encouraged to increase the frequency of financial reporting on *Twitter*, especially companies with small market capital size.

In general, companies are required to follow the existing disclosure regulations. For example, listed companies in the U.S. are subject to the 2008 Guidance on the Use of Company Websites (Securities and Exchange Commission, 2008), when they consider conducting financial reporting on social media. The SEC emphasised in the Netflix investigation report that this 2008 Guidance was designed to be flexible and adaptive (Securities and Exchange Commission, 2013a). The SEC further stated that while they appreciate the technology advancement and companies' efforts to work with new media, they still require listed companies to play by the rules. In Australia, the enforcement of a continuous regime has been consistently emphasised, especially with regular updates of Guidance Note 8. Similar to SEC in the U.S., while ASIC encourages the use of social media to disseminate information, ASX listed companies are also subject to the challenges of consistent monitoring of social media (Australian Securities Exchange, 2015a). Although social media is a new phenomenon, following the principles within existing corporate disclosure regulations is always the safest approach.

One significant challenge of financial reporting on social media is identifying material information. The incidents of both DJS and Netflix illustrate the significant market volatility following the disclosure of material financial reporting information on social media. However, it is difficult to identify whether corporate disclosure is material or not in the first place, especially for new information. As discussed by Gibson and Price (2013), good continuous disclosure practice is about preparation and organisation. Thus, to address this issue of identifying material information, ASX listed companies should first maintain a continuous record regarding historical market reaction following each disclosure of financial reporting information. Through adequate recording of stock market reaction following each financial

reporting announcement, ASX listed companies would have a general idea about the scale of market reaction following the proposed financial reporting, which forms a reference for future disclosure management.

Second, ASX listed companies should be prepared to lodge material information with the ASX. While ASX Listing Rule 3.1A provides several situations in which ASX listed companies are exempt from disclosing material information if they do not wish to, ASX Listing Rule 3.1B also clearly states that ASX listed companies must submit such material information to the ASX, if the ASX considers that there is or is likely to be a false market (Australian Securities Exchange, 2015b). Therefore, it becomes necessary for ASX companies to be prepared for immediate disclosure of material financial reporting information when they are required to do so. As addressed by Gibson and Price (2013), the common issues of continuous disclosure are failing to recognise whether information should be disclosed, and spending too long looking for reasons not to disclose. If ASX companies could maintain a continuous record of market reaction following financial reporting and be ready for immediate disclosure of material information, then these companies would be in better control when they face a barrage of rumours or material information leaks.

The identification of what constitutes material information and quick response to rumours relies on constant monitoring of both media outlets and stock market trading (including share price and trading volume). However, it seems impractical to monitor all social media channels in an era where social media is dramatically and rapidly evolving. Therefore, it is reasonable to at least monitor the social media channels that are important to listed companies' investing communities, especially during periods when material information is being formed or pending disclosure (Australian Securities Exchange, 2015b). This of course includes the platforms that listed

companies are currently using or are familiar with. To maintain an adequate level of monitoring, one strategy could be to have a delegated staff or a consultant service for constant monitoring of social media channels. This could help flag whether a false market might be developing in the entities' securities, as well as indicating any leak of confidential information. Another strategy would be to adopt an internet risk-management assessment to understand the appropriate response when there is a leak of price-sensitive information on social media. The staff or consultant service in charge of social media monitoring should then directly report to the company chairman and secretaries, in the case of potential information leaks (Rose, 2013).

Although social media monitoring is possible with advanced technology and extra staff, there are concerns that small market capital listed companies might not have the same luxury of time when it comes to continuous disclosure (Australian Securities Exchange, 2015a; Ramsay, 2015). To address this issue, ASIC (Gibson & Price, 2013) suggested that smaller companies must at the very least monitor postings by regular commentators, such as brokers that research the company. It is also essential to educate listed companies that even though some listed companies choose not to adopt social media, potential or existing stakeholders may have already utilised social media and are actively seeking a company's response regarding financial reporting information (Barouch, 2015). This means that rumours and the risk of material information leaks are ever-present, regardless of a listed company's action plan for social media monitoring. Under these circumstances, listed companies must be more active in social media monitoring.

While an understanding of market reaction following material announcement and preparation for potential rumours and material information leaks are appropriate precautions for listed companies, if a false market or inadequate information

environment has already formed, one essential approach that could be taken is to call a trading halt. In the enquiry letter from ASX to DJS, ASX recommended the use of a trading halt if DJS felt they needed more time to prepare a response for the enquiry letter (David Jones Ltd, 2012b). ASIC supports the use of a trading halt when circumstances allow, as the use of a trading halt is an effective management tool that ensures adequate actions are taken when there is a material information leak or rumour that leads to unexpected market movement (Gibson & Price, 2013).

Referring to the previous discussion of the DJS incident, if a trading halt was imposed on the first trading day after the initial appearance of the takeover bid offer on social media, the market fluctuation could have been avoided. In between the first and second announcements from DJS, the DJS stock was in fact trading on news/rumours that were disclosed by bloggers in the UK and EBPE. DJS did not have significant control of the information flow during this time period. The trading halt mechanism, including when to use a trading halt, is thoroughly discussed in the most updated Guidance No. 8 document. Listed companies must be aware that sometimes it is more important to protect market integrity than to be intimidated by the fear of the potential goodwill damage following the use of a trading halt (Ramsay, 2015).

The above precautions (and actions) are developed from the previous discussion of the DJS and Netflix incidents, as well as the existing regulations as guidance. The following suggestions are developed from the results and findings from previous literature and this present study. The first observation is that some ASX listed companies do not advertise their *Twitter* accounts, even though they conduct financial reporting on these accounts. This interesting finding was in fact previously discussed by the SEC in the Netflix investigation report, who recommend that listed

companies should alert investors regarding which form of communication (including social media platforms) the listed company intends to use for disseminating material and non-public information (Securities and Exchange Commission, 2013a). Alerting investors allows them enough time to become familiar with the proposed social media channel and also improves the efficiency of financial reporting on social media, as investors realise where to locate the financial information they are looking for.

The second observation is that innovators and early adopters of *Twitter* for financial reporting are more likely to be ASX companies with large market capital size and from certain industry sectors. To address this issue and promote the practice of financial reporting on social media, a few different approaches can be taken by industry practitioners, managers of companies, and regulators. As companies with small market capital size lack resources to manage and understand social media for financial reporting, industry practitioners could first draft a manual that is easy to understand and follow. This manual should cover the dos and don'ts of financial reporting on social media, so that companies with small market capital size can adopt this innovation with limited resources. Moreover, the innovators and early adopters of *Twitter* for financial reporting can share their experience of this practice with the late adopters.

The third observation is that companies tend to disclose non-negative financial reporting on *Twitter*. This leads to a necessary debate of the function of *Twitter* and other social media platforms, and whether it is a legitimate corporate disclosure channel or not. If social media platforms are deemed as marketing channels, then as far as no fake information is presented, companies should be free to advertise their products and services, including positive financial reporting information. However, if

social media platforms are recognised as corporate disclosure channels, then releasing only non-negative financial reporting information may appear to constitute a selective disclosure practice. Previously, regulators have been more concerned about selective disclosure from the viewpoint of listed companies sharing material non-public information with certain parties, who can trade on such information advantage, and which will eventually damage the rights of most investors (Securities and Exchange Commission, 2013a; Australian Securities Exchange, 2015b). This new aspect of selective disclosure (i.e. releasing only non-negative financial reporting on *Twitter*), is worth further exploration. At this stage, even though listed companies have no motivation to share negative financial reporting information on social media, since they are required to maintain a balance of good and bad news disclosure (Gibson & Price, 2013), listed companies are advised to be vigilant about this aspect and investigate further for potential regulation violation.

The fourth observation from the result in research question two is that companies disclosing multiple financial reporting tweets and companies with small market capital sizes can receive greater benefits from financial reporting on *Twitter*. Despite the lack of resources and concerns regarding regulatory consequences of financial reporting on social media, companies with small market capital size are encouraged to adopt *Twitter* for financial reporting, especially with help from peers with large market capital sizes. Further, listed companies are encouraged to disclose more financial reporting information on social media, as the stock market is more active in responding to multiple financial reporting tweets.

Overall, this section discussed recommendations for industry practitioners, based on the challenges identified from previous incidents, as well as results and findings from previous literature and this study. As regulators play a key role in the adoption of

social media for financial reporting, Section 6.5 provides suggestions regarding elements of interest for future regulation development in order to accommodate and encourage the use of social media for financial reporting.

6.5 SUGGESTED ELEMENTS OF FUTURE REGULATION REGARDING FINANCIAL REPORTING ON SOCIAL MEDIA

There are several elements in the current regulation that pose obstacles to promoting financial reporting on social media: whether social media is considered as a legitimate corporate disclosure channel; the social media monitoring responsibility; lack of alignment of existing corporate disclosure regulation with current academic findings; and the need for a more proactive regulatory attitude towards financial reporting on social media.

First, the function of social media, and whether it constitutes a legitimate corporate disclosure channel or simply a marketing channel, is still under debate. Although ASIC recommends companies apply the listing rule requirements consistently, whether good or bad news is required to be disclosed (Gibson & Price, 2013), this study shows that most of the financial reporting on *Twitter* comprises non-negative comments. This could be considered as a 'cherry-picking' issue from the viewpoint of ASIC (Gibson & Price, 2013). A clearer statement from ASIC and ASX is required regarding the recognition of the value of financial reporting on social media and regulators' opinions towards this trending practice, in order to address listed companies' concerns.

The second obstacle relates to where the responsibility of social media monitoring lies. The incident involving the failure of VB to respond to an inappropriate comment on its social media page illustrates the importance of continuous monitoring of social media and rapid response rates. In addition to this expectation

from ACCC, when discussing the VB incident, Ms Sarah Court, the then commissioner of the ACCC, suggested that big corporate players with sufficient resources should be expected to react in less than 24 hours (J. Lee, 2012). Further, companies with greater familiarity of social media are obligated to bear greater responsibility regarding their social media posts and responses to these posts. In response to the requirement for social media monitoring, ASIC advises that (Gibson & Price, 2013, p. 5):

> "For larger companies this means monitoring major sources of news and information, on mainstream outlets and significant social media sites. Smaller companies at the very least need to monitor the regular postings by regular commentators – such as brokers that research the company."

The incidents of VB and comments from ACCC and ASIC present the obstacle of social media monitoring from using social media for financial reporting, as well as the concern that familiarity leads to greater responsibility. Listed companies with small market capital sizes may want to take up the advantages of financial reporting on social media in order to reduce information asymmetry. Once they become familiar with this practice, they may attract higher expectations from regulators regardless of their available resources to monitor social media. This compounds the existing concern that listed companies with small market capital size already lack resources to maintain small scale social media monitoring. In general, companies with small market capital sizes are already concerned with the potential legislative consequences of inadequate practice of financial reporting on social media (Garcia & Conroy, 2013), as they have insufficient resources to respond to potential legislative challenges. Therefore, regulators should provide clear guidance on the practice of

financial reporting on social media, such as that released by the SEC (Securities and Exchange Commission, 2013a, see Appendix C).

The next regulatory obstacle is that the existing corporate disclosure regulation lacks contextualisation of the current academic evidence. In Australia, while ASIC encourages the use of social media to disseminate financial reporting information, they remind ASX listed companies that it may be a safer approach to simply replicate existing announcements on social media with links to the full announcement (Gibson & Price, 2013). This is despite previous empirical studies both in the U.S. and Australia (Blankespoor et al., 2014; Prokofieva, 2015) that have demonstrated that increased disclosure on *Twitter* during announcement periods reduces information asymmetry. In addition, the results of this present study show that the stock market response favours multiple financial reporting tweets instead of single tweets. These favourable responses come in the form of more records of information asymmetry reduction following multiple financial reporting tweets. These results and findings from previous literature show that financial reporting on social media benefits information asymmetry reduction. Therefore, ASIC's conservative approach of replicating existing announcements on social media with links to a full announcement may not be the most ideal approach. It is recommended that regulators respond to the trend of financial reporting on social media and accommodate the needs from both stock market and industry practitioners.

The last obstacle of financial reporting on social media is regulators' attitude. As the use of *Twitter* for financial reporting has increased, and it has been demonstrated that the use of *Twitter* for financial reporting reduces information asymmetry, it is recommended that regulators maintain a more open attitude towards financial reporting on new media channels, including social media. In the U.S., Grundfest

(2013) argued the SEC's investigation of the Netflix incident had already suppressed the use of social media for financial reporting. Furthermore, if the SEC were to have taken any enforcement action, it would be seen as discrimination against social media in favour of more traditional corporate disclosure channels (Grundfest, 2013). A similar situation exists in the Australian context, where companies with small market capital sizes receive greater benefits through financial reporting on *Twitter*, (see results from research question two in this current study and previous literature of Blankespoor et al., 2014; Prokofieva, 2015), however, results from research question one indicates they are in fact less likely to adopt *Twitter* for financial reporting.

The fear of legislative consequences is one of the main concerns that stop companies from adopting social media for financial reporting. Therefore, it is recommended that regulators maintain a more open attitude towards financial reporting on new media channels, including social media. Interestingly, as the SEC, ASX, and ASIC have all adopted social media as communication platforms with their own stakeholders, they should be more open to the use of social media technology for the purpose of corporate disclosure (Grundfest, 2013). Regarding regulation update and enforcement, a constant update of regulations that includes consultation with academics and industry practitioners is encouraged. When it comes down to addressing specific issues, proper guidelines are better than enforcement after-the-fact. Communication with listed companies is recommended, rather than the imposition of investigation and potential lawsuits in the absence of proper guidelines.

This section has discussed the elements of regulatory obstacles that hinder listed companies from adopting social media for financial reporting. First, legislative consequences are considered as a major concern by listed companies. Communication and consultation between listed companies and regulators is

essential in response to concerns from listed companies, especially for those with small market capital size that lack resources to adopt this practice. Second, since previous literature and the current study have demonstrated the benefits of financial reporting on *Twitter* in reducing information asymmetry, regulators are encouraged to maintain an open attitude towards this practice to create a better informed stock market. Third, in considering the constantly changing stock market trading behaviour and information sharing mechanism, regulators are reminded of the importance to constantly update the current regulations, while maintaining an open attitude towards corporate disclosure in new media channels, including social media.

6.6   SUMMARY

Social media is a new communication channel, and financial reporting on social media is thus a new way for information dissemination. Despite the fact that social media provides a low cost and highly efficient media alternative for listed companies to communicate with stakeholders, these features also create challenges for listed companies, such as extra monitoring requirements and rapid response to rumours. Through discussion of the DJS and Netflix incidents in Australia and the U.S., this chapter presented the existing challenges that listed companies face when they use social media for financial reporting. Based on these identified challenges, as well as findings from previous literature and the results from this study, this chapter provided suggestions to both companies and regulators in order to achieve better use of social media for financial reporting and to improve accompanying regulations. Listed companies must be aware that, even though a company may choose not to adopt social media, the above challenges still apply in the era of social media, regardless of whether companies actively monitor these channels or not (Barouch, 2015).

For regulators, a call for better understanding of social media and regulation updates can be traced back to 2013 (Katz & McIntosh, 2013). Therefore, a constant review of existing regulations based on the current practice of financial reporting on social media and other new media channels is necessary. This chapter answered the third research question of this study: 'What are the elements that industry practitioners and regulators should focus on in order to achieve better practice and regulation of financial reporting on social media?' There are other unmentioned challenges of conducting financial reporting on social media, such as hustle rumours from stakeholders (Hall, 2014), unexpected comments from celebrity investors (Sherr & Benoit, 2013), and educating social media users about the specific characteristics of their chosen social media platform [25] (Trinkle et al., 2015). These unexplored challenges can be further examined in future studies.

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[25] A study showed that some Facebook users thought the comments under the company's original post formed part of the disclosure (Trinkle et al., 2015).

Chapter 7: Conclusions

Section 7.1 provides an overview of the study, explaining the research motivations, research questions, and the developed predicted observations and hypotheses. Section 7.2 discusses the research methodologies used in this study, and how the results and findings answered the three research questions. Section 7.3 reviews the findings and contributions of this study in terms of theoretical and practical implications. To provide directions for future research, Section 7.4 provides a review of the reliability and validity issues of this study, and the approaches undertaken to address limitations. Directions of future research are discussed in Section 7.5.

7.1 OVERVIEW OF THE STUDY

The gradual emergence, growth, and popularisation of financial reporting on social media has been a source of considerable international interest, excitement, and speculation as to its future potential (Australian Securities Exchange, 2013a; Blankespoor et al., 2014; Koh, 2015). Since previous empirical studies (Blankespoor et al., 2014; Prokofieva, 2015) have revealed the association between corporate disclosure/financial reporting on *Twitter* and the reduction of information asymmetry, a fuller understanding of the nature and extent of financial reporting on *Twitter* is warranted. Regulators in Australia and the U.S. have approved the use of social media for financial reporting although with different views on the extent of its use. To inform regulation development, knowledge of the stock market reaction mechanism following financial reporting on social media is essential. Further, previous cases and incidents of financial reporting on social media as well as results and findings from previous literature have presented various challenges of financial

reporting on social media. Both industry practitioners and regulators have called for evaluation of better practice.

To address the above issues and improve understanding of financial reporting on social media, this study elected to investigate the *Twitter* platform, which has previously been examined and discussed as an alternative corporate disclosure channel for financial reporting (Blankespoor et al., 2014; Prokofieva, 2015). In addressing the research problem, this study conducted a three stage research approach. First, to obtain a better understanding of the current practice of financial reporting on *Twitter* by Australian listed companies, this study explored the nature and extent of financial reporting on *Twitter* by Australian listed companies. Second, the economic impact of financial reporting on *Twitter* was reviewed. Third, to examine whether the current regulations are adequate to manage the practice of financial reporting on social media, the third stage of this study explored the elements that industry practitioners and regulators should focus on in order to achieve better practice and regulation of financial reporting on social media.

To answer the three research questions, this study developed predicted observations and hypotheses, according to the application of related theories. In discussion of the diffusion of innovation theory (Rogers, 2003), this study argued that financial reporting on *Twitter* formed one type of 'innovation' as discussed by Rogers. Therefore, the adoption of *Twitter* for financial reporting should follow the diffusion of innovation theory. This study developed the first predicted observation that the use of *Twitter* technology for financial reporting has increased over time. Furthermore, as Rogers (2003) argues that innovators and early adopters of innovation have more resources and are willing to adopt innovation, this study developed Hypotheses 1a (that there is a positive association between ASX companies' market capital sizes

and the adoption of *Twitter* for financial reporting) and Hypothesis 1b (that ASX companies from certain industry sectors that are close to technology are more likely to adopt *Twitter* for financial reporting). These predicted observations and hypotheses were developed to answer the first research question.

To answer the second research question, this study discussed the agency theory (Jensen & Meckling, 1976), information asymmetry (Healy & Palepu, 2001), and information economic theory (Allen, 1990). According to Jensen and Meckling (1976), the agency relationship between managers and shareholders creates agency conflict that leads to information asymmetry between these two parties. To address this issue, corporate disclosure is one approach to reduce the information asymmetry (Healy & Palepu, 2001), while information can also benefit investors by enabling them to rationally allocate capital to desired investment options (Allen, 1990). Based on the application of these three theories, this study developed Hypothesis 2 (the level of information asymmetry is smaller in ASX companies with both ASX announcement and financial reporting tweets than ASX companies with only ASX announcement).

To answer the third research question, this study discussed how the adverse selection issue may affect financial reporting on social media. According to Akerlof (1970), the sellers of good quality used cars are at a disadvantage, as consumers are only willing to pay the average price if they cannot ascertain the used cars' quality. This study argued that this adverse selection issue also applies to financial reporting on social media, leading to the development of the second predicted observation that 'the current framework of corporate disclosure regulation is not adequate to manage the practice of financial reporting on social media.

To answer the research questions and test predicted observations and hypotheses, this study adopted several different research approaches. First, this study used thematic analysis and binary regression analysis to examine the nature and extent of financial reporting on *Twitter*. Second, this study combined the use of event methodology and a comparative approach to review the stock market reaction following financial reporting tweets. Finally, this study discussed the challenges that companies face when they conduct financial reporting on social media and provided suggestions accordingly. These challenges were articulated from assessment of previous incidents (DJS and Netflix), the current study, and prior literature. A reflection of how ASX companies can better practise financial reporting on social media and how future regulation can better accommodate this practice were provided through this discussion.

This study outlined distinct financial reporting practices on *Twitter* among companies with different market capital sizes and from various industry sectors. Furthermore, this study presented the stock market reaction following financial reporting tweets, focusing on the aspect of information asymmetry. Furthermore, the findings from this study have confirmed the observations in previous literature (Blankespoor et al., 2014; Prokofieva, 2015), especially the association between financial reporting on *Twitter* and the reduction of information asymmetry. In addition, this study has shown that small market capital size companies could benefit more than their large market capital counterparts from the use of *Twitter* for financial reporting. Section 7.2 provides detailed explanations regarding how each research question, predicted observation, and hypothesis was answered in this study.

7.2 SUMMARY OF RESULTS

This study contained three research questions. Two predicted observations and three hypotheses were developed, according to the implication of related theories, in order to answer these three research questions. To answer the first research question, this study explored the *Twitter* adoption pattern for financial reporting among ASX 500 companies. Through collection of the first financial reporting tweet from each corporate *Twitter* account, results show that the use of *Twitter* for financial reporting has increased over time, which supports the first predicted observation. Based on the adoption behaviour of *Twitter* for financial reporting, this study differentiated 'innovators and early adopters' who have adopted *Twitter* for financial reporting and the 'late majority and laggards' who have not. A comparison of the corporate characteristics (market capital size and industry sector) between 'innovators and early adopters' and 'late majority and laggards' shows that 'innovators and early adopters' are the companies with larger market capital sizes and who are closer to technology. These findings support Hypotheses 1a and 1b of this study.

To answer the second research question, this study examined the stock market reaction following financial reporting on *Twitter*. Both event study methodology and a comparative approach were used to compare the stock market reaction between event periods where there were financial reporting tweets and control periods where there was no financial reporting tweet. The results indicate that the levels of information asymmetry following financial reporting tweets in the event periods reduced significantly in comparison to the control periods without financial reporting tweets. Moreover, the records of information asymmetry reduction were more frequent for small market capital size companies and companies that disclosed multiple financial reporting tweets during the event periods. These findings support

Hypothesis 2 of this study, which also answered the second research question of this study. This study finds that the level of information asymmetry is reduced following financial reporting on *Twitter*.

To answer the third research question, this study explored the existing challenges that companies face when they conduct financial reporting on social media, followed by a discussion of several precautions and suggestions for companies and regulators. For example, companies are advised to maintain a continuous record of stock market reaction following financial reporting on social media, as well as to constantly monitor social media platforms and be aware of rumours and leakage of sensitive corporate information. In addition, based on the findings of research question one, this study also emphasises the importance of advertising the use of social media for financial reporting to relevant stakeholders. Furthermore, companies are recommended to consider social media as a legitimate financial reporting channel, which means that companies should not only disclose positive financial information, but also any negative information. This study argues that the current corporate disclosure regulation is not adequate to manage the practice of financial reporting on social media. This argument supports the second predicted observation and answers the third research question of this study: 'What are the elements that industry practitioners and regulators should focus on, to achieve better practice and regulation of financial reporting on social media?'

7.3 KEY FINDINGS AND CONTRIBUTIONS

7.3.1 Theoretical Contribution

7.3.1.1 Agency Theory, Information Asymmetry, and Corporate Disclosure

The discussion of the agency relationship (Jensen & Meckling, 1976) and information asymmetry (Healy & Palepu, 2001) established the theoretical

foundation of this study. As discussed in the literature review and theoretical framework chapters, there has been continuous research on the topic of how corporate disclosure could reduce information asymmetry, the consequence of agency conflict. Focusing on financial reporting on *Twitter*, this study shows the significant stock market reaction following financial reporting on *Twitter*, as observed by reduced bid-ask spread and increased share trading volume. These findings extend the discussion of how corporate disclosure can reduce information asymmetry into the practice of financial reporting on *Twitter*. Further, it strengthens the argument of Healy and Palepu (2001), who suggest that corporate disclosure is an important approach for addressing the information asymmetry issue.

7.3.1.2 Financial Reporting on Twitter and Diffusion of Innovation Theory

To the best of the author's knowledge, this is the first study of its kind to explore the nature and extent of financial reporting on *Twitter* in the Australian context. The findings of this study show that companies are more likely to disclose 'profit' related and 'non-negative' financial information on *Twitter*, and that companies with larger market capital sizes and from specific industry sectors that are close to technology are more likely to adopt *Twitter* for financial reporting. These findings provide further understanding of financial reporting on *Twitter*. Furthermore, these findings support the diffusion of innovation theory, as proposed by Rogers (2003), who argues that innovators and early adopters of new technology are the ones with greater resources and who are close to new technology. From the methodology aspect, this study developed a new thematic analysis framework from a previous study (Sprenger et al., 2014) to identify the financial reporting themes on *Twitter*. Although this thematic analysis framework was developed from Australian data, it can be generalised to other developed capital markets to some extent. Future research that

investigates financial reporting on *Twitter* or other social media channels may reference this thematic analysis framework to categorise different types of financial reporting information.

7.3.1.3 Market Reaction following Financial Reporting on Twitter and the Discussion of Market Efficiency

While previous literature has established the association between corporate disclosure/financial reporting on *Twitter* and the reduction of information asymmetry, this study examined the stock market reaction mechanism following financial reporting on *Twitter* from the lens of stock market microstructure. This study enriches understanding of how the stock market reacts to financial reporting tweets, especially different stock market reaction mechanisms following various types of ASX announcements and different timings of financial reporting tweets. Since the ASX is a semi-strong efficient stock market, the above observations as developed from this study are consistent with the argument from Fama (1970), who suggests that in a semi-strong efficient stock market, the stock market reacts to new information. In the ASX stock market, financial reporting on *Twitter* does not include new information, as all material information must be first released through the ASX market announcement platform. However, the observations from this study show that the ASX stock market does react to financial reporting on *Twitter* via different scales and mechanisms based on the types of financial reporting on *Twitter* and their relative timings. These observations further show that financial reporting on *Twitter* has valuable information content, regardless of the ASX announcement. These observations are supported by the discussion of information economy theory by Allen (1990), as these financial reporting tweets provide new information to investors and assist investors' allocation of capital. As this study expands the research scope of corporate disclosure into financial reporting on *Twitter*, it also

promotes the use of a comparative approach from Frino et al. (2011) and further develops a series of data transformation techniques to better capture the stock market reaction following financial reporting on *Twitter*. These methodological contributions benefit future research.

7.3.2 Practical Contribution

7.3.2.1 Regulator

This study outlines the current use of *Twitter* for financial reporting, including the adoption behaviour of this practice by ASX companies and the content of financial reporting tweets. These findings are important, as they provide regulators with updated information with which to articulate future regulations and guidance to better accommodate this practice. For example, the findings of this study indicate that ASX companies are much less likely to disclose negative financial information on *Twitter*. This observation contradicts the ASX's expectation, in that the ASX requires companies to establish a fair information environment where both positive and negative financial information is provided and discussed (Gibson & Price, 2013). To address this issue, regulators need to investigate and identify the function of *Twitter*, that is, should it be considered a formal corporate disclosure channel that is under the supervision of existing regulation, or is it in fact an advertising channel that can be managed in a less rigid manner? The role of *Twitter* for financial reporting can significantly change the reporting regulatory framework for this practice.

As discussed in Chapter One, regulators from different business areas, such as marketing communication and financial reporting, may have different expectations of companies' response time to information on social media. For example, the ACCC expects large companies to respond to rumours on social media within 24 hours. This study revealed the stock market reaction mechanism following financial reporting

tweets, which indicates that the stock market could respond to financial reporting on *Twitter* in a much faster manner, such as within one to two hours. This knowledge of the stock market reaction mechanism following financial reporting on *Twitter* is essential for future regulation and guidance, especially in deciding the responsibility and liability for ASX companies when they face challenges, including rumours, of financial information on social media.

At the conclusion of this study, the challenges of financial reporting on social media were reviewed, followed by corresponding suggestions. This part of the discussion incorporated views from industry practitioners and academics on this practice, which formulated a submission to regulators. This submission includes a range of elements that future regulations should focus on, such as companies' monitoring responsibility of social media and the need for future regulation to accommodate the current practice of financial reporting on social media in order to formulate a more informed stock market.

7.3.2.2 Corporate Practitioner

Although *Twitter* is widely recognised as a low cost and fast speed communication channel, the results from research question one in this study show that the adoption of *Twitter* for financial reporting is more popular for listed companies with larger market capital sizes and those that belong to certain industry sectors. However, previous studies (Blankespoor et al., 2014; Prokofieva, 2015) have revealed that listed companies with smaller market capital sizes could receive greater benefits from increased disclosure on *Twitter,* compared to companies with larger market capital sizes. This study identifies a potential lack of understanding among listed companies with smaller market capital sizes regarding the benefits of using *Twitter* for financial reporting. It is therefore necessary to identify what constitutes this lack

of understanding. Industry practitioners need to review the potential concerns (and obstacles) of smaller listed companies, and search for an effective approach that promotes the use of *Twitter* for financial reporting. Chapter Six of this study provides some suggestions towards these ends.

The results of this study show that ASX companies prefer to disclose certain types of financial information and are more willing to disclose positive financial information. These findings raise concerns regarding selective disclosure behaviour. While previous studies (Blankespoor et al., 2014; Prokofieva, 2015) have explained that the stock market reacts to information posted on *Twitter*, a manipulation of the types and sentiments of financial information on *Twitter* may create unfairness for investors. For industry practitioners, as it becomes an ordinary practice to disclose specific types of financial information with positive sentiments on *Twitter*, company managers should consider the need for a well-designed system to manage the potential risks from financial reporting on *Twitter* and other social media platforms. These risks include, but are not limited to, market overreaction and legislative consequences. Chapter Six provides relevant suggestions.

This study reveals the stock market reaction mechanism following financial reporting tweets, which shows that the stock market could react distinctively according to different timings of ASX announcements and financial reporting tweets. Under this observation, ASX companies may need to consider various disclosure practices based on the ASX announcement release time, that is, when is the best time to tweet the relevant financial information. Finally, corporations must be aware of the existence of the challenges of financial reporting on social media and seek adequate advice.

In summary, this study presents important findings and contributes to theoretical development and practice.

7.4 RELIABILITY AND VALIDITY

This section discusses three validity issues: reliability, internal validity, and external validity (generalisability). Reliability refers to the repeatability of findings. In this study, both filters and frameworks were used to maintain the consistency of data recording and interpretation. If this study were to be repeated (following the research processes contained within Chapter Four), it is very likely that it would yield the same results for research questions one and two, as all of the data used in this present study are available for public access . For researchers who follow the clear guidance in the Chapter Four, it is expected that similar findings of this study would be generated (Shenton, 2004). Chapter Four includes a brief description of what was planned and executed on a strategic level in the introduction section, and detailed explanations of research processes, including the operational detail of data gathering and analysis in the rest of the chapter. Moreover, as the filter and framework were clearly defined and discussed, researchers will be able to follow the coherent internal research process and make judgements in terms of changing conditions and phenomena, including unclarified financial reporting tweets (Bradley, 1993).

Internal validity focuses on whether the instruments and procedures used in the research have measured what they were supposed to measure. At the first stage of this study, an existing thematic analysis framework to categorise the type of corporate disclosure was referenced from a peer-reviewed article. This use of a previous established framework increases the credibility of this present study (Shenton, 2004). Based on another established thematic analysis framework to categorise financial reporting contents, this present study further developed a new

thematic analysis framework through a pilot test on the samples of financial reporting tweets in this present study. This new thematic analysis framework is different from the previous established framework, as this new framework was developed from Australian data, while the previous established framework was developed from U.S. data. This new thematic analysis framework suits the purpose of conducting data analysis for this present study in the Australian context, as it adequately represents the current financial reporting practice on *Twitter* in Australia. The use of this newly developed thematic analysis framework enhanced the internal validity of this study, as it measured what it is supposed to measure (Bradley, 1993).

From another aspect, the use of the thematic analysis approach in this study made it possible to identify, describe, and organise the patterns of financial reporting on *Twitter* with a minimum of words while interpreting these disclosure themes or phenomenon at a maximum, which also contributes to the internal validity (Boyatzis, 1998). In addition, this study uses the thematic analysis framework as a data management tool for an organising template (Crabtree & Miller, 1999) to significantly increase the internal validity of this study (Fereday & Muir-Cochrane, 2008). This approach of thematic analysis ensures that the applicability of the code to raw information is an essential step, as it also maintains the consistency of interpretation in the process of data analysis regarding the financial reporting content on *Twitter* (Fereday & Muir-Cochrane, 2008).

External validity represents whether the results can be generalised beyond the immediate study, which is similar to the requirement of generalisability. In this study, the issue of external validity is in two aspects. First, this study only investigated the Top 500 ASX companies. Second, this study only investigated companies in the Australian context. From the first aspect, although ASX 500

companies only represent 27% of all the companies listed on the ASX, the market capital of ASX 500 companies is equal to 98.5% of the market capital of all the ASX companies (as of the 30th Nov 2013). Therefore, this study argues that the results and findings from the analysis of ASX 500 are generalisable to other ASX companies, at least from the aspect of market capital size. However, due to the wide distribution of companies in various industry sectors, the investigation of *Twitter* adoption of financial reporting among ASX 500 companies may not represent the full spectrum of ASX company *Twitter* adoption for financial reporting. Therefore, future studies can expand the sample size to obtain a better understanding of this issue, especially concerning how the industry sector may affect the *Twitter* adoption practice for financial reporting.

Further, this present study only investigated ASX companies in the Australian context. As discussed in Chapter Three, the ASX is a semi-strong efficient stock market, which responds to the release of new information. Therefore, the stock market reaction mechanism following financial reporting tweets, as examined and discussed in this present study, is likely to apply to other stock markets with the same form of efficiency setting, as well as under a similar reporting regulatory framework. For other stock markets with different forms of efficiency and reporting regulations, the results of this present study may not apply.

7.5   LIMITATIONS OF THE STUDY

This section outlines the four main limitations of this study and discusses actions taken to address them. First, while this study has a large enough sample size to answer the research questions, a larger sample size may lead to greater understanding of financial reporting on *Twitter*. Second, the research design for the second research question can be further expanded to explore the economic consequences following

other types of financial reporting. Third, the results of research questions one and two may not be generalisable to companies in different industry sectors, as well as companies listed in various stock markets with different forms of efficiency and reporting regulation. Fourth, the discussion of research question three is based on existing materials.

Among the ASX 500 companies, this study identified and examined 191 ASX 500 companies with corporate *Twitter* accounts. While this study collected over 64,933 tweets, a filter was used to reduce the number of potential financial reporting tweets to 5,637. For research question one, 880 financial reporting tweets constituted the final sample. For research question two, 128 financial reporting events constituted the final sample. This sample is large enough to conduct Wilcoxon Signed Rank Test (WSRT) data analysis, which shows significant reduction of information asymmetry following financial reporting on *Twitter*. However, a larger sample size of financial reporting events can achieve further understanding of the stock market reaction following financial reporting on *Twitter*, under different financial reporting event scenarios. Therefore, future studies could expand the sample size of financial reporting events. Researchers may consider directly starting the thematic analysis approach with all tweets, without the use of filters as in this present study. However, this approach of thematic analysis would involve a significantly large amount of work, as it would incorporate much unrelated financial information.

The second limitation of this study is the approach to control market effect within the research design for research question two, which can be further modified to reveal stock market reaction following financial reporting on *Twitter* from other aspects. In comparison to the OLS regression analysis approach that was taken in previous literature (Blankespoor et al., 2014; Prokofieva, 2015), this study used the WSRT

data analysis approach. Although such an approach makes it possible to directly compare the stock market reaction following financial reporting tweets, it is difficult to control for the existence of other unexpected factors that may initiate stock market movement.

As this study aims to review the stock market reaction following financial reporting tweets, the use of event methodology and a comparative approach presents one possible approach. In addition, this study is aware of unexpected stock market factors and has incorporated the same controlling strategy as a previous study that used a similar research design of event methodology and comparative approach (Frino et al., 2011). This controlling strategy includes several selection criteria for each financial reporting event period and its corresponding control period, which ensure that the data between the event and control periods are comparable. In addition, this study follows the use of 'pre-period' as per the previous study (Frino et al., 2011) to address the impact of the 'static market effect' and changing stock market trading behaviour.

Researchers undertaking future studies are encouraged to combine the use of OLS regression and WSRT data analysis to develop a more comprehensive understanding of stock market reaction following financial reporting tweets. However, such a combined use of OLS regression and WSRT data analysis may not generate significant results, yet it requires the provision of reasoning regarding the reason for using OLS regression and WSRT at the same time. While the proxies used under the OLS regression analysis approach in previous literature (Blankespoor et al., 2014; Prokofieva, 2015) were for a three-day event window, this study used a 15-minute event window. If future studies follow the 15-minute event window and then adopt OLS regression analysis, researchers must consider what value they should assign

the 'Twitter activity' proxy. As all 15-minute event windows are after the disclosure of financial reporting tweets, researchers of future study may have no choice but to assign the same values for the 'Twitter activity' proxy in each 15-minute interval. This will not make sense for the OLS regression analysis and interpretation as all 15-minute intervals have the same value of independent variable, which is 'Twitter activity'. Therefore, the combined use of OLS regression and WSRT data analysis approach may not achieve the same level of significant results as previous literature (Blankespoor et al., 2014; Prokofieva, 2015). In addition, future studies must be very careful in their selection of the event window, as there is a trade-off between generating significant results and understanding the stock market reaction mechanism. If the event window is too long, then the stock market reaction following financial reporting tweets may not be observed.

Third, the results and findings from research questions one and two may not apply to ASX companies in certain industry sectors and listed companies in other stock markets. This is due to the wide distribution of ASX companies in various industry sectors, the semi-strong efficient setting of ASX, and the continuous disclosure regime. Australia maintains a different reporting regulatory framework and attitude towards financial reporting on social media in comparison to the U.S. This is what makes this present study unique, as it investigates the stock market reaction mechanism following financial reporting on Twitter in a stock market that has different settings in comparison to the U.S.

In the future, researchers from other countries are very likely to find different results even if they replicate this study using the same research methodology, as other countries or stock markets follow different reporting regulatory frameworks or have different stock market efficiencies. This study calls for further studies to compare the

different stock market reaction mechanisms following financial reporting on *Twitter*, under different settings of reporting regulatory framework and stock market efficiencies. To serve this purpose, this study clearly stated the full information of the sample and research methodology in Chapter Four, including the number of sampling listed companies in each stage, the detailed data collection method, and the time period of sampling data. Therefore, future researchers following the same research approach as this study can produce a comparative study between other countries and Australia.

Fourth, the discussion in Chapter Six is based on existing information, and this includes incident reports regarding Netflix, ASX announcements from DJS, discussion papers from academics, findings from previous literature, and results of this present study. While all these materials are public, they could be seen as secondary data from relevant stakeholders. The purpose of Chapter Six is not to serve as definitive regulation; it is more of a discussion to outline the challenges and opportunities of financial reporting on social media. Chapter Six should be viewed as an invitation for further discussion among the audience of industry practitioners, company managers, and regulators. It not only provides a suggestion to industry practitioners and company managers, but also reminds the regulators to pay attention to the impact of financial reporting on social media, and then make regulation adjustments accordingly. Along with the development of financial reporting on social media, future researchers are encouraged to incorporate more results and findings from academic research, as well as opinions from industry practitioners and company managers, in order to further expand the discussion of how to conduct better practice of financial reporting on social media.

There is another minor limitations of this study. For example, during the coding process of financial reporting themes, only single coder was used due to the limited resources when conducting the current PhD Project. Future studies are suggested to use two coders and apply statistics tests such as Cohen's Kappa and Lawsches to confirm the coding process is reliable.

In summary, this study has several limitations, including an expandable sample size, the approach taken to control the market effect within the research design of research question two, and the examination of views from industry practitioners and regulators. Adequate actions have been taken to address these limitations. In addition, this study faces the limitation of generalisability. As this study was conducted in the Australian market, which is a semi-strong efficient stock market with a continuous disclosure regime, findings from this study may not apply in other stock markets due to different regulatory and market efficiency settings. This potential issue of generalisability is in fact beyond the researchers' control. Another limitation is that the market reaction time following financial reporting tweets may not be consistent for all ASX listed companies, as the stock market pays different scales of attention towards various companies. After all, the contribution of this study is not only about revealing the stock market reaction mechanisms following financial reporting tweets, it is also about establishing a valid approach to identify such mechanisms. As the stock market reaction mechanisms are constantly changing, including the scales of market reaction following financial reporting tweets, the main contribution of this study is to establish, discuss, and present a valid research design and the first evidence of the stock market reaction following financial reporting tweets that can be used in future studies. It encourages a more innovative approach to further understand this practice of financial reporting on social media.

7.6   DIRECTIONS FOR FUTURE RESEARCH

According to the above discussion of limitations in this study, this section points out directions for future research. First, future research can replicate this study with a larger sample of ASX companies and financial reporting tweets. Second, future research can replicate this study in other stock markets with different efficiency and regulation settings. Third, future research may consider the combined approach of event methodology, comparative approach, and OLS regression analysis to examine the association between financial reporting on *Twitter* and the reduction of information asymmetry. Fourth, future research may conduct a series of interviews with listed companies, regulators, and industry practitioners to obtain primary data.

First, the results of research question one, which identified the adoption behaviours of *Twitter* for financial reporting by ASX companies, may not be generalisable for all companies due to the wide spread of ASX companies from various industry sectors. Therefore, a future study involving a larger sample of ASX companies could provide further insights into the practice of financial reporting on *Twitter*. In addition, as the results of research question two were developed from 128 financial reporting events, a future study with more financial reporting events could expand the understanding of stock market reaction following financial reporting tweets. For example, the results of research question two in this study presented the different stock market reactions following financial reporting tweets between larger and smaller market capital size companies, under the scenario that they all disclosed a single financial reporting tweet. Future studies that involve more financial reporting events may produce significant findings in other scenarios, such the disclosure of multiple financial reporting tweets. In addition, future studies with more financial reporting

events may evaluate different stock market reactions following financial reporting tweets, based on the types of financial information.

Second, it is acknowledged in Section 7.5 that the results of research questions one and two may only be applicable in the Australian context, due to its unique setting of the reporting requirement and semi-strong efficiency of the ASX stock market. Therefore, future research may replicate this study in another country, such as the U.S. In considering the different reporting requirements between Australia and the U.S., as well as the regulators' attitudes towards financial reporting on social media, such a comparative study may present different scales of stock market reaction mechanisms following financial reporting on social media in these two countries.

Third, future research can utilise both the comparative approach and OLS regression analysis in order to obtain a more detailed understanding of how the stock market responds to financial reporting on social media. As discussed in Section 7.5, this study may not fully control for the stock market effect. Previous literature (Blankespoor et al., 2014; Prokofieva, 2015) adopted the OLS regression analysis and used control variables, including the number of news coverage items from press media and forecasts from financial analysts, to represent the stock market effect. Therefore, future research could combine the use of the comparative approach as applied in this present study, as well as the OLS regression analysis in previous literature. Following this combined approach, future studies may achieve a better understanding of how stock markets react to financial reporting on social media, while controlling most of the known stock market effects.

Fourth, it was recognised in Section 7.5 that the discussion surrounding research question three may not represent the true concerns of regulators and direct suggestions for industry practitioners, as the discussion was based on existing

material. Future research could conduct interviews with company managers to obtain their views and attitudes towards financial reporting on social media. Specifically, future research may consider interviewing company managers from the innovator and early adopter groups of social media for financial reporting in order to understand their motivations for using social media for financial reporting, as well as their goals through this practice. Second, future research could conduct interviews with regulators to understand their concerns towards this practice and identify the long-term goals of regulators. Third, future research could interview industry practitioners, including social media and investor relationship officers, to gain insights into their challenges and concerns that have not been covered in the discussion within this study.

In summary, this study not only reviewed the current practice of financial reporting on *Twitter*, but also presented various avenues of future research.

7.7 CONCLUDING REMARKS

This study explored the adoption of *Twitter* for financial reporting among ASX 500 companies. In addition, this study reviewed the stock market reaction mechanism following financial reporting on *Twitter*. At the conclusion of this study, several precautions and suggestions were provided based on the discussion of previous incidents, existing regulations, and results from previous literature and this present study. This study has made theoretical and practical contributions to achieve a better understanding of financial reporting on social media. Based on the research methodology and results from this study, future research can replicate and further develop this study with a larger sample size of financial reporting tweets, or conduct a similar study in other stock markets with different regulation settings and stock

market efficiency. This future research will provide further understanding of financial reporting on social media.

Appendices

The following table provides an example of how this study categorises the filtered tweets into different themes of corporate disclosure, according to the thematic analysis framework as presented in Table 4.3.

Tweet	Date (DD/MM/ YYYY)	Time	Corporate disclosure theme
RT @pgtedwards: ANZ CEO Mike Smith address to Brisbane Club. "When Australia turns away foreign capital, we turn away opportunity." http://…	20/11/2013	14:26:30	HRM
ANZ standard variable rates for Aust mortgages remain unchanged at 5.88% after Nov interest rate review http://t.co/BkLCCvMSIS	9/11/2013	11:50:40	PFR
ANZ CEO Mike Smith comments on Australian Treasurer @JoeHockey announcement to bring certainty to unlegislated tax, super measures.	6/11/2013	17:20:21	HRM
RT @MattCNBC: Our chat with #ANZ Bank CEO Mike Smith on the bank's 11% jump in FY cash profit http://t.co/ptPLJuJG9h #ausbiz #banks @ANZ_Me…	29/10/2013	14:35:04	FR
ANZ CEO Global Wealth & Private Banking Joyce Phillips says Smart Choice Super is half the cost of the average super fund.	22/11/2012	12:11:37	CP
35 communities in regional Aus will share $250,000– part of 2012 Seeds of Renewal grants program run by ANZ and the FRRR http://t.co/vXB9fRWe	12/11/2012	13:50:08	CSR
ANZ trading ex-dividend today. Final dividend of 79c paid on 19 Dec for total 2012 dividend of $1.45 per share.	8/11/2012	8:55:50	FR
Australian small business sales reveal flat retail conditions persisting. http://t.co/5KoM9onX	19/10/2012	15:00:36	MN
ANZ Aus reduces variable rate for mortgages by 0.20%pa as part of its Oct 2012 Interest Rate Review http://t.co/sSamHnYH	12/10/2012	14:36:43	PFR
@James_Boston Hi James, wrong James sorry - but let us know if you have any interest in finding out about our plans for biometrics :-) ^RF	5/10/2012	16:05:05	CSE

Appendix B

Categorisation of Financial Reporting Tweets

Financial reporting tweet	Date (DD/MM/YYYY)	Time	Financial reporting theme	Sentiment
ANZ 2013 Full Year Result - super regional strategy driving stronger shareholder returns http://t.co/tORarH0uus	29/10/2013	10:51:24	Financial Issues - Earnings	Positive
ANZ standard variable rates for Aust mortgages remain unchanged at 5.88% after October interest rate review http://t.co/eUQBFIMcng	11/10/2013	13:43:06	Financial Issues - Change of Interest Rate/Bank	Neutral
ANZ allocates $1 billion under ANZ Capital Notes Bookbuild http://t.co/8rQ6axmGxt	10/07/2013	15:48:46	Financial Issues - Issue New Capital	Neutral
ANZ has agreed to sell its wholesale mortgage distribution business Origin to Columbus Capital. http://t.co/CTB9pVgR	21/09/2012	13:37:40	Restructuring Issues - M&A	Neutral
ANZ trading ex-dividend today. Final dividend of 79c paid on 19 Dec for total 2012 dividend of $1.45 per share.	8/11/2012	8:55:50	Financial Issues - Financial Others	Neutral
Origin winds back price increases for Tariff 11 to match Qld electricity rate "freeze" for 2012/13: http://t.co/zm1Ewjy3	17/07/2012	13:20:36	Operations - Operational Performance	Neutral
To Comply with U.S. Law, Voting Rights Suspended for a Portion of News Corp. Class B Common Stock http://t.co/sMuPfi9d #NewsCorp	18/04/2012	22:40:45	Technical Trading - Trading Related	Neutral

SEC Guidance on Financial Reporting on Social Media

SECURITIES AND EXCHANGE COMMISSION

SECURITIES AND EXCHANGE ACT OF 1934
Release No. 69279 / April 2, 2013

Report of Investigation Pursuant to Section 21(a) of the Securities Exchange Act of 1934:
Netflix, Inc., and Reed Hastings

I.   Introduction

The Division of Enforcement has investigated whether Netflix, Inc. ("Netflix")
and its Chief Executive Officer, Reed Hastings ("Hastings") violated Regulation FD (17
C.F.R. §243.100 *et seq.*) and Section 13(a) of the Securities Exchange Act of 1934
("Exchange Act"). The Commission has determined not to pursue an enforcement action
in this matter. The investigation concerned Hastings's use of his personal Facebook
page, on July 3, 2012, to announce that Netflix had streamed 1 billion hours of content in
the month of June. Neither Hastings nor Netflix had previously used Hastings's personal
Facebook page to announce company metrics, and Netflix had not previously informed
shareholders that Hastings's Facebook page would be used to disclose information about
Netflix. The post was not accompanied by a press release, a post on Netflix's own web
site or Facebook page, or a Form 8-K.

The investigation raised questions regarding: 1) the application of Regulation FD
to Hastings's post; and 2) the applicability of the Commission's August 2008 Guidance
on the Use of Company Web Sites[1] to emerging technologies, including social
networking sites, such as Facebook.

Regulation FD and Section 13(a) of the Exchange Act prohibit public companies,
or persons acting on their behalf, from selectively disclosing material, nonpublic
information to certain securities professionals, or shareholders where it is reasonably
foreseeable that they will trade on that information, before it is made available to the
general public. The Commission's 2008 Guidance explained that for purposes of
complying with Regulation FD, a company makes public disclosure when it distributes
information "through a recognized channel of distribution."

In its investigation, the SEC staff learned (and some public commentary further
suggested) that there is uncertainty concerning how Regulation FD and the Commission's
2008 Guidance apply to disclosures made through social media channels. Since the
issuance of the 2008 Guidance, the use of social media has proliferated and the
Commission is aware that public companies are increasingly using social media to
communicate with shareholders and the market generally. The ways in which companies
may use these social media channels, however, are not fundamentally different from the
ways in which the web sites, blogs, and RSS feeds addressed by the 2008 Guidance are

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[1] Commission Guidance on the Use of Company Web Sites, Release No. 34-58288 (Aug. 7, 2008) ("2008
Guidance").

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used. Accordingly, the Commission deems it appropriate and in the public interest to issue this Report of Investigation ("Report") pursuant to Section 21(a) of the Exchange Act to provide guidance to issuers regarding how Regulation FD and the 2008 Guidance apply to disclosures made through social media channels.[2]

II.   Background of Regulation FD and the 2008 Commission Guidance on the Use of Company Web Sites

Regulation FD provides that when an issuer, or a person acting on its behalf, discloses material, nonpublic information to securities market professionals or shareholders where it is reasonably foreseeable that they will trade on the basis of the information, it must distribute that information in a manner reasonably designed to achieve effective broad and non-exclusionary distribution to the public.[3] When the disclosure of material, nonpublic information is intentional, distribution of the same information to the public must be made simultaneously. When the disclosure of material, nonpublic information is inadvertent, distribution of the same information to the public must be made promptly afterwards. Regulation FD was adopted out of concern that issuers were selectively "disclosing important nonpublic information, such as advance warning of earnings results, to securities analysts or selected institutional investors before making full disclosure of the same information to the general public."[4] In our previous statements on Regulation FD, we have recognized that the "regulation does not require use of a particular method, or establish a 'one size fits all' standard for disclosure."[5] We did, however, "caution issuers that a deviation from their usual practices for making public disclosure may affect our judgment as to whether the method they have chosen in a particular case was reasonable."[6] We have since encouraged "honest, carefully considered attempts to comply with Regulation FD."[7]

In August 2008, in response to the changing electronic landscape of issuer disclosure and the wide-spread use of web sites to disseminate information electronically

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[2] Section 21(a) of the Exchange Act authorizes the Commission to investigate violations of the federal securities laws, and, in its discretion, "to publish information concerning any such violations." This Report does not constitute an adjudication of any fact or issue addressed herein. The facts discussed in Section III, *infra*, are matters of public record or based on documentary records.

[3] 17 C.F.R. § 243.100. Final Rule: Selective Disclosure and Insider Trading, Exchange Act, Release No. 34-43154, 65 Fed. Reg. 51,716 (Aug. 15, 2000) (the "Adopting Release"). Regulation FD applies generally to selective disclosures made to persons outside the issuer who are (1) a broker or dealer or persons associated with a broker or dealer, (2) an investment advisor or persons associated with an investment advisor, (3) an investment company or persons affiliated with an investment company, or (4) a holder of the issuer's securities under circumstances in which it is reasonably foreseeable that the person will trade in the issuer's securities on the basis of the information. 17 CFR § 243.100(b)(1).

[4] *Id.*, at 51,716.

[5] *Id.*, at 51,724.

[6] *Id.*

[7] Report of Investigation Pursuant to Section 21(a) of the Securities Exchange Act of 1934: Motorola, Inc., Release No. 34-46898 (Nov. 25, 2002).

2

to investors and the market, the Commission issued its 2008 Guidance.[8] As the 2008 Guidance explained, the Commission has "long recognized the vital role of the Internet and electronic communications in modernizing the disclosure system under the federal securities laws and in promoting transparency, liquidity and efficiency in our trading markets."[9] Additionally, the guidance detailed the many steps we have taken over the years to encourage the dissemination of information electronically, "as we believe that widespread access to company information is a key component of our integrated disclosure scheme, the efficient functioning of the markets, and investor protection."[10]

The Commission has not explicitly addressed the application of Regulation FD and the 2008 Guidance to disclosures made through social media channels. The 2008 Guidance was directed primarily at the use of issuer web sites as a method of disseminating information in compliance with Regulation FD. Yet the guidance also contemplated other "push" technology forms of communication such as email alerts and RSS feeds, along with "interactive" communication tools such as blogs.[11] In light of the rapid "development and proliferation of company web sites since 2000" and with the expectation of "continued technological advances," the 2008 Guidance was designed to be flexible and adaptive.[12] Accordingly, the guidance provided issuers with a factor-based framework for analysis, rather than static rules applicable only to web sites.

As explained in the 2008 Guidance, "whether a company's web site is a recognized channel of distribution will depend on the steps that the company has taken to alert the market to its web site and its disclosure practices, as well as the use by investors and the market of the company's web site."[13] The guidance offered a non-exhaustive list of factors to be considered in evaluating whether a corporate web site constitutes a recognized channel of distribution.[14] The central focus of this inquiry is whether the company has made investors, the market, and the media aware of the channels of distribution it expects to use, so these parties know where to look for disclosures of material information about the company or what they need to do to be in a position to receive this information.

III.   Facts

Netflix is an on-line entertainment service that provides movies and television programming to subscribers by streaming content through the internet and by distributing DVDs through the mail. Over the last two years, Netflix has stated that it is increasingly focused on expanding its internet streaming business.

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[8] 2008 Guidance, at 10.

[9] *Id.*, at 6.

[10] *Id.*, at 7.

[11] *Id.*, at 9 n.20, 21, & n.51.

[12] *Id.*, at 5.

[13] *Id.*, at 18-19.

[14] *Id.*, at 20-22.

On January 4, 2012, Netflix announced by press release that it had streamed two billion hours of content in the fourth quarter of 2011. Netflix also featured the two billion hours streaming metric in the opening paragraph of the January 25, 2012, letter to shareholders signed by Hastings that accompanied Netflix's quarterly financial results included in its earnings release, a copy of which was also furnished on EDGAR on a Current Report on Form 8-K. During Netflix's 2011 year-end and fourth quarter earnings conference call on January 25, 2012, Hastings was asked why this streaming metric was relevant (since Netflix's revenues are derived through fixed subscriber fees, not based on the number of hours of programming viewed). Hastings explained that streaming was "a measure of an engagement and scale in terms of the adoption of our service and use of our service. . . . . It [two billion hours streaming in a quarter] is a great milestone for us to have hit. And like I said, shows widespread adoption and usage of the service." He also stated that although he did not anticipate that Netflix would regularly report the number of hours of streamed content, Netflix would update the metric "on a milestone basis."

In an early June posting on Netflix's official blog, Netflix made a brief reference to people "enjoying nearly a billion hours per month of movies and TV shows from Netflix." The blog was technical in nature, announcing a new content delivery network available to Internet Service Providers, and there was no further detail given about the streaming metric. Beyond that, Netflix did not make any milestone announcements regarding streaming hours between January 25, 2012 and the beginning of July 2012.

On July 3, 2012, just before 11:00 a.m. Eastern time, Hastings posted the following message on his personal Facebook page:

> Congrats to Ted Sarados, and his amazing content licensing team. Netflix monthly viewing exceeded 1 billion hours for the first time ever in June. When House of Cards and Arrested Development debut, we'll blow these records away. Keep going, Ted, we need even more!

This announcement represented a nearly 50% increase in streaming hours from Netflix's January 25, 2012 announcement that it had streamed 2 billion hours over the preceding three-month quarter.

Prior to his post, Hastings did not receive input from Netflix's chief financial officer, the legal department, or investor relations department. Netflix did not file with or furnish to the Commission a Current Report on Form 8-K, issue a press release through its standard distribution channels, or otherwise announce the streaming milestone. Also on July 3, 2012, and after the Facebook post, Netflix issued a press release announcing the date of its second quarter 2012 earnings release but did not mention Hastings's Facebook post. Netflix's stock continued a rise that began when the market opened on July 3, increasing from $70.45 at the time of Hastings's Facebook post to $81.72 at the close of the following trading day.

4

The announcement of the streaming milestone reached the securities market incrementally. The post was picked up by a technology-focused blog about an hour later and by a handful of news outlets within two hours. Approximately an hour after the post, Netflix sent it to several reporters, but did not disseminate it to the broader mailing list normally used for corporate press releases. After the markets closed early at 1:00 p.m., several articles in the mainstream financial press picked up the story. Research analysts also wrote about the streaming milestone, describing the metric as a positive measure of customer engagement, indicative of a reduction in the rate Netflix is losing customers, or "churn," and possibly suggesting that quarterly subscriber numbers would be at the high end of guidance.[15]

Facebook members can subscribe to Hastings's Facebook page, which had over 200,000 subscribers at the time of the post, including equity research analysts associated with registered broker-dealers, shareholders, reporters, and bloggers. Neither Hastings nor Netflix had previously used Hastings's Facebook page to announce company metrics. Nor had they taken any steps to make the investing public aware that Hastings's personal Facebook page might be used as a medium for communicating information about Netflix. Instead, Netflix has consistently directed the public to its own Facebook page, Twitter feed, and blog and to its own web site for information about Netflix. In early December 2012, Hastings stated for the public record that "we [Netflix] don't currently use Facebook and other social media to get material information to investors; we usually get that information out in our extensive investor letters, press releases and SEC filings."

IV. Discussion

A fundamental question raised during the staff's investigation was the application of Regulation FD and the 2008 Guidance to issuer disclosures through rapidly changing forms of communication, including social media channels. We do not wish to inhibit the content, form, or forum of any such disclosure, and we are mindful of placing additional compliance burdens on issuers. In fact, we encourage companies to seek out new forms of communication to better connect with shareholders. We also remind issuers that the analysis of whether Regulation FD was violated is always a facts-and-circumstances analysis based on the specific context presented.

We take this opportunity to clarify and amplify two points. First, issuer communications through social media channels require careful Regulation FD analysis comparable to communications through more traditional channels. Second, the principles outlined in the 2008 Guidance — and specifically the concept that the investing public should be alerted to the channels of distribution a company will use to disseminate material information — apply with equal force to corporate disclosures made through social media channels.

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[15] On July 24, 2012, after the close of market, Netflix announced its second quarter earnings, including quarterly subscriber numbers on the low end of guidance. The stock dropped from the previous day's close of $80.39 to $60.28 per share on July 25, 2012.

A. Disclosures Triggering Regulation FD

Regulation FD applies when an issuer discloses material, non-public information to certain enumerated persons, including shareholders and securities professionals.[16] It prohibits selective disclosure "[w]henever an issuer, or any person acting on its behalf, discloses any material nonpublic information regarding that issuer *to any person* described in paragraph (b)(1) of this section."[17] Although the Regulation FD Adopting Release highlights the Commission's special concerns about selective disclosure of information to favored analysts or investors, the identification of the enumerated persons within Regulation FD is inclusive, and the prohibition does not turn on an intent or motive of favoritism. Nor does the rule suggest that disclosure of material, non-public information to a broader group that includes both enumerated and non-enumerated persons but that still falls short of a public disclosure negates the applicability of Regulation FD. On the contrary, the rule makes clear that public disclosure of material, nonpublic information must be made in a manner that conforms with Regulation FD whenever such information is disclosed to any group that includes one or more enumerated persons.

Accordingly, we emphasize for issuers that all disclosures to groups that include an enumerated person should be analyzed for compliance with Regulation FD. Specifically, if an issuer makes a disclosure to an enumerated person, including to a broader group of recipients through a social media channel, the issuer must consider whether that disclosure implicates Regulation FD.[18] This would include determining whether the disclosure includes material, nonpublic information.[19] Further, if the issuer were to elect not to file a Form 8-K, the issuer would need to consider whether the information was being disseminated in a manner "reasonably designed to provide broad, non-exclusionary distribution of the information to the public."[20]

B. Broad, Non-Exclusionary Distribution of Information to the Public

Our 2008 Guidance was directed primarily at the use of corporate web sites for the disclosure of material, non-public information. Like web sites, corporate social media pages are created, populated, and updated by the issuer. The 2008 Guidance, furthermore, specifically identified "push" technologies, such as email alerts and RSS feeds and "interactive" communication tools, such as blogs, which could enable the automatic electronic dissemination of information to subscribers.[21] Today's evolving social media channels are an extension of these concepts, whereby information can be

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[16] *See supra* n.3.

[17] 17 CFR § 243.100(a) (emphasis added).

[18] We reiterate that nothing in Regulation FD is intended to interfere with "legitimate, ordinary-course business communications" or communications with the press. Adopting Release, 65 Fed. Reg. at 51,718.

[19] 17 CFR § 243.100(a).

[20] 17 CFR § 243.100(e)(1)-(2).

[21] *See supra* n.10.

6

disseminated to those with access. Thus, the 2008 Guidance continues to provide a relevant framework for applying Regulation FD to evolving social media channels of distribution.

Specifically, in light of the direct and immediate communication from issuers to investors that is now possible through social media channels, such as Facebook and Twitter, we expect issuers to examine rigorously the factors indicating whether a particular channel is a "recognized channel of distribution" for communicating with their investors.[22] We emphasize for issuers that the steps taken to alert the market about which forms of communication a company intends to use for the dissemination of material, non-public information, including the social media channels that may be used and the types of information that may be disclosed through these channels, are critical to the fair and efficient disclosure of information. Without such notice, the investing public would be forced to keep pace with a changing and expanding universe of potential disclosure channels, a virtually impossible task.

Providing appropriate notice to investors of the specific channels a company will use for the dissemination of material, nonpublic information is a sensible and expedient solution. It is not expected that this step would limit the channels of communication a company could use after appropriate notice or the opportunity for a company and investors to benefit from technological innovation and changes in communications practices. The 2008 Guidance encourages issuers to consider including in periodic reports and press releases the corporate web site address and disclosures that the company routinely posts important information on that web site. Similarly, disclosures on corporate web sites identifying the specific social media channels a company intends to use for the dissemination of material non-public information would give investors and the markets the opportunity to take the steps necessary to be in a position to receive important disclosures — e.g., subscribing, joining, registering, or reviewing that particular channel. These are some, but certainly not all, of the methods a company could use, with minimal burden, to enable evolving social media channels of corporate disclosure to be used as recognized channels of distribution in compliance with Regulation FD and the 2008 Guidance.

Although every case must be evaluated on its own facts, disclosure of material, nonpublic information on the personal social media site of an individual corporate officer, without advance notice to investors that the site may be used for this purpose, is unlikely to qualify as a method "reasonably designed to provide broad, non-exclusionary distribution of the information to the public" within the meaning of Regulation FD.[23] This is true even if the individual in question has a large number of subscribers, friends, or other social media contacts, such that the information is likely to reach a broader audience over time. Personal social media sites of individuals employed by a public company would not ordinarily be assumed to be channels through which the company would disclose material corporate information. Without adequate notice that such a site

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[22] 2008 Guidance, at 20-22.

[23] 17 CFR § 243.101(e)(2).

7

may be used for this purpose, investors would not have an opportunity to access this information or, in some cases, would not know of that opportunity, at the same time as other investors.

V.   Conclusion

There has been a rapid proliferation of social media channels for corporate communication since the issuance of the Commission's 2008 Guidance. An increasing number of public companies are using social media to communicate with their shareholders and the investing public. We appreciate the value and prevalence of social media channels in contemporary market communications, and the Commission supports companies seeking new ways to communicate and engage with shareholders and the market. This Report is not aimed at inhibiting corporate communication through evolving social media channels. To the contrary, we seek to remind issuers that disclosures to persons enumerated in Regulation FD, even if made through evolving social media channels, must still be analyzed for compliance with Regulation FD. Moreover, we emphasize that the Commission's 2008 Guidance, though largely focused on the use of web sites, is equally applicable to current and evolving social media channels of corporate communication. The 2008 Guidance explained that issuers must take steps sufficient to alert investors and the market to the channels it will use for the dissemination of material, nonpublic information. We believe that adherence to this guidance will help, with minimal burden, to assure compliance with Regulation FD and the fair and efficient operation of the market.

By the Commission.

8

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