

What If 140 Characters Can Impact Your Company's Market Value? Tweeting Corporate Social Responsibility and Stock Prices in the Financial Sector

Completed Research Paper

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Abstract

Many firms signal, announce, and conduct organizational activities on the prevalent Information and Communication Technology Twitter. Then, *do firms financially benefit from tweeting those activities?* In this paper, we focus on corporate social responsibility (CSR) signaled through tweets and examine via the event study methodology the impact of CSR tweets on organizational effectiveness measured in abnormal stock returns. Our findings show that Twitter has a broadcasting power like tradition media; tweeting CSR impacts stock prices. Managers thus may want to announce organizational activities on the more cost-effective tool Twitter, rather than on press releases. We also demonstrate that tweeting CSR less frequently is more impactful on stock prices than tweeting CSR more frequently. Managers should also take advantage of these findings; tweeting similar messages over and over again might not be as effective in getting across a particular message.

Keywords

Social media, IT impact, Twitter, corporate social responsibility (CSR), event study, text classification

Introduction

Twitter has become important part of our lives. Through Twitter, people gain information (Gil de Zúñiga et al. 2012) and share emotions. Through Twitter, organizations conduct diverse PR, HR, and marketing activities (Miranda et al. 2015a). 78% of Fortune 500 firms on the 2015 list are using Twitter (Barnes et al. 2015), and Twitter is now slightly more popular than Facebook among large companies—74% of the Fortune 500 firms use Facebook. Twitter has also well penetrated into the political sphere, often used by political campaigns (Conway et al. 2013).

Although research has shown some positive returns of organizations' Twitter use (e.g., Coyle et al. 2012), many organizations are still struggling to benefit from their wide use of Twitter (Kane 2015) and are striving to understand the impact of their use of Twitter (Gallup 2014). In this paper, our broad goal is thus to understand Twitter's business value for organizations. By achieving this goal, we aim to contribute to the theorization of Twitter impacts, in effect providing guidance to managers on how to benefit from tweeting.

Organizations use Twitter to interact with stakeholders; however, broadcasting has been the primary use of Twitter by many organizations (Etter 2014; Gallup 2014). In the paper, we examine the impact of such

popular use of Twitter (i.e., broadcasting) on firms' market value (i.e., stock prices) by using the event study method (e.g., Im et al. 2001).

Research on broadcasting and signaling in the Information Systems (IS) literature has solely focused on broadcasting through traditional media (see Konchitchki and OLeary 2011). Like traditional media, Twitter can have a wider reach and can reach major stakeholders such as shareholders, journalists, and creditors (Boyle and Zuegner 2015; Etter 2014). Compared to issuing press releases, however, tweeting allows organizations to broadcast their diverse organizational activities frequently with almost no cost. Many firms thus announce and signal their activities through Twitter (Projofieva 2015; Reilly and Hynan 2014; Tao and Wilson 2013). Then,

Does announcing and signaling on Twitter, which is a cost-effective convenient broadcasting tool, also have financial implications on organizations as traditional media do?

We address this research question by focusing on a common broadcasting message type on Twitter: tweets on corporate social responsibility (CSR). Research has shown that announcing and signaling CSR through traditional media such as press releases has an impact on firms' market value (Flammer 2013). By examining the impact of tweeting CSR, we should then be able to understand whether and how an information communication technology (ICT) Twitter, like traditional media, impacts firms' market value by informing investors and shareholders of important firm activities.

For our event study, we examine the tweets from Fortune 500 firms in the financial services sector. Our final dataset contains 60 CSR tweets. The findings of our event study show that tweeting CSR indeed has an impact on firms' market value. The findings also show that less-frequent tweeting of CSR is more effective in informing shareholders.

By examining the impact of tweeting, we make three key contributions. First, we contribute to the social media impact literature. There are studies that doubt the impact of Twitter in branding and promoting products (Gallup 2014). Also, it is not clear what kind of role Twitter plays against traditional media. In this paper, we show Twitter's potential to replace the broadcasting power of traditional media in informing shareholders of important organizational activities. Second, we contribute to the event study literature in the IS field. Event studies in IS primarily use press releases as their source for events (see Konchitchki and OLeary 2011 for a review). However, as the findings of this study show, Twitter can also be as effective as traditional media in reaching key shareholders of organizations. Finally, this study sends a practical message to managers: Managers may want to announce important organizational activities on the more cost-effective tool Twitter, rather than on press releases that consume more financial resources.

In the next section, we briefly review the literatures on Twitter, corporate social responsibility, and event studies. We then propose our hypotheses and explain how we tested our hypotheses. We finally discuss our findings, implications, and limitations of the study along with future research directions.

Theoretical Underpinnings

Broadcasting and Signaling Organizational Activities through Tweets

Twitter was founded in 2006. According to their IPO filings, in 2013 they already reached over 200 million active monthly users (SEC 2013a), and in the first quarter of 2015, Twitter boasts 307 million active monthly users (Statista 2015). How organizations use Twitter has been well documented (e.g., Mandviwalla and Watson 2014; Miranda et al. 2015a). Whether organizations see and use Twitter as a strategic tool or tactical tool, we note three foundational usage types of Twitter: monitoring, interacting, and broadcasting.

First, Twitter is used for monitoring. Firms monitor and listen to customers' conversations and follow the current trends through Twitter (Dunn 2010; Kumar and Mirchandani 2012). Second, Twitter is used to interact with stakeholders. Through Twitter, firms address customer questions about products (Coyle et al. 2012; Dunn 2010), questions about firms' CSR activities (Etter 2014), and questions about hiring (Jarvenpaa and Tuunainen 2013). Firms also gain consumer inputs for brands, products, services (e.g., Day 2011; Jarvenpaa and Tuunainen 2013; Miranda et al. 2015). Finally, Twitter is used for broadcasting and signaling. Firms use Twitter to disseminate healthcare information (Vance et al. 2009), to broadcast

emergency situations (Oh et al. 2013; Smith 2010) and breaking news (Evans et al. 2011), to inform stakeholders of company missions and policies (Mahler et al. 2011; Unsworth and Townes 2012), and to promote brands, products, and services (Kumar and Mirchandani 2012). Firms also use Twitter to announce and signal organizational activities such as adoption of technology (Miranda et al. 2015b), new marketing campaigns (Jarvenpaa and Tuunainen 2013), and corporate social responsibility (Albu and Etter 2015; Etter 2014).

Many organizations use Twitter for this broadcasting capability. How this broadcasting capability of Twitter impacts firms' market value is the focus of this paper. In particular, we examine the broadcast of corporate social responsibility.

Corporate Social Responsibility (CSR)

CSR is defined as “actions that appear to further some social good, beyond the interests of the firm and that which is required by law” (McWilliams and Siegel, 2001: 117). CSR includes helping community members, hiring minority groups, making donations, and protecting the environment (Christmann 2004; Flammer 2013; Godfrey 2005; Marquis et al. 2007).

Scholarly attention to CSR goes back as far as to 1957 (Kaysen 1957). Since the formal introduction of a stakeholder approach, or stakeholder theory (Freeman 1984), it has helped understand what influences firms' involvement in CSR and how firms' CSR impacts diverse firm effectiveness measures (Parmar et al. 2010) across the domains of Management (Chin et al. 2013), Marketing (Lichtenstein et al. 2004), and Strategy (Hull and Rothenberg 2008). For example, CSR has been considered to improve diverse organizational effectiveness measures, such as increased resources, organizational attractiveness to job candidates, and firms' market value (Parmar et al. 2010).

To benefit from CSR, however, organizations need to communicate what CSR they did, what CSR they are doing, and possibly what CSR they will do (Crane and Glozer 2016). Traditionally, organizations used mass media such as press releases and TV commercials in communicating their CSR. In this social media era, many organizations take advantage of Twitter for broadcasting CSR (Capriotti 2011; Kesavan et al. 2013; Stohl et al. 2015). To examine the impact of broadcasting CSR through tweets, we turn to event studies.

Event Study in IS and CSR Research

The event study methodology (Fama et al. 1969) examines stock prices to determine how an event changes stock prices abnormally. More specifically, an event study calculates a cumulative abnormal return (CAR) during a certain period (e.g., 3 days) in response to an event. One key premise of the event study is that the market is efficient and the stock prices fully reflect all the related information about the company in a timely manner—i.e., efficient market theory (Fama 1970).

Many studies in the IS field have applied the event study method (see Konchitchki and OLeary (2011) for a review). For example, most recently Dong and Wu (2015) examined how firms' IT-enabled innovation capabilities impact firms' market value. Xu and Zhang (2013) examined a moderating role of Wikipedia on the relationship between firm announcements and firms' market value. The event study method has too been applied in CSR research (McWilliams and Siegel 1997). For example, Flammer (2013) examined how the announcements of environment-friendly actions impact firms' market value. Miller et al. (2012) examined how CSR mitigates the negative impacts of negative events on firms' market value.

It should be noted that these IS and CSR event studies utilized traditional media as the communication tool. By using the event study method, we can examine whether and how CSR broadcasted through *Twitter* also impacts firms' market value (i.e., changes in stock prices).

Hypotheses

Traditional Media-like Impact of Twitter Broadcasting

Although there are some studies that report negative impacts on CSR on firm performance, several review and meta-analysis studies have found that generally CSR tends to positively impact firm effectiveness

(Aguinis and Glavas 2012; Margolis and Walsh 2003; Orlitzky et al. 2003; Peloza 2009). Firms' signaling of CSR through traditional media has also shown to have a positive impact on firms' market value (Flammer 2013).

Signaling CSR through Twitter is also likely to have a positive impact on firms' market value because tweeting CSR can also reach key stakeholders. Signals made on Twitter are likely to reach a wide range of interested audiences who are concerned about CSR (Mamic and Almaraz 2013; Projofieva 2015). Although Twitter users may not represent the entire society, they do include opinion leaders such as journalists, investors, activists, and politicians (Etter 2014). Moreover, Twitter users are not simply limited to a certain age group (Boyle and Zuegner 2015).

In addition, tweets can be more efficient than traditional media in informing interested actors. Through Twitter, organizations can directly reach the target audience, not having to go through the press (Kaplan and Haenlein 2010; Minton et al. 2012). Tweets are also easily searched and spread (Kane 2015). Therefore, it is likely that CSR tweets reach key stakeholders as traditional media do, impacting stock prices:

Hypothesis 1: *Tweeting CSR will be positively related with firms' market value.*

Twitter-specific Capability and Its Impact

One key distinction between traditional broadcasting tools and Twitter is that it is much easier and costs less for organizations to announce, signal, and discuss similar activities on Twitter (Kaplan and Haenlein 2010; Mamic and Almaraz 2013). As a result, organizations can and do frequently tweet about their activities, such as CSR (Stohl et al. 2015).

However, when organizations tweet about CSR often, especially similar types of CSR (e.g., donation to School A and donation to School B), shareholders may still remember previous similar CSR events stored in their mental models, as suggested by the Memory Processing Model (Atkins and Schiffrin 1968; Kim 2009). Stock prices react to new information (McWilliams and Siegel 1997); stock prices are then less likely to react to the CSR tweets when firms frequently tweet CSR.

In addition, frequent tweeting of CSR suggests that the firm is also likely to tweet other types of firm activities frequently. In this case, the cognition of shareholders is likely to be overloaded with information (Hiltz and Turoff 1985), making it hard for them to recognize new CSR tweets. All in all, we propose the following hypothesis:

Hypothesis 2: *Tweeting CSR less frequently will be more effective in impacting firms' market value than will tweeting CSR more frequently.*

Methods

Sample

To test the impact of Twitter on firms' market value, we used the financial services firms on the 2015 Fortune 500 list. We included all the Fortune 500 financial industries such as Commercial Banks, Financial Data Services, Securities, and Diversified Financial. We focused on large firms primarily because they tend to conduct and discuss their CSR activities more than small firms do (Reilly and Hynan 2014). We first had 159,016 tweets from 71 firms before we identified CSR tweets. The first tweet in our initial dataset was posted on 1/11/2010, and the last was posted on 11/17/2015.

Identifying CSR: Text Mining

To determine whether a tweet signals CSR, we looked for tweets falling into the categories in the KLD Social Performance Index. The KLD Index has often been used to identify CSR (e.g., Flammer 2013; Hull and Rothenberg 2008; Luo et al. 2014). Table 1 illustrates the most common CSR (or KLD) categories and CSR cases that we observed in our tweets while coding random tweets to create a training dataset for our text classification model.

Table 1 Example CSR Categories, Cases, and Key Words

CSR Categories	CSR Cases	Key Words
Community	Hiring locals Donating to the poor, disadvantaged, charities Volunteer work for outside entities, for charities Helping schools Local job promotion Assisting disabled/chronically ill people	Veteran, Charity, Donation, Disability, Cancer, Poor, Hunger, Kids, School, Grant, Volunteer
Environment	Recycling Clean energy initiatives	Sustainability, Recycling
Employee	Wellness program Time off program for new parents	FMLA, Health
Diversity	Hiring women, LGBT, minorities	Diversity, LGBT, Hispanic, African American, Women, Minority

The authors each first manually coded random 2,500 tweets to agree on a coding scheme. Only tweets written in English were considered, and we searched for indications of an actual event or action. If a tweet met our criteria, we marked it as a CSR. Simple thanks or well wishes were not considered CSR, nor were gifts that did not fit into one of the KLD categories. We did consider awards to companies for their accomplishments in one of the accepted KLD categories as CSR as this indicated that at one point in the past they had performed CSR.

After we reconciled our differences, the first author manually coded random 4,000 tweets to create a binary training set for text classification. In our training set, there were 206 CSR tweets and 3,794 non-CSR tweets that did not signal CSR. We first preprocessed the tweets in R version 3.2.3 before building our text classification model. We removed unnecessary symbols such as @, rt, and http. We also removed numbers, punctuations, whitespaces, and common stop words. All the capital letters were transformed to lower cases, and the words were stemmed. After this preprocessing, we created a document-term matrix through the TF-IDF transformation. Subsequently, information gain feature selection was conducted, and 157 attributes (or words) out of 3201 were retained that would contribute to text classification. Some of the retained stemmed attributes are donat, volunt, communiti, support, veteran, lgbt, help, equal, woman, and service.

With the 157 attributes and with the random 4,000 coded tweets, a machine-learning algorithm Support Vector Machine (SVM) (e.g., Abbasi 2010) learned our coding patterns and built a SVM classification model. This model building was also done in R version 3.2.3 with the e1071 package. We used the radial kernel and optimized the SVM with the cost of 7 and the gamma of 0.05. The 10-fold cross validation accuracy was 95% with the Area Under a Curve (AUC) 0.964. We then used this classification model to classify the entire 159,016 tweets either as CSR tweets or as non-CSR tweets. The classification returned 310 CSR tweets posted by 37 firms.

Data Analysis

To analyze the effects of tweeting CSR on stock prices, we conducted event study analysis by following the recommendations by McWilliams and Siegel (1997). In, particular, we strictly followed the methods reported in detail in Im et al. (2001). Before we calculated cumulative abnormal returns of the CSR tweets, we first conducted screening of the 310 CSR tweets in order to make sure our findings to be valid.

We first removed the tweets of firms that did not have stock prices for the period when the tweets were posted. Next, since abnormal returns for a certain period may also happen due to other confounding events, we checked firms' press releases, tweets, and Facebook posts up to 3 days prior and 2 days after the CSR tweets for confounding events. Isolating abnormal returns of an event from those of confounding events is "perhaps the most critical assumption of the methodology" (McWilliams and Siegel 1997: 634). We particularly searched for events such as restructuring/divestiture, price changes, new products,

dividend/earnings announcements, a joint venture, acquisition activity, litigation/labor unrest, major executive changes, major initiatives by rivals, forecasted changes in earnings of sales, layoffs, debt or equity related events, or contract awards (Im et al. 2001; Konchitchki and O'Leary 2011). We also searched for press releases and Facebook posts that signal CSR up to 3 days prior and 2 days after our CSR tweets. This entire screening process removed tweets that overlapped the dates with any confounding events and reduced the 310 CSR tweets to 60 tweets for which we calculated abnormal returns of stock prices. Table 2 contains example CSR tweets used in data analysis.

Table 2 Example CSR Tweets

Firms	Example CSR Tweets
Citigroup	#Citi EMEA CEO Jim Cowles gets involved in a #CitiDiversity team cycle challenge supporting WWTW @supportthewalk http://t.co/d6SvYKkTMq
Global Payments	GPN Worldwide Day of Service today employees give back to our communities across the globe. #service https://t.co/ojEPZg22tm
Huntington Bancshares	Some of our branches might have been closed yesterday, but we were busy volunteering for the #MLKDayofService: http://t.co/BKKQ1ZEq
Regions Financial	Regions associates assemble green bikes then donate them to Birmingham nonprofits today including @UNITEDWAYAL. http://t.co/8e8wSbhfib
Stifel Financial	Last weekend, Team Stifel rode in @pedalthecause to support cancer research at @SitemanCenter & @STLChildrens! http://t.co/bKMBLCoama

When calculating cumulative abnormal returns for each of the 60 tweets, we used a short event window—the day before event ($t-1$), the event day (t_0), and the day after event ($t+1$)—to further minimize the possible impact of announced confounding events, as recommended by McWilliams and Siegel (1997). Our estimation period was 250 days leading up to $t-1$ (the day before the event).

We followed the estimation methods β reported in Appendix B in Im et al. (2011) when calculating abnormal returns and testing whether the abnormal returns are significantly different from zero. Conceptually, the abnormal return of a stock for a particular day is the difference between the actual return of a stock for the day and the expected normal return for the day when we assume there were no particular events. We first calculated daily abnormal returns for $t-1$, t_0 , and $t+1$ for each of the 60 tweets. Next, we calculated standardized abnormal returns (SAR) by dividing each daily abnormal return by the standard deviation of the three abnormal returns for the event. Subsequently, cumulative standardized abnormal returns (CSAR) were calculated for each event. We tested whether or not the distribution of CSARs was normal—an assumption to be met before producing Z-statistics (McWilliams and Siegel 1997). The Shapiro-Wilks test showed that the distribution was normal ($S.D.= 1.814$, $p= 0.05016$). Finally, we produced the average standardized cumulative abnormal returns (ASCAR) and Z-statistics to test whether the average effects of the CSARs are significantly different from zero—that is, to test the average effects of CSR tweets on firms' market value.

Results

Hypothesis 1—Traditional Media-like Impact of Twitter Broadcasting

Hypothesis 1 proposes that tweeting CSR will be positively related with firms' market value. Table 3 shows that the abnormal return of CSR tweets is significantly negative (-0.21% return, $p<0.10$). Although Hypothesis 1 is contradicted, this finding still shows the traditional media-like impact of Twitter broadcasting, informing the shareholders of organizational activities.

Table 3 Traditional Media-like Impact of Twitter Broadcasting on Firms' Market Value

	ASCAR	Z-value	Sample Size
Stock Reaction to CSR Tweets	-0.214	-1.67*	60 tweets

ASCAR: Average Standardized Cumulative Abnormal Returns

* $p<0.10$, ** $p<0.05$, *** $p<0.01$

Hypothesis 2—Twitter-specific Capability and Its Impact

Hypothesis 2 proposes that tweeting CSR less frequently will be more effective in impacting firms' market value than will tweeting CSR more frequently. To test this hypothesis, we first counted CSR tweets for each firm for each year in our sample of 310 tweets.

We then identified four types of tweets based on this tweet count for each firm for each year: (1) a CSR tweet that was the only CSR tweet posted by a firm in the particular year; (2) a CSR tweet that was posted by a firm that posted CSR tweets three times or less in the particular year; (3) a CSR tweet that was posted by a firm that posted CSR tweets seven times or more in the particular year; and (4) a CSR tweet that was posted by a firm that posted CSR tweets 16 times in the particular year. The first and second types of tweets were considered as less frequent-tweeting of CSR, and the third and fourth were as more frequent-tweeting of CSR. There was no firm that tweeted CSR more than 16 times in a year.

Table 4 shows that less-frequent tweeting of CSR impacts firms' market value negatively, which supports Hypothesis 2. -0.89% is the abnormal return of the CSR tweets from the firms with one CSR tweet in the particular year ($p < 0.01$). -0.38% is the abnormal return of the CSR tweets from the firms with three or less CSR tweet in the particular year ($p < 0.05$). On the other hand, the abnormal returns of tweets from the firms with more-frequent tweeting of CSR are insignificant.

Table 4 Impact of Less- and More-frequent Tweeting on Firms' Market Value

	Tweet Types	ASCAR	Z-value	Sample Size
Less-frequent tweeting of CSR	Stock Reaction to CSR Tweets posted by Firms with 1 CSR tweet in the year	-0.885	-2.65***	9 tweets
	Stock Reaction to CSR Tweets posted by Firms with 3 or less CSR tweets in the year	-0.385	-2.00**	28 tweets
More-frequent tweeting of CSR	Stock Reaction to CSR Tweets posted by Firms with 7 or more CSR tweets in the year	0.127	0.57	22 tweets
	Stock Reaction to CSR Tweets posted by Firms with 16 CSR tweets in the year	-0.525	-1.39	9 tweets

ASCAR: Average Standardized Cumulative Abnormal Returns

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Discussion

Our research question was *Does announcing and signaling on Twitter, which is a cost-effective convenient broadcasting tool, also have financial implications on organizations as traditional media do?* By focusing on CSR tweets, we have found that Twitter indeed has a broadcasting power like traditional media in informing shareholders of important organizational activities; stock prices reacted to the CSR that was most likely to be posted only on Twitter. We also found that frequent tweeting of CSR is not as effective as less-frequent tweeting of CSR in informing stakeholders. These findings have significant theoretical and practical implications.

Implications and Contributions

First, we contribute to the social media impact literature. There are studies that doubt the impact of Twitter in branding and promoting products (Gallup 2014). Also, it is not clear what kind of roles Twitter plays against traditional media (Sprenger et al. 2014). In this paper, we show Twitter's potential to replace the broadcasting power of traditional media in informing shareholders of organizational activities. Second, CSR has been studied in other disciplines, such as Management (Chin et al. 2013), Marketing (Lichtenstein et al. 2004), Strategy (Hull and Rothenberg 2008), and Public Relations (Tao and Wilson 2013). But we have a limited understanding of how IT enables or constrains organizations to benefit from CSR. From an IT perspective, we show that organizations may be harmed from signaling CSR through tweets. Third, we contribute to the event study literature in the IS field. Event studies in IS primarily use traditional media—in particular, press releases—in examining the impact of signaling on firms' market value (see Konchitchki and OLeary 2011). However, as we have shown in this paper, Twitter can also be as effective as traditional media in reaching key shareholders.

Practically speaking, through the findings of this study, managers should be able to understand how to take advantage of one of the most commonly used social media platforms. Managers may want to announce important organizational activities on the more cost-effective tool Twitter, rather than press releases that consume more financial resources. Finally, this study also demonstrates an approach of measuring financial impacts of Twitter and CSR when we still need such an approach (Peloza 2009).

Limitations and Future Research Directions

Some might argue that CSR tweets might improve firm images that might turn into positive firms' market value with a time lag. According to the efficient market theory (Fama 1970), however, the stock prices should reflect this possibility as well. Still, future research could examine how CSR tweets impact other firm effectiveness measures, such as firm images and firm attractiveness to job candidates.

When interpreting the findings of this study, one should keep in mind the followings. For the event study method, we only used 250 estimation days. Future research could examine how our results may vary with other estimation days. In addition, it could be that there are sector-specific factors that may affect our findings. Future research could examine whether and how our findings hold in other industries and sectors. Future research could also augment our preliminary findings by using a larger sample.

Finally, tweeting certain types of CSR may have different impacts on firms' market value. Future research could examine this possibility. Moreover, tweeting other types of organizational activities, such as IT adoption, might have a positive impact of firms' market value. This could be a fruitful future research endeavor.

Conclusion

Many firms signal, announce, and conduct organizational activities on the prevalent ICT Twitter (Reilly and Hynan 2014; Tao and Wilson 2013). Then, do firms financially benefit from tweeting those activities? What's the impact of announcing and signaling those on Twitter? In this paper, we have focused on corporate social responsibility (CSR) signaled through tweets and examined its impact on organizational effectiveness measured in abnormal stock returns. Twitter turned out to have a broadcasting power like tradition media; tweeting CSR impacts stock prices. We also demonstrated that tweeting CSR less frequently informs the shareholders better. Managers should take advantage of these findings; tweeting similar messages over and over again might not be effective in getting across a particular message.

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