



The use of social media to detect corporate fraud: A case study approach

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Wisdom of crowds;
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Abstract Social media is a rapid and dynamic medium of communication that forms a crucial component of the modern business toolkit. It can be used to detect corporate fraud by tapping into collective user wisdom, also known as the wisdom of crowds. This article highlights both the potential and limitations of social media in detecting corporate fraud by examining information from traditional media and social media for a recent corporate fraud case (i.e., Empowered Products Inc.). Using text analysis of information posted on traditional media compared to social media, this article illustrates how social media provides an increased level of relevant information in a faster manner. By using wisdom of crowds in this way, social media platforms such as Twitter can improve organizational knowledge quality. We identify methods for managers to utilize social media to improve their organizational knowledge management.

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1. Identifying corporate disclosure fraud with social media

Corporate fraud is a popular topic in business as its occurrence is detrimental to the organization, its

shareholders, and society as a whole. Managers, auditors, investors, and regulators alike seek to predict or detect corporate fraud in all forms. This article focuses on fraudulent disclosures and misstatements, arguing that corporate fraud may be predicted through the aggregation of dispersed information from the market (Johnson, Budescu, & Wallsten, 2001; Wolfers & Zitzewitz, 2004), which Surowiecki (2004) termed the *wisdom of crowds*.

The concept of wisdom of crowds implies that the independent valuation of a small crowd is usually

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more accurate than the evaluation of individual experts. According to Surowiecki (2004) and Fleenor (2006), there are four elements required to form a wise crowd: diversity of opinion, independence of thought, decentralization of knowledge, and aggregation of judgment into a collective decision. Social media users within the investment community come from diverse backgrounds, including sophisticated investors with deep levels of corporate knowledge, mom-and-dad investors who trade occasionally, and financial analysts mindful of their reputation. Social media aggregates a wide range of independent opinions utilizing local knowledge; its unique features make it possible to tap into the wisdom of crowds.

Corporate fraud detection is a knowledge management (KM) process by which stakeholders obtain information about a business and its operations relevant to decision making, including judgments about the existence or future occurrence of corporate fraud (Massingham, 2014; Teece, 1998; Uden & He, 2017). Over the past 2 decades, firms have proactively engaged in KM in hopes of improving performance through better management of information (Bharati, Zhang, & Chaudhury, 2015).

Bhatt (2002) noted that knowledge activities are difficult to monitor and control as only a proportion of knowledge is internalized by the organization, with the remainder held by individuals. While individuals have access to limited information, collective wisdom shapes business, economics, societies, and nations (Surowiecki, 2004). In applying the wisdom of crowds, individuals coordinate and cooperate to reach an accurate decision in a rapid and reliable manner (Bartov, Faurel, & Mohanram, 2017; Johnson et al., 2001; Wolfers & Zitzewitz, 2004).

Serving as an untapped resource for wisdom of crowds, social media is a collection of online services that encourages social interaction among users and allows them to co-create, find, share, and evaluate a repository of online information (Chua & Banerjee, 2013). The development of social media has transformed traditional static information dissemination channels into a more dynamic approach. It is now possible to build relationships with consumers via a range of social media platforms by promoting products and answering consumer enquiries (Hanna, Rohm, & Crittenden, 2011; Shin, Pang, & Kim, 2015). The social media platforms of Facebook, LinkedIn, and Twitter house millions of members who use these networks to keep track of each other and engage in commercial transactions (Kleinberg, 2008).

Since its inception, the number of social media users has grown exponentially (Huberman, Romero, & Wu, 2008). Social media has been shown to impact company performance through four channels: (1) social capital, (2) customers' revealed preferences

(Grégoire, Salle, & Tripp, 2015), (3) social marketing, and (4) social corporate networking. These channels impact financial, operational, and corporate social performance (Paniagua & Sapena, 2014). The information on these platforms creates a rich landscape of content that draws on the wisdom of crowds.

Twitter is one of the most popular social media channels for business use (Zhou, Lei, Wang, Fan, & Wang, 2015). Twitter users come from diverse backgrounds (Bartov et al., 2017) and each tweet is restricted to 280 characters. In addition, Twitter tracks phrases, words, and hashtags and posts them under a relevant title for convenient user access. These features make it possible for users and readers to disseminate and capture business information efficiently.

One application of the wisdom of crowds is to use investors' opinions on social media platforms to predict stock/corporate performance, including future stock returns, earnings surprises (Chen, De, Hu, & Hwang, 2014), and firms' earnings and returns several days before the announcement period (Bartov et al., 2017). In addition, companies like Starbucks, Dell, and American Express use social media to improve their KM, especially customer knowledge (Chua & Banerjee, 2013).

Applying the wisdom of crowds within social media involves the convergence of outsiders for voluntary knowledge sharing in order to generate KM. In this article, we present a case study that details how individual opinions on social media can be used to detect corporate disclosure fraud; we then provide appropriate methods for managers to use this approach as a way to improve their organizational KM. By comparing the information environment within traditional media and social media, we show that crowd intelligence captured from social media can be used to detect corporate fraud. Such intelligence is not observed in traditional media. Our findings suggest that stakeholders and managers should implement both traditional media and social media monitoring pertaining to or within target organizations, or improve existing systems by developing a refined set of keywords. Calibrating the information levels between traditional media compared to social media facilitates the detection of exceptions and outliers. These findings are useful additions to KM for managers, investors, regulatory and investigatory authorities, and scholars.

2. Corporate disclosure fraud, undesired consequences, and detection

Corporate fraud is a broad term that covers a range of undesired business practices that are detrimen-

tal to stakeholders. This study focuses on one specific corporate fraud practice, namely the intentional disclosure of false information.

It is common practice today for a company to issue a newsletter that provides information to internal and external stakeholders. A newsletter may be considered grey literature if it is used by a company to manipulate financial markets or promote specific stock through the spread of information (Adams, Smart, & Huff, 2017). Traditionally, grey literature is difficult to discover, access, and evaluate as it may be made available to the public or distributed privately within companies, thus appearing to lack a systematic means of distribution and collection. As grey literature is prepared by companies, its standard of quality, review, and production can vary considerably. Grey literature is well placed to facilitate or constitute information manipulation or corporate fraud.

The internet has increased access to newsletters and grey literature. Delort, Arunasalam, Leung, and Milosavljevic (2012) analyzed the effect information shared on stock message boards had on financial markets and identified that manipulation of stock prices may occur via the dissemination of distorted price-sensitive information. In describing the extent of damages initiated by fraud, there is growing evidence that fraud not only undermines the integrity of a company's financial reports, as it damages investors' benefits and erodes confidence, but also triggers an in-depth reflection on the regulatory role of government in protecting the interests of investors (Bhasin, 2013; Bhasin & Reddy, 2011). Such fraud behavior subverts regulatory restrictions and misconstrues private market discipline (Black, 2010). Other parties also suffer from the damaging effects of corporate fraud, such as severe market volatility for investors due to stock market manipulation (Aggarwal & Wu, 2006; Delort et al., 2012) and legal penalties for firms and auditors in cases of accounting misstatement (Dechow, Sloan, & Sweeney, 1996; Karpoff, Lee, & Martin, 2008; Palmrose, Richardson, & Scholz, 2004; Price, Sharp, & Wood, 2011). As corporate fraud affects a diverse range of stakeholders, an efficient approach to detect/predict fraud in a timely and efficient manner is desirable—if we cannot prevent it entirely—especially for the managers, who usually are held responsible.

Identification or prediction of corporate fraud typically assesses corporate insider characteristics and governance features (Uzun, Szewczyk, & Varma, 2004), suspicious patterns in stock price movement (Kim & Sohn, 2012), and any relevant news stories reported by the press (Miller, 2006). Nonsystematic approaches include strategies to

build ethical decision-making practices into organizations from the bottom up and the outside in, as well as plans to create shared responsibility for ethical leadership (Hess & Broughton, 2014) and corporate risk management policies (Hess & Cottrell, 2016). The press often acts as a monitor or watchdog for accounting fraud. Per Miller (2006), the press has two roles: (1) to rebroadcast information from other information intermediaries (analysts, auditors, and lawsuits), and (2) to undertake original investigation and analysis to reveal fraud. In fact, the stock market reacts more strongly to original investigation and analysis since reporter analysis is more informative. However, Miller (2006) pointed out that the press is more likely to reveal fraud in high-visibility companies, those with greater market capital size or investor numbers, because it is generally more interested in reporting information that attracts the greatest attention in order to improve subscription numbers.

Popular social media platforms such as Twitter provide an alternative information channel for corporate fraud detection. Unlike traditional media, social media is not biased toward coverage of high-visibility companies, as it does not need to consider the limits of print pages or broadcasting time. Previous academic studies in the U.S. (Blankespoor, Miller, & White, 2014) and Australia (Prokofieva, 2015; Xiong et al., 2016) illustrated that social media is an excellent communication platform for low-visibility companies to attract more market attention (e.g., reducing information asymmetry through corporate disclosure on Twitter). Second, unlike intermediaries such as financial analysts that may provide outdated information (Brown & Kim, 1991), social media provides a source of information from a diverse set of individuals and allows one to tap into the wisdom of crowds (Bartov et al., 2017).

3. A corporate disclosure fraud case study: Empowered Products Inc.

We examined the corporate fraud case of Empowered Products Inc. (EMPO). EMPO conducted three promotional campaigns from September 2011 to October 2012 to promote their stock, including the release of news articles online and the dissemination of emails.

3.1. Data collection

We used text-based analysis to compare the information environment for both social media and traditional media during the time period of the EMPO

case. Social Studio, a social media management platform produced by Salesforce, and Factiva, a newswire collection service managed by Dow Jones, captured the information environment on social media and traditional media.

To review the information environment on social media platforms and traditional media outlets, we used the keyword EMPO to search for related information on these two platforms. We collected the headline, author, content, media provider, publish date, and other relevant information for each post. In addition to our searches on Social Studio and Factiva, we conducted a keyword search of EMPO on Twitter. Our search range was January 1, 2011–December 31, 2016; we downloaded and read all relevant news items concerning EMPO that were a part of the search results.

3.2. Background on the case

EMPO is a Nevada corporation with its principal offices in Las Vegas.¹ EMPO describes itself as a manufacturer of gels and other sexual health products. It was founded by Scott S. Fraser in 2002 and became a public company in June 2011. Fraser is the president, CEO, chairman of the board, and a major EMPO shareholder in addition to being the owner and president of Contrarian Press. Contrarian Press is a limited liability company established in California; it was founded by Fraser in 1992 to publish newsletters and other information that promote ideas for investing in securities, including stock recommendations.

Beginning in September 2011, Fraser concealed from the investing public his and EMPO's involvement with and funding of at least three separate campaigns promoting EMPO. Fraser and Contrarian Press touted EMPO's business prospects and repeatedly recommended the purchase of EMPO shares via emails and hard-copy mailers. Fraser and Contrarian Press authored and distributed highly positive articles about EMPO's business without disclosing their relationship to the company. EMPO and Contrarian Press also entered into an investor relations/sales and marketing agreement under which EMPO paid thousands of dollars per month to Contrarian Press, in part to promote its business and stock.

Contrarian's promotional campaign fraudulently hid the fact that it was sponsored by EMPO, the very company the articles were recommending. To make this promotional campaign more effective, Fraser and Contrarian Press worded the promotional ar-

ticles to create the false appearance of objectivity in reporting on EMPO's prospects. Fraser actually wrote a number of the promotional articles under an alias, Charlie Buck. These articles failed to disclose that Fraser was both EMPO's CEO and the promoter hiding behind the alias, and created the false and misleading appearance that the author was an objective third party, unconnected to EMPO and Fraser, strongly recommending the purchase of EMPO stock.

In summary, by engaging in the conduct described above, Contrarian Press, Fraser, and Nathan Yeung (an employee working under Fraser's direction at Contrarian Press) recommended the purchase of EMPO shares to stakeholders without fully disclosing that they were the beneficiaries.²

3.3. Details on the alleged promotional campaigns

3.3.1. First promotional campaign (September 2011–October 2011)

On September 9, 2011, *Contrarian Press* (2011) released the newest issue of its Stock-Profit Guide newsletter, which featured an article stating: "Empowered Products (EMPO) represents a solid growth stock that just launched at \$1.25 per share." Additional Stock-Profit Guides promoting EMPO as a good investment were disclosed throughout September and October 2011. During this campaign, Fraser and Contrarian Press made materially false and misleading statements about their relationship.

3.3.2. Second promotional campaign (May 2012)

Fraser and Contrarian Press continued a campaign to promote EMPO stock while EMPO was making monthly payments to Contrarian Press for investor relations activities. In order to hide both Fraser's and Contrarian Press's involvement in the campaign, it is assumed that Fraser arranged for his long-time associate (Associate 1) to organize the promotional campaign through his companies, Red Rock Marketing Group³ and Silver Crest Equity Research. By May 2012, Associate 1 and Red Rock had a longstanding relationship with Fraser and Contrarian Press and it represented virtually all of Red Rock's business. In this second promotional cam-

¹ All information about EMPO's corporate fraud is based on SEC filings and internet materials.

² A more detailed description of the EMPO case is available via the SEC website: <https://www.sec.gov/litigation/complaints/2016/comp-pr2016-178.pdf>

³ Red Rock is a print broker that coordinates printing jobs, rents email lists for stock promotions, and distributes printed materials via direct mail and email.

paign, Red Rock and Associate 1 arranged for the printing and distribution of stock promotions for Fraser and Contrarian Press.

3.3.3. Third promotional campaign (October 2012)

From summer through autumn 2012, Fraser and Contrarian Press hired Yeung (a third party) to arrange promotion for EMPO and its stock. Yeung worked under the alias Mason Zhang through Crown Pacifica Media Services, a company created by Fraser and his personal assistant in early October 2012 to create the appearance that an entity other than Contrarian Press was organizing the EMPO

promotion. The promotional campaign again did not disclose the involvement of Fraser or Contrarian Press, or the fact that EMPO was paying Contrarian Press to promote EMPO.

3.4. The information level of EMPO during alleged promotional campaigns

We retrieved news about EMPO from the Factiva database and supplemented it with observations regarding the information transformation process, especially during the alleged campaign periods. Selected search results are recorded in [Table 1](#) and show that news about EMPO formally began

Table 1. News reports recorded on Factiva database

No.	Date	Time	Publisher	Title	Summary
6	7.13.2011	9:09	Market News Publishing	On time filings Inc. Common – OTCBB name and symbol change Eff. 07/13/2011	OTCBB name and symbol change eff. 07/13/2011 on time filings, Inc. Common has undergone a symbol/status change. OTMF has been changed to EMPO.
8	9.28.2011		India Pharma News	Empowered Products increases sales of PINK by 182% in South Korea	EMPO reports a 182% increase in year-over-year sales of PINK Silicone, PINK Water, and Hot PINK to customers in South Korea as of August 31, 2011. Korean distributor, The Real Standard, is selling Empowered Products' PINK for women line to hospitals throughout the country. This symbiotic relationship has the potential to rapidly expand to more wholesale clients in additional industrial sectors throughout The Real Standard's Korean consumer base.
9	10.10.2011		India Retail News	Empowered Products reports increased efficiency by reducing manufacturing costs up to 39.6% on wellness samples via Mobile Samples America	EMPO has teamed up with Mobile Samples America (MSA) for the onsite design and production of promotional sample-size packets for its PINK and GunOil flagship brands. The global wellness company reports immediate cost savings of up to 39.6%—based on an approximate per unit price of \$0.058 previously through outsourcing to currently around \$0.035 cost per unit via MSA.
10	10.11.2011		M2 Presswire	Shines its spotlight on Empowered Products Inc. (OTCBB: EMPO) upon cost savings announcement for promotional samples— October 11, 2011	StockGuru shines its spotlight on Empowered Products Inc. The Company announced yesterday that it has teamed up with Mobile Samples America (MSA) for the onsite design and production of promotional sample-size packets for its PINK and GunOil flagship brands. Additionally, as a direct result of its business relationship with MSA, Empowered Products has greatly improved its sample-pack production efficiency.

Table 1 (Continued)

No.	Date	Time	Publisher	Title	Summary
13	10.28.2011		India Pharma News	PINK Elevate marks Empowered Products' commitment to enhance women's intimacy	EMPO is pleased to announce that its PINK Elevate product launch is generating rave reviews from retail and wholesale customers alike throughout the company's global sales reach of over 30 countries.
14	10.29.2011	3:12	PR Newswire (U.S.)	PINK Elevate marks Empowered Products' commitment to enhance women's intimacy	EMPO is pleased to announce that its PINK Elevate product launch is generating rave reviews from retail and wholesale customers alike throughout the company's global sales reach of over 30 countries.
17	11.15.2011	22:02	Market News Publishing	Empowered Products Inc. – Dr. Martha Lee presents Empowered Products' PINK line at nursing seminar in Singapore	Empowered Products Inc. reports that its PINK line of personal lubricants for women was featured in the 21 st Annual Obstetrics & Gynecology Nurses Seminar held at Singapore's leading teaching & research hospital, National University Hospital, on October 23, 2011.
20	12.02.2011		Chemicals & Chemistry	Lubricants; Dr. Martha Lee presents Empowered Products' PINK line at nursing seminar in Singapore	EMPO reports that its PINK line of personal lubricants for women was featured in the 21 st Annual Obstetrics & Gynecology Nurses Seminar held at Singapore's leading teaching & research hospital, National University Hospital, on October 23, 2011.
37	5.01.2012	21:15	PR Newswire (U.S.)	New video highlights the merits and growth of Empowered Products	EMPO.OB invites all members of the stock-market community to view the latest video highlighting the steady growth of Empowered Products' global consumer base and lines of innovative wellness formulas.
38	5.01.2012		India Pharma News	Empowered Products: New video highlights the merits and growth of Empowered Products	EMPO.OB invites all members of the stock-market community to view the latest video highlighting the steady growth of Empowered Products' global consumer base and lines of innovative wellness formulas.
40	5.22.2012		India Pharma News	Empowered Products: PINK lubricants sample program draws substantial requests from consumers	EMPO.OB launched a sample-request program to its branding site. The objective of this program is to connect directly with our female consumers to inform and provide samples within our full range of women's personal and interactive lubricants.
41	5.27.2012		India Retail News	Empowered Products: Pink lubricants sample program draws substantial requests from consumers	EMPO.OB launched a sample-request program to its branding site. The objective of this program is to connect directly with our female consumers to inform and provide samples within our full range of women's personal and interactive lubricants.

on the July 13, 2011, discussing the name change of an over-the-counter (OTC) stock from OTMF to OTC EMPO. Beginning September 28, 2011—19 days after the first Stock-Profit Guide was issued—news regarding sales increases and cost reduction (a result of the cooperation between EMPO and Mobile Samples America) of EMPO's PINK Elevate product started to appear. Such news was sourced originally from India Pharma News and India Retail News, which constituted EMPO's primary sources. StockGuru picked up the cost reduction news, and M2 Presswire reported StockGuru's recommendation of EMPO. Another round of news during the first alleged campaign appeared at the end of October 2011; India Pharma News reported the launch of EMPO's PINK Elevate product on October 28, 2011 and that it was receiving positive reviews. This news was picked up and reported by PR Newswire in the U.S. on October 29, 2011, and October 31, 2011.

There were some minor promotional news items regarding EMPO on the Factiva database between the first and second alleged campaigns. While these are not yet considered by the SEC as alleged promotion campaigns, some of them are still worthy of discussion. One news item, first reported by Market News Publishing on November 15, 2011, explained how EMPO's PINK Elevate product was featured at a nursing seminar in Singapore. Chemicals & Chemistry reported this same news again 17 days later; this raises questions of information manipulation, as surely by that point this particular news item was no longer relevant or up to date.

Another alleged EMPO campaign began in May 2012. On May 1, 2012, both India Pharma News and PR Newswire (U.S.) reported the release of a new promotional video regarding the steady growth of EMPO. This was followed by the launch of EMPO's

sample-request program as reported by India Pharma News (May 22, 2012) and India Retail News (May 27, 2012).

There were more news reports concerning EMPO in October and November 2012 compared to the previous time period. This is consistent with the allegations from SEC that EMPO conducted an alleged campaign in October 2012. Outlets reported on the following:

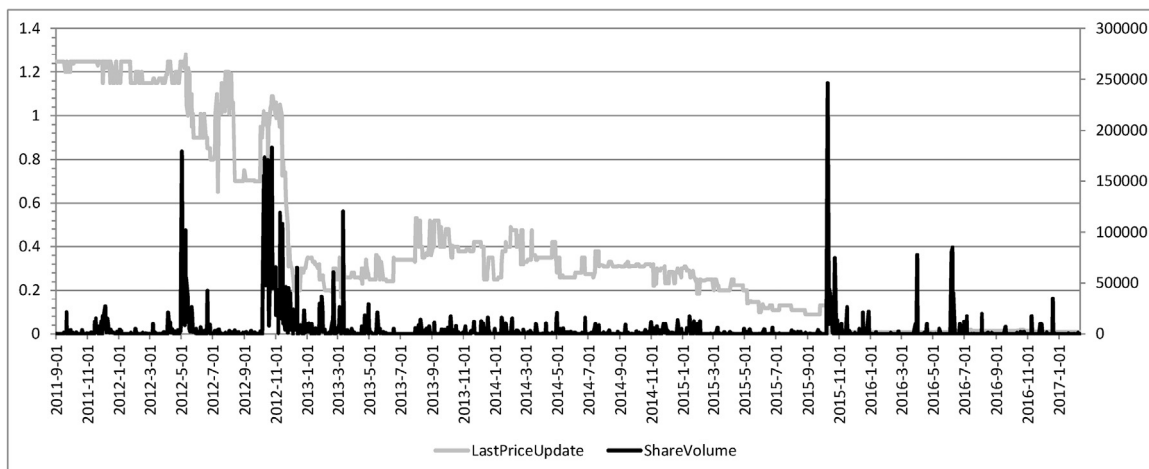
- The entry of EMPO's products PINK Elevate and GunOil into mainstream retailers (October 2, 5, 11, 19, 20, 26, 29 and November 3, 2012);
- EMPO's participation at a retail investor conference (reported November 6–7, 2012);
- Product distribution in Africa (November 17–18, 2012); and
- The ongoing promotion of EMPO's products (November 21, 28, and 30, 2012).

Our discussion of the company's information environment in traditional media outlets illustrates that information manipulation did exist, especially during the alleged campaign periods. The next section discusses the stock market movement following these campaigns.

3.5. The economic consequences following alleged promotional campaigns

An investigation of stock market reaction before, during, and after the alleged promotional campaigns presents how the alleged campaigns affected the stock market movement. Figure 1 shows the changes in EMPO's share price and share trading

Figure 1. EMPO share price and share trading volume



volume from September 1, 2011 to the end of 2016. It appears that there was no significant stock market reaction surrounding the first alleged campaign. This is reasonable, as EMPO was a new company at the time; the aim of the first alleged campaign may simply have been to increase stock market awareness. In contrast, the second and third alleged campaigns generated significant stock market reactions.

Following the second alleged campaign in May 2012, EMPO's stock trading volume increased significantly (66,651 on May 1; 179,010 on May 2; 103,777 on May 3; 99,690 on May 4). This high level of share trading volume lasted several days before it eventually dropped back to normal. Interestingly, this alleged campaign also boosted the share price from \$1.15 on April 27, 2012 to \$1.24–\$1.28 for several days (April 30–May 10, 2012) before it dropped, reaching \$0.80 on June 27, 2012—the lowest share price on record at the time.

The third alleged campaign (from October 2012) once again buoyed EMPO's share price and share trading volume. The share trading volume was comparable to that of the second alleged campaign (155, 261 on Oct 8; 92, 168 on October 9; 173, 484 on October 10). More importantly, this third campaign pushed EMPO's share price back to above \$1 on October 8, 2012, and it remained at this relatively high price until November 13, 2012 before dropping, reaching \$0.15 on December 12, 2012.

This look at the impact on the market shows that the alleged campaigns significantly encouraged the trading activities of EMPO, and even boosted EMPO's share price to some degree. Investors focusing on traditional media, as captured by the Factiva database, would not be party to any hint of ongoing corporate fraud during these three campaigns.

3.6. The information level of EMPO on the social media campaigns

Stakeholders focused on traditional media had limited opportunities to detect EMPO's corporate fraud during the alleged campaigns. In this section, we examine whether the wisdom of crowds can assist in the detection of corporate fraud. We used the Social Studio platform produced by Salesforce. The search started with the keyword '\$EMPO'; it is a popular practice among social media users to use \$ + a listed company's ticker symbol to indicate that they are discussing a certain stock. A thorough examination of the results revealed that there was no post on social media that discussed EMPO's corporate fraud.

Recognizing that the use of \$EMPO as the sole search keyword may miss some results, we also used

the search keyword 'OTC EMPO.' Note: we did not use simply EMPO as it generated a large amount of unrelated content. Also, as EMPO had been trading as OTC stock since listing, the use of OTC EMPO as search keyword seems adequate. Our search found a generic blog post (Gadzhev, 2011) from November 3, 2011, that discussed the alleged corporate disclosure fraud of EMPO with the title "Empowered Products Inc. (OTC: EMPO) promoted by its own CEO." In this blog post, Gadzhev (2011) exposed the fact that "EMPO is being touted by the Stock-Profit Guide of Contrarian Press. Contrarian Press is owned by Scott Fraser who happens to be CEO of EMPO."

The results on social media platforms captured by Social Studio indicate that most of the social media posts came from Twitter. Therefore, we conducted a further search with the keyword of OTC EMPO on Twitter. We found a tweet that linked to the blog post that alerts readers to the alleged campaign (see Figure 2). The posting time of the tweet is similar to the blog post.

The above searches of EMPO-related information on social media, including Twitter, indicate that investors are more likely to be exposed to commentary, speculation, and information regarding corporate misstatements—and in a more candid and timely way—than through traditional media. In fact, both the generic blog post and the Twitter post appeared at similar times, which was soon after the first alleged campaign for EMPO. Investors attentive to information on social media, in this case, would have recognized EMPO's first alleged corporate disclosure fraud soon after its appearance. This would have enabled investors to weigh the potential consequences before investing in EMPO based solely on the alleged campaign material.

Using distinct keywords and search terms on various social media platforms can help capture the wisdom of crowds. Such collective information contributes to the understanding of corporate performance, which eventually improves the KM quality of both individuals and corporations. As evidenced by the EMPO case discussed above, it

Figure 2. EMPO alleged corporate fraud tweet sample



is reasonable to claim that social media provides information that is not readily accessible in traditional media. Results based on the use of targeted keywords and social media tools reveal challenges and opportunities in adopting the use of information on social media for KM; including corporate fraud detection.

4. Implications for managers

The use of social media as a tool to detect fraud in a broader sense is becoming a common practice. Insurance companies examine a claimant's social media pages to investigate whether or not the claimant's lifestyle choices (e.g., an overseas holiday) are consistent with his/her claimed medical condition (Coverhound, 2015; Ethics Sage, 2011); banks set up machine learning algorithms based on social network information to flag exceptions and outliers for transaction fraud (Wellers, Elliott, & Noga, 2017). The rich and diverse information on social media makes it possible to detect corporate fraud by capturing the wisdom of crowds.

Active engagement with consumers on social media platforms for marketing (Hanna et al., 2011) and crisis management (Grégoire et al., 2015) are not new. However, using information shared on social media by relevant stakeholders for fraud detection is an area that deserves attention from managers. This study presents several observations on how managers can use social media as a tool to expose disclosure fraud.

- Users of social media tend to be less inhibited in expressing their moods and openly share what they know on social media compared to an offline environment (Christofides, Muise, & Desmarais, 2009; Valkenburg, 2017). Individuals and organizations can access novel information on social media related to fraud detection. In the EMPO case study, social media users expressed doubts about EMPO's promotional campaign. This new information was not picked up by traditional media outlets, likely because EMPO is such a small company and the benefits of conducting an investigation did not outweigh the potential cost.
- Social media provides an opportunity for coverage for all organizations, regardless of their size. As noted by Blankespoor et al. (2014) and Prokofieva (2015), low-visibility companies benefit from greater exposure by posting financial and business information on their Twitter accounts; social media reduces their level of information asymmetry.
- Establishing a system to monitor and track the rich information landscape provided by social media should be a top priority for managers. Such monitoring systems generally are put in place as a response to consumers' complaints and public relations crisis management (Mathison, 2017). These monitoring systems can also be used to detect corporate disclosure fraud with adequate settings for critical keywords or phrases.
- Information is posted on social media from a diverse group of stakeholders and these platforms allow for the mapping of social networks, which may contribute to corporate fraud detection. Monitoring tools can map connections or relationships among individual network actors and their links to discrete functions of organizations. It is possible to identify corporate fraud by examining the digital footprint left by individuals and companies. Social media monitoring tools can issue alerts of potential fraud when they detect associations between key personnel from interested business parties, if such information is preloaded into social monitoring tools (such as Facebook, Twitter, and LinkedIn profiles).
- Social media creates volume. Comparing the information environment between traditional media and social media reveals that misleading information is more repetitive in traditional media than social media, as was the case with EMPO's alleged campaign periods. Notably, EMPO subsidized their promotional campaigns; most subsidized promotional materials are disseminated through traditional media rather than social media because an organization has more information control in traditional media (Chapple, Sadiq, & Xiong, 2017). As fewer restrictions and costs are imposed by communicating via social media, it broadcasts more diverse information—the wisdom of crowds. This observation illustrates that managers can develop an information comparison system to examine different information levels between traditional media and social media. Focusing on the reporting frequency and key characteristics of reports/messages, any exceptions and outliers between these two communication channels should alert managers to a misalignment between the organization's controlled message and stakeholder perceptions. Misalignment in volume can be treated as the potential disclosure of fraud.

The use of wisdom of crowds on social media transcends marketing and service communication with current and potential consumers on these platforms. Managers can utilize information on social media as evidence to support decision making in many different areas. As presented in this study, the use of appropriate keywords and searching on Twitter can return useful information for fraud detection. Considering the information on social media as an archive of diverse opinions from a broad audience, ongoing analysis of such information serves as a means to capture the wisdom of crowds on such platforms. This data improves companies' knowledge management quality, which is essential for current and future business actions.

5. Summary

This study presents evidence from social media platforms pointing to the existence of EMPO's fraud before the SEC revealed EMPO's fraudulent action. Applying the wisdom of crowds on social media represents a new means of KM; this approach of gathering information from many individuals results in useful predictions that exceed those made by any single member of a group or regulator. Thus, the wisdom of crowds improves an organization's KM quality.

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