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Abstract

This study analyzes the ways in which CEOs communicate via Twitter and helps develop guidelines for effective tweeting strategies that can leverage Twitter in leadership communication. We conduct a large-scale content analysis of more than 65,000 tweets by 338 CEOs and propose a model that categorizes differences in CEO tweets along six independent dimensions: content professionalism, language professionalism, emotional valence, emotion activation, interactional effort, and information cues. We also develop coding schemes and measurement scales for each dimension. The study provides a multi-dimensional paradigm as well as useful tools for future research on corporate leadership communication on social media.

Keywords Twitter, Social media, CEO, Leadership communication, Content analysis

In recent years, social media have emerged as popular communications channels for senior management, especially for chief executive officers (CEOs). Twitter is one of the most popular social media platforms because of the ease it offers in engaging customers, employees, media, and the general public (Weber Shandwick 2017). Some famous names on Twitter include Richard Branson (Virgin Group), Tim Cook (Apple), John Legere (T-Mobile), Aaron Levie (Box), and Michael Dell (Dell). Studies suggest that the presence of a CEO on Twitter improves his or her perceived transformational leadership abilities (Hwang 2012) and demonstrates a more human side of the organization, in turn facilitating more direct and interactive communications with stakeholders online (Craig & Amernic 2020; Tsai & Men 2017).

However, there are also dangers when CEOs turn to Twitter. For example, Ryanair CEO Michael O'Leary was highly criticized for his tweet - "Nice pic!" – in response to a female consumer during a live Twitter question-and-answer session (Calder 2013). Many news outlets covered this episode, which was embarrassing for the firm. Another example is the tweet in poor taste posted by shoe designer Kenneth Cole, using the Cairo riots to promote the firm's new collection of shoes (Sweet 2011). After netizen pressure, Cole later deleted his inappropriate tweet and apologized to the public. The number of such cases continues to grow. A more recent case involves Oscar Munoz, the CEO of United Airlines. This third-largest carrier in the United States was heavily criticized online for violently dragging a passenger – a 69-year-old Asian man, believed to be a doctor – off an overbooked flight so that a staff member could take his seat. Oscar Munoz added more fuel to the fire with his response, which was issued on both Twitter and Facebook. The CEO's statement did not mention the use of force

but instead said the airline needed to "re-accommodate" passengers on occasion. Munoz's use of the word "re-accommodate" to describe the way the airline dealt with the passenger was widely derided, and Twitter users' reactions were extremely negative. Amid the controversy, United's stock fell by 6.3%, wiping $1.4 billion off the airline's market capitalization (Shen 2017).

These CEO failures on Twitter highlight a growing need for better guidance on designing more effective executive corporate communications on social media. Several pioneering studies have attempted to shed some light on this issue by testing the effects of different CEO tweeting strategies, or styles, on audience responses, such as loyalty (Alghawi, Yan, & Wei 2014), retweetability (Huang & Yeo 2018), parasocial interactions (Tsai & Men 2017), and public engagement (Yue, Thelen, Robinson, & Men 2019). However, the CEO tweeting strategies examined in these studies were developed in theoretical settings instead of grounded in the phenomenon, and thus there is a possibility that other CEO tweeting strategies or styles were overlooked.

We argue that to develop helpful and relevant guidance for leadership communication on Twitter, researchers need to have a sound understanding of how, in practice, CEOs communicate through Twitter in the first place. This article presents timely research grounded in the phenomenon, using content analysis techniques on real CEO Twitter data. Our analysis of tweets collected from 338 CEO Twitter accounts identifies six key dimensions charaterising CEOs' use of Twitter. We further develop a coding matrix and measurement scales for all six dimensions. From this, we position each of the 334 CEO Twitter accounts (excluding four

outliers) on each dimension. Our research findings are useful for corporate leaders and their marketing and public relations teams, as they help guide CEOs on how best to leverage Twitter and how to devise an effective tweeting strategy. Our coding schemes and measurement scales also contribute to theory development by providing useful tools for future research on leadership communication via social media.

Literature review

Twitter

Twitter is one of the world's most popular social networking and microblogging service sites. As of the first quarter of 2021, Twitter's average monetizable daily active user base reached 199 million, an increase of 20% or 7 million year-on-year (Twitter 2021). Twitter allows registered users to read and post short messages, or so-called tweets. Twitter messages are limited to 280 characters, and users can upload photos or short videos. Twitter is an interactive platform on which users can follow any other user with a public profile, reply to and repost others' tweets. The flexibility of information sharing and the ease of interaction between Twitter users have rendered this platform an attractive marketing and communication tool in cultivating relationships between brands and their stakeholders (Li & Bernoff 2008; Serrano, Santamaría, & Pallares 2020; Solis & Breakenridge 2009).

Given the scale and relevance of Twitter in business practice, a wealth of related academic research is emerging, focusing on three types of accounts: those of noncommercial users, celebrities, and commercial organizations. The first line of research asks why people use Twitter (Java et al. 2007; Zhang and Pentina 2012; Zhao and Rosson 2009), what motivates

users to contribute content and information sharing on Twitter (Junga Kim, Lee, & Elias 2015; Toubia & Stephen 2013), who follows whom (Chen, Liu, Wang, & Gu 2012), what users tweet about (Banerjee 2018; Honeycutt & Herring 2009), how electronic word of mouth on Twitter affects consumers' new product adoption (Hennig-Thurau, Wiertz, & Feldhaus 2015), how trust influences user intention to follow brands on Twitter (Pentina, Zhang, & Basmanova 2013), and whether early propagators of trending topics are indeed responsive to firm-sponsored messages (Lambrecht, Tucker, & Wiertz 2018).

The second line of research pertains to celebrity accounts. Marwick and Boyd (2011) examine the use of Twitter by famous people in an attempt to conceptualize celebrity Twitter practice. Through an analysis of 237 highly followed Twitter users, including actors, musicians, politicians, technologists, and reality television stars, they find that celebrity practice on Twitter involves presenting a seemingly authentic, intimate image of the self while meeting fan expectations and maintaining important relationships. Kim and Song (2016) investigate how celebrities' self-disclosure on Twitter affects fans' parasocial perceptions. They find that celebrities' self-disclosure together with fans' retweeting behavior enhance fans' feeling of social presence, which in turn positively influences parasocial interaction with celebrities. Jin and Phua (2014) conduct two experiments to demonstrate the impact of celebrities' tweets about a brand on consumers' source credibility perceptions, buying intention, and social identification with celebrities. Dwyer and Fraser (2019) examine Twitter messages about addiction posted by celebrities and suggest that celebrity Twitter activity serves to stimulate addictive behaviors, for which abstinence is proposed as the only effective and genuine

response. Though celebrities on Twitter might not be able to help in solving addiction problems, they are found to be effective in influencing public attitudes and behavioral intentions to mitigate another issue: for example, that of climate change (Park 2020).

Third, regarding company accounts, Burton and Soboleva (2011) compare the use of Twitter in 12 company accounts and find a lack of consistency in Twitter practice in most organizations. Swani et al. (2014) conduct a longitudinal content analysis on more than 7,000 tweets by Fortune 500 companies and show that business-to-business and business-to-consumer company accounts exhibit significant differences in their branding and selling strategies, their use of message appeals, and the cues, links, and hashtags that support information search. Scholars are also interested in corporate disclosure on Twitter. Several board characteristics, such as board independence and gender diversity, are found to be associated with the extent of Twitter usage as a corporate disclosure platform (Amin, Mohamed, & Elragal 2020; Basuony, Mohamed, & Samaha 2018). Research also attempts to provide guidance on corporate communication to customers on Twitter. For example, in their study on customers' voice and firms' service interventions on Twitter, Ma et al. (2015) suggest that though service intervention improves relationships, it also subsequently encourages more complaints. Culotta and Cutler (2016) provide firms with a novel and fully automated method for mining consumer-brand perceptions on Twitter. Through a netnography of the Protein World's 2015 "Are You Beach Body Ready?" firestorm on Twitter, Scholz and Smith (2019) identify an escalation strategy as a way to build brand value and activate supporters during social media crises. Thelen et al. (2021) analyze Twitter use by public relations agencies and

suggest that while media 'vividness' increases the public's levels of engagement, interactivity has an inverse effect.

CEO communication

Notwithstanding extant research on the three types of accounts, studies have paid insufficient, attention to contributions by CEOs, who play an increasingly important role in social marketing and communication. As top leaders of their firms, CEOs influence organizational direction, stakeholder relations, corporate reputation, and organizational effectiveness (Men 2014; Resick, Whitman, Weingarden, & Hiller 2009). They personify the organization and embody the highest authority able to provide information on a company's decision-making and strategic direction (Kantola 2014).

A major external role most company founders or CEOs assume is that of the "spokesperson" of the firm, representing the firm and speaking on its behalf. The role of the CEO as the firm's spokesperson has long been recognized as an important aspect of corporate communication. Literature in organization theory and strategy documents how the CEO as spokesperson manages the impression of external audiences about the company (e.g., Bansal and Clelland 2004; Elsbach 1994; Marcus and Goodman 1991; Sutton and Callahan 1987; Westphal et al. 2012). Before social media, CEOs achieved this objective by appearing in newspapers, in company annual reports, and sometimes in advertisements.

In today's digital age, social media have become new channels for the public to easily reach out to CEOs; in turn, the public has come to expect more direct and open interactions with these corporate executives. For example, when Chiquita Brands was considering

relocating its corporate headquarters, people in competing cities actively reached out to the CEO via Twitter to try to influence his decision (Jameson 2014).

Indeed, the interactive nature of social media provides unprecedented opportunities for CEOs to constantly interact, create dialogues, and build relationships with customers of the firm. In turn, this calls for a new type of leader – namely, a "leader as ambassador." The CEO's role as an ambassador goes beyond being a spokesperson of the firm. Today, the CEO not only represents the firm and speaks on its behalf but also interacts with consumers and builds relationships with them.

CEOs on Twitter

CEOs' new role as ambassadors of the firm represents an emerging research domain. CEO accounts comprise a distinctive category of accounts for study because, unlike individual celebrities, CEOs also lead their organizations. Their dual roles create new opportunities but also carry potential for tension and dissonant messaging within the organization and between the organization and other stakeholders (Craig & Amernic 2020; Kelton & Pennington 2020; Men 2014; Resick et al. 2009). For example, there is brand and organization reputational risk over and above the risk to the individual CEOs (and their personal brands, as in the case of celebrities) from their social media activities (Girginova 2015; Petroff 2017; Pickard 2018). For company accounts, while they also represent the firm and can interact with the public, CEOs as ambassadors serve to personify the organization by giving it a human face and imbuing the brand with personality and feeling (CEO.com 2015; Tang & Gray 2018; Weber Shandwick 2012). In this way, what the public expects from CEO accounts is likely to differ

from expectations of largely impersonal company accounts, and thus the strategies proposed for company accounts on social media might not be applicable to CEO accounts (Huang & Yeo 2018). The unique characteristics of CEO accounts provides an opportunity to better understand the role of the CEO as an ambassador in organizational communications in the digital age as well as the nature and content of these communications.

A few research pioneers have tried to close this research gap by drawing academic attention to the influential role of social CEOs in communication with the public. Building on self-presentation theory, Alghawi et al. (2014) identify four types of CEO image strategies and examine their effects on follower loyalty on microblogs. Tsai and Men (2017) investigate how CEOs socio-communication style, which, according to Thomas et al. (1994), has two dimensions (i.e., assertive and responsive), influences stakeholders' parasocial interactions on Twitter. Huang and Yeo (2018) apply an heuristic-systematic model (Chaiken 1980) while assessing 37 Fortune 1000 CEOs on Twitter to determine whether re-tweetability is influenced by CEOs' industry background, activity level, Twitter age, tweet content, supplementary information (hashtags and URLs), and linguistic styles. Yue et al. (2019) try to employ dialogic communication theory (i.e., the use of conversation or shared dialogue) (Kent & Taylor 1998) in the CEO tweeting context, but findings regarding the association between dialogic principles and public engagement are mixed. Drawing on social penetration theory, Yue et al. (2020) examine the effect of CEOs' personal disclosures on perceived likeability, competence and relationship investment. By reviewing 64 social media articles, Heavey et al. (2020) propose a typological conceptualization of strategic leaders' social media engagement behaviors which,

they argue, comprise: conveyance, evangelization, dialogue, mobilization, obfuscation and celebration.

However, the communications strategies/styles examined in the above-mentioned studies were developed in a largely theoretical context. Indeed, little research adopts a grounded approach to explore how CEOs actually tweet, a notable exception being a study by Malhotra and Malhotra (2016). In this case, the authors code 25 CEO Twitter accounts of publicly traded companies in the US and classify these CEOs into four types. They consist of expressionists, who mainly share their personal opinions about events and politics and give their followers an insight into their daily lives; information mavens, who primarily share links to information, news and other happenings; business mavens, who mainly tweet about business content such as personal opinions about business related issues, product information, strategy, customer stories and so on; and generalists, who tweet about a range of topics from personal opinions, interest, links, to business- and non-business-related issues. Note that Malhotra and Malhotra (2016) only consider a limited number of 25 CEOs in US, and that their resulting CEO Twitter typology, though providing interesting insight into how CEOs tweet, is not anchored by any key tweeting attribute or dimension. We think that identifying key CEO tweeting style dimensions is helpful not only for understanding the phenomenon but also for further analysis of the effects of CEO's tweeting styles on consumer reactions. Therefore, our study aims to improve the understanding of the CEO Twitter phenomenon by extending the contribution made by grounded research. We conduct a significantly more extensive content analysis of 338 international CEO Twitter accounts to explore how CEOs communicate through Twitter. The

goal is to identify key dimensions that capture CEOs' use of Twitter in practice, which not only helps to identify CEO Twitter typology and position individual CEOs against these dimensions, but also serves as a starting point for theory development. We believe that a better understanding of the phenomenon at scale will provide a more robust basis from which both practitioners and academics can work to develop effective communication strategies for corporate leaders.

Methodology

Data collection

By merging existing social CEO lists produced by well-established business practitioners (e.g., Twibe.com, StrategicObjective.com, Klout.com, WorldofCEOs.com), we formed our own list of 353 CEOs. We dropped three CEOs whose total number of followers was significantly smaller than the rest (fewer than 400), which left 350 CEO accounts for further consideration. We ran a verification exercise on each of the 350 CEOs and examined the official websites of all listed CEOs to confirm their identity and their Twitter accounts. For the CEOs whose Twitter information was not available on the company website, we conducted a search on Twitter for a verified account under their name with their identity as a CEO displayed on the profile. When multiple accounts under a CEO's name existed, but none were verified, we checked the number of followers, follower comments, and information provided by general social media outlets to ascertain whether the information on our master list was correct. The verification process confirmed that all the names were correct.

Using Twitter's REST API,[1] we collected the most recent 200 tweets from each of the 350 listed CEO accounts. During the tweet collection process, we dropped an additional 12 CEO accounts because the CEOs either had changed their account username, which was an essential parameter for Twitter REST API to work, or had forbidden public access to their tweets by the time of data collection. For the remaining 338 accounts, we successfully collected the 200 most recent tweets. Only a few accounts failed to reach 200, as a result of CEOs only tweeting to a limited extent during their time on Twitter. The total number of tweets collected from these 338 accounts was 65,471.

Data analysis

The study has two main objectives: (1) to identify the key dimensions characterizing CEOs' use of Twitter in their communication with the public and (2) to develop measurement scales for these dimensions, thus permitting existing CEO Twitter accounts to be mapped. To address the first objective, we conducted an inductive content analysis on a random sample of CEO tweets. The resulting product was a categorization matrix specifying key dimensions of CEOs' Twitter use, including the main elements constituting each dimension.

For the second objective, we ran a deductive-oriented content analysis on all existing CEO Twitter accounts based on the matrix developed in the first step. Note that in a deductive-oriented analysis, compared with a purely deductive analysis, elements of each dimension can

[1] Twitter REST (representational state transfer) API (application programming interface) gives developers access to some of the core primitives of Twitter, including timelines, status updates, and user information.

also be tested with the new data and subjected to refinement if new or relevant concepts or categories emerge during the process.

Coding

Content analysis (I): An inductive approach

Open coding Content analysis (I) consisted of open coding, axial coding, and selective coding. Open coding is an unrestricted coding process of data in which the researcher has no *a priori* assumptions about the major themes and issues presented. Therefore, we coded, constantly compared, and grouped all relevant sections of tweets into categories. We devised new categories whenever a main topic did not match any previous category.

We used multistage sampling to randomly select 30 of the 338 CEO accounts and then, from each account, randomly selected 10 of the 200 tweets to form a sample of 300 tweets. We conducted open coding on four sets of such random tweet samples (1,200 tweets in total) when categories became saturated. The randomly selected CEOs work in a variety of industries, including information technology (IT), telecommunications, marketing & PR consulting, holding & investment, and charity. Their number of followers ranged from 420 to 23 million. Their firms are mainly located in the United States, Canada, and Europe, though a few are in Asia, including Australia, China, Japan, India, Malaysia, and South Korea. Next, we list the 14 categories generated from the open coding process and provide illustrative examples for each:

1. Work & company

"Mint & Quicken are looking for a new Director/Head of Marketing: http://bit.ly/dX6mRPN to run $100m+ lines of business & about 10 ppl team"

"Hong Kong invested in the internet, so we're proud to invest in its entrepreneurs.

goo.gl/mMQp6e”

2. Personal life

“Saw Impossible movie last night – it was amazing. One of the best movies I’ve ever seen.”

“Happy Birthday to my Dad Hector Cuellar!! Happy 74th Dad! I Love You! #Blessed (He’s the one on the right ;))” (Image attached to the tweet)

3. Nonstandard vocabulary

Colloquial terms:

“Wow! Matt & crew have come a long way. Congrats @Punchbowl – inks deal with @Disney, via @BostonBizJournl ow.ly/tjpnQ #boston…”

Abbreviation:

“@candaselin tk u honored.”

Intentional misspelling:

“@dan_copley ahhhh! You sponsored Maisie! Thanks Dan! :-) hope student life is treating you well!”

Emoticon:

“Haven’t been near Twitter in far too long…just realized @adamslisa is the feed I missed most :)”

4. Complex vocabulary

Lengthy word[2]:

“@GeorgeCohta: Check it out – Becoming an #entrepreneur … through enlightenment by @faisal-hoque wp.me/p3NYV-5TR via @FortuneMagazine”

5. Pleasant feeling

“@DvineMrsM @tylerperry @MsReneeLawless @OWNAmbassadors Happy to join the fun!! #HavesAndHaveNots”

6. Unpleasant feeling

[2] Word length can be an indicator of vocabulary complexity (Neuendorf 2017).

"So sad to see violence ruling over democracy in #Ukraine & #Venezuela. We all need to stand up for true democracy http://t.co/do1HuyBLuT"

7. Tense feeling

"Thrilled to support National Day of Unplugging since I #unplug to reconnect! @SabbathManifest http://t.co/MzeUexwam8 http://t.co/1YT5ZwkGin"

8. Calm feeling

"Possibly the most serene spot in all of New York City. Feels good to be home. http://t.co/97XICZylah"

9. Addressing

Second-person pronoun:

"In case you missed it: Larry's response to alleged Google involvement in a government spying program called #PRISM: goo.gl/67SXb"

@mention:

"Gettin Ready Again!! This time for IMAGE awards tonite. w/ @footnanny #bestpedicurevah http://t.co/0CwhZUjmBm7"

10. Reply

"@cdixon thanks for the kind words :) to be fair we've had our share of lucky breaks so far"

11. Retweet

"RT @TyLepley: "It belongs to the monarch" WOW @Angelarobschild @tylerperry #HavesAndHaveNots"

12. Hashtag[3]

"Is your #LinkedIn Profile up to par & SEO optimized? Ask me about my #LinkedIn

[3] A hashtag, the # symbol, is used to index keywords or topics on Twitter, allowing people to easily follow topics in which they are interested.

profile review service."

13. URL

"Sprinklr is Hiring! Learn more about opportunities to join the tream here: http://spr.ly/6014ZajQ"

14. Image/video

"OmyCARBS! @tylerperry party had a truffle Mac and cheese bar! http://t.co/1nFURWSmyu" [image attached to the tweet]

Axial coding and selective coding In axial coding, we performed two tasks. First, we examined and refined the categories previously developed in open coding. Second, we compared the categories and grouped similar ones under higher-order categories.

With regard to category refinement, the categories "work & company" and "personal life" actually describe the content of CEOs' tweets. Therefore, these two categories were refined as "work-related content" and "life-related content" to better capture the essence of the coded data. Meanwhile, the categories "complex vocabulary" and "nonstandard vocabulary" describe the language CEOs use when tweeting. Because messages/speeches that include complex vocabulary are often viewed as formal in terms of language (Heylighen & Dewaele 1999), we refined the "complex vocabulary" category into that of "formal language." For the tweets that contain "nonstandard vocabulary," we view them as informal in terms of language and decided to revise this category into "informal language."

Next, we grouped similar subcategories into six higher-order categories. First, we grouped "work-related content" and "life-related content" under a generic category called "content professionalism," while we grouped "formal language" and "informal language" under "language professionalism." These two generic categories comprise "professionalism" – the

extent to which a CEO's tweets adhere to the general norms expected from a professional in terms of content and language use. Second, drawing on theories on dimensions of emotion (Russell & Barrett 1999; Thayer 1986; Watson & Tellegen 1985), we grouped the categories "pleasant feeling" and "unpleasant feeling" into "emotional valence," which refers to the extent to which the emotion expressed in CEOs tweets was positive or negative. At the same time, "tense feeling" and "calm feeling" were grouped into "emotion activation," which refers to the arousal (how tense or calm the experience feels) of the CEO's emotion expressed through Twitter. These two generic categories – "emotional valence" and "emotion activation" are both related to the overall "emotion" expressed in a CEO's tweet. Third, because categories such as "addressing," "reply," and "retweet" all represent CEO actions in creating conversations with other users, we grouped them under a generic category called "interactional effort." By contrast, elements such as "hashtag," "URL," and "image/video" make a text-based tweet richer by including more information. Therefore, we grouped these into another generic category called "information cues." Together, these two categories represent a CEO's "communication action" with the audience.

In selective coding, a core category should be generated to sum up all those categories previously developed to represent the central phenomenon. By reviewing all categories identified in axial coding, we decided to unify them under a core category called "CEO tweeting style." As such, a CEO's tweeting style can be summarized into three aspects related to the six dimensions: (1) the "professionalism" aspect which includes two dimensions, one being content professionalism and the other language professionalism; (2) the "emotion" aspect

containing the two dimensions of emotional valence and emotion activation; and (3) the "communication actions" aspect, which is anchored by the dimensions of interactional effort and information cues (see Appendix 1 for coding matrix and Fig. 1 for illustration of CEO tweeting styles).

[Insert Fig. 1 here]

Content analysis (II): A deductive-oriented approach

In content analysis (II), we coded each CEO account (represented by its 200 most recent tweets) according to the categorization matrix developed in content analysis (I). We then compared the number of codes in each category to map the relative position of each CEO account onto the corresponding dimension.

Measurement scales NVivo was the main tool used to code each of the existing 338 CEO Twitter accounts. We compared the number of codes in each category according to the following six measurement scales:

Content professionalism = Normalized (#work-related words – #life-related words).

Language professionalism = Normalized (#formal lengthy words – #nonstandard words).

Emotional valence = Normalized (#pleasant feeling words – #unpleasant feeling words).

Emotion activation = Normalized (#tense feeling words – #calm feeling words).

Interactional effort = Normalized (#second-person pronouns + #mentions + #replies + #retweets).

Information cues = Normalized (#hashtags + #URLs + #Image/videos).

Normalized (e_i) = $\frac{ei}{|E|max}$.

Results

Dimensions

Professionalism Content professionalism has two subcategories: professional content (represented by work-related keywords) and personal content (represented by life-related keywords). To identify and code such content in CEOs' tweets, we used NVivo to run a word frequency query on all the CEOs' tweets. We set the query to return 500 of the most frequently appearing words of no fewer than three letters. We then examined these frequently appearing words, as well as the context with which they were usually associated, to identify a set of work-related keywords (e.g., "work," "job," "business," "company") and life-related keywords (e.g., "family," "party," "weekends," "holiday"). We ran another word frequency query to return 1,000 of the most frequently appearing words. Few new keywords emerged, meaning the keyword set was saturated. We then coded each keyword and counted every time it appeared in any tweet.

Language professionalism consists of two subcategories: formal language (represented by lengthy words) and informal language (represented by nonstandard vocabulary). To identify key lengthy words, we created a word frequency query to gather 500 of the most frequently used words with a minimum word length of five. This pool of 500 words constituted three types of words: (1) usernames (e.g., @JohnTaylor), (2) hashtags (e.g., #business), and (3) "real" words. We then ran the frequency query repeatedly, each time increasing the minimum word length by one letter until it reached 18.

We found that the number of usernames and tags increased significantly as the minimum

word length increased, until 13, and then flattened out afterward (see Fig. 2). This implies that most words longer than 13 letters appearing in CEOs' tweets are just usernames or hashtags, and meaningful words longer than 13 letters are rare. Yet some CEOs still use long words of more than 13 letters, which can be one indication of their orientation to formality. We therefore decided to collect a pool of 500 of the most frequently used words with a minimum word length of 13 and identified a set of lengthy words with real meaning, excluding usernames, hashtags, and other nonstandard words.

[Insert Fig. 2 here]

After examining lengthy words, we evaluated nonstandard words, which include abbreviations, colloquialisms, intentional misspellings, and sideway emoticons. We used NVivo to obtain a pool of 2,000 of the most common words from which a set of key abbreviations, colloquialisms, and intentional misspelled words were identified. We then drew a second pool containing 3,000 of the most frequently occurring words to confirm our findings. For emoticons, as NVivo 12 is unable to recognize punctuation, we used the search function in Word 2016 to identify emoticons used by CEOs. We then coded each of the lengthy words and nonstandard words identified during this process and counted every time they appeared in any tweet.

Emotion Emotional valence includes the two subcategories 'pleasant feeling words' and 'unpleasant feeling words', while emotion activation includes 'tense feeling words' and 'calm feeling words'. Again, we conducted a word frequency query on all CEO tweets, to collect 500 of the most frequent words with no fewer than three letters. In line with Russell and Barrett's

(1999) and Matthews et al.'s (1990) work on classifying adjectives, we closely examined these frequently appearing words to identify relevant adjectives describing different feelings. We then ran another query to get 1,000 of the most frequently used words from which few new emotion adjectives emerged.

Communication action A CEO's interactional effort includes addressing (second-person pronoun, @mention), reply, and retweet. We used NVivo to search and code second-person pronouns. Any @mention, reply, and retweet actions were captured by the Twitter REST API during our data collection.

Information cues contain hashtags, URLs, and image/videos. Again, we used NVivo to search and code hashtags and employed Twitter REST API to obtain the number of URLs and image/videos for each CEO account.

Mapping CEOs

When examining the number of codes obtained in different categories, we found several outliers in the professionalism and emotion dimensions. In terms of professionalism, the outlying CEOs either tweet predominantly about their work (e.g., Keven Johnson from Johnson Media whose #work-related words – #life-related words = 546) or use much informal language when tweeting (e.g., the late Tony Hsieh from Zappos whose #formal lengthy words – #nonstandard words = –162, Fred Cuellar from Diamond Cutter International whose #formal lengthy words – #nonstandard words = –146). In respect of the emotion aspect, Amit Verma from ModernLifeBlog tends to be rather emotional, expressing highly positive and tense feelings (#pleasant feeling words – unpleasant feeling words = 67, #tense feeling words –

#calm feeling words = 68).

After excluding the four above-mentioned outlying CEOs, we calculated a score for each of the remaining 334 CEOs on each dimension based on their codes and the measurement scales previously developed. Using these scores, we mapped all 334 CEOs onto the six dimensions (see Fig. 3 and Fig. 4).

[Insert Fig. 3 & Fig. 4 here]

- **Content professionalism (CP):** Scores for CP range from -1 (highly personal) to 1 (highly professional). The tweet content of more than half of the CEOs (62%) is moderately professionally oriented: CP∈(0.09, 0.5]. A few CEOs' (12%) tweets are relatively heavy with work-related content: CP∈(0.5, 1]. Conversely, a small number of CEOs (9%) opt to tweet slightly more about their personal life than work: CP∈[-0.23, 0].
- **Language professionalism (LP):** Scores for LP vary from -1 (highly informal) to 1 (highly formal). The majority of CEOs (66%) tend to use moderately informal language when tweeting: LP∈(-0.5, 0]. Only a few CEOs (2%) use very informal words in their tweets: LP∈[-1, -0.5]. The rest (32%) tweet in moderately formal language: LP∈(0, 0.5].
- **Emotional valence (EV):** Scores for EV span from -1 (highly negative) to 1 (highly positive). Many CEOs (64%) prefer expressing pleasant feelings and display a happy and optimistic image on Twitter: EV∈(0.04, 0.5]. A few CEOs (8%) go even further in this direction: EV∈(0.5, 1]. By contrast, 16% of CEOs do not mind sharing more

negative feelings on Twitter: EV∈[-0.72, 0].

- **Emotion activation (EA):** The EA scores range from -1 (very calm) to 1 (very tense). A common practice among CEOs (76%) is to express moderately activated emotions, thereby creating a more energetic image on Twitter: EA∈(0.07, 0.5]. More than a dozen CEOs (6%) show greater emotional intensity, however, using 'tense' words to communicate their feelings: EA∈(0.5, 1]. By contrast, a similarly sized group of CEOs (8%) opt to stay calm and more relaxed: EA∈[-0.11, 0].
- **Interactional effort (IE):** The IE scores fall into a range from 0 (no effort) to 1 (great effort). Half the CEOs (50%) make a moderate effort to interact with their audience: IE∈[0.26, 0.53]. Another 24% of CEOs make a greater effort in this regard: IE∈(0.53, 1]. For the rest (26%), interactional effort is relatively low: IE∈[0, 0.26].
- **Information cues (IC):** Scores for IC range from 0 (none) to 1 (many). Many CEOs (64%) provide a moderate number of information cues, such as hashtags, URLs, and image/videos, to their audience when tweeting: IC∈(0.21, 0.5]. A few (12%) provide even more such cues to make the information in their tweets richer: IC∈(0.5, 0.97]. For the rest of the CEO accounts (approx. 25%), the number of information cues is relatively small: IC∈[0, 0.21].

In summary, the majority of CEOs tend to tweet about their work using somewhat informal language. In addition, they prefer expressing more pleasant and energetic feelings, and their level of effort to communicate with the public is moderate.

Discussion

Our research adopts a grounded approach to explore how CEOs communicate through Twitter. We provide a model that categorizes differences in CEOs' use of Twitter according to six dimensions. We argue that these dimensions represent universal categories for characterizing CEO tweeting style. In addition, we develop a coding matrix and measurement scales for all six dimensions and then map each of the 334 CEO Twitter accounts (excluding four outliers) relative to others through a score on each dimension.

Implications for research

Our study contributes to the emerging and growing literature on corporate executive communication on social media. It presents the first comprehensive, large scale content analysis of the tweeting CEO phenomenon. As CEO Twitter strategies examined within the current literature are mostly developed in a theoretical setting (e.g., Alghawi, Yan, and Wei 2014; Huang and Yeo 2018; Tsai and Men 2017; Yue et al. 2019), we argue that some important and interesting CEO tweeting strategies or styles used in practice may have been overlooked. By exploring how CEOs actually tweet and communicate on Twitter, we believe that our research is a timely contribution to a better understanding of the CEO Twitter landscape, thus facilitating more relevant theory development, which is grounded in the phenomenon.

More specifically, our work serves to inform future research on corporate executive social media communication from three important perspectives. First, we offer a dimensional paradigm for research on CEOs' practice on Twitter. Our six-dimensional model provides researchers with a useful tool to examine, measure and categorize the extent of particular

Twitter practices. A larger category set, combined with a methodology which permits the development of multi-dimensional scores, provides a more sophisticated analytical tool than previously developed and constitutes a methodological advance on earlier studies (e.g., Malhotra and Malhotra (2016). The six-dimensional CEO Twitter typology provides a starting point for fruitful theoretical development in terms of designing and testing effective communication strategies. It would be possible for researchers to further explore all, or a specific combination of, these dimensions to test how their flexing might lead to different communications outcomes and audience responses. Such research questions might include, for example: how might CEO content professionalism interact with language professionalism to affect retweetability? What is the influence of CEO emotion activation on follower engagement? Does expressing negative emotions make CEOs seem more authentic and help them build stronger parasocial relationships with their audience? Do certain dimensions resonate better with different audiences? Does interactional effort on the CEO side make a difference in generating follower response, or does follower response require the CEO to prompt it? Does seeing an CEO interacting with his/her employees or other CEOs affect perceived transformational leadership ability? We believe that there is a rich set of opportunities for theoretical contribution and empirical investigation, given this comprehensive categorization tool.

Second, we develop a coding matrix for all six dimensions, which could provide the basis for the investigation of many Twitter elements. For example, images on Twitter comprise a potentially rich information cue and would merit a content analysis of their own. Hashtags

could also be examined: for example, we might ask whether there is a threshold number of hashtags in a tweet that could result in audience irritation. Similarly, for emoticons, we might explore whether there is a particular type of emoticon, or a threshold number of emoticons beyond which viewers would begin to doubt the CEO's sincerity. For example, is it a good idea to use emoticons in apologies if those emoticons are sad faces?

Third, our study presents three visualizations that capture the position of 334 CEO Twitter accounts relative to one another on all six dimensions. This visualization tool can help researchers quickly identify particular types of CEO Twitter account to use in their studies perhaps, for example, as stimuli in an experiment to test viewer response effects. Indeed, these visualizations already suggest several interesting tendencies in CEOs' practice on Twitter, which might provide ample material for future research. Researchers might additionally consider probing the motivations behind a certain tendency or style when using Twitter. For example, the majority of CEOs tend to maintain a professional *approach* in terms of tweet content but not always a professional language *style* – many CEOs score negatively on language professionalism. What might be the reasons for this inconsistency on these two professional dimensions? We also find that while the majority of CEOs prefer showcasing a happy image, some CEOs (16% in our sample) seemed not to mind showing more negative emotions on Twitter. This might be due to personality, but it is also possible that CEOs exhibiting negative emotional valence have good justifications for doing so. Furthermore, our results show that, unlike the other dimensions, the interactional effort dimension has data that are more statistically dispersed (see Fig. 3, the interquartile range of interactional effort is

greater than others). Given that Twitter, as a typical social media platform, is inherently interactive in nature (Kaplan & Haenlein 2011), we find it interesting that CEOs seem to have different opinions on whether to make full use of Twitter's interactive capabilities. Again, this might be due to different CEO personalities and preferences, or perhaps different organizational communications policies, but researchers might find it worthwhile to explore the circumstances in which some CEOs appear to hold back in this respect on Twitter. In sum, our research provides a rich and diverse roadmap for future work.

Managerial implications

The findings of this study also have several practical implications for CEOs and communications professionals. Our scores and maps of tweeting CEOs provide managers with useful insight on CEOs' social media communication styles and available positioning approaches to Twitter, based on a rigorous and scholarly approach to the analysis. This is in stark contrast to many of the commercial social media analysis tools presently available to firms, which tend to be overly simplistic, not well grounded in theoretical terms, or which are excessively opaque to the client.

Practically, in developing a coding matrix and measurement scales for each CEO tweeting style dimension, we have been able to develop a more accessible and robust methodology by, for example, providing details on how to use NVivo to code each tweet on the basis of the matrix. This provides managers with the ability to obtain both a score for their own CEO using our matrix and scales, as well as a sense of how that CEO's communications style relates to others in their competitor group, or sector. Such insight could help managers develop guidance

for their own CEOs in crafting appropriate tweeting styles, styles that might be more closely related to corporate communications objectives – should they, for example, follow an existing sectoral trend or rather seek to stand out with a distinctive tweeting style compared to their sector?

Our categorization and visualization approach has much in common, too, with the brand positioning exercises conducted by firms seeking to differentiate their products and services from those of their competitors. They might therefore be seen as useful extensions of existing tools designed to inform a firm's marketing strategy, providing the potential to integrate and better align the Twitter usage of corporate executives with the goals, creation, monitoring and analysis of the firm's overall communications mix.

Limitations and future directions

We should note that this study has a number of particular limitations that would benefit from being addressed in future research. As we adopted a grounded methodological approach, we tried our best not to hold *a priori* assumptions about the themes or issues emerging from this phenomenon. However, it is almost inevitable that our coding results will have been influenced by the authors' education and academic backgrounds. Therefore, we call for more scholarly work from a variety of different disciplines to independently investigate the phenomenon. Secondly, this study focuses on corporate executives' use of Twitter. Future research could test whether our six-dimensional model could be extended to other social media contexts, such as Facebook or Instagram, which, though somewhat similar to Twitter, have their own distinctive features. Our provisional expectation would be that our model works for Facebook in general,

which is similar to Twitter in terms of features and presentation format; while in the case of Instagram, which is essentially an image-sharing site, another dimension dedicated to image features might be necessary.

Finally, we notice that social media platforms continue to proliferate and their features, functionality and use continue to innovate and evolve. For example, in November 2020, Twitter's introduced a 'Fleets' feature, giving the opportunity to share fleeting or transitory thoughts which will disappear in 24 hours, provides an ever-changing basis for scholarly enquiry into this fascinating communications medium. However, the feature was discontinued in August 2021. Future research will therefore need to be sufficiently agile to match the rapid innovation in and evolution of social media platforms.

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Fig. 1 Dimensions of CEO tweeting style

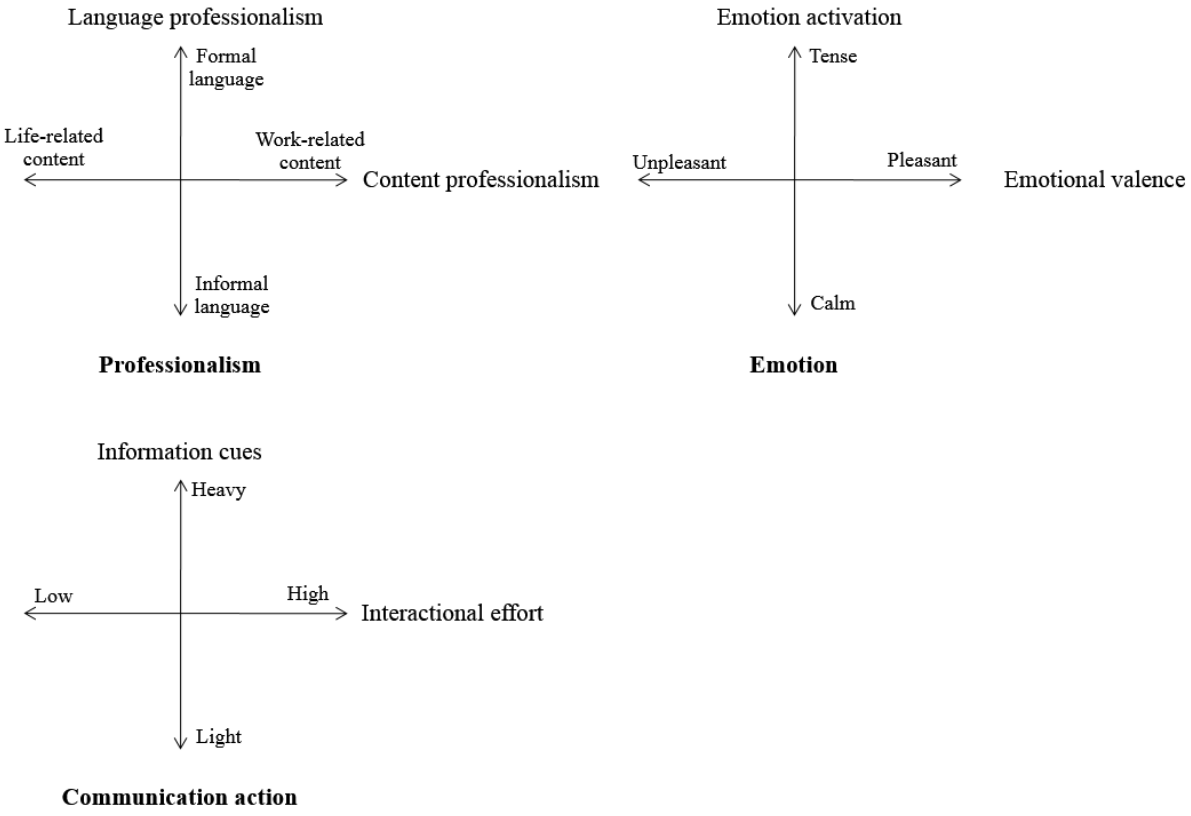


Fig. 2 Lengthy words frequency results

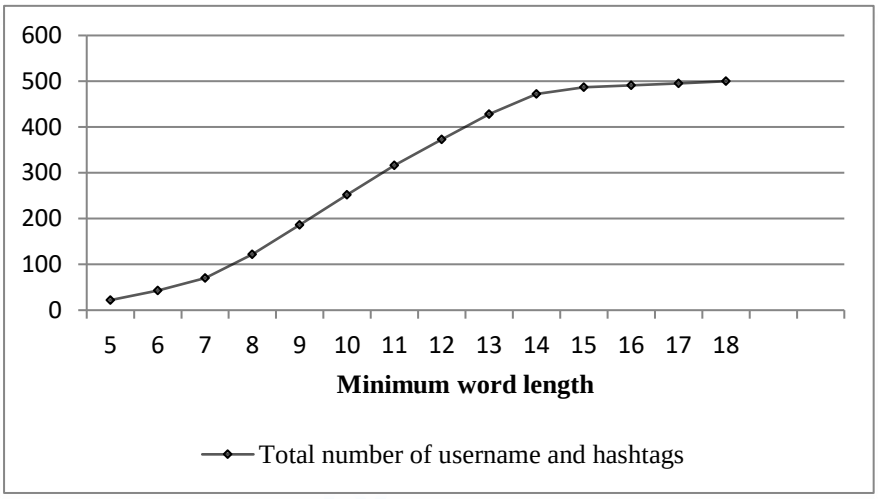


Fig. 3 CEO tweeting style: Six dimensions box plot

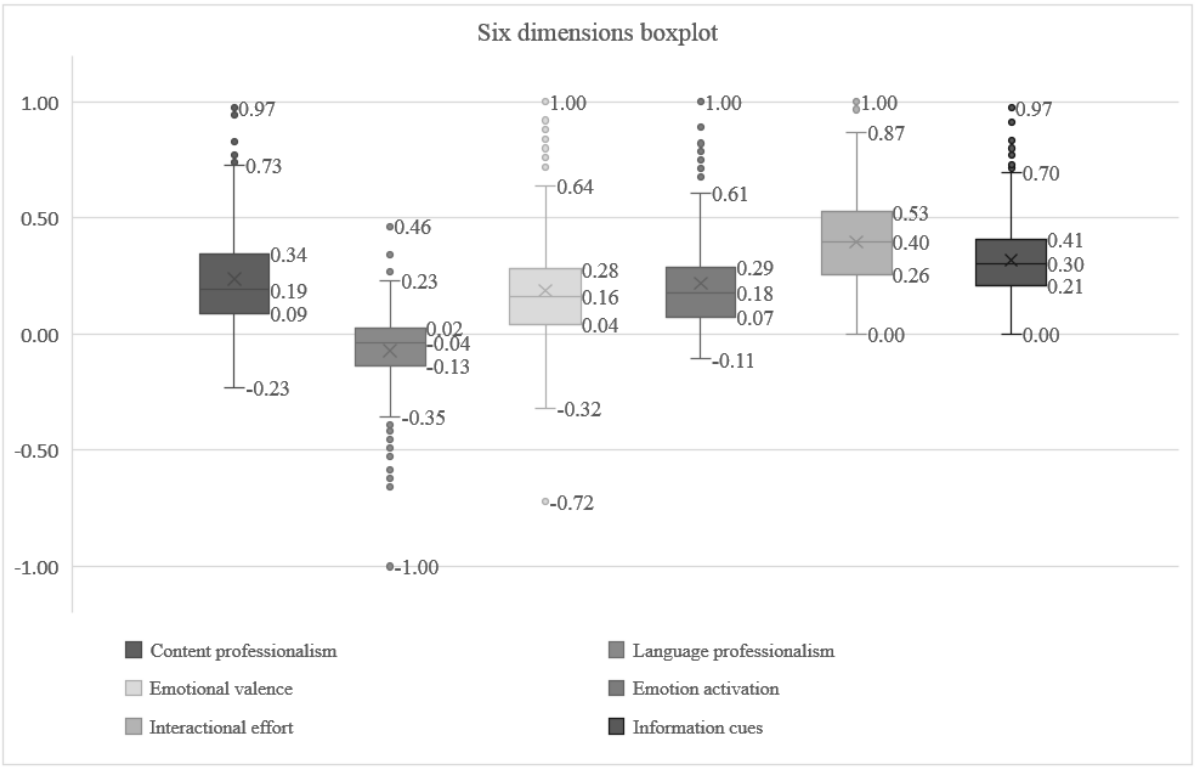
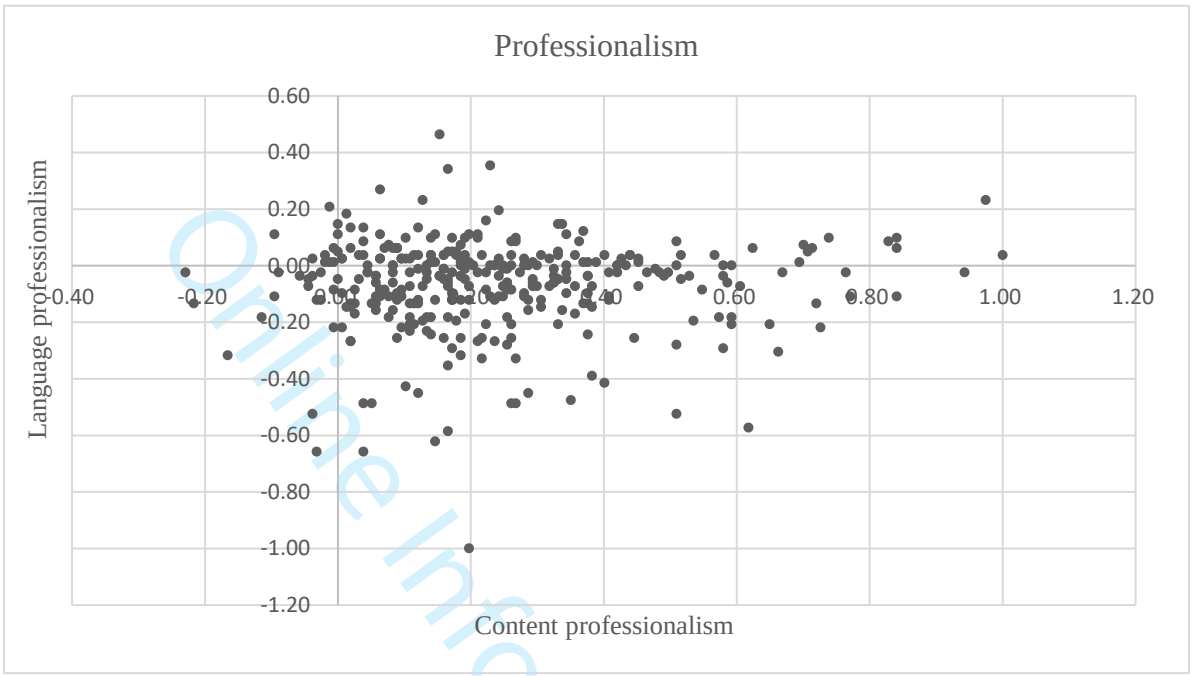
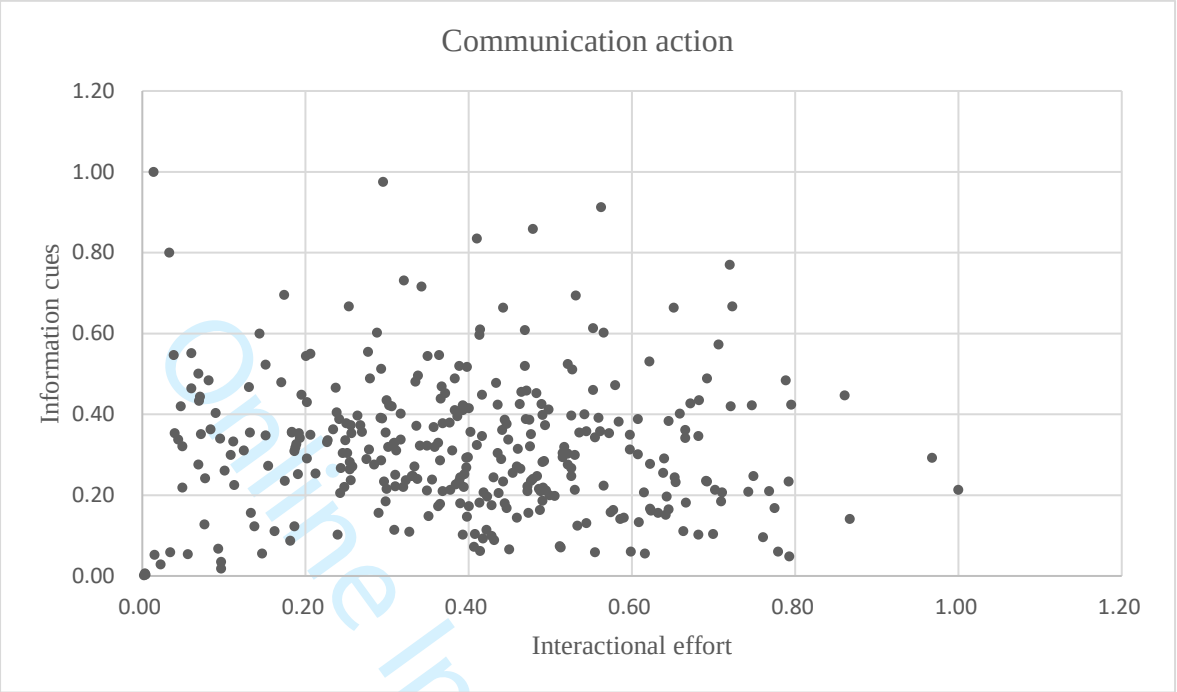


Fig. 4 CEO tweeting style maps





Appendix 1. Coding matrix

Open coding		Axial coding			Selective coding
Codes	**Original sub-categories**	**Refined sub-categories**	**Generic categories I**	**Generic categories II**	**Core category**
Investment decision Business insights Management expertise Product/ service …	Work & Company	Work-related content	Content professionalism	Professionalism	CEO tweeting styles
Leisure, Vacation, Family, Friends …	Personal life	Life-related content			
Lengthy words …	Complex vocabulary	Formal language	Language professionalism		
Colloquial, Abbreviation, Intentional misspelling, emoticon …	Non-standard vocabulary	Informal language			
Happy, Glad, Cheerful, Delighted, …	Pleasant feeling	/	Emotional valence	Emotion	
Sad, Upset, Depressed, Nervous, …	Unpleasant feeling	/			
Excited, Thrilled, Stressed, Anxious, …	Tense feeling	/	Emotion activation		
Calm, Serene, Gloomy Tired, …	Calm feeling	/			
2nd-personal pronoun	Addressing	/	Interactional effort	Communication action	
@mention					
@reply	Reply	/			
Retweet	Retweet	/			
#hashtag	Hashtag	/	Information cues		
URL	URL	/			
Image/video	Image/video	/			