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Tweeting for change: social media narratives for sustainable service

Purpose – This interdisciplinary study aims to analyze how service organizations communicate sustainable beliefs in their social media narratives and use them to generate brand awareness, customer recognition, and ongoing demand for sustainable service.

Design/methodology/approach – We conduct a two-phase exploratory analysis of 10,342 tweets from 2019-2020 by sustainable global corporations to identify best practices for social media teams working for sustainable corporations operating within a service-based business model. First, we identify the significant themes using an unguided machine learning approach of three types of firms: services, goods, and mixed ones. Next, we analyze the full set of tweets with linguistic sentiment analysis followed by a deeper view of the services-based organizations based on their strategic focus (B2B versus mixed).

Findings – Our findings indicate that tweets that appear to create the highest customer engagement are characterized as having high levels of analytic language, high clout (i.e., are socially relevant), a positive tone, a high number of words, and a high number of words per sentence. On the other hand, having complex language in terms of six-letter words does not seem to associate with customer engagement. Our last level of analysis shows that B2B services-based corporations with positive tone and higher word count exhibit higher levels of retweets. Implications include providing rational and informational tweets to increase engagement and highlight societal relevance.

Practical Implications –The key implication of our research is that corporations must strategically design social media narratives about climate change as part of their online branding and communications process.

Originality/value – Climate change has negative consequences on human and physical capital, and ecosystems across the globe. Our study provides specific recommendations for how services corporations can increase their sustainable communications and actions.

Keywords climate change, Twitter, corporate social responsibility, narratives, semantic analysis, public engagement

Paper type Research paper

1. Introduction

Climate change has dramatic negative consequences on human and physical capital, ecosystems, and economic activities (Fisk, 2022). The movement around evidence-based climate change research has added momentum to action and policy at national, regional, and global levels, including the Paris Climate Agreement and COP 26 in Scotland (Friedman, 2021; Omri, Daly, and Nguyen, 2015). The relationship between business and climate change is gaining importance as the financial aspects are increasingly evident. Kompas *et al.* (2018) estimate an approximate global loss of $9.5 trillion, or about 3%, of the 2100 global GDP, is due to a 3°C increase in global warming. Moreover, consumers worldwide have become increasingly interested and concerned about environmental degradation and climate change and reflect more sustainable patterns of behavior, while businesses increasingly market new environmentally friendly technologies (Rasouli and Timmermans, 2016).

However, governments, businesses, advocates, and activists must move beyond inaction to create a compelling narrative argument and influence behavioral change. Service providers and consumer advocates share stories to promote audience interest in various topics (Hamby and van Laer, 2022). Narrative-based sharing of climate change knowledge supports active climate change adaptation at both the micro and macro levels (Skarmeas *et al.*, 2020).

The concerted effort of businesses to align their social and environmental positions has increased the momentum around climate change (He and Harris, 2020). This type of performance requires organizations, especially in the services sector, to integrate sustainability, environment, and social information into their business activities and involve their stakeholders (Stäbler and Fischer, 2020). As an example of a corporate environmental awareness initiative, 95 Fortune-500 corporations now have Chief Sustainability Officers (CSOs) (Huang *et al.*, 2021). Inevitably, business organizations with more mature sustainability practices evolve to focus on

ecologically-centric issues and respond better to climate change risks and opportunities (Omri, Daly, and Nguyen, 2015; Rasouli and Timmermans, 2016). Developing research shows a positive correlation between corporations with a clearly defined environmental and sustainability agenda and financial performance (Lean and Nguyen, 2014). Overall, evidence suggests that corporations should increase their sustainability performance not only to decrease their environmental footprints, but also to increase their climate change resilience, and ultimately increase their profitability.

The discussion around climate change is complicated and can be categorized as a global "wicked problem" (Sun and Yang, 2016). Addressing climate change requires rigorous navigation and research with multiple stakeholders in the corporate sector, government, and civil society. Despite a significant number of studies in top science and engineering journals, there is a dearth of research in business journals on sustainable and socially responsible services and the role of the services sector in promoting sustainability and reducing climate change (Huang *et al.*, 2021). Considering the ongoing evolution of social media and its potential benefit in enabling consumers to take an active market role, new media, and big data provide opportunities for creative strategies in the service industries (Hennig-Thurau *et al.*, 2010). Studies emphasize the need for researchers and practitioners to evaluate the use of new media to successfully manage stakeholder interactions, communicate, and exploit platform network effects.

Therefore, we heed the call to "…to make climate change a major service research topic." (Fisk, 2022, p. 3) and utilize social media, a newer form of brand and consumer-based interactive communication (Wang, 2021; Wang, 2023). The key objective of this interdisciplinary study is to analyze how service organizations communicate sustainable beliefs in their social media narratives and use them to generate brand awareness, customer recognition, and ongoing demand for sustainable service. Based on narrative and knowledge-sharing theories, including Social

Cognitive Theory (SCT) (Bandura, 1986, 2001; Bozkurt et al., 2023; Compeau and Higgins, 1999), this research provides an unguided qualitative interpretive content analysis of social media (specifically Twitter-based) narratives. By analyzing the content of tweets from various types of corporations on the Corporate Knights list of the Global 100 Most Sustainable Corporations in the world for the year 2020, this study aims to identify corporate-level best practices and resource mobilization mechanisms for sustainable service through climate change mitigation and adaptation strategies. The objectives of this social cognition and engagement-based theory-driven study are threefold. First, we aim to identify and analyze the key social cognition concepts and themes highly sustainable service corporations commonly discuss when communicating climate change on social media, employing narrative theory as a guiding framework. Second, we examine these corporations' specific strategies in crafting their social media marketing narratives to foster climate change awareness. Lastly, our study aims to evaluate which types of climate narratives generate the highest levels of knowledge sharing and interaction and to assess how these engagement levels vary depending on a corporation's business strategy and model.

Our paper is organized as follows. First, we review the literature that examines the narrative theory and the relationship between business narratives and brand-related social media communications on Twitter. Next, we analyze a sample of over 10,000 tweets from 2019-2020 posted by corporations on the 2020 Corporate Knights list of sustainable firms. Our analysis includes two phases: (1) unguided qualitative semantic analysis to uncover key social cognition and knowledge-sharing and engagement themes and concepts across all tweets, and (2) comparative quantitative linguistic sentiment analysis of all tweets to interrogate retweet engagement among corporations engaged in supplying goods, services, or both, and, among services-oriented corporations, B2B, B2C, and mixed business strategies.

2. Literature review

2.1 Narrative theory and business narratives

The *narrative paradigm* or philosophy views all types of communication as culturally embedded stories told and interpreted by individuals (Fisher, 1989). Narrative formats are defined as those that follow a storyline and can be compelling (Green, 2004). In contrast, analytically formatted messages tend to set up a logical argument and elicit scrutiny from the reader (Schellens and de Jong, 2004). Through narratives, the audience is transported into the story portrayed, contributing to consumer immersion in the action (Farivar and Wang, 2022). Especially in the service industry, consumer experience is inherently narrative, including elements of time and transition in emotional and consumption states (van Laer *et al.*, 2019). Emotional narratives can foster *narrative transportation*, a phenomenon that can build consumer trust, connection, and advocacy (Anaza *et al.*, 2020). This type of connection increases persuasion and the level of emotion felt by the audience (Green and Brock, 2000; van Laer *et al.*, 2019). Aleti *et al.* (2019) find that narrative tweets, i.e., those styled in a story-like format, are more likely to be retweeted. When utilized as an advertising mechanism, narratively transported messages are perceived as more enjoyable (Seo *et al.*, 2018).

Corporations adopt a variety of narrative formats driven by their strategic marketing stance, including forming emotional connections with corporate goals to create and foster stronger human bonds with the organization and employing positive attribute framing in cause-related marketing. Using the richness of narrative communication, firms can share and influence patterns of social relationships and activities, ultimately enabling them to mold their positioning on issues (Kachen and Krishen, 2020; Laurence and Valentina, 2019). Regarding narrative persuasion in service communication, recent research indicates that characters' motivations for

engaging in service-related behavior affect consumer interest in services, with more significant effects from characters who act for intrinsic (vs. extrinsic) motivations and exhibit brand meaning (Hamby and van Laer, 2022).

Engaging narratives can provide an essential mechanism for retrospective sense-making and ensure that marketing activity is aligned with corporate branding and prioritization (Shapiro 2016). Moreover, marketing narratives from engaged employees can lead to enhanced trust in a service provider and higher levels of positive word of mouth about the service (Wang *et al.*, 2019). Such narratives can increase consumer interest in services that improve personal and societal well-being (Mattila, 2000). Corporate sustainability climate change narratives demonstrate superior performance when their nature and content reflect an awareness of its risks and opportunities and contain discussions of mitigation strategies (Elijido-Ten and Clarkson, 2019). Narratives are prevalent approaches in social media communication to activate social identity and increase influence (Farivar and Wang, 2022).

2.2 Social-cognitive elements in digital narratives

Social Cognitive Theory (SCT) explains how individuals acquire and maintain certain behavioral patterns (Bandura, 1986, 2001; Bozkurt et al., 2023; Compeau and Higgins, 1999). Unlike other behaviorist theories, SCT considers social and cognitive elements, emphasizing the reciprocal interaction among the environment, cognitive processes, and behavior. Key constructs of the theory include observational learning, self-efficacy, and reinforcement. Cognitive processes are also important in the interpretation of content on social media. Social media platforms often require users to process information rapidly. How information is framed, shared, or interacted with on social media can shape users' understanding and subsequent sharing behaviors (Kim and Kim, 2023; Samarah et al., 2022). This highlights the importance of considering cognitive processes in designing and presenting content on social media platforms

(Bozkurt et al., 2021). Understanding the role of SCT in social media has implications for practice. Marketers can create an environment that motivates users to share their knowledge and insights by incorporating features that promote observational learning, self-efficacy, and reinforcement. Promoting self-efficacy and providing positive reinforcement for responsible sharing behaviors can help users navigate the vast amount of information available on social media platforms. Social media platforms have become vital tools for firms and marketers to engage with consumers, promote their brands, and drive sales (Akdevelioglu and Kara, 2020; Samarah et al., 2022; Shen, 2021). The integration of narrative persuasion, agility, value-laden content, and other attributes in social media campaigns can influence consumer knowledge sharing and engagement significantly.

In the context of knowledge sharing and engagement, researchers explored the concept of perceived social media agility and its impact on customer purchasing behavior (Bozkurt et al., 2023; Gligor and Bozkurt, 2019). They identified that consumers are more responsive to interactive and novel brand posts, leading to stronger customer-brand relationships (Hamzah et al., 2020). Customers who perceive a brand as being agile on social media are more inclined to make purchases from that brand. Perceived social media agility in enhancing customer engagement and customer-based brand equity behavior (Bozkurt et al., 2023; Gligor and Bozkurt, 2019). For knowledge sharing and engagement to take place, three types of congruence are important — self-image, brand-image, and value — as sub-dimensions of perceived fit between a consumer, brand, and cause (Deng et al., 2020). These sub-dimensions positively influence community identification, leading to enhanced consumer citizenship behaviors.

Marketer-generated content, which strikes a balance between being utilitarian and hedonic value, as well as entertainment and promotional rewards, significantly affects consumers' intentions to engage in electronic word-of-mouth and consumption intentions (Huang

et al., 2017; Izogo and Mpinganjira, 2022; Ji et al., 2020; Vlachvei et al., 2022; Zadeh et al., 2023). When the claim in a message is abstract, using appeals that highlight benefits for others leads to more positive consumer engagement compared to appeals that emphasize self-benefits in the context of social causes and environmentally-related communications (Kim et al., 2021; Kim and Kim, 2023). Additionally, consumers are motivated to engage with green product advertising messages when the appeal is abstract, and the message is associated with benefits for others, as it enhances their self-image (Kim et al., 2021).

The media from which messages are communicated is as important as the content; more recently, traditional marketing communications approaches are augmented by interactive digital and social media platforms (Dwivedi *et al.*, 2020; Hennig-Thurau *et al.*, 2010). When implemented effectively, many digital platforms can utilize personalized messaging, targeted promotions, and timely touchpoints, ultimately increasing consumer loyalty (Peltier *et al.*, 2013). As a form of education and customer relationship marketing (CRM), social media communication allows firms to impart consumer knowledge and service information (Field *et al.*, 2021; Raab *et al.*, 2016). When appropriately utilized, social media marketing can build brand equity (Zollo *et al.*, 2020).

Li, Larimo, and Leonidou (2020) identify four ways that firms can engage in online communication: social commerce, social content, social monitoring, and social CRM. Social media communications generate awareness in online communities through sharing mechanisms, mainly when containing the dimensions of interactivity, credibility, and infotainment (Majid *et al.*, 2019; Samarah et al., 2022). When firms connect with their customers and broader stakeholders through social media, they generate higher engagement, co-create value, and foster healthier consumer-brand relationships (Dessart, 2017; Mattila, 2000). Moreover, social media

storytelling can enhance and influence social identity, consumer purchase intentions, and engagement with the brand (Farivar and Wang, 2022).

2.3 Conceptual framework

Twitter, a popular microblogging platform used worldwide, hosts communications from 96% of Fortune 500 companies (Barnes *et al.*, 2020) and engages 145 million active daily users (Lin, 2019). Tweeting is an effective firm-based marketing tool that can increase content viewing, generate retweets, target influencers to boost awareness, and facilitate social diffusion (Gong *et al.*, 2017). Brand-generated tweets must provide intimate knowledge and be perceived as popular to drive consumer engagement, retweeting, and co-promotion (Read *et al.*, 2019). However, long-term relationships with social media followers require acting beyond tweets. Firms are also expected to fulfill the statements and promises made to their customers and broader stakeholder community by providing trustworthy and accurate information and executing timely delivery (Ball, Coelho, and Machás, 2004; Skarmeas *et al.*, 2020).

Online and computer-mediated knowledge sharing, including its methods and mechanisms, is a primary topic for climate change researchers and practitioners, especially in the services sector (Field *et al.*, 2021; Kim et al., 2021; Kim and Kim, 2023). The current analysis aims to gain insights into the online social media-based climate change narratives of sustainable global service-related businesses. Many organizations convey their narratives in online formats as a form of knowledge sharing (Chen & Hung, 2010). Knowledge sharing, especially in virtual platforms, also increases social interactions within and outside of firms, strengthening relationships and increasing innovation capability (Nguyen, Ngo, & Paramita, 2022).By conveying their knowledge through social media platforms, both individuals within firms and firms themselves are able to increase their communication visibility (Leonardi, 2014). As

communication visibility increases, platforms such as Twitter allow consumers to participate on multiple levels both by approving of messages (i.e. "liking them") and by amplifying them (i.e. retweets) (Neu et al., 2020). When organizations share corporate social responsibility-based knowledge on social media, specifically Twitter, Neu and Saxton (2023) argue that they become socially accountable to consumers. Thus, firm-based narratives discussing climate change, especially those that highlight a strategic stance, must be carefully executed. Our theory-driven inquiry addresses the following research questions:

RQ1: Through the lens of narrative theory, what social cognition and knowledge-sharing concepts and themes do highly sustainable service corporations commonly discuss when communicating about climate change on social media?

RQ2: How do highly sustainable service corporations use their social media marketing narratives to promote climate change knowledge sharing and engagement?

RQ3: What types of climate narratives generate the highest levels of public knowledge sharing and engagement, and how do they differ depending on a corporation's business strategy and model?

This study employs an interdisciplinary, phased, qualitative, and semi-quantitative analysis methodology based on Twitter posts to explore the components of climate change social media narratives from various corporations. First, we gathered a team of researchers whose experience and expertise span various fields, including political science, engineering, water resources management, public affairs, communication studies, strategic management, and marketing. As noted by extant research, global and systemic problems such as climate change and sustainability, food waste mitigation, and wildlife conservation benefit from interdisciplinary and cross-disciplinary collaborations (Lindgreen *et al.*, 2020). Next, we constructed a dataset of tweets from the most sustainable corporations in 2020 and classified them in terms of their

business models (goods, services, mixed), followed by a focus on the business strategies of services-based corporations (B2B and mixed).

Figure 1 depicts our two-phase conceptual framework. In our sample, services-oriented corporations operate under the B2B or mixed business strategy; none of the corporations in our services sample utilize a B2C strategy only. We expect a firm's business strategy and model to impact its narrative design, warranting separate analysis. We interrogate the linguistic style of the tweets within each category to pinpoint how corporations craft their social media narratives on climate change and sustainability. Finally, we identify the level of public engagement (i.e., retweets) each category receives to deduce which categories receive the highest public engagement. We apply these results to identify actionable steps or best practices in designing social media narratives that garner the highest narrative transport.

[Figure 1 here]

3. Methodology and results

3.1 Sample and data collection

We utilized a sample of companies from the Corporate Knights list of the Global 100 Most Sustainable Corporations in the world for 2020 (Elijido-Ten and Clarkson, 2019; Pal and Jenkins, 2014). Since 2005, this Toronto-based media and investment research company has evaluated the most sustainable corporations based on their capability to manage environmental, social, and governance risks and opportunities. The Global 100 is announced annually at the World Economic Forum in Davos, Switzerland (Corporate Knights, 2020).

To analyze online services-related social media narratives regarding climate change, we downloaded tweets from these companies' corporate English language accounts, which are predominantly managed by marketing and digital teams (e.g., Yuksel and Labrecque, 2016). The tweets related to climate change, the environment, sustainability, and global warming.

Companies were included if they have a corporate/main brand account in English and if any tweets relate to the keywords: climate change, environment, sustainability, or global warming. The list of companies included in the analysis and other pertinent information regarding each corporation are provided in Web Appendix A. We downloaded 11,583 Twitter messages posted on the social media platform between 2019 and 2020. After removing duplicates, 10,342 tweets were left for analysis.

3.2 Phase 1: Exploratory thematic analysis

To ensure the tweet sample centers on climate change and sustainability concepts, we performed a conceptual mapping analysis of the 10,342 Twitter messages using Leximancer (Smith, 2007). We coded the tweets into three major groups based on their corporation's business model: services (4366 tweets), goods (1489 tweets), and mixed model (5728 tweets). Leximancer is a semantic analysis tool designed to further understand themes and concepts as a series of associations and links (Kachen and Krishen, 2020; Petrescu *et al.*, 2019). This data-driven, unsupervised analysis uses deep learning to extract a transparent three-level network model of meaning from the data (Smith and Humphreys, 2006).

The key themes in the 10,342 tweets are reflected as large, shaded circles representing higher-order clusters of semantically connected groups of concepts. Overlapping circles indicate semantically related themes in the tweets. Concepts are represented as smaller shaded circles or nodes (inside of larger shaded bubbles), and their size represents the prominence of the concepts relative to other concepts. The lines connecting the concepts or links indicate the semantic proximity of the concepts as they were mentioned inside the tweets.

[Figure 2 here]

The themes listed in order of most to least prominent are **sustainability**, **climate**, **climate change**, **companies**, **renewable**, **energy**, **action**, **water**, and **forward,** as shown in Figure 2,

each distributed as a function of the business model of the company. Table 1 also reflects the essential themes and keywords that compose them, and their presence and connectivity levels within the three main groups analyzed.

[Table 1 here]

The prominence scores for the key concepts are included in Table 2 and represent absolute measures of correlation between concept categories and attributes. Prominence is defined as the joint probability divided by (the product of the marginal probabilities). A score of > 1.0 for prominence indicates that the co-occurrence happens more often than chance (i.e., the items are not independent), reflecting a purposeful relationship (Smith, 2007). The original search terms included sustainability, climate change, global, and environment, so leaving these aside, the most prominent concepts in the dataset were *energy* (*n*=941), *action* (*n*=842), *companies* (n=1852), *water* (237), and *forward* (n=103). These thematic results indicate that the sample of tweets is centered around climate change and sustainability messaging, thus verifying that we have identified a suitable dataset for the second analysis phase.

[Table 2 here]

This analysis seeks to identify the similarities and differences in themes among the three main groups of corporations under analysis: services, goods, and mixed. The service-oriented organizations present narratives that are more focused on topics with a long-term orientation, including on a sustainable future, renewable energy sources such as wind, and water conservation. These narratives are also more objective and contain a higher negative tonality, calling upon their audience to get involved and act. On the other hand, goods-related businesses are more oriented towards short-term aspects of climate change, immediate, “today” solutions and activities related to design and sustainability, and business commitment to action. Finally, businesses with mixed orientations appear to contain short- and long-term narratives,

emphasizing climate change actions and corporate social responsibility, including carbon credits, corporate emissions, and practical suggestions. Next, we conduct an additional linguistic analysis of these tweets to understand further the intersection of business strategy and business model sustainability narratives and their level of effectiveness for consumer engagement.

3.3 Phase 2: Business model & strategy analysis

In phase 2 of our analysis, we used the tweets coded into the three major groups based on their corporation's business model: services (4366 tweets), goods (1489 tweets), and mixed model (5728 tweets). Following the classification process, we focused on the sentiment-based linguistic elements that characterize our tweets in each group and the level of public engagement (i.e., retweets) each group of tweets receives (e.g., Rambocas and Pacheco, 2018). We use the automated text analysis software, Linguistic Inquiry Word Count (LIWC, 2015), to identify whether tweet messages differ within these classifications in terms of analytics, clout, tone, word count, words per sentence, and six-letter words.

LIWC analysis is based on predefined dictionaries, existing psychometrically tested scales, and algorithms from the Pennebaker Lab (Alzate *et al.*, 2022; Humphreys and Wang, 2018; Pennebaker *et al.*, 2015). There are over 90 indices included in the output, including three summary language variables: analytical thinking index, clout index, and tone index (Newman *et al.*, 2003; Pennebaker *et al.*, 2014). The LIWC analytical thinking index analyzes formal, logical, and hierarchical thinking patterns in text based on function and grammar words and reflects the narrative/analytical style of the tweets (Aleti *et al.*, 2019; Alzate *et al.*, 2022; Pennebaker *et al.*, 2014; Plotkina *et al.*, 2020). Analytical thinking measures the formal, logical, and hierarchical thinking in the text. Higher scores suggest more analytical, logical content, while a lower score in this category indicates that messages are more narrative and informal (Pennebaker *et al.*, 2001).

Clout reflects a higher score for externally focused messages with a high social score and interest; this variable is chosen to analyze the internal vs. external focus of the Twitter messages. Higher scores indicate more authority and assertiveness in the text, whereas lower scores hint at tentativeness or insecurity. Tone captures the overall positivity expressed in the emotional style of the message, based on positive/negative words and associated emotions. The tone index is used to analyze the emotion level of the tweet messages. The validity of the LIWC summary variables has been tested in multiple contexts, including in traditional corporate communications, academic language, and social media (Aleti *et al.*, 2019; Alzate *et al.*, 2022; Pennebaker *et al.*, 2014, 2001; Tausczik and Pennebaker, 2010).

LIWC also analyzes three general descriptor categories – words per sentence, percent of target words captured by the dictionary, and percent of words in the text that are longer than six letters. Words per sentence measure the average sentence length. This can provide insights into the complexity and information density of the content. Longer sentences might indicate complex thoughts or ideas, while shorter ones imply simplicity or directness. Percent of target words captured by the dictionary indicates the percentage of words in the text that the software could match to its internal dictionary. A high percentage means LIWC could analyze most of the text, while a low percentage might suggest the text contains many uncommon or specialized words not in the LIWC dictionary. LIWC's real strength lies in comparing texts. For instance, comparing the LIWC scores of positive messages to negative ones can reveal linguistic patterns that distinguish them.

Many of these variables have been used in marketing and business studies and are also included in our study as covariates (Leek, Houghton, and Canning, 2019). Next, a multivariate analysis of variance (MANOVA) was conducted to perform comparison tests for the three

business model groupings (i.e., services, goods, mixed) for the following variables: retweets (public engagement), analytical thinking index, clout index, tone index, word count, number of words per sentence, and the percentage of words longer than six letters. The between-group differences were tested using Fisher's least significant difference (LSD) test, an appropriate method for comparing the variable mean differences between three groups (Williams and Abdi, 2010).

The results of the MANOVA show significant differences in Twitter communication as a function of the organization's business model (services vs. goods vs. mixed), for all included variables based on F-values and partial eta squared (see Table 3). Table 4 shows the results of the LSD multiple comparison analysis for the business model groupings.

[Table 3 here]

The number of retweets differs as a function of the type of business model, showing a greater public engagement with brands selling goods and those with a combination of goods and services. Results from corporations focused on goods indicate that their tweet narratives are analytical and not significantly emotional. Corporations with mixed business models have the highest public engagement, with fewer analytical tweets, have higher clout, and are generally the most positive. Corporations providing services experience the lowest public engagement and emphasize a greater complexity in language, as shown by their usage of longer words.

[Table 4 here]

Next, to better explore the category of tweets coming from sustainable services corporations, we analyzed the business strategy tweet groupings (i.e., B2B, B2C, and mixed). The MANOVA results for the dataset of B2B (1428 tweets) and mixed-orientation (2938 tweets) strategies are provided in Table 5. Findings indicate that there are significant differences in Twitter communication as a function of the organization's business strategy based on F-values

and partial eta squared (Table 5). The results show that tweets from B2B service organizations have a more positive tone and tend to be lengthier, while the other categories of organizations with a mixed profile focus more on narrative complexity and semantic comprehension, with longer words and sentences. Both categories of service organizations have similar levels of consumer engagement, even though engagement is marginally higher for B2B service companies.

[Table 5 here]

4. Findings and discussion

This study had three main objectives: identify and analyze the social cognition concepts and themes that sustainable service corporations commonly discuss when communicating climate change on social media, using narrative theory as a framework, examine the strategies these corporations use in crafting their social media marketing narratives to promote climate change awareness and evaluate which types of climate narratives generate the most knowledge sharing and interaction, and how engagement levels vary based on a corporation's business strategy and model.

For the first research question regarding studying the social cognition and knowledge sharing concepts and themes of highly sustainable service corporations from the perspective of narrative theory, our results show that they collectively seek to create impact while emphasizing their role in discussing climate change. In doing so, these firms explicitly remind viewers of their shared goal and vision of overcoming climate change and increasing sustainability through social media narratives. Our findings show that service companies seek to instigate activity and movement in their audience by talking about long-term actions, renewable energies, and various ways the audience can get involved in fighting alongside corporations against climate change. These findings confirm previous research in service narratives discussing their potential to

increase interest and emotional response for the betterment of society (Hamby and van Laer, 2022). Given this finding, we could further interrogate the data to identify how corporations with differing business strategies and models design their social media narratives and whether these designs garner increased public engagement.

In our second analysis phase, the tweets were analyzed in terms of different business models (services, goods, mixed) and, for services-oriented corporations, business strategies (B2B and Mixed). In line with Swani, Brown, and Milne (2014), our results show that while certain styles may work for all corporations, there are expectations for different narratives based on the target market. Regarding our second research question, we studied tweets from service-related firms on how highly sustainable service corporations use their social media marketing narratives to promote climate change awareness. Findings showed that tweets from corporations providing both services and goods (mixed) garnered the highest public engagement, and tweets from corporations providing primarily services had significantly lower public engagement than both mixed- and goods-based corporations. Although other variations were identified, tweets from mixed corporations were significantly more positive than goods- and services-based tweets. Our findings support and clarify previous studies emphasizing the narrative elements of time and state transition in the consumer service experience (van Laer *et al.*, 2019).

Our third research question focused on what types of climate narratives generate the highest public engagement and how they differ depending on a corporation's business strategy and model. The findings emphasize the power of sustainable service narratives with greater emotional tone, social orientation, action orientation, and long-term focus for generating audience recognition and engagement. In a B2B-services context, semantic aspects such as language complexity and sentence length also generate differences in engagement.

The study presents modern theoretical insights into how service organizations communicate sustainability via social media narratives. Integrating narrative and knowledge-sharing theories offers a holistic view of sustainable corporate discourse. The research innovatively differentiates between business models, revealing that the narrative's structure and sentiment are influenced by the nature of the business (service-based, goods-based, or mixed). A deeper sentiment analysis unveils distinctions in tone based on business type, emphasizing the need for tailored communication approaches. The study also introduces two central categories in effective messaging: narrative characteristics and technical semantic elements. Additionally, the research sheds light on the nuances of B2B service narratives, highlighting how language complexity can impact engagement. Ultimately, the study provides a novel conceptual framework that amalgamates these findings, offering a valuable tool for future academic and practical applications in sustainability communication.

5. Conclusion and contribution

To analyze the components of climate change social media narratives in service-based corporations, we used an interdisciplinary, phased, qualitative, and semi-quantitative analysis methodology based on Twitter posts from some of the most sustainable corporations in the world. This study used narratives and knowledge-sharing theories to perform a qualitative interpretive content analysis of social media narratives. We provide additional information on the role of service in promoting sustainability and reducing climate change (Field *et al.*, 2021; Huang *et al.*, 2021). Also, clarifications regarding the new media and stakeholder interactions in different types of sustainable organizations, including B2B, provide additional theoretical information.

Our phase 1 semantic analysis shows that the three types of corporations stress different themes in their tweets. Services firms emphasize wind, water, and climate as critical themes, and their social media contains resources-based narratives. Mixed corporations appear to focus on taking timely action. Lastly, goods-based firms highlight business innovation and design. Delving into sentiment analysis, our second phase analysis showed that mixed and goods-based corporations have significantly higher levels of retweets than services-based ones (Tables 3 and 4). Tweets that appear to create the highest customer engagement are characterized as having high levels of analytic language, high clout, a positive tone, a high number of words, and a high number of words per sentence. Having complex language in terms of six-letter words does not seem to be associated with customer engagement. Our last level of analysis shows that B2B types perform better in terms of retweets within services-based corporations since they have a positive tone (M=59.08) and a higher word count (M=30.67; see Table 5). However, both types of service organizations (B2B and mixed) have low levels of customer engagement.

As summarized in Figure 1, our emergent findings identified two key categories of elements essential in communications from service organizations on sustainability and social responsibility, namely narrative characteristics, and technically oriented, semantic elements of social media language. Our findings complement previous literature in services and build on the narratives and knowledge-sharing theories by incorporating narrative elements related to the level of informative/narrative content in social media discourse, the degree of identification with the audience and stakeholders, and the emotionality of the messages (Green and Brock, 2000; van Laer *et al.*, 2019). Additionally, semantic elements related to the complexity of language, and the length and formality of the message, also interplay to complete the conceptual framework of service narratives and to differentiate among different types of sustainable corporations and service organizations.

5.1 Theoretical implications

Using the conceptual framework in Figure 1, our findings emphasize narrative elements' positive impact and commonality in sustainable service discourse through social media messaging. As a function of the type of service organization and the business goals, the key narrative and semantic elements can be situationally adapted to generate more engagement, short and long-term stakeholder involvement, and customer recognition and demand for sustainable service. We can also expect these impactful messages to lead service providers to implement real-world climate change measures (Jones, Waites, and Stevens, 2022).

Drawing from the Social Cognitive Theory (SCT), our study on sustainable service organizations' social media narratives offers profound insights into the reciprocal interplay of environment, cognitive processes, and behavior within the digital realm. The findings underscore several theoretical implications related to the following six essential SCT components in the context of digital business narratives:

- Observational learning in digital narratives;
- Self-efficacy and information processing;
- Reinforcement and engagement;
- Cognitive processes in the social media context;
- Perceived social media agility;
- Congruence in digital narratives.

SCT posits that individuals learn by observing others; our findings echo this construct. The high engagement with tweets characterized by analytic language and societal relevance suggests that users on social media are keenly observing and learning from well-structured, insightful content. This reaffirms the importance of crafting narratives that serve as learning templates for audiences, fostering a culture of sustainable thinking and behavior.

The prominence of tweets with a positive tone and clear, concise content underscores the role of self-efficacy in digital engagement. When users encounter uplifting and easy-to-digest content, it boosts their confidence in understanding and sharing the information. This aligns with SCT's emphasis on self-efficacy, suggesting that content creators should prioritize messages that empower users, enabling them to process and disseminate information swiftly.

The fact that B2B service-based corporations with positive tones and a higher word count receive more retweets highlights the reinforcement construct of SCT. These retweets act as positive reinforcements, encouraging organizations to maintain a particular narrative style. Marketers and content creators should know these reinforcing elements to optimize their messaging strategies.

The rapid pace of information dissemination on platforms like Twitter necessitates quick information processing. Our findings, combined with prior research (Kim and Kim, 2023; Samarah et al., 2022), accentuate the role of cognitive processes in shaping user engagement and behavior on social media. This underscores the significance of framing information in a manner conducive to rapid cognition and comprehension.

The responsiveness observed in the study, especially towards interactive and novel brand posts, resonates with the findings of Bozkurt et al. (2023) and Gligor and Bozkurt (2019). The agility with which brands communicate on social media can influence the strength of customer-brand relationships, reinforcing the importance of perceived social media agility in determining consumer behaviors.

The study indirectly touches upon the importance of congruence between self-image, brand image, and values. Sustainable narratives that align with consumers' self-perceptions and values are more likely to foster community identification and engagement, as highlighted by Deng et al. (2020).

5.2 Managerial implications

The key implication of our research is that corporations must strategically design social media narratives about climate change as part of their online branding and communications process. As society moves closer to the UN SDG 2030 targets, there will inevitably be more visibility and activity on social media around multiple topics, including climate change. Online activity can create peer pressure for organizations to adopt and normalize a commitment to provide sustainable services and mitigate climate change. The benefits of brand recognition will be afforded to leading companies in multiple fields that take on the role of champions for change. Given our findings, we recommend that corporate social media marketing teams consider the following best practices for developing effective, sustainable service narratives on social media:

- Incorporate timing and action within their tweets using language that stresses the need to do very specific actions within specified periods.
- Focus on providing facts-based, formal, logical, and rational information and avoid using misinformation, empty promises, and hype-based information.
- Contain socially and societally relevant information that has implications beyond the personal or individual context.
- Highlight positivity as an emotional style to create a solution-oriented approach for sustainability initiatives.

Provide the highest possible amount of information targeted towards honesty, rationality, positivity, and simplicity (i.e., avoiding complex jargon).

5.3 Limitations and future research

Our research has limitations that foreshadow potential opportunities in future studies. First, our study interrogates sustainable service corporations' narrative tweets on social media

regarding climate change. Thus, our analysis is limited to specific corporations and certain climate change keywords. Even though the data collection process was reasonably random, we believe that there are likely other types of social media narratives regarding climate change to analyze. As such, we recommend that future research explore publicly available digital and social media content such as online and community posts, blogs, corporate websites, and corporate strategy documents to examine emergent themes climate change dates can provide organizations opportunities further.

Future studies should examine how companies alter their tweeting activities in line with critical milestones through a longitudinal study. For example, UN-specific dates around climate change can provide opportunities for organizations to align their social media messages and benefit from increased online activity. Monitoring the activity over an extended period would demonstrate whether tweeting is a planned and deliberate effort to build campaigns or rather an opportunistic reaction to spikes in interest.

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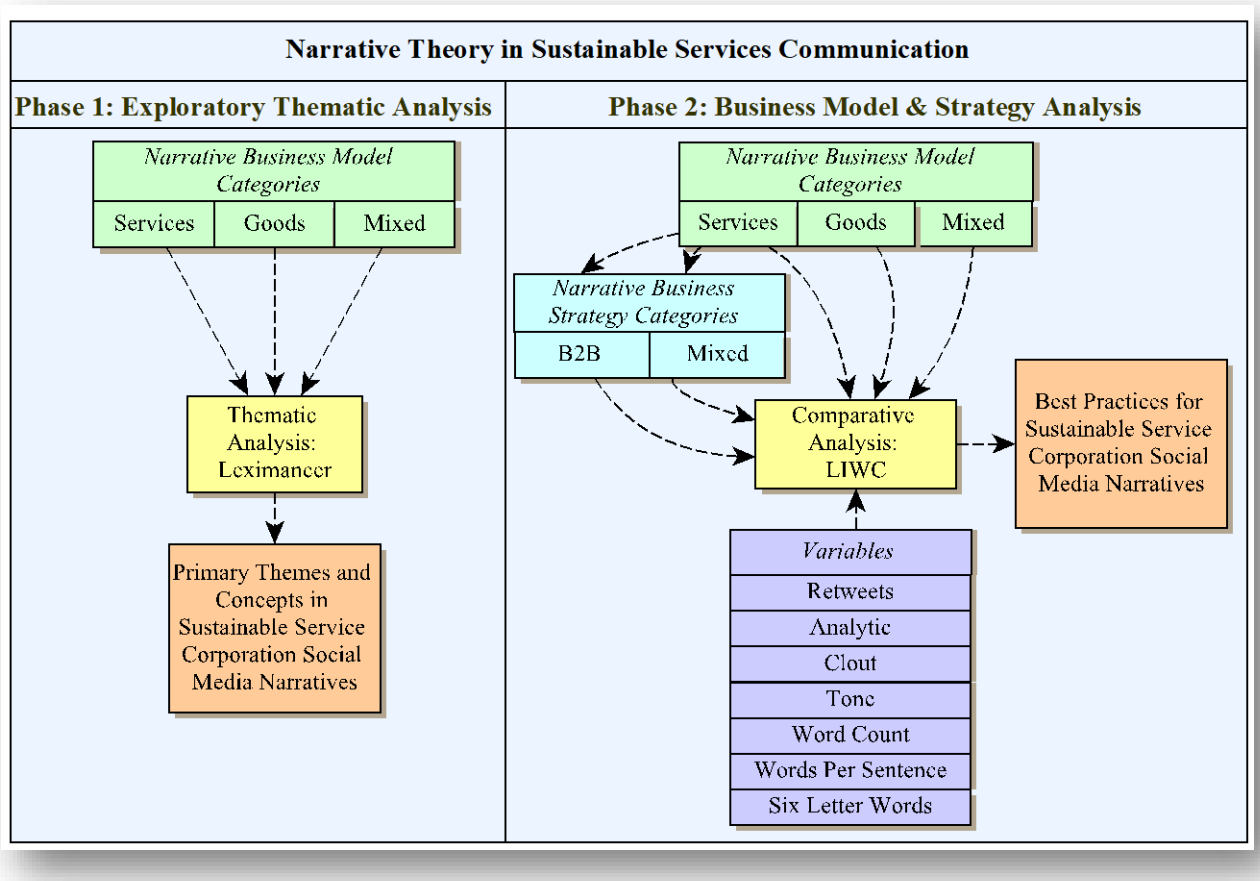

Figure 1: Conceptual Framework

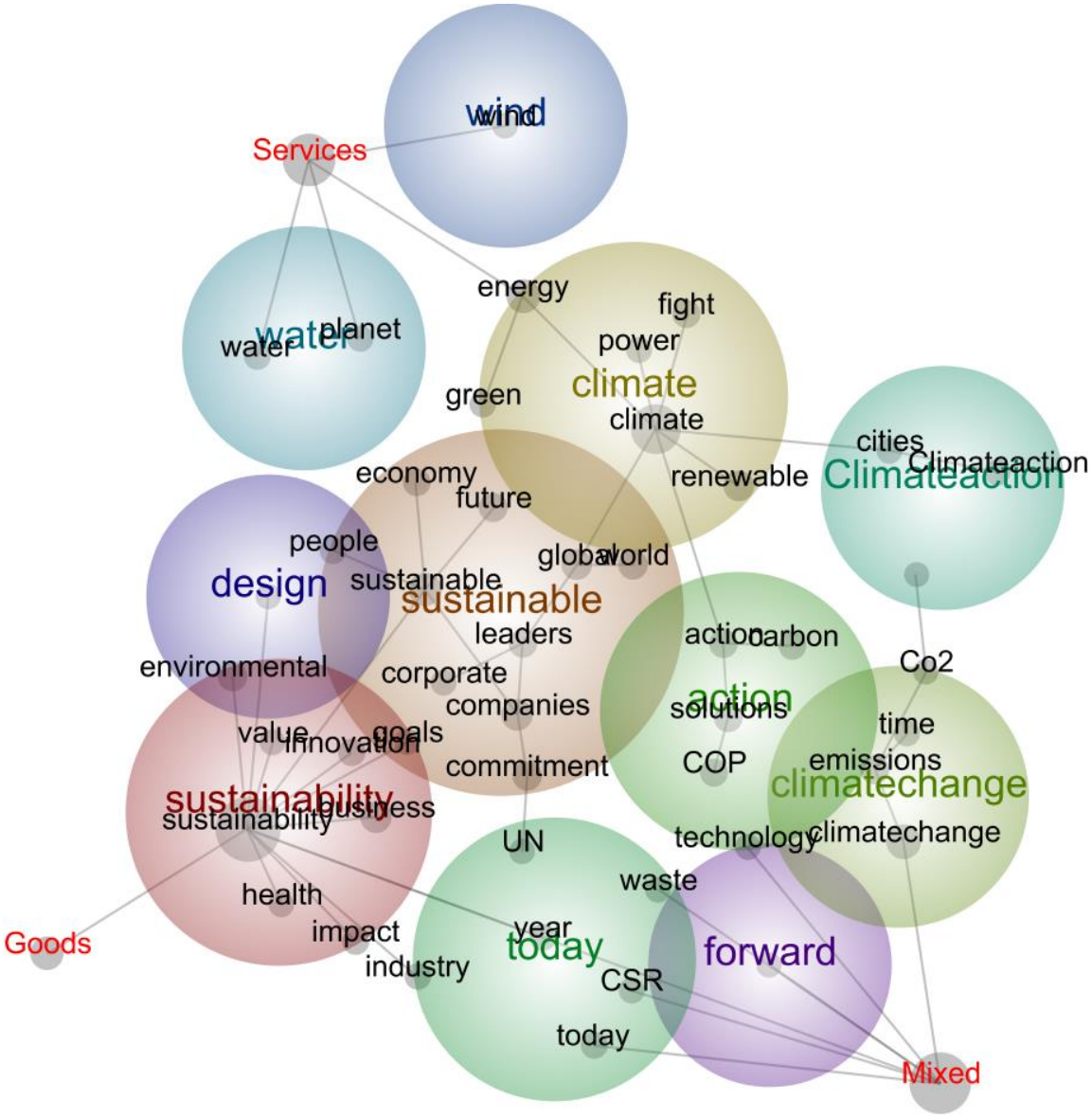

Figure 2. Phase 1 themes and concepts

Table xx: Summaries of relevant research about narratives and narrative theory

Citation	Journal	Summary
Diaz Ruiz & Nilsson (2023)	*Journal of Public Policy & Marketing*	Based on rhetorical and consumer identity theories, the paper identifies a funnel through which disinformation is intentionally seeded and disseminated into social media. These narratives are then moved through the echo chamber by obfuscation, controversy, argumentation, and consumer identity work.
Cartwright et al. (2022)	*Industrial Marketing Management*	Influencer marketing in the B2B (business-to-business) sector is often positioned as trustworthy and professional, and called "influential marketing." Through the framework of organizational endorsement theories, the authors analyzed the narratives of marketing professionals to understand how influencer marketing travels through social media in B2B industry-specific business networks.
Chen et al. (2023)	*Journal of Consumer Psychology*	The authors present a study of nostalgia-based narratives on various platforms of social media, including customer reviews and customer-to-customer word of mouth. Utilizing experimental methodology, the authors then differentiate nostalgia from other related emotions to create a nostalgia dictionary.
Dastidar et al. (2023)	*Journal of Marketing*	The paper identifies brand-related advertisements during the COVID-19 pandemic to understand their spillover effects on social distancing. Their findings reveal that brand advertising relates positively to social distancing behavior, thus firms can propagate socially responsible messages through their campaign narratives.
Eagar & Dann (2016)	*European Journal of Marketing*	Proposes a classification system for selfie meta-narratives related to human brands, including autobiography, parody, propaganda, romance, self-help, travel diary, and coffee table book. The authors study both the images and their accompanying text from a narrative perspective to uncover the storytelling aspect of social media interactions.

Table xx: Summaries of relevant research about climate change

Citation	Journal	Summary
Ballestar et al. (2022)	*Psychology & Marketing*	The authors present a study of over 20,000 twitter posts of two prominent social media influencers in the climate change action context. Using different but effective communication strategies, artificial intelligence-related natural language processing identifies the marketing mechanisms by which these messages influence different social media networks.
Jena et al. (2022)	*Industrial Marketing Management*	The authors analyzed two years of social media word-of mouth messaging regarding electric vehicles (EV) using deep learning techniques. Their focus on EV as a case study is based on climate change and air pollution as profound global threats to humankind.
Parvatiyar & Sheth (2023)	*Journal of Consumer Affairs*	The paper discusses the lack of sustainability of a consumer culture that promotes overconsumption, consumerism, and materialism at the cost of societal well-being. The authors argue that whereas governments can drive messages of sustainability and argue that climate change is a critical issue, ultimately consumers must shift to alternative lifestyles wherein they prioritize mindful consumption.
Wallace & Buil (2023)	*Journal of Business Research*	In the context of pro-environmental behaviors, the authors discuss virtual self-identity derived from social media posts about climate change. The paper introduces conspicuous green behavior as an overarching phenomenon identified from Instagram consumer-to-consumer interactions.

Table 1: Thematic results

theme	hits	connectivity	concepts
sustainability	4590	16742	sustainability, sustainable, solutions, innovation
climate	2515	10663	climate, global, fight
climate change	1450	9204	climate change, emissions, carbon
companies	1852	9064	companies, business, world, commitment, leaders
renewable	1246	5008	renewable, environmental, future
energy	941	4708	energy, economy
action	842	4654	action, COP, impact
water	237	1264	water
forward	103	340	forward

Table 2: Concept prominence

	concept	1	2	3	4	5	6	7	8	9	10	11
1	**Mixed**	-										
2	**Services**	0										
3	**Goods**	0	0									
4	**sustainability**	1.05	0.92	1.05								
5	**climate**	0.95	1.08	0.96	0.90							
6	**climatechange**	1.21	0.76	0.94	0.82	0.90						
7	**energy**	0.70	1.63	0.19	1.27	1.61	1.29					
8	**companies**	1.01	0.82	1.54	1.43	1.64	1.16	1.48				
9	**renewable**	1.22	0.95	0.28	1.39	1.40	2.08	5.07	1.80			
10	**action**	1.13	0.65	1.57	0.79	3.81	1.81	0.49	1.61	0.36		
11	**water**	0.60	1.42	1.23	1.29	2.07	0.81	2.68	1.26	0.61	1.19	
12	**forward**	1.46	0.55	0.63	1.57	1.45	0.74	0.95	0.41	1.41	0.68	0.96

Table 3: MANOVA analysis business model

	Goods (N=1489)		Services (N=4366)		Mixed (N=5728)		F	p	ηp²
	M	SD	M	SD	M	SD			
Retweets	6.62	16.19	4.49	22.99	**6.65**	31.81	8.581	**0.001***	0.001
Analytic	**91.22**	12.68	89.04	14.93	89.40	14.96	12.583	**0.001***	0.002
Clout	76.82	18.29	76.05	18.31	**77.27**	17.86	5.617	**0.004***	0.001
Tone	53.02	34.17	52.51	35.46	**56.25**	34.64	15.637	**0.001***	0.003
Word count	28.65	11.36	28.75	11.34	**29.36**	12.02	4.355	**0.013***	0.001
Words per sentence	**18.75**	8.39	17.87	9.08	17.81	8.83	6.859	**0.001***	0.001
Six letter words	31.77	10.17	**32.63**	9.47	31.36	9.58	21.654	**0.001***	0.004

Table 4. Multiple comparison analysis

	A	B	Mean Difference (A-B)	Std. Error	Sig.
Retweets	Goods	Mixed	-0.033	0.788	0.966
		Services	**2.12***	**0.813**	**0.009**
	Mixed	Goods	0.033	0.788	0.966
		Services	**2.16***	**0.544**	**0.000**
	Services	Goods	**-2.12***	**0.813**	**0.009**
		Mixed	**-2.16***	**0.544**	**0.000**
Analytic	Goods	Mixed	**1.822***	**0.427**	**0.001**
		Services	**2.188***	**0.440**	**0.001**
	Mixed	Goods	**-1.822***	**0.427**	**0.001**
		Services	*0.367*	*0.295*	*0.214*
	Services	Goods	**-2.188***	**0.440**	**0.001**
		Mixed	*-0.367*	*0.295*	*0.214*
Clout	Goods	Mixed	*-0.456*	*0.526*	*0.386*
		Services	*0.760*	*0.543*	*0.161*
	Mixed	Goods	*0.456*	*0.526*	*0.386*
		Services	**1.217***	**0.363**	**0.001**
	Services	Goods	*-0.760*	*0.543*	*0.161*
		Mixed	**-1.217***	**0.363**	**0.001**
Tone	Goods	Mixed	**-3.229***	**1.015**	**0.001**
		Services	*0.515*	*1.047*	*0.623*
	Mixed	Goods	**3.229***	**1.015**	**0.001**
		Services	**3.744***	**0.701**	**0.001**
	Services	Goods	*-0.515*	*1.047*	*0.623*
		Mixed	**-3.744***	**0.701**	**0.001**

* The mean difference is significant at the .05 level.

Table 5: MANOVA analysis business strategy

	B2B (N=1428)		Mixed (N=2938)		F	p	ηp^2
	M	SD	M	SD			
Retweets	5.07	12.96	4.21	26.53	1.345	0.246	0.001
Analytic	89.62	13.69	88.75	15.49	3.307	0.069	0.001
Clout	76.53	18.71	75.82	18.11	1.443	0.230	0.001
Tone	**59.08**	34.84	49.31	35.33	74.151	**0.001**	0.017
Word count	**30.67**	11.55	27.82	11.12	61.835	**0.001**	0.014
Words/ sentence	16.03	7.96	**18.76**	9.45	89.118	**0.001**	0.020
6-letter words	31.56	9.12	**33.15**	9.59	27.150	**0.001**	0.006