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The performance of green communication across social media: Evidence from large-scale retail industry in Italy

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Abstract

Social media have surged prominently as communication channels for corporate social responsibility. However, little is still known about the performance of *green* versus *non-green* communication across different social media. We contribute by examining whether the presence of green features in social media communication exerts a beneficial effect on consumer response in terms of likes, comments, and shares. We also investigate how this effect hinges upon the social media platform where the content is posted as well as the richness of the format (text, photos, videos) utilized for the diffusion. To our scopes, we use an ad hoc dataset of posts of two major large-scale retailers in Italy across three major social media, namely Facebook, Instagram, and Twitter. Our results show that, while green content generally stimulates larger response than non-green content, its effect varies across social media, with the highest effect being observed on Instagram (at least for likes) and the lowest on Twitter (at least for comments). Moreover, the extent to which the positive effect of green content increases as media richness increases (i.e., moving from only text to text plus photo, and then to text plus video) is also contingent upon the social media platform. On Facebook, the moderation of media richness is positive and significant, while being insignificant on Instagram. On Twitter, the moderation is even nonmonotonic in the sense that the highest (positive) effect of green content tends to be obtained for either low or high media richness. Our findings offer remarkable implications for firms engaging in environmental sustainability.

KEYWORDS
corporate environmental management, corporate social responsibility, environmental sustainability, green marketing, social media, sustainable development

1 | INTRODUCTION

In recent decades, the awareness about the need for environmental protection and sustainable economic development has dramatically grown in international public opinion. Policy makers and governments around the world have committed to finding new solutions to achieve sustainable development goals. At the same time, an increasing number of citizens and firms have become sensitive to sustainability issues and started understanding the active role they can play in mitigating environmental degradation problems. In response to such increasing salience of sustainability issues, a growing number of firms have already chosen to pursue sustainability objectives through

increased investments (Dangelico, 2016; Demirel et al., 2019). With the aim of developing new solutions to this complex set of problems and promoting sustainable development, sustainable production and consumption approaches have been conceived (Steurer et al., 2005; Vivek & Shubham, 2017).

In this scenario, several strategies have been also developed to raise consumer awareness of sustainable consumption behaviors, such as *green marketing* strategies. Many definitions of green marketing have been provided and the concept has evolved to become more structured. Nowadays, green marketing refers to the determinants that incentivize consumers to sustainable consumption behaviors and, thus design more assertive and effective communication strategies, as well as develop products and services with high environmental quality and, at the same time, able to satisfy customers' expectations (Dangelico & Vocalelli, 2017). Contemporary discussions on green marketing address the concept in relation to competitive advantage, discussing green marketing's ability to increase consumers' perceived benefits, improve product marketability, and yield better company performance (Dangelico & Pontrandolfo, 2015; Ottman et al., 2006; Walker & Wan, 2012). In this respect, an effective corporate social responsibility (CSR) strategy, and in particular a corporate green communication one, are crucial in building stakeholder trust and reputation, providing insights into the (green) values underlying an organization's culture (Banerjee, 2002; Bellucci et al., 2019; Bellucci & Manetti, 2018; Brown & Starkey, 1994; Giacomini et al., 2022).

Social media have surged prominently as communication channels for CSR, playing an important role in fostering the dialog between firms and stakeholders, creating a two-way interactive communication environment where companies simultaneously interact with customers, investors, and activists (Kaplan & Haenlein, 2010). There is a growing trend of firms using social media to communicate their green initiatives and/or to promote sustainable consumption, referred to as *green communication*, hereafter (Giacomini et al., 2020; Giacomini, Martini, et al., 2021; Reilly & Hynan, 2014; Rocca et al., 2021). In social media firms can convey content about green products/services or green corporate-level initiatives, leveraging on strategies that differ from those used for non-green communication, that is, communication exhibiting no green features (Groening et al., 2018).

Several studies have examined the implications of adopting green communication through social media regarding both the effectiveness of corporate communication strategy and user engagement into environmental sustainability (Bellucci & Manetti, 2017, 2018; Castelló et al., 2013, 2016; Dunn & Harness, 2018; Korschun & Du, 2013; Perks et al., 2017; Reilly & Hynan, 2014). However, quite surprisingly, scant attention has been devoted to understanding the performance of *green* versus *non-green* communication across different social media. That is, it is still unclear whether and under which conditions green communication may be more effective than non-green communication in terms of consumers' response across different social media. In this paper, we aim to fill this gap by comparing green versus non-green communication across social media and unraveling critical factors that can influence the efficacy of green (vs. non-green) content in stimulating response from social media users. Specifically, we examine the role of two factors that may prominently influence the performance implications of green communication, namely the type of social media and the degree of media richness. This is because, by reflecting differences in community- and functionalities-related aspects, the type of social media (e.g., Facebook, Instagram, Twitter) may naturally influence how different types of content (e.g., green vs. non-green) will be received by consumers across different platforms (Roma & Aloini, 2019; Smith et al., 2012). The degree of media richness refers to the ability of a communication format to deliver the intended information (Daft & Lengel, 1986; Dennis & Kinney, 1998; Osei-Frimpong & McLean, 2018; Reilly & Hynan, 2014) and can be captured by the type of content format (e.g., text, images, videos) through which the communication occurs. Since the degree of media richness has been shown to play a crucial role in the performance of brand-related communication, especially in social media (e.g., Roma & Aloini, 2019), it may also exert an influence in the green versus non-green content comparison. In a nutshell, our paper aims to answer the following research questions (RQs):

> RQ1. Can green communication be more effective than non-green communication in terms of consumers' response in social media?
>
> RQ2. Does any possible difference in consumers' response between green and non-green communication hinge upon the type of social media platform and the degree of media richness?

Answering the above questions is clearly pivotal as it advances the current understanding on the role of social media platforms in sustainable communication (e.g., Dunn & Harness, 2018; Korschun & Du, 2013; Perks et al., 2017; Reilly & Hynan, 2014). Indeed, given the increasing impact of social media on the one hand, and the growing focus on environmental sustainability issues on the other hand, understanding how users react to and interact with green versus non-green content, depending on the type of social media and on the type of content format published (e.g., text, photos, videos), can provide marketers with useful insights regarding the green communication strategies to select across different social media to engage consumers into environmental issues and obtain positive outcomes in terms of both environmental and economic performances. In this respect, our study can also allow marketers to better understand the important differences that emerge among different types of social media. Social media differ in terms of scopes, architectures, content formats (e.g., text, images, videos), and norms evolving over time in an interconnected manner (Roma & Aloini, 2019; Smith et al., 2012). These differences among social media platforms can deeply influence the social context, which in turn may naturally shape users' perceptions and appreciation for green versus non-green content. Shedding light on how users respond within different social media and to different media formats is critical to firms' returns on corporate image and profitability. Indeed, it can enable a better allocation of resources among them (Smith et al., 2012), identifying which social media platform to use under

certain circumstances (Gensler et al., 2013), and which content format to adopt to attract user attention (Voorveld et al., 2011).

To empirically investigate the above questions, we built an ad hoc sample from two major large-scale retailers active in the Italian market, namely *Coop Italia* and *Conad*. We gathered and analyzed data from the three main social media platforms used by these two companies: *Facebook*, *Instagram*, and *Twitter*. By way of anticipation, our results show that, while green content generally stimulates larger consumers' response in terms of likes, comments, and shares than non-green content, its performance varies across social media, with the highest effect being observed on Instagram (at least for likes) and the lowest on Twitter (at least for comments). Moreover, the positive effect of green content does not increase in general as media richness increases (i.e., moving from only text to text plus photo, and then to text plus video). This is because the moderating role of media richness is also contingent upon the social media platform where a post is publicized.

The remainder of this article is organized as follows. In Section 2, we discuss the literature background and present the hypotheses. In Section 3, we describe data and methods employed in the study. In Section 4, we discuss our findings, while in Section 5 we show their robustness. Finally, in Section 6 we provide theoretical and practical implications of our findings and discuss possible avenues for future research.

2 | LITERATURE BACKGROUND AND HYPOTHESES

2.1 | The effect of green versus non-green communication

The academic interest in the use of social media for green communication purposes has flourished in recent years. An important research stream addresses the relationship between green marketing and the concept of gaining a competitive advantage and differentiation (Arnaud, 2017; York, 2009), discussing the ability of green marketing to augment consumers' perceived benefits, increase the marketability of products as well as boost the overall company performance (Dangelico & Pontrandolfo, 2015; Ottman et al., 2006; Walker & Wan, 2012; Yang et al., 2022). Several scholars identify the authentic commitment to sustainability as a key competitive advantage (Beverland & Farrelly, 2010; Delmas & Burbano, 2011; Delmas & Grant, 2014; Porter & Kramer, 2011). Indeed, factors that may lead to an effective green communication include authenticity of information (Parkman & Krause, 2018), transparency (Aung & Chang, 2014; Badia-Melis et al., 2015), and continuous effort in sustainable engagement (Araujo & Kollat, 2018; Giacomini, Rocca, et al., 2021).

Communication activities through social media allow firms to better perceive consumers' expectations, respond to criticism, increase trust, and obtain an overall benefit on corporate image and social performance (Dunn & Harness, 2018; Korschun & Du, 2013; Perks et al., 2017). For such reasons, an increasing number of green-oriented firms have started using social media to launch their green marketing campaigns with the aim of communicating their commitment to environmental causes in an innovative manner (Hao et al., 2018; Kapoor et al., 2021; Reilly & Hynan, 2014). By stimulating consumers to interact with products/services, social media favor positive word-of-mouth, brand loyalty, dialogic accounting, and lead to augmented purchase intentions (Acuti et al., 2019; Bellucci et al., 2019; Ko & Megehee, 2012; Nekmahmud et al., 2022). In this respect, some studies suggest that social media are pivotal to inform customers about firm's sustainability initiatives, entertain a two-way dialog with them (Bellucci & Manetti, 2017, 2018; Cooper & Owen, 2007; Giacomini et al., 2022; Khanal et al., 2021; Rocca et al., 2021), as well as shape their attitudes and behaviors toward green products and services (Ghali et al., 2016; Han et al., 2018; Pizzi et al., 2021). At the same time, some companies are still reluctant to communicate their efforts toward sustainability due to the fear of being accused of *greenwashing*, that is, the malpractice of reporting fake or misleading information about firms' environmental initiatives and outcomes (Falchi et al., 2022; Peloza et al., 2012; Zhang et al., 2018).

At a first glance, it might seem that marketing goals are incompatible with those of sustainability. Traditional marketing incentivizes consumerism, favoring an endless search for the satisfaction of needs and considering resources as always abundant (Csikszentmihalyi, 2000; Swim et al., 2011). In contrast, pursuing sustainability would suggest that the resources available are limited and their use and renewal should mimic the natural and circular flow (McDonough & Braungart, 2002). Moreover, although in the recent past consumers often declared favorable attitudes toward pro-environmental behavior (Hatanaka, 2020; Hojnik et al., 2020; Trudel & Cotte, 2009), often they did not subsequently act in a sustainable fashion (Auger & Devinney, 2007; Campbell et al., 2020; Gatersleben & Vlek, 2002). This inconsistency between what consumers say and what they do has been one of the biggest challenges for environmental agencies, policy makers, and even firms who promote sustainable consumption (Johnstone & Lay, 2015; Prothero et al., 2011).

Nevertheless, the recent trend toward more environmentally sustainable society suggests that satisfaction of needs/wants and sustainability are not always in opposition (Chowdhury & Quaddus, 2021; Daub & Ergenzinger, 2005; Wang et al., 2019). Marketing helps sell new sustainable lifestyles, a necessary step due to the urgency of contrasting the effects of climate change (Mont et al., 2014; Veleva, 2021). Firms are called upon to communicate their commitment in terms of sustainable production and disseminate sustainable consumption using strategies in line with socially responsible marketing (Laczniak & Murphy, 2006). This is because, compared to the past when a more consumerist society prevailed, environmental awareness has grown considerably within the society (Bortree et al., 2013; Luchs et al., 2012; Severo et al., 2021; Sun et al., 2019). The number of consumers who consider, in their purchase decisions, companies' commitment to social and environmental aspects has been indeed fast growing over time (Hamzah & Tanwir, 2021; Hosta & Zabkar, 2021; Marquina & Morales, 2012). As consequence,

shareholders and investors have also become naturally interested in sustainability-oriented issues (Ernst & Young, 2022). Therefore, the current scenario sees not only a trend of firms addressing green issues in their campaigns, but also an equally keen interest and involvement from stakeholders, who play a crucial role for organizations in the development of a CSR strategy (Bellucci & Manetti, 2017, 2018; Cooper & Owen, 2007; Lee, 2011; Madsen & Ulhøi, 2001).

Focusing on the individual, different theories endeavor to explain pro-environmental behavior and their positive attitude toward environmental initiatives or causes. Researchers who regard environmental behavior primarily as a pro-social motivation often ground on the norm activation model, NAM (Schwartz, 1977), whereas those who regard self-interest as the most important motive often rely on rational choice models, such as the theory of planned behavior, TPB (Ajzen, 1991).

The basic premise of NAM is that moral or personal norms are direct determinants of pro-social behavior. Schwartz (1977) conceived moral norms as feelings of strong moral obligations that people feel toward themselves to engage in pro-social behavior. In line with this model, many scholars have shown that moral norms help to explain pro-environmental behavior (Bamberg & Möser, 2007; Biel & Thøgersen, 2007; Hunecke et al., 2001; Kang, 2022; Thøgersen, 1999). The formation and activation of a moral norm is probably based on the interaction of cognitive, emotional, and social factors (Bierhoff, 2002). Environmental awareness and knowledge are cognitive conditions paramount to the creation of moral norms in the sphere of pro-environmental action (Confente & Scarpi, 2021). Consumers, for example, may purchase products based on how worried they are about how their consumption impacts the environment (Follows & Jobber, 2000). Consequently, this line of reasoning leads us to believe that, given the growing environmental concerns in recent years, many users would positively interact with green content, especially on social media, to provide their little, yet important, contribution to the spread of environmental awareness.

Research applying TPB to explain pro-environmental attitudes instead proposes that altruism implies obtaining personal pleasure from a "helping" behavior. Thus, it recognizes ego-centered motivations (positive self-interest) as dominant antecedents to environmental behavior (Prakash & Pathak, 2017; Steenhaut & van Kenhove, 2006; Yarimoglu & Günay, 2020). Accordingly, users may be incentivized to interact with green content in social media because of a strong self-interest in perceiving themselves and being perceived by others as green consumers, which would help them build a green identity (Freestone & McGoldrick, 2008; Mancha & Yoder, 2015).

Although the above views are different in their explicative mechanism, they both favor the pro-environmental behavior in a variety of contexts. Prior literature suggests that pro-environmental behavior is probably best seen as a mixture of self-interest and concern for other people, the next generation, or other species (Bamberg & Möser, 2007). As we have discussed above, this pro-environmental behavior and the interest of consumers and other stakeholders on environmental sustainability issues have grown substantially in recent years (Bellucci & Manetti, 2018; Ernst & Young, 2022; Zahid et al., 2018). Combining this evidence with the growing (and effective) use of social media for green communication purposes (Ghali et al., 2016; Han et al., 2018; Pizzi et al., 2021), we expect that the green content firms publicize through social media should perform better than non-green content in terms of consumers' response (e.g., likes, comments, shares). Accordingly, we formulate our first hypothesis as follows:

> **H1.** In social media, firm-generated green content yields a better performance than firm-generated non-green content, in terms of consumers' response (e.g., likes, comments, shares).

2.2 | Factors influencing the performance of green communication

Among the factors that may influence the performance of green communication relative to non-green communication in social media, we focus on: (i) the type of social media, which captures the different features of social media platforms, both in terms of community-related aspects (e.g., community participants, social norms, rules) and in terms of technology-related features (e.g., different functionalities), and (ii) the degree of media richness, which refers to the ability of a communication format to deliver the intended information (Daft & Lengel, 1986; Reilly & Hynan, 2014; Roma & Aloini, 2019). Our choice is guided by their expected prominence in the performance comparison between green and non-green communication. As a matter of fact, by reflecting differences in community- and functionalities-related aspects, the *type of social media* may naturally influence how different types of content (e.g., green vs. non-green) will be received by users across different platforms. Indeed, the higher or lower appreciation green content is able to generate from consumers as compared with non-green content naturally depends on the different types of participants and social norms/rules established in different social media community, including the different awareness and sensitivity toward environmental initiatives (Jalali & Khalid, 2022; Šikić, 2021; Zahid et al., 2018). On the other hand, the degree of media richness has been shown to be paramount to the performance of brand-related communication in numerous settings, especially in social media (Roma & Aloini, 2019). Therefore, we believe that it may also play a role in the comparison between green and non-green content in social media, an issue not yet unveiled. Indeed, as we discuss in greater detail in Section 2.2.2, green content may be more incisive when users can generate and transfer more (complex) emotions, thus making richer media possibly more suitable for green content (Jones, 2022; Smith & Joffe, 2009).

For these reasons, we elucidate the moderating roles of these two relevant factors in the relationship between the presence of green content and consumers' response in social media. Moreover, the community-related and technology-related features characterizing different social media platforms may themselves influence the moderating role of media richness as they may favor the preference for

certain tools (and thus certain types of content) over others as primary means of communication (Zhou et al., 2021). That is, the presence of a moderating role of media richness may hinge upon the type of social media platform. Therefore, we explore this interplay as well.

2.2.1 | The moderating role of the type of social media platforms

The extant research has examined the numerous differences among several social media platforms (e.g., Facebook, Twitter, Instagram) in terms of usage intensity and motivations (Chen, 2015; Hollenbaugh & Ferris, 2014; Pourazad et al., 2023; Whiting & Williams, 2013). Across different platforms, the number of users currently exceeds hundreds of millions, and their popularity changes overtime.[1] For instance, while the popularity of Twitter was very prominent a few years ago, newer social media, such as Instagram and TikTok, have become popular recently (Alhabash & Ma, 2017; Wong, 2023). Facebook remains popular among young adults, but most teens have migrated to Instagram (Dibb & Foster, 2021; Mackson et al., 2019) and/or Tik-Tok (Cheong & Lloyd, 2023). Currently, Instagram is indeed one of the social media most commonly used by the new generations (e.g., generation Z), who prefer Instagram to all other social platform, ranking it above TikTok (Newberry, 2023; Williamson, 2022). Besides the different trends in popularity among different groups of users, different social media emphasize different social norms and rules, and activate different functionalities (Roma & Aloini, 2019), which in turn induce different user behavior in terms of response to firms' communication. Therefore, the study of whether and how this response changes across different social media can provide useful insights into the communication strategies to choose across different platforms to better encourage consumers toward sustainable communication (Colleoni, 2013; Roma & Aloini, 2019).

According to the above perspective, several studies have investigated the adoption of social media in general (e.g., Belk, 2013; Chen, 2015; Muntinga et al., 2011), whereas others have focused on the use of a specific platform, such as Facebook (e.g., Alhabash et al., 2014; Bellucci & Manetti, 2017; Giacomini et al., 2022; Hollenbaugh & Ferris, 2014; Nelson-Field et al., 2012; Rocca et al., 2021), YouTube (e.g., Liu-Thompkins, 2012; Pourazad et al., 2023), Twitter (e.g., Ceron et al., 2014; Colleoni, 2013; Etter et al., 2018; Liu et al., 2017) or Pinterest (e.g., Phillips et al., 2014). In this regard, it is noteworthy that social media have contributed to fuel greater environmental consciousness among consumers (Kleinrichert et al., 2012; Lu & Miller, 2019; Reilly & Hynan, 2014; Zahid et al., 2018). Consumers use social media to express their concern about the environment, and the social factors behind the environmental consciousness and its appreciation in the community positively influence their purchase behavior (Zahid et al., 2018). However, the single-platform approach adopted by most of the prior studies provides little information when the goal is to assess the effectiveness of green content in stimulating consumers' response across different platforms.

By taking the cross-platform comparison perspective (e.g., Roma & Aloini, 2019; Roma & Vasi, 2019), we argue that the type of social media platform is a key determinant of the performance of green content. Specifically, prior studies have documented that Facebook and Instagram are leading social media platforms for green advertising and sustainable communication (Šikić, 2021). This is particularly true for Instagram because this platform is mostly visually oriented with a focus on large creative images and as such offers a variety of functionalities for both photos and videos that enable users to edit and improve their posts for maximum appeal (Herman, 2014). These features on Instagram have been increasingly utilized over the last years for storytelling and advertising purposes to generate emotional appeal (Rietveld et al., 2020). The emotional aspect is crucial for promoting firms' initiatives related to environmental sustainability issues and thus for opening up room to users' habits that favor green communication (Guadagno et al., 2013). Moreover, as anticipated above, the presence of a more fertile ground for green communication especially on Instagram is also driven by the type of users active within the Instagram community, that is, mostly young people (generation Z). There exists indeed evidence that younger generations are much more informed about sustainable living than previous generations (Arora & Manchanda, 2021; Bedard & Tomie, 2018). As a matter of fact, nowadays, Instagram is the social media platform where also the major green influencers are more active (Jalali & Khalid, 2022). In contrast, we argue that the practice of creating emotional content on Twitter is still rather limited or at least is not as customary as in the other social media platform, because short textual descriptions, that is, tweets, are still the most common format for communication (Bigné et al., 2019). Consequently, it is reasonable that the scarcer presence of emotional content, which is often crucial for green communication to be effective, on this platform may negatively affect users' response to this type of communication. Based on these considerations, we formulate our second hypothesis as follows:

> **H2.** The positive performance gap between green and non-green content (in terms of consumers' response) differs across social media platforms, with Instagram showing the highest gap and Twitter showing the lowest gap.

2.2.2 | The moderating role of media richness

Social media are recognized as powerful tools for involving and engaging consumers at higher levels of efficiency than those that can be achieved via more traditional channels of communication (Hollebeek

[1]We recognize that there are other rising social media platforms, such as Tik-Tok or Snapchat. However, in our study, these platforms have not been investigated because they were not as popular as Facebook, Instagram, and Twitter at the time of data collection. Moreover, the two retailers considered in our study did not have an official channel on these social media at the time of data collection and do not have it even nowadays. In Section 6, we point out the importance for future research to examine the same questions studied in the present study by including also growing social media such as Tik-Tok or Snapchat, perhaps sampling data from companies using these platforms.

et al., 2014; Kaplan & Haenlein, 2010). In this regard, prior literature has suggested that different types and formats of content shared may yield different levels of efficacy in engaging consumers (e.g., Bonsón et al., 2015; Ji et al., 2019; Lock & Araujo, 2020; Roma & Aloini, 2019; Yin & Zhang, 2020). Grounding mostly on media richness theory (MRT) (Daft & Lengel, 1986; Dennis & Kinney, 1998) as well as on social presence theory (SPT; Osei-Frimpong & McLean, 2018; Short et al., 1976), this body of literature argues that the format of communication (e.g., text, images, videos) is paramount to the emergence of differences in the degree of user engagement across social media. In fact, MRT and SPT propose that media may differ in terms of both informational richness (i.e., the ability of information to change understanding per unit of time) and social presence (i.e., the degree of salience of the other person in an interaction).

Accordingly, some media may exhibit higher efficacy than others in the process of communicating to the public (Roma & Aloini, 2019; Yin & Zhang, 2020). Specifically, formats that allow for more comprehensive forms of communication (e.g., including gestures, motion, voice, etc.), such as videos, should be more effective than more streamlined formats, such as plain text (Kaplan & Haenlein, 2010; Klein, 2003). Indeed, media typically considered richer such as videos, audios, and animations include a range of interactive and dynamic methods that can stimulate different sensory characteristics. In contrast, content with a lower degree of richness (e.g., text) often just excite few senses or basic ones (Rosenkrans, 2009). As a matter of fact, in a study conducted by Sabate et al. (2014), it has been shown that content consisting of photos and videos enhances engagement in the form of likes. Along the same lines, Bonsón et al. (2015) and Ji et al. (2019) show that content posted on social media via pictures and videos is more likely to be shared than plain text. These results are also confirmed by Yin and Zhang (2020), who suggest that visual content (e.g., images or videos) is capable of capturing attention more easily than plain text.

Posting content via rich media formats has become a popular strategy in environmental activism to attract public attention. Indeed, more and more often we observe videos of environmental activists filming themselves during their protests or showing the reality of life on Earth due to global warming or other factors detrimental to the environment (Jones, 2022). For green communication, the aim is to show concrete evidence that environmental concerns (e.g., climate change, waste management, pollution) are now real and impact on our daily lives (Calculli et al., 2021; Sun et al., 2020). The rationale is that the stronger the emotional response this type of communication is able to generate the higher the odds it will go viral (Dobele et al., 2007; Guadagno et al., 2013). Kao and Du (2020) find that advertising design with positive moral and social emotions has higher effect on consumers, since emotions are capable of influencing consumer preferences (Pornpitakpan et al., 2017; Swim et al., 2011; Ursavas & Hesapci-Sanaktekin, 2013). Although this communication approach is naturally adopted by environmental agencies, it is also more frequently pursued by sustainability-oriented firms in communicating their green initiatives (Reilly & Hynan, 2014). Indeed, consumers may not pay the adequate attention or may not even understand the importance of the given environmental concern at hand if the communication is not able to deeply stimulate consumers' senses (Kao & Du, 2020). Richer content, such as videos, sounds, images, is typically more effective in generating emotions and nurturing engagement in the context of environmental initiatives as these initiatives require the activation of stronger stimuli to be fully interiorized by consumers (Ji et al., 2019), which is an outcome more easily achieved via richer content. Images, sounds, or videos accompanying green messages can indeed help recognize threats, personify the environmental issues, and visualize their impacts, in a way that the communication will be really effective (Smith & Joffe, 2009). Hence, it is reasonable to expect that richer content is more important for green than for non-green communication. This would imply that the positive performance gap between green and non-green content in social media increases as the media richness increases, that is, when the content moves from text-only, to text and photo/image, and then to text and video.[2] Accordingly, we formulate:

> **H3.** The positive performance gap between green and non-green content in social media increases as the media richness increases, that is, as the content shifts from text-only, to text and photo/image, and then to text and video.

2.2.3 | How the moderating role of media richness depends on social media platforms

Our third hypothesis above states that the use of richer media (e.g., videos) should favor more green communication than non-green communication, thereby enhancing the performance of the former type of communication as compared with that of the latter. However, this effect may not be the same across different social media platforms. Indeed, as we have highlighted earlier, different social media platforms typically differ both in terms of community-related aspects (e.g., community participants, social norms, rules) and in terms of technology-related features (e.g., different functionalities; Hughes et al., 2012; Petrocchi et al., 2015; Roma & Aloini, 2019). In turn, these different features may promote different habits among users (both consumers and firms) on which type of media format to use for their communication, thus directly or indirectly inducing users to conform more with certain media formats (Alhabash & Ma, 2017). For instance, Instagram supports only photos/images plus text and videos plus text. Only text is not available in this platform. However, even if (short) videos are supported, Instagram has been traditionally identified as the social media platform for sharing pictures (Pittman & Reich, 2016; Yu & Egger, 2021). Therefore, the culture developed over the years in this platform may favor higher diffusion and appreciation of pictures over videos despite the latter are richer media. That is, a richer medium (i.e., videos) may not necessarily guarantee higher

[2]We consider these three formats, that is, only text, text and photo/image, text and video, as they are the only formats observed in the sample under study.

response from consumers in this social network. Consequently, the green communication may not necessarily benefit from moving from less rich to richer medium vis-à-vis non-green communication. Similarly, Twitter has been conceived as a microblogging social network, with great emphasis on fast and timely sharing of information. Therefore, while functionalities for more visual and richer content have been made available over time, its original and intrinsic nature still puts great emphasis on communication via textual messages (Bigné et al., 2019). Once again, this would imply that users may not necessarily appreciate richer content in this social network.

On Facebook, instead, no specific culture has been originally established emphasizing the role of a media over another one. That is, different types of content, for example, text only, images, videos, are typically utilized in this platform (Bessi et al., 2016; Escobar-Rodríguez & Bonsón-Fernández, 2017; Kim et al., 2015). However, a number of studies have underscored a recently growing trend for richer content in social media, primarily on Facebook (Gupta, 2013; Pollard, 2017; Roma & Aloini, 2019; Thompson, 2017; Vilnai-Yavetz & Tifferet, 2015). For instance, Facebook has made available new live video streaming and short stories functionalities, which have become very popular among users in this social media platform. Therefore, we believe that, due to its intrinsic characteristics and this growing orientation to richer content, this social network is a more fertile ground for the beneficial effect of richer content to manifest. According to our argument backing our third hypothesis (*H3*), richer content is typically more useful for green communication than for non-green communication. Therefore, combining the two arguments, we expect that the positive performance gap between green and non-green content in social media increases as media richness increases to a greater extent on Facebook than on Instagram and Twitter. That is, the presence of a positive moderating role of media richness as described in our third hypothesis (*H3*) is contingent upon the type of social media, with Facebook being more likely to exhibit this positive moderation as compared to the other two social media. Accordingly, we formulate:

> **H4.** The increase of the performance gap between green and non-green content as the media richness increases is more likely to occur on Facebook than on Instagram and Twitter.

3 | DATA AND METHODS

3.1 | Setting

To test our hypotheses, we use the Italian large-scale retail market as a setting for our study. Specifically, we evaluate the commitment and the initiatives in terms of green communication of two major companies operating in this industry in Italy, namely *Conad* and *Coop*. The choice of the industry naturally follows from the fact that, by selling food and other consumer goods, large-scale retailers have huge, direct and indirect, impact on numerous environmental issues (including use of energy, waste of products and resources, pollution due to logistics activities), and as such in recent years have been at the forefront in promoting green initiatives in their business (Bompan & Fassio, 2022). Both considered brands operate under a cooperative business model that groups multiple legally independent retailers, and have a prominent presence mainly in the national context. By the end of 2021, Conad counted more than 3300 stores (the majority in the form of supermarkets) across Italy, more than 70,000 employees, nearly 17 billion euros revenues and a market share of 15% (https://chisiamo.conad.it/chi-siamo/la-nostra-storia; GDO News, 2021). Similarly, Coop counted more than 2100 stores (the majority in the form of supermarkets) across Italy, nearly 60,000 employees, nearly 15 billion euros revenues and a market share of 12.5% (https://www.e-coop.it/noi-coop-e-chi-siamo; GDO News, 2021). Some relevant statistics of these two retailers are summarized in Table 1. While the two retail chains are very comparable, currently Conad is leading the market, whereas Coop was the leader until 10 years ago (GDO News, 2021).[3]

TABLE 1 Retailers' profiles.

	Conad	Coop
Stores	3300	2100
Employees	70,000	60,000
Revenues (*euro billions*)	17	15
Market Share	15%	12.5%
Facebook followers (*thousands*)	1100	300
Instagram followers (*thousands*)	74	63
Twitter followers (*thousands*)	27.5	27.3

Moreover, we chose these two retailers because, in addition to their economic relevance, they have embraced environmental sustainability as a business philosophy, publishing annually a sustainability report where they account for the environmental impact of their business and the green initiatives conducted to reduce it (Conad, 2021; Coop, 2021). To give a few examples, Conad has launched the "Verso Natura" line of organic products with reduced environmental impact in its packaging choices and best production processes. Moreover, Conad has taken sustainability as the compass of its strategic business choices, embarking on a path of defining sustainability policies and strategies. This approach led in 2021 to the launch of "Let us Sustain the Future" project involving investments in concrete actions such as the "Forestiamo Insieme l'Italia" (Let us Forest Italy Together) initiative, carried out in collaboration with Rete Clima, a non-profit organization that promotes CSR and decarbonization actions. The project envisages the planting of 11,000 trees in 11 Italian regions by spring 2024 (Conad, 2021). Coop has moved along the same lines as Conad, proposing its own "Vivi Verde" line of organic products. In addition, the company has launched its multi-year sustainability plan, *Coop Alleanza 3.0*, with the aim to align the cooperative's objectives with

[3]There is a third major Italian player, namely Selex. However, for our study we decided to focus only on Conad and Coop since they operate their supermarkets under a single brand (Conad and Coop, respectively), whereas Selex is a multi-brand type of large-scale retail chain.

the global goals of the UN 2030 Agenda. The sustainability plan revolves around sustainable production and consumption. In particular, Coop's commitment to animal welfare is remarkable, as demonstrated by the "Let us Breed Health" campaign launched with the aim to reduce and, where possible, eliminate the use of antibiotics on more than 2000 farms (Coop, 2021).

Both retailers are fully active in communicating their green initiatives through social media platforms, using Facebook, Instagram, and Twitter daily for marketing purposes. Conad's official page on Facebook (https://www.facebook.com/Conad) currently counts approximately 1.1 million followers and page likes, whereas Coop's official page on Facebook (https://www.facebook.com/Coop.it) currently counts nearly 300,000 followers and page likes. Conad's official page on Instagram (https://www.instagram.com/conad/?hl=it) currently counts about 74,000 followers, whereas Coop's official page on Instagram (https://www.instagram.com/coopitalia/) currently counts nearly 63,000 followers. Conad's official page on Twitter (https://twitter.com/conad?lang=it) currently counts approximately 27,500 followers, whereas Coop's official page on Twitter (https://twitter.com/coopitalia?lang=it) currently counts nearly 27,300 followers.

3.2 | Data collection

We used a web scraper to collect all posts made available by the two retailers in their official page of each of the three considered social media, since the inception of each retailer's official page[4] in each social media platform until the end of February 2020. The timespan stops at the end of February to avoid including data that were significantly affected by the emergence of COVID-19 pandemic. Specifically, for each post, data related to the date of publication, the content, the content format (i.e., texts, photos/images, videos, or combinations of them), the user responses in terms of likes, comments, and shares (in the social media where shares or retweet are available) were collected.

After the posts were downloaded, we numbered them and randomly extracted 350 posts for each pair retailer-social media platform, resulting in a total of 2100 posts (700 for each platform). The reason why we decided to collect a random subsample of posts made available by the two retailers in their official page of the three considered social media is to reduce the workload to experts that were called to assess the presence of green versus non-green features in each content. As explained in greater detail in Section 3.3.2, we involved five experts active in the field of SPC who had to read, visualize and/or even watch each post carefully to assess these features. Therefore, it was necessary to reduce this heavy workload by limiting the number of posts retrieved from each social media platform. Specifically, while the total number of posts made available by each retailer in each social media platform from the inception of the page until the end of February 2020 was more than a thousand in most of the cases, a random subsample of 700 posts from each social media platform, equally divided between Coop (350 posts) and Conad (350 posts), for a total of 2100 posts was considered acceptable by the experts to evaluate. At the same time, this number is sufficiently large and representative of the posts of the two retailers in the three considered social media. Our approach is consistent with similar studies examining sustainability issues (e.g., Calic & Mosakowski, 2016). In particular, the choice of having equal number of posts for all three platforms is to avoid that the imbalance in the posts among different platforms would affect our results.

[4]Note that Twitter sets a limit of 3200 tweets (the actual posts made by the given account owner) that can be made visible at a given time. For this reason, on Twitter the first available post dates back to 2016 and 2015 for Conad and Coop, respectively. On the other hand, on Facebook, the first available post dates to 2011 and 2013, for Conad and Coop, respectively. On Instagram, the first available post dates to 2015 and 2012 for Conad and Coop, respectively. Note that these years refer to the universe of posts visible and available on the considered social media platforms before our random sampling.

3.3 | Variables

3.3.1 | Dependent variables

Consumers can react to firms' posts in social media in different ways. For instance, they can express appreciation for a post by clicking on the like option available across the three considered social media. They can react by commenting back to the given post. They can also share the given post to their network of friends. Therefore, we operationalized the response by using three different variables. We considered the number of likes each post received (*Likes*), the number of comments each post stimulated (*Comments*), the number of shares (or retweets in case of Twitter) each post generated (*Shares*). The latter measure is not available for Instagram as this platform does not enable sharing posts created by others. Therefore, we used the variable *Shares* only when considering the subsamples of Facebook only and Twitter only, respectively. All these variables were retrieved (as they were at the time of data collection) directly from the considered social media platforms.

Table 2 reports the descriptive statistics for all variables in our sample across the different social media under study. As for *Likes*, we observe that posts receive on average 484 likes on Facebook, 190 on Instagram, and only 7 on Twitter. This suggests the presence of large differences among social media regarding this measure. As for *Comments*, we observe on average 24 comments on Facebook, 3 on Instagram, and near 6 on Twitter. Finally, regarding *Shares*, we observe on average near 41 shares on Facebook and 26 on Twitter (recall that shares are not enabled on Instagram).

3.3.2 | Main independent variables

As mentioned earlier, to assess the presence of green features in each post we involved five experienced professionals who have worked for environmental associations at a national level for several years. We asked them to independently evaluate all selected posts on the three social media. While these experts were informed about the general scope of the research, they were not informed about the specific

TABLE 2 Descriptive statistics.

	Facebook				Instagram				Twitter			
	Mean	Std. dev	Min	Max	Mean	Std. dev	Min	Max	Mean	Std. dev	Min	Max
Likes	483.5	1045.0	0	16,746	190.3	882.8	1	17,686	7.3	35.5	0	897
Comments	23.82	65.6	0	651	3.0	5.4	0	57	5.8	10.9	0	126
Shares	40.5	161.0	0	2010	-	-	-	-	25.9	51.2	0	589
Green	0.19	0.39	0	1	0.08	0.28	0	1	0.15	0.36	0	1
Company	0.50	0.50	0	1	0.50	0.50	0	1	0.50	0.50	0	1
Holidays	0.08	0.26	0	1	0.05	0.22	0	1	0.04	0.19	0	1
Text + Photo	0.75	0.43	0	1	0.85	0.35	0	1	0.55	0.50	0	1
Text + Video	0.25	0.43	0	1	0.14	0.35	0	1	0.21	0.41	0	1
Year 2020	0.02	0.14	0	1	0.03	0.17	0	1	0.26	0.44	0	1
Year 2019	0.12	0.33	0	1	0.15	0.36	0	1	0.34	0.47	0	1
Year 2018	0.19	0.39	0	1	0.16	0.36	0	1	0.17	0.38	0	1
Year 2017	0.20	0.40	0	1	0.18	0.39	0	1	0.20	0.40	0	1
Year 2016	0.17	0.37	0	1	0.25	0.43	0	1	0.01	0.09	0	1
Year 2015	0.21	0.41	0	1	0.19	0.40	0	1	0.01	0.09	0	1
Year 2014	0.08	0.28	0	1	-	-	-	-	-	-	-	-
Year 2013	0.00	0.08	0	1	0.00	0.08	0	1	-	-	-	-
Year 2012	-	-	-	-	0.01	0.11	0	1	-	-	-	-

formulation of our hypotheses to prevent any influence in their evaluation. Although we relied on the experience of these five professionals for the evaluation, to further reduce any assessment variability due to different interpretation of a post, we instructed them to adhere to the definitions provided by the U.S. Bureau of Labor Statistics (http://www.bls.gov/green/) when evaluating a post, as done for instance in recent environmental sustainability studies (Calic & Mosakowski, 2016; Mrkajic et al., 2019; Roma et al., 2023). According to this classification, posts related to products or processes reducing pollution as well as the consumption of natural resources, promoting energy efficiency and the use of renewable energy, making recycling easier, creating the conditions for a cleaner environment (spaces, air, water, ecosystems, etc.), or improving the hygiene, safety, and health conditions of people, animals, and plants were all considered as having green features. Specifically, for each post, experts were asked to independently evaluate the presence (indicated by 1) or the absence (indicated by 0) of any green feature.

After the coding phase from all five experts was completed, the Cronbach's α value was calculated to measure inter-rater reliability for each social media platform (Calic & Mosakowski, 2016; Krippendorff, 1980). This measure was never lower than 0.875, a value considerably higher than the standard acceptability threshold of 0.70 available in literature (e.g., Davidsson, 2006). In the cases of disagreement among the experts, the natural majority rule (three out of five) was utilized. The resulting variable is therefore a dummy variable, referred to as *Green*, taking the value of 1 if the focal post exhibited green features according to the experts, 0 otherwise. Table 2 shows, to some extent, similar occurrences of posts exhibiting green content across the three social media: we observe 19% of occurrences for Facebook, 8% for Instagram, and 15% for Twitter.

To test the hypothesis *H2*, we introduced in our regression models the interaction between the variable *Green* and the dummy variables indicating the social media platform where the focal post was publicized. As we consider three social media platforms, it is sufficient to introduce two dummy variables and consider one as a baseline. For our study, we chose Facebook as a baseline, and thus we introduced two dummies *Instagram* and *Twitter* taking the value of 1 if the focal post was publicized on Instagram or Twitter, respectively; zero otherwise. Clearly, if both dummies took the value of zero, then the focal post was publicized on the baseline Facebook. Besides introducing their interactions with the variable *Green*, the two dummies *Instagram* and *Twitter* were also introduced in their level form to control for any direct effect of the given social media platform on the level of reaction (likes, comments, shares) of consumers. As we have pointed out earlier, we have collected an equal number of posts (i.e., 700) for each social media platform.

To test the hypothesis *H3*, we introduced in our regression models the interaction terms between the variable *Green* and the dummy variables indicating the format of the focal post, which is used to capture the media richness. In our sample, there are three possible formats. First, some posts displayed only text. This format (i.e., only text), however, was available only on Twitter. Second, some other posts displayed text plus photo/image. Third, some other posts displayed text plus a video. The latter two formats were available on all three social media. Note that no images or videos without text were observed in our sample. As discussed in our hypothesis formulation, based on MRT and SRT, text plus video is considered a richer format than text plus photo/image, which in turn is considered a richer format than plain text. Therefore, in the full sample with all posts from all

social media platforms as well as in the sample with posts only from Twitter we considered the format "only text" as a baseline and introduced the dummies *Text + Photo* and *Text + Video*. These variables take the value of 1 if the focal post displayed text plus photo(s)/image(s) or text plus video, respectively; zero otherwise. Clearly, if both dummies took the value of zero, then the focal post was characterized as having only text. In the samples with posts only from Facebook or only from Instagram, respectively, given the absence of posts exhibiting only text, the format "text plus photo(s)/image(s)" was considered as a baseline, and only the dummy *Text + Video* was introduced. Besides introducing their interactions with the variable *Green*, the two dummies *Text + Photo* and *Text + Video* were also introduced in their level form to control for any direct effect of the given format on the level of reaction (likes, comments, shares) of consumers. Table 2 shows that on Facebook 75% of the posts are related to *Text + Photo*, while the remaining 25% are related to *Text + Video*. On Instagram, 85% of the posts are related to *Text + Photo*, while the remaining 15% are related to *Text + Video*. Finally, on Twitter 55% of the posts are related to *Text + Photo*, 21% are related to *Text + Video*, and the remaining 24% to only text.

3.3.3 | Control variables

In addition to the direct effects of social media (via the dummies *Instagram* and *Twitter*) and the media richness (via the dummies *Text + Photo* and *Text + Video*), we control for the retailer fixed effect by introducing a dummy variable (*Company*) taking the value of 1 if the focal post is publicized by Conad, 0 if it is promoted by Coop. We also control for any time-related effect by introducing dummies (*Year*), which capture the year of the post (in the timespan 2012–2020), and a dummy variable (*Holidays*) taking the value of 1 if the focal post is publicized during official national holidays, 0 otherwise. We control for the variable *Holidays* because previous research on social media usage has shown that there is a significant increase of social media usage during holidays to enhance the holiday atmosphere and share experiences (Gao et al., 2017). For instance, according to industry research, during the holiday season in 2021 retailers have experienced a significant surge in the average number of messages received compared to non-holiday months in all three considered social media platforms (Smith, 2022). As we were not aware a priori how this higher involvement in using social media from both companies' and users' sides during holidays would translate in terms of response to green versus non-green communication, we decided to explicitly control for this aspect. Table 2 also reports the descriptive statistics for the control variables.[5] Note that the sample distribution of posts between Conad and Coop across the three platforms is by construction identical.

[5]In Table 2, it can be observed that in our sample there are no posts in certain years (specifically, the less recent ones). The reason is that in less recent years both Coop and Conad posted much less frequently, and it is also possible that some posts were also later removed by the firms, thus leading our random sampling procedure with zero observations in some years. In addition, for Twitter, the reasons explained in footnote 4 also apply here.

4 | EMPIRICAL FINDINGS

Table 3 reports the correlation matrix for the entire sample, from which we can appreciate the presence of no serious degree of correlation.[6] To test our hypotheses, we resorted to two approaches. First, since we applied a logarithmic transformation to our dependent variables, we ran robust OLS regression models using the entire sample. This allowed us to test the first three hypotheses (*H1*, *H2*, *H3*) by introducing the interaction terms in a stepwise fashion. Second, we ran three sets of robust OLS regression models, one for each subsample consisting of posts retrieved only from one social media platform at a time. By doing so, we can check the robustness of our results for the first three hypotheses, and also test our fourth hypothesis (*H4*). Indeed, by using separate subsamples we can test: (i) how the effect of the variable *Green* on consumers' response changes across different social media platforms (which helps further investigate hypotheses *H1* and *H2*); (ii) how the moderating role of media richness on such effect may hinge upon the social media platform where the focal post is publicized (which helps further investigate hypotheses *H3* and *H4*).

Table 4 reports the results under the first approach, that is, considering the entire sample. In this case, given that shares are not enabled on Instagram, we only use *Likes* and *Comments* as measures of performance of a post. For both dependent variables, Table 4 reports the results with no interactions (columns indicated as *H1*), with the interaction terms between the variable *Green* and the social media dummies (columns indicated as *H2*), and with the interaction terms between the variable *Green* and the content format dummies (columns indicated as *H3*), respectively. First, we note that the control variables exhibit the expected sign and significance. Specifically, Facebook exhibits the highest consumer response in terms of likes and comments (the coefficients of both *Instagram* and *Twitter* dummies are indeed negative and significant across the columns). Moreover, the coefficients of both *Text + Photo* and *Text + Video* dummies are mostly positive and significant across the columns, implying in line with MRT and SPT that content richer than plain text generates higher consumer response in terms of likes and comments (Roma & Aloini, 2019; Rosenkrans, 2009). The only exception is the effect of the dummy *Text + Photo* on comments, which is not significant.

Moving to the variables of interest, first from columns indicated as *H1*, we notice that the coefficient of the variable *Green* is positive and largely significant (particularly in the models with no interactions). That is, firm-generated content exhibiting green features results in higher consumer response in terms of likes and comment, as compared with content exhibiting no green features. This provides support to our hypothesis *H1*. Second, from columns indicated as *H2* the

[6]The correlation coefficient between the two dummies *Text + Photo* and *Text + Video* is the only high coefficient, which is intuitive given that in two out of three social media platforms these are the only formats observed for the content posted by the two retailers Coop and Conad. Indeed, as we have pointed out, posts consisting of plain text are observed only on Twitter. Nevertheless, this correlation is not problematic because, when we run separate regression analyses for each subsample (corresponding to each social media platform), we include both dummies only for Twitter (where the correlation is obviously smaller), whereas we use only the dummy *Text + Video* for Facebook and Instagram.

TABLE 3 Correlation matrix.

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)
(1) Green															
(2) Company	−0.109*														
(3) Holidays	−0.014	−0.010													
(4) Text + Photo	−0.123*	−0.224*	−0.022												
(5) Text + Video	0.169*	0.216*	0.058*	−0.799*											
(6) Instagram	−0.120*	0.000	−0.006	0.214*	−0.098*										
(7) Twitter	0.028	−0.000	−0.059*	−0.269*	0.016	−0.500*									
(8) Year 2020	−0.024	−0.216*	0.006	−0.035	−0.059*	−0.167*	0.367*								
(9) Year 2019	0.150*	−0.146*	−0.020	−0.113*	0.110*	−0.092*	0.238*	−0.175*							
(10) Year 2018	−0.009	0.055*	0.015	−0.106*	0.204*	−0.027	−0.004	−0.159*	−0.236*						
(11) Year 2017	−0.006	0.125*	−0.018	−0.168*	0.041	−0.023	0.013	−0.168*	−0.251*	−0.227*					
(12) Year 2016	−0.057*	0.133*	0.015	0.188*	−0.132*	0.222*	−0.271*	−0.140*	0.208*	−0.188*	−0.200*				
(13) Year 2015	−0.064*	0.108*	−0.011	0.228*	−0.176*	0.124*	−0.266*	−0.137*	−0.204*	−0.185*	−0.197*	−0.163*			
(14) Year 2014	−0.028	−0.124*	0.035	0.080*	−0.056*	−0.120*	−0.120*	−0.058*	−0.087*	−0.079*	−0.084*	−0.069*	−0.068*		
(15) Year 2013	−0.027	−0.066*	0.016	0.041	−0.033	0.016	−0.046*	−0.023	−0.034	−0.030	−0.032	−0.027	−0.026	−0.011	
(16) Year 2012	0.015	−0.066*	−0.016	0.041	−0.033	0.093*	−0.046*	−0.023	−0.034	−0.030	−0.032	−0.027	−0.026	−0.011	−0.004

Note: The significance level is set equal to 0.05.

TABLE 4 OLS regressions for the entire sample with different measures of the dependent variable.

	Ln likes			Ln comments		
	H1	H2	H3	H1	H2	H3
Green	0.427*** (0.070)	0.397** (0.138)	0.422* (0.200)	0.322*** (0.071)	0.591*** (0.136)	0.105 (0.193)
Green × Instagram	-	0.289^{+} (0.160)	-	-	0.045 (0.189)	-
Green × Twitter	-	−0.081 (0.163)	-	-	−0.751*** (0.157)	-
Green × Text + Photo	-	-	−0.114 (0.218)	-	-	0.044 (0.209)
Green × Text + Video	-	-	0.227 (0.229)	-	-	0.576* (0.241)
Instagram	−0.981*** (0.073)	−1.009*** (0.080)	−0.978*** (0.073)	−0.927*** (0.070)	−0.903*** (0.075)	−0.921*** (0.069)
Twitter	−4.585*** (0.090)	−4.566*** (0.098)	−4.567*** (0.091)	−0.997*** (0.075)	−0.852*** (0.081)	−0.970*** (0.075)
Text + Photo	0.420*** (0.083)	0.431*** (0.083)	0.442*** (0.084)	0.002 (0.072)	0.047 (0.071)	0.016 (0.075)
Text + Video	0.234* (0.097)	0.243* (0.098)	0.187^{+} (0.103)	0.409*** (0.088)	0.423*** (0.087)	0.313*** (0.093)
Company	0.162** (0.061)	0.161** (0.061)	0.154* (0.061)	0.825*** (0.056)	0.829*** (0.056)	0.812*** (0.056)
Holidays	0.155 (0.111)	0.159 (0.111)	0.153 (0.111)	−0.007 (0.105)	−0.005 (0.107)	−0.009 (0.105)
Year dummies	Included	Included	Included	Included	Included	Included
Constant	2.494*** (0.327)	2.459*** (0.339)	−0.929*** (0.164)	1.035*** (0.267)	0.891** (0.281)	1.059*** (0.261)
N	2100	2100	2100	2100	2100	2100
Prob > *F*	0.000	0.000	0.000	0.000	0.000	0.000
R^2	0.704	0.704	0.704	0.329	0.339	0.339

Note: Robust standard errors in parentheses. $^{+}p < 0.10$; $^{*}p < 0.05$; $^{**}p < 0.01$; $^{***}p < 0.001$.

social media platform where a green versus non-green post is publicized seems to matter. Note that in a model where the interaction terms *Green* × *Instagram* and *Green* × *Twitter* are introduced, the term *Green* measures the effect of green content for Facebook, whereas the interaction terms (*Green* × *Instagram* and *Green* × *Twitter*) will capture whether the positive effect of green content will be higher or lower for Instagram or Twitter, respectively, as compared to Facebook. From columns indicated as *H2*, we observe that the coefficient of the *Green* variable is positive and significant, whereas the coefficient of the interaction between *Green* and *Instagram* dummies is positive and significant for *Likes*, but not for *Comments*. This implies that, at least in terms of likes, the positive effect of green content is higher on Instagram than on the baseline social media platform, that is, Facebook, whereas no difference arises between the two platforms regarding the effect on comments. In contrast, the coefficient of the interaction between *Green* and *Twitter* is negative and significant for *Comments*, while being insignificant for likes. Therefore, the effect of green content in terms of comments is lower on Twitter than on Facebook, whereas no significant difference is shown to emerge in terms of likes. Overall, our hypothesis on the moderating role of social media is thus confirmed with some platforms showing higher beneficial effect of green content than others, that is, Instagram versus Facebook and Twitter for likes, and Instagram and Facebook versus Twitter for comments.

From columns indicated as *H3*, we do not observe in the full sample any positive moderating role of media richness on the relationship between green content and consumer response in terms of likes. As a matter of fact, the coefficient of the interaction terms involving the dummies *Text* + *Photo* and *Text* + *Video* are not significant, which implies that the positive effect of green content on consumers' likes is not higher as media richness increases. We only observe a positive and significant effect of the coefficient of the interaction term between the dummies *Green* and *Text* + *Video* when *Comments* is the dependent variable. This implies that the effect of green (vs. non green) content on comments is the highest when communicated via video. Apart from this result, our hypothesis *H3* does not seem to be supported in general. Nevertheless, using the second approach (i.e., running robust OLS regressions with separate subsamples) we investigate whether this insignificance is attributable to the fact that the moderating role of media richness on the relationship between green communication and consumers' response may hinge upon the social media platform where the focal post is publicized (i.e., our hypothesis *H4*).

In Tables 5, 6, and 7, we report the results for the subsamples of posts on Facebook, Instagram, and Twitter, respectively. As we have highlighted above, for Facebook and Twitter we also report the results of the regression models where *Shares* is the dependent variable. As can be observed, our hypothesis *H1* is confirmed across the three

TABLE 5 OLS regressions for Facebook sample with different measures of the dependent variable.

	Ln likes		Ln comments		Ln shares	
	H1-H2	H3-H4	H1-H2	H3-H4	H1-H2	H3-H4
Green	0.710*** (0.134)	0.338* (0.155)	0.701*** (0.139)	0.230^{+} (0.141)	0.855*** (0.197)	0.417^{+} (0.229)
Green × Text + Video	-	0.908** (0.271)	-	1.149*** (0.297)	-	1.070** (0.411)
Text + Video	−0.305* (0.128)	−0.548*** (0.137)	0.171 (0.139)	−0.136 (0.152)	1.555*** (0.177)	1.268*** (0.187)
Company	1.619*** (0.101)	1.608*** (0.101)	0.928*** (0.108)	0.914*** (0.107)	0.114*** (0.131)	0.101 (0.131)
Holidays	−0.084 (0.190)	−0.096 (0.189)	−0.117 (0.182)	−0.133 (0.180)	−0.422^{+} (0.221)	−0.437^{+} (0.226)
Year dummies	Included	Included	Included	Included	Included	Included
Constant	4.025*** (0.416)	4.085*** (0.437)	1.482*** (0.333)	1.558*** (0.356)	0.151 (0.563)	0.222 (0.555)
N	700	700	700	700	700	700
Prob > *F*	0.000	0.000	0.000	0.000	0.000	0.000
R^2	0.371	0.382	0.176	0.196	0.265	0.276

Note: Robust standard errors in parentheses. $^{+}p < 0.10$; $^{*}p < 0.05$; $^{**}p < 0.01$; $^{***}p < 0.001$.

TABLE 6 OLS regressions for Instagram sample with different measures of the dependent variable.

	Ln likes		Ln comments	
	H1-H2	H3-H4	H1-H2	H3-H4
Green	0.340*** (0.089)	0.245* (0.096)	0.348** (0.107)	0.397** (0.136)
Green × Text + Video	-	0.330 (0.218)	-	−0.169 (0.204)
Text + Video	0.183* (0.092)	0.143 (0.095)	0.252* (0.114)	0.272* (0.121)
Company	−0.731*** (0.069)	−0.745*** (0.069)	−0.250*** (0.067)	−0.243*** (0.068)
Holidays	−0.344** (0.110)	−0.341** (0.110)	−0.270* (0.133)	−0.271* (0.133)
Year dummies	Included	Included	Included	Included
Constant	2.485*** (0.102)	1.995*** (0.117)	0.519^{+} (0.289)	0.519^{+} (0.290)
N	700	700	700	700
Prob > *F*	0.000	0.000	0.000	0.000
R^2	0.746	0.747	0.402	0.403

Note: Robust standard errors in parentheses. $^{+}p < 0.10$; $^{*}p < 0.05$; $^{**}p < 0.01$; $^{***}p < 0.001$.

social media as the variable *Green* is largely significant across the models, except for cases related to comments and shares on Twitter. At the same time, this different result observed on Twitter also suggests that the social media platform where the given post is publicized matters. More interestingly, from Tables 5, 6, and 7 it can also be observed that the moderating role of media richness on the relationship between the presence of green content and consumer response depends on the social media platform where the communication is posted. Indeed, on Facebook the coefficient of the interaction terms between the dummies *Green* and *Text + Video* is positive and strongly significant, suggesting that in this social network the positive effect of the presence of green features on the consumers' response increases as media richness increases (i.e., moving from photos to videos). In contrast, on Instagram, the positive effect of the presence of green features on the consumers' response is unchanged as media richness increases. That is, photos/images and videos exhibit the same moderating effect on the relationship between green communication and consumers' response, as measured by likes and comments. Finally, quite surprisingly, on Twitter the positive effect of the presence of green features on consumers' response is higher for only text communication than for communication featuring "text plus photos/images" (except for likes), while being not significantly different between only text communication and "text plus video" communication. That is, on Twitter the highest benefit of green features tends to occur for either low or high media richness. This evidence does not support our hypothesis *H3*, yet it supports our hypothesis *H4*. Indeed, the increase of the consumers' response gap between green and non-green content as the media richness increases is more likely observed on Facebook than on Instagram and Twitter.

5 | ROBUSTNESS CHECK

In our main analysis, we have considered three different measures of consumers' response in social media: likes, comments, and shares. We kept these three dependent variables separate in our analysis as it is

TABLE 7 OLS regressions for Twitter sample with different measures of the dependent variable.

	Ln likes		Ln comments		Ln shares	
	H1-H2	H3-H4	H1-H2	H3-H4	H1-H2	H3-H4
Green	0.190* (0.079)	0.312^{+} (0.177)	0.031 (0.049)	0.297* (0.127)	0.074 (0.071)	0.388** (0.142)
Green × Text + Photo	-	−0.210 (0.201)	-	−0.369** (0.140)	-	−0.396* (0.165)
Green × Text + Video	-	0.015 (0.238)	-	−0.177 (0.171)	-	−0.301 (0.221)
Text + Photo	0.236** (0.086)	0.264** (0.092)	0.154** (0.053)	0.199*** (0.055)	0.362*** (0.079)	0.407*** (0.086)
Text + Video	0.451*** (0.119)	0.444** (0.128)	0.373*** (0.087)	0.388*** (0.093)	0.637*** (0.125)	0.669*** (0.134)
Company	−0.229^{+} (0.136)	−0.236^{+} (0.135)	2.469*** (0.103)	2.462*** (0.102)	2.465*** (0.134)	2.460*** (0.134)
Holidays	0.320* (0.150)	0.313* (0.151)	0.145^{+} (0.084)	0.140 (0.085)	0.243 (0.158)	0.241 (0.157)
Year dummies	Included	Included	Included	Included	Included	Included
Constant	2.177*** (0.284)	2.183*** (0.280)	−0.139** (0.053)	−1.141** (0.055)	1.516*** (0.306)	1.506*** (0.298)
N	700	700	700	700	700	700
Prob > *F*	0.000	0.000	0.000	0.000	0.000	0.000
R^2	0.439	0.440	0.774	0.776	0.595	0.596

Note: Robust standard errors in parentheses. $^{+}p < 0.10$; $^{*}p < 0.05$; $^{**}p < 0.01$; $^{***}p < 0.001$.

not immediate to come up with an aggregate measure that would consider them jointly. Indeed, likes, comments and shares have very different meaning and value in terms of consumers' response. One intuitive way to obtain a reasonable aggregate measure is to weight the importance of likes, comments, and shares, and essentially sum the resulting weighted measures. The key point is therefore to compute the weights. In this section, we adopted this approach to show robustness of our findings even when the three measures are aggregated in a comprehensive dependent variable.

To compute the weights, we followed the *geometric average* aggregation rule suggested by several scholars (Crawford, 1987; Golany & Kress, 1993) as a useful method for determining weights. For example, for Facebook, the average values of likes, comments, and shares were first calculated, and pairwise comparisons were carried out by comparing the number of likes, on average 484, with the number of comments, on average 24, thus obtaining that one comment is proportional to 20 likes. Then, the number of likes was compared with the number of shares, on average 40, obtaining that one share is proportional to 12 likes. Finally, the number of shares is 1.67 times the number of comments on Facebook. At this point, the matrix of the above proportions (and their inverse) was constructed to enable us to calculate the geometric mean for each row. After normalization, we obtained that the relative weights of likes are equal to 3%, comments 61%, and shares 36%. These weights are in line with the importance that Facebook's algorithm gives to likes, comments, and shares (Swani & Labrecque, 2020). The same reasoning was used for Twitter's data, obtaining weights equal to 50% for comment, 39% for likes, and 11% for retweet (shares). Similarly, considering that on Instagram shares are not allowed, we obtained the following weights: 98% for comments and 2% for likes. Using all these weights, we computed the aggregate dependent variable *Performance*.

In Table 8, we report the results of our regression analyses considering the aggregate variable *Performance*, for the subsamples of posts on Facebook, Instagram, and Twitter, respectively. As can be observed, our hypothesis *H1* is confirmed across the three social media as the variable *Green* is largely significant across the models. Moreover, from Table 8 it is once again confirmed that the moderating role of media richness on the effect of green communication on consumers' response depends on the social media platform where the content is posted. Indeed, on Facebook the coefficient of the interaction term between the dummies *Green* and *Text + Video* is positive and strongly significant, suggesting that in this social network, the positive effect of the presence of green features on the consumers' response increases as media richness increases (i.e., moving from photos to videos). In contrast, on Instagram, the positive effect of the presence of green features on the consumers' response is unchanged as media richness increases. Finally, on Twitter the highest benefit of green features occurs for either low or high media richness. Overall, this suggests that our results are robust to the use of the aggregate measure of consumers' response.

6 | DISCUSSION AND CONCLUSION

6.1 | Summary of findings

In this paper, we have examined whether the presence of green features in social media communication has a beneficial effect on consumers' response in terms of likes, comments, and shares. Moreover, we have shed light on how this effect hinges upon the social media platform where the given communication is posted as well as upon the richness of the format (text, images, videos) utilized for the diffusion. To address these questions, we used an ad hoc dataset of posts of two major large-scale retailers (Conad and Coop) in the Italian market across three major social media, namely Facebook, Instagram, and Twitter. Our results suggest that the attention and awareness for

TABLE 8 OLS regressions for Facebook, Instagram, and Twitter samples with aggregate measure as dependent variable.

	Facebook		Instagram		Twitter	
Ln performance	**H1-H2**	**H3-H4**	**H1-H2**	**H3-H4**	**H1-H2**	**H3-H4**
Green	0.564*** (0.094)	0.143^{+} (0.085)	0.320*** (0.084)	0.228* (0.090)	0.106^{+} (0.064)	0.340* (0.142)
Green × Text + Photo						−0.315* (0.164)
Green × Text + Video		1.028*** (0.202)		0.320 (0.210)		−0.178 (0.189)
Text + Photo					0.263*** (0.071)	0.300*** (0.076)
Text + Video	0.283** (0.081)	0.007 (0.070)	0.151^{+} (0.088)	0.113 (0.092)	0.528*** (0.108)	0.545*** (0.116)
Company	−0.156** (0.058)	−0.168** (0.057)	−0.823*** (0.064)	−0.837*** (0.065)	1.423*** (0.118)	1.417*** (0.117)
Holidays	−0.142 (0.092)	−0.156^{+} (0.093)	−0.316** (0.103)	−0.313** (0.103)	0.287** (0.109)	0.283** (0.109)
Year dummies	Included	Included	Included	Included	Included	Included
Constant	0.341*** (0.060)	0.344*** (0.058)	1.080*** (0.102)	1.100*** (0.093)	1.575*** (0.244)	1.571*** (0.238)
N	700	700	700	700	700	700
Prob > *F*	0.000	0.000	0.000	0.000	0.000	0.000
R^2	0.211	0.263	0.759	0.760	0.377	0.379

Note: Robust standard errors in parentheses. $^{+}p < 0.10$; $^{*}p < 0.05$; $^{**}p < 0.01$; $^{***}p < 0.001$.

environmental issues on social media seem to have finally emerged prominently. Indeed, in general, green content posted on social media generates higher consumers' responses in terms of likes, comments, and shares, than non-green content. However, we also document that this positive effect of green content varies across social media, with the highest effect being observed on Instagram (at least for likes) and the lowest on Twitter (at least for comments). Interestingly, we also find that, in general, the positive effect of green content does not increase as media richness increases (i.e., moving from only text, to text plus photo, and then to text plus video). This is because the moderating role of media richness is also influenced by the type of social media where the given post is publicized. In this respect, we show that on Facebook the moderation is positive and significant. That is, the higher consumers' response to green content as compared to non-green content is magnified as media richness increases. On Instagram, however, this moderation is shown to be insignificant. Finally, on Twitter, this moderation is even nonmonotonic in the sense that the highest (positive) effect of green content is obtained for either low or high media richness (except for likes where the moderation is insignificant). These results have remarkable implications for both theory and practice, which we discuss extensively below.

6.2 | Implications for theory

Our study has important theoretical implications for four streams of literature. First, our results contribute to the stream of literature on social media usage for green communication. In this respect, a consolidated body of literature has documented a positive role of social media as a tool for firms and institutions to communicate their green initiatives (e.g., Castelló et al., 2013, 2016; Colleoni, 2013; Dunn & Harness, 2018; Korschun & Du, 2013; Perks et al., 2017; Reilly & Hynan, 2014). In particular, by grounding on stakeholder and legitimacy theories, several studies in this stream have contributed to explain which corporate communication approaches adopted in online social media are more effective in driving a convergence between corporations' sustainability agenda and stakeholders' social expectations, thus increasing corporate legitimacy in the eyes of consumers, stakeholders, and society as a whole (Colleoni, 2013; Korschun & Du, 2013). It is suggested that legitimacy is achieved through social media when the company is able to establish dialogs with users without imposing institutional conditions (Castelló et al., 2016). By reinterpreting our findings under the lens of stakeholder theory, our study contributes to the recent debate on the use of social media to build corporate legitimacy in the eyes of consumers. In this respect, we indeed reveal that green communication is a more suitable strategy than non-green communication to stimulate higher involvement from consumers in social media. As such, green communication in social media proves to be an effective tool at firms' disposal to build corporate legitimacy, at least in the eyes of consumers. Moreover, we characterize the role of important boundary conditions that favor the efficacy of green communication in building such legitimacy, namely the type of social media and the degree of media richness.

Second, our results advance the extant knowledge available in the literature on consumers' engagement in social media (Hollebeek et al., 2014; Kaplan & Haenlein, 2010; Lee et al., 2018; Li & Xie, 2020; Lim & Rasul, 2022; Osei-Frimpong & McLean, 2018; Sabate et al., 2014). Previous research has identified social media as a powerful instrument to engage consumers in a timely and direct manner and at higher levels of efficiency than can be achieved with more traditional communication tools (Hollebeek et al., 2014; Kaplan & Haenlein, 2010; Lim & Rasul, 2022; Osei-Frimpong & McLean, 2018; Rietveld et al., 2020). In particular, a number of antecedents that could influence consumer engagement on social media have been pinpointed, including the characteristics of brands (Algharabat et al., 2020), the efforts of marketers and their customer orientation

(Agnihotri, 2020; Lee et al., 2021), message characteristics and format (Ashley & Tuten, 2015; Bai & Yan, 2020; Lee et al., 2018; Lee et al., 2021; Li & Xie, 2020; Shahbaznezhad et al., 2021). We advance this stream from a theoretical perspective by showing that green communication can be an additional powerful tool for engaging consumers to the extent that it can be even superior to conventional non-green communication. Accordingly, it becomes important for future research in this literature to include green communication among the effective tools for firms to propel consumer engagement.

Third, we advance the stream of literature on the role of social media for firm-generated or user-generated content (e.g., Colicev et al., 2019; Kumar et al., 2016; Roma & Aloini, 2019), providing a cross-platform comparison perspective. This literature has underscored that the characteristics of communication vary across different social media as the latter typically differ both in terms of community-related aspects (e.g., community participants, social norms, rules) and in terms of technology-related features (e.g., different functionalities). We open up a new angle on this issue by revealing that, because of the aforementioned different characteristics, the effect of green content on consumer response depends on the given social media platform where the content is publicized. For instance, social media platforms such as Instagram characterized by younger, and thus more environmentally friendly users (Arora & Manchanda, 2021; Jalali & Khalid, 2022), are more likely to stimulate larger consumer response to green content. In contrast, platforms such as Twitter, typically characterized by short communication formats (e.g., Bigné et al., 2019), do not seem to be particularly favorable for green content.

Finally, we contribute to the literature on the role of media richness and social presence in determining the performance of communication (e.g., Kaplan & Haenlein, 2010; Klein, 2003; Osei-Frimpong & McLean, 2018; Roma & Aloini, 2019; Sabate et al., 2014). Grounding on MRT and SPT, prior studies propose that media that can stimulate broader sensory characteristics, such as videos, should be more effective instruments for user engagement than media exhibiting a lower degree of richness, such as plain text (Bonsón et al., 2015; Ji et al., 2019; Lock & Araujo, 2020; Roma & Aloini, 2019; Rosenkrans, 2009; Yin & Zhang, 2020). Our results instead reveal a more nuanced picture where an increase in the degree of media richness is not necessarily more beneficial to green than non-green communication. In fact, we explain that the extent to which the predictions of MRT and SPT apply depends once again on the characteristics of social media. In some social media platforms (e.g., Facebook), the expected positive moderating role of media richness on the relationship between green communication and consumers' response is observed. However, in other social media platforms, the social norms (and the enabling technological functionalities) developed over the years may promote the use of communication formats that are not necessarily those exhibiting the highest media richness. Under these formats, the consumer response to green content may be larger or at least comparable to that of richer formats. For instance, Instagram has traditionally promoted photos as the social norm in this community. Hence, we observe that no difference in the effect of the presence of green features emerges between photos and videos. Similarly, Twitter has always promoted short text communication, which may explain why this less rich format tends to generate higher consumer response than photos and the same level of response as videos. Therefore, our study offers new food-for-thought in this fourth stream of literature by pinpointing the type of social media as one important boundary condition for the role of media richness in consumer response to (green) firm-generated content. Theoretically speaking, it also confers a contextual nature to MRT and SPT.

6.3 | Implications for practice

Our findings also offer useful insights for firms engaged in environmental sustainability on how to design and manage their interactions with consumers in social media. First, we have shown that in recent years green communication has been able to stimulate larger consumers' response in social media than non-green content. This clearly suggests that companies engaging in green initiatives should consider investing in green communication campaigns in social media to increase the visibility of these initiatives, improve the interaction with consumers and stakeholders in general, and enhance the efficacy of their CSR strategy. The caveat is, however, not to fall into greenwashing practices that would instead have negative effects on the company's credibility in the long run.

At the same time, our findings offer tailored suggestions to firms for each social media platform. Indeed, due their intrinsic characteristics, some social media represent a more fertile ground for communicating green content. Firms should factor in these characteristics, and possibly fine tune their green communication strategy to the specific context. For instance, on Instagram, and to some extent on Facebook, users are more prone to embrace firm (communication) commitment to environmental sustainability, and thus firms should take advantage of the type of users active in these social media platforms for their communication. Other social media such as Twitter may require more attention to the type of users and social norms, and thus firms should carefully design the green content to be at least as effective as non-green communication. Moreover, firms pursuing environmental sustainability should consider the type of format (and its degree of richness and social presence) through which to communicate the green content. In this respect, we inform these firms that higher benefits in terms of consumer response associated with green content as media richness (and social presence) increases will occur only in some social media platforms. Therefore, the characteristics of social media matter not only in shaping the relationship between green content and consumer response, but also in shaping the moderating role of media richness in such a relationship. Indeed, higher benefits for green content emerge for videos as compared to photos only on Facebook. On Instagram no significant differences emerge, whereas on Twitter the positive moderating role of media richness tends to occur only partially, as the consumer response to green content is higher when moving from photos to videos, but not when moving from only text to photos. This implies that firms would need to consider the

characteristics of different social media platforms (e.g., social norms, rules, technical functionalities) where the green content will be posted when deciding the most appropriate format for their communication.

6.4 | Limitations and future research directions

Being the first study explicitly examining the performance of green versus non-green content across different social media, our study is not without limitations, which however offer opportunities for future research. First, our study focuses on two leading players operating in a specific industry in the Italian market. Therefore, future studies could consider selecting other industries or global companies, as well as conducting a multi-industry analysis to increase the generalization of our findings and gain a better understanding of how the variables under investigation may impact different sectors. Second, we have considered three prominent social media platforms for our study. However, as the social media environment evolves, other social media having quite different characteristics, such as Tik Tok, Snapchat, and so forth, will be more and more massively utilized by firms pursuing environmental sustainability. Therefore, extending our investigation to new social media will help further shed light on how and why the performance of green content will vary across social media. Third, given that our research relies on social media data, we did not directly survey the firms. This implies that some relevant issues about green communication cannot be addressed through our sample. For instance, some brands may decide to under-communicate about their efforts toward sustainability due to fear of being accused of greenwashing. Exploring the relationship between this fear and the propensity of brand sustainability communication is a very interesting direction for future research, which could be addressed by interviewing managers and combining their answers with data available on social media. Fourth, surveying firms and consumers, rather than simply relying on social media data, would also help overcome an another important aspect, namely understanding the reasons behind firms' decisions and viewpoints on green communication as well as consumers' motivations behind their positive or negative reactions to green content. Finally, while we have focused on the moderating role of social media and media richness, future studies could consider other moderators or contingent factors, such as the type of advertising content.

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