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CSR Communication and Environmental Issue Networks in Virtual Space: A Cross-National Study

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Abstract

Nowadays, a significant portion of corporate social responsibility (CSR) communication takes place online. The current article attends to an essential, yet often overlooked element of online CSR communication: cross-sectoral hyperlink networks. The article argues that corporations build cross-sectoral hyperlink networks with nongovernmental organizations (NGOs) as a form of CSR communication to manage social issues. Using social network analysis, this article analyzes the hyperlink network data between 136 corporations and 94 international NGOs. Findings show that corporations' cross-sectoral ties serve as a communication strategy to respond to salient issues and manage issues that are relevant to these corporations. NGOs' tenure and network dynamics are also found to significantly affect the number of cross-sectoral ties built with corporations.

Keywords

cross-sectoral hyperlink networks, CSR communication, environmental issues, issue networks

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In response to the rising societal expectations, corporations often devote considerable efforts to communicate corporate social responsibility (CSR) initiatives to stakeholders (Basu & Palazzo, 2008; Ihlen, Bartlett, & May, 2011). In recent years, scholars from disciplines such as communication (Ihlen et al., 2011), marketing (Podnar, 2008; Porter & Kramer, 2006), and management (Du, Bhattacharya, & Sen, 2010) have extensively examined the processes and outcomes of CSR communication. For example, studies have examined the strategies corporations use to communicate CSR initiatives, content-analyzed corporations' CSR messages, and investigated the potential business returns of CSR campaigns (Chapple & Moon, 2005; Kim, Nam, & Kang, 2010). Skeptics of CSR communication have pointed out that some firms may promote CSR as a form of greenwashing, which refers to the practice of positively communicating corporations' poor environmental performances to mislead stakeholders (Delmas & Burbano, 2011; Walker & Wan, 2012).

As corporations' CSR practices increasingly migrate to the digital space, many highlight the growing complexity of online CSR communication (Colleoni, 2013; Etter, 2013). Hyperlinks, one of the fundamental features of the digital space (Rogers & Marres, 2000), are increasingly utilized by corporations to communicate cross-sectoral CSR collaborations (Shumate & O'Connor, 2010a, 2010b). Hyperlinks constitute a subtle yet powerful element of online communication. As Hespos (2008) put it as follows: "hyperlinking has changed the fundamental dynamics of human communication" (p. 137). When stakeholders seek information to make sense of a social issue, they often turn to the web and navigate through a system of hyperlinks. The connection pattern among key organizations helps stakeholders identify the scope of an issue and the actors involved that contribute to the issue solution (Young & Leonardi, 2012). For example, when stakeholders (e.g., local residents, future investors, etc.) of a local water pollution issue visit relevant environmental nongovernmental organizations' (NGO) websites to look for information about the issue, they may click through hyperlinks that take them to find corporations that have donated to support the cause. The corporations connected with the environmental NGOs may, therefore, be perceived as responsible corporate citizens.

In addition, publicly visible hyperlinks among corporations and NGOs are "symbolized to stakeholders to influence the mobilization and creation of capital" (Shumate & O'Connor, 2010a, p. 578), including human, social, and financial capitals. Corporate hyperlinks have a considerable resource mobilization potential. The top 500 most popular websites in the world are all corporate owned (Alexa Web Analytics, 2015). Corporate sites significantly direct web traffics and social attention to certain issues and civil society actors. A deep understanding of corporations' hyperlinking patterns,

therefore, allows us to anticipate what social issues and civil society actors are more likely to receive strong support.

We argue that hyperlinks help corporations construct a sphere of references that could form the context for stakeholders to interpret the meaning of CSR initiatives. Habermas (1991) has argued that corporations can construct public spheres within which different actors discuss relevant issues. A public sphere is a social space where individuals can freely discuss issues of common interests, and through their discussion, identify solutions and proper actions. Specifically, one way through which corporations can construct a sphere of CSR interpretations is by forming hyperlinks with NGOs specializing in different social issues. Compared with corporations, NGOs are better trusted by publics on issues such as environmental protection (Shumate & O'Connor, 2010b). Hyperlinks with NGOs enable corporations to "enter the public dialogue, offer legitimacy claims, and create positive relationships with publics that can influence their institutional operating environments" (Shumate & O'Connor, 2010b, p. 584).

Research has found that corporations do not randomly select NGO partners and such decisions are made with prudence and careful considerations. Among a sample of U.S. Fortune 500 companies, Shumate and O'Connor (2010a) found that each corporation only communicated alliances with a few NGOs and selected only one NGO in each issue area. In other words, corporations seem to strategically select partners and build hyperlink networks around selected social issues. To advance research in this area, the current article asks what factors would influence the structure of cross-sectoral hyperlink networks among corporations and NGOs. The article focuses on environmental issues because environmental protection and sustainability presents severe global challenges, and environmental CSR is a significant component of CSR worldwide (Orlitzky, Siegel, & Waldman, 2011). Guided by a set of hypotheses (see Table 1), the article examines the effects of a range of factors, including the relevance of social issues to a corporation, the salience of issues in society, NGOs' characteristics, and network dynamics on the level of cross-sectoral hyperlinking activities (see Figure 1 for the conceptual model). Our analysis shows that corporations' cross-sectoral hyperlink networks are a communication strategy that helps corporations to respond to salient issues and manage issues that are relevant to these corporations. Findings further demonstrate that NGOs' tenure and endogenous network dynamics also powerfully affect the level of cross-sectoral ties in the digital space.

In the remainder of the article, we first discuss CSR communication in the networked digital sphere, with a focus on CSR-related hyperlink networks. We then explain how these networks can be influenced by issue salience and

Table 1. A Summary of Hypotheses Predicting the Likelihood of Building Cross-Sectoral Hyperlinks.

Hypotheses tested	Independent variable	Result
H1: Corporations receiving negative environmental news coverage are more likely to build cross-sectoral hyperlinks with environmental NGOs	Negative environmental news coverage associated with corporations	Supported
H2: Corporations' environmental performance ratings are likely to negatively correlate with the cross-sectoral hyperlinking level.	Corporations' environmental performance	No significant correlation was found.
H3: NGOs working on certain salient issues (e.g., sustainable development, climate change, etc.) are more likely to build cross-sectoral hyperlinks than other NGOs.	Environmental NGOs' issue areas (N = 14)	Supported
H4: The more an environmental issue receives media coverage, the more likely corporations would build cross-sectoral hyperlinks with NGOs working on this issue.	The amount of media coverage of environmental issues	Supported
H5a: The industry types of corporations are likely to influence their levels of cross-sectoral hyperlinks.	Corporations' industry types (N = 11)	Not supported
H5b: Corporations with higher annual revenues are more likely to build cross-sectoral hyperlinks.	Corporations' annual revenues	
H6: NGOs with longer tenures are more likely to build cross-sectoral hyperlinks with corporations.	NGOs' tenure	Supported
H7: The number of neighboring organizations engaging in cross-sectoral hyperlinking is likely to increase the likelihood of building cross-sectoral hyperlinks.	Partnering organizations' cross-sectoral hyperlinking level	Supported

Note. The dependent variable for all hypotheses is the likelihood of building cross-sectoral hyperlinks, defined as the formation of hyperlink ties between corporations and their nonprofit counterparts, and vice versa. NGO = nongovernmental organization.

network dynamics. To test our hypotheses, we use data-mining techniques to collect the hyperlink network data among a sample of Global Fortune 500

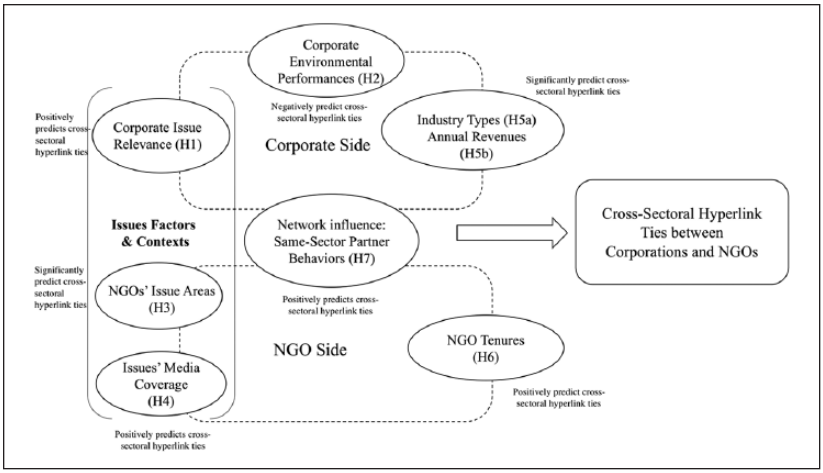

Figure 1. Issue relevance, context, and network factors predicting cross-sectoral hyperlink ties between corporations and environmental NGOs.
Note. NGO = nongovernmental organization.

multinational corporations and international NGOs (INGOs). We further apply the exponential random graph models (ERGMs) to analyze the data. Practical and theoretical implications are discussed.

Literature Review

CSR Communication in the Networked Virtual Space

CSR can be understood as a set of actions aiming at furthering social good, beyond the explicit pecuniary interests of corporations (Carroll, 1999). The idea of CSR first appeared in the second half of the 20th century. Although early critics of CSR (Friedman, 1970) believed that corporations share little responsibility beyond profit-making, abiding by the law, and basic ethical considerations, the current consensus agrees that corporations need to adapt to the raising societal expectations for corporate responsibilities and develop strategies accordingly. Over the years, as CSR values, norms, and standards gradually disseminate across the world, scholars have developed distinctive approaches to examining corporate CSR (for an extensive review, see Basu & Palazzo, 2008).

Communication about CSR initiatives supports the dialogue between corporations and stakeholders about what behaviors are considered socially responsible (Manetti, 2011). Communication also allows corporations to

inform stakeholders about their CSR performance. As business returns of CSR (e.g., purchase, seeking employment, investing in the company) are contingent on stakeholders' awareness of CSR initiatives (Du et al., 2010), the process of communicating CSR activities plays a vital role in CSR operation (Dawkins, 2005; Schoeneborn & Trittin, 2013). Extensive research has shown that effective CSR communication goes beyond a one-way broadcasting of information about CSR initiatives (Schoeneborn & Trittin, 2013), but requires practitioners to overcome various communication barriers—such as consumer skepticism and information overload, to build and maintain corporate reputation in today's ever-changing media environment (Ihlen et al., 2011).

Moreover, we argue that corporations use CSR communication to proactively or reactively *respond* to stakeholder concerns and demands to function sustainably in contemporary society (Devin & Lane, 2014). Strategic communication refers to organizational communication that is "aligned with the company's overall strategy, to enhance its strategic positioning" (Argenti, Howell, & Beck, 2005, p. 83). Strategic communication sits at the intersection of management strategy and communication, with a focus on how organizations use purposeful communication strategies to accomplish organizational goals (Hallahan, Holtzhausen, van Ruler, Verčič, & Sriramesh, 2007).

The conceptualization of CSR communication as a form of strategic communication suggests that CSR communication is not static, routinized organizational communication, but a communication strategy that allows organizations to respond to changes in the turbulent business environment, such as changing stakeholders' CSR expectations, societal standards, and media attention (Hallahan et al., 2007). Moreover, strategic CSR communication helps organizations proactively enter social dialogues that delineate corporate rights, roles, and responsibilities (Ihlen et al., 2011). Indeed, when corporations engage stakeholders in various issues, the boundaries of these issues are often co-constituted by all parties involved in the dialogue. The boundary of issues may become especially prominent in the virtual space, where organizations, individuals, and artifacts of communication (e.g., narratives, texts) are all interconnected via various forms of networks, and CSR communication messages are never interpreted in isolation (Barabasi, 2003). For example, the websites of organizations and their partner organizations are often connected through hyperlinks. As further discussed below, such interorganizational hyperlinks can be understood as an important strategy employed in CSR communication.

CSR and Hyperlink Networks

Hyperlinks are publicly visible tools that guide visitors' online navigation. In this article, without questioning the importance of text and discourse, we

argue that an important form of CSR communication is performed through the strategic use of hyperlinks. Hyperlinks have both a connective function and a symbolic function. Park and Thelwall (2003), for instance, argued that hyperlinks are not merely a technological capability that enables websites to connect with one another; they often are "designed, sustained, or modified by websites creators to reflect their communicative choices and agendas" (p. 6). In other words, the publicly visible hyperlinks communicate affiliations between the actors and are, thus, a form of representational communication (McPhee & Zaug, 2001; Shumate & O'Connor, 2010b).

Corporations may involve NGOs in CSR communication for a variety of reasons. For instance, NGOs often act as the external stakeholders that demand CSR actions (Basu & Palazzo, 2008). Engaging NGOs in CSR communication may help directly respond to such demands. Furthermore, especially for areas such as environmental protection, NGOs are often perceived by the general public as more trustworthy than corporations (Doh & Guay, 2006). Therefore, connecting with NGOs allows corporations to be perceived as more accountable and trustworthy.

In different issue areas, the structure and boundaries of hyperlink networks may help the public construct their understanding of social issues and make sense of corporations' roles (Young & Leonardi, 2012). For instance, when visitors navigate through a network of interconnected organizational websites, they obtain different information and perspectives from different sites. Moreover, the associations among organizations help provide "evidence of the topics and players involved in a social issue" (Young & Leonardi, 2012, p. 233). In other words, the public's online navigation experience helps them identify the actors involved with an issue and those actors' perspectives.

In recent years, a stream of research has examined issue networks on digital media (Huang & Sun, 2014; Kim et al., 2010; Rogers & Ben-David, 2008; Rogers & Marres, 2000; Shumate & Lipp, 2008). Although some of these studies are descriptive in nature, others attempt to offer theoretical explanations of the structural dynamics of hyperlink networks. In fact, studies have uncovered significant structural patterns (Monge & Contractor, 2003) that occur beyond what might happen by chance alone (Shumate & Dewitt, 2008).

Indeed, corporations rarely communicate with or respond to stakeholders in a social vacuum. CSR initiatives are always issue-specific in the sense that corporations would selectively take actions on certain issues rather than others, and respond to different issues under different circumstances. To explain the structural features of CSR hyperlink networks, the current article proposes to introduce a theoretical framework that accounts for the following factors: (a) the popularity of certain social issues among corporations; (b) the influence of media coverage, public attention, or issue-related scandals on

corporations' choices of NGO partners; and (c) the influence of network dynamics on the choices of NGO partners. We argue that the issues management theory offers unique insights to understanding how issue-related factors may influence the cross-sectoral hyperlink networks among corporations and NGOs. In the next section, we discuss the concept of issue and issues management in greater details.

Issue and Issues Management

For corporations, building hyperlink connections with NGOs is a form of CSR communication through which corporations position themselves within certain issue spaces and manage these issues. Issues are contestable matters of concerns regarding facts, values, or policies (Young & Leonardi, 2012). Issues management refers to the process that deals with issue identification, research, analysis, organizational decision-making regarding those issues, and the communication of such strategies both internally and externally (Botan & Taylor, 2004).

The issues management process involves two fundamental processes: issue activation and response (Hallahan, 2001). Issue activation occurs when organizations and individuals recognize the existence of a social problem and start to assign the problem significance. Issue diagnosis is key in issue activation (Taylor, Vasquez, & Doorley, 2003). Issue response refers to how organizations involved in a social issue react to the issue and communicate their responses to various issue publics. Depending on issue diagnosis, organizations may choose from an array of response strategies that range from avoidance-confrontational tactics to outreach and alliance building (Hallahan, 2001). In general, the more salient an issue is to an organization and its stakeholders, the more likely the organization would adopt cooperative responses such as alliance building (Heath & Palenchar, 2009). In the current article, we view the communication of cross-sectoral alliances as a form of issue response, and explore the issue-related conditions that motivate corporations to opt for alliance building. Dutton (1993) and other scholars (Bansal, 2003; Dutton, Ashford, O'Neill, & Lawrence, 2001) identified three sets of conditions that affect strategic issue diagnosis: (a) organizations' relevance to the issue, (b) issue context-related factors, and (c) organizational characteristics. Each condition is discussed in the next section.

Organizations' Relevance to the Issue

Organizations are surrounded by numerous issues. Limited by managerial and resource constraints, organizations have to selectively respond to issues with

high priorities (Bansal, 2003). In general, the management's evaluation of an issue is often influenced by personal experiences (Dutton, 1993; Jaques, 2009). In the context of corporate communication, social issues such as environmental protection become directly relevant to management often through scandals, negative news coverage, and crises. Managers who fail to respond to negative issue coverage often face demotion if not more severe consequences (Heath & Palenchar, 2009). For example, in 2017, United Airline Chief Executive Officer's (CEO) inappropriate initial response to the news about the violent removal of a fare-paying passenger triggered public outrage and caused the company's stock value to plunge by 1.13% in the week following the incident (Creswell & Maheshwari, 2017). In fact, negative issues may escalate into crises, and effective issues management actively contributes to both pre and postcrisis management (Jaques, 2009). Drawing insights from issues management, we expect that for issues on which corporations already receive negative news coverage, these corporations are more likely to build and communicate alliance relationships with NGOs that work on these issues to manage stakeholder expectations. We, thus, hypothesize the following:

Hypothesis 1 **(H1):** Corporations receiving negative environmental news coverage are more likely to build cross-sectoral hyperlinks with environmental NGOs.

In addition to negative news, corporations may also build connections with NGOs to cover up their poor environmental performance. The use of CSR communication to mislead stakeholders about corporations' environmental performance is commonly known as greenwashing (Delmas & Burbano, 2011; Lyon & Maxwell, 2011). Nowadays, many companies are eager to communicate their greenness to cater to a growing "green market" (Delmas & Burbano, 2011, p. 77). Over time, the less sophisticated forms of greenwashing may decline, due to a combination of more skeptical stakeholders and the growth of public data and monitoring technologies (Bowen, 2014). Nonetheless, Bowen warns that more sophisticated and subtle forms of greenwashing may become pervasive. Although scholars have examined various types of greenwashing behaviors (Walker & Wan, 2012), little research has looked into the corporate practice of using hyperlinks with NGOs as a form of subtle greenwashing. Recognizing the gap, the current article hypothesizes that the levels of cross-sectoral hyperlinks would negatively correlate with corporations' environmental performance ratings:

Hypothesis 2 **(H2):** Corporations' environmental performance ratings are likely to negatively correlate with the cross-sectoral hyperlinking level.

Issue Context Factors

Moreover, issues differ in terms of their inherent social significance, temporal relevance, complexity, and categorical presence (i.e., whether similar issues have been discussed or resolved in the past; Dutton et al., 2001; Heath & Palenchar, 2009). Although environmental issues overall are significant, certain categories of environmental issues are more prominent than others. For instance, Rondinelli and Berry (2000) found that management tends to see valuable returns of investment in sustainable development, preservation of crucial resources and biodiversity, and environment research; whereas, issues such as indigenous people's rights or animal rights are rarely perceived by corporate executives as relevant. Consequently, NGOs working on different sub-issue areas may receive different levels of corporate recognition and support in the virtual space. Therefore, we hypothesize the following:

> **Hypothesis** 3 **(H3):** NGOs working on prominent issues (e.g., sustainable development, climate change, etc.) are more likely to build cross-sectoral hyperlinks than other NGOs.

In addition, another issue context factor is public attention. Research consistently documents that management may perceive greater necessity to cooperate when the public demands that actions are taken on serious issues (Rondinelli & Berry, 2000). Hallahan (2001) maintained that the choice of communication strategies should take into consideration the public involvement levels. The higher level of public involvement often leads to cooperative communication strategies. The publics are more likely to be informed about issues that receive a considerable amount of media coverage and, thus, pressure corporations to take actions (Heath & Palenchar, 2009). As communication research continues to suggest that mass media have the capacity to set the public agenda (McCombs, 2014), we expect that the level of news media coverage of a social issue may affect the level of corporate responsiveness, making corporations more willing to communicate alliances with NGOs working in the issue area. Therefore, we hypothesize the following:

> **Hypothesis** 4 **(H4):** The more an environmental issue receives media coverage, the more likely corporations would build cross-sectoral hyperlinks with NGOs working on this issue.

Organizational Characteristics

Both corporation and NGO characteristics may affect the cross-sectoral hyperlinking level. Dutton and colleagues (2001) found that various organizational

characteristics may affect organizations' response to issues. For instance, larger and financially established corporations are more likely to build alliances with NGOs than smaller firms, not only because they have greater resources at their disposal, but also because they tend to be more "CSR minded" in terms of utilizing CSR practices to gain competitive advantages (O'Riordan & Fairbrass, 2008). In addition, corporations' industry area is an important factor. In the context of environmental issues and sustainable development, industries may differ substantially in terms of their external effects on the environment. For instance, oil, gas, and other natural resource-mining industries are commonly associated with environment hazards such as pollution or resource depletion; whereas, other industries, such as financial or telecommunications, pose a significantly lower level of environmental risk. In short, we expect that corporations' industry types and financial conditions would affect the cross-sectoral hyperlinking level:

Hypothesis 5a (H5a): The industry types[1] of corporations are likely to influence their levels of cross-sectoral hyperlink.
Hypothesis 5b (H5b): Corporations with higher annual revenues are more likely to build cross-sectoral hyperlinks.

In terms of NGOs' standing and legitimacy status, as older NGOs are more likely to possess higher levels of legitimacy status (Margolin et al., 2015), corporations may prefer NGOs with longer organizational tenure (Shumate & O'Connor, 2010b). Based on previous research, we propose the following:

Hypothesis 6 **(H6):** NGOs with longer tenures are more likely to build cross-sectoral hyperlinks with corporations.

Network Factor

As hyperlink networks are social networks, the structure may be driven by network mechanisms. Previous studies find that network embeddedness creates favorable conditions for relationship formation through mechanisms such as peer pressure, or "isomorphism" (O'Connor & Shumate, 2010, p. 547). In other words, when a corporation is embedded in an issue network, where peer corporations tend to link with NGOs, the corporation is more likely to establish connections with NGOs out of peer pressure or external conformity. We, therefore, hypothesize the following:

Hypothesis 7 **(H7):** The number of neighboring organizations engaging in cross-sectoral hyperlinking is likely to increase the likelihood of building cross-sectoral hyperlinks.

Method

Sample

The sampling process took place in several steps. First, a list of 500 multinational corporations was obtained from the 2014 Global Fortune 500 list. In addition, to obtain a comprehensive sample of environmental INGOs, the research team first obtained a list of all identifiable environment INGOs from the Yearbook of International Organizations. By far, this is the most comprehensive source on INGOs (Landman, 2005; Smith & Wiest, 2005). Specifically, any INGOs that met the following criteria were included: (a) had members in more than one country, (b) mainly focused on environmental protection as suggested by mission statement, and (c) was a nonprofit and NGO. The final list included a total of 441 environmental INGOs. Second, a data-mining procedure using SocSciBot 4.0, a web crawler that mines hyperlink data (Statistical Cybermetrics Research Group, 2014), was used to collect hyperlinks among the total of 941 organizations. As not all corporations or INGOs had cross-sectoral ties, we further removed organizations that did not have any cross-sectoral hyperlinks from the sample. We also manually verified every link to ensure that each link did communicate cooperation/alliance relations (e.g., announcements of strategic partnership), and excluded any links that reflected conflict (e.g., NGOs challenge corporations on environmental issues) or utility purpose (e.g., NGOs paid to use corporation's service/technological support). The final sample included a total of 136 corporations and 94 INGOs.

Measures

Cross-sectoral hyperlink level. Each organization's cross-sectoral hyperlink level was measured by the total number of cross-sectoral ties the organization had. For example, corporations' cross-sectoral hyperlinks were indicated by the total number of links with INGOs ($M_{\text{cross-ties}} = 2.71$, $SD_{\text{cross-ties}} = 3.31$), whereas INGO's cross-sectoral hyperlinks were the number of connections with corporations ($M_{\text{cross-ties}} = 3.97$, $SD_{\text{cross-ties}} = 6.45$).

Neighboring organizations' cross-sectoral alliances index. This index was calculated in two steps: (a) all same-sector hyperlinks (hyperlinks between NGOs and hyperlinks between corporations) were identified and verified for each organization; (b) we inspected whether each organization's same-sector partners were also engaged in cross-sectoral hyperlinking, and "yes" was coded as "1" and "no" was coded as "0." For each organization, the total number of one-degree, same-sector partners that engaged in cross-sectoral hyperlinking was taken as the final value for this variable ($M_{\text{cross-ties}} = 2.71$, $SD_{\text{cross-ties}} = 4.53$).

NGOs' issue areas. In this article, we used the classification of environmental INGOs' issue areas as proposed by Global Environmental Action, an established NGO in close collaboration with the United Nations on environment issues, which included 14 issue areas: (a) sustainable development; (b) biodiversity; (c) animal rights; (d) forestry and plants protection; (e) climate change; (f) energy; (g) extractive industries such as logging, mining, and oil extraction watch groups; (h) water resource; (i) waste procession, recycling, controlling of pollution; (j) indigenous people's rights and environmental conversation; (k) environmental research and information sharing; (l) promoting local and global connection and networks among environmental NGOs; (m) foundations for environmental protection; and (n) mixed aims. Thirteen dummy variables were created with "mixed aims" being the reference group.

Issues coverage. Following the issue coverage measures developed by Gonzalez-Bailon (2009) and Pilny and Shumate (2012), we operationalized each issue's media coverage by the number of times the issue was mentioned by news media during a 1-year period prior to the collection of hyperlink data. The LexisNexis database was used to gather the number of news articles on each issue, with media genres set to include "newspapers," "major world publications," "magazines," and "wire services." We used the name of each issue area as search words. Except for the "mixed aims" NGOs, the media coverage regarding the 13 issues were collected. The media coverage for each issue ranged from 5 to 22,998, with an average of 2,904 articles (SD = 6,505). Following the common practice of transforming variables of high skewness, logarithmic transformation was made before entering the variable into the model.

Corporate related negative news. We operationalized this variable by measuring whether a corporation was negatively portrayed in environment-related news coverage in the previous year. We used a combination of each corporation's name and the keyword "environment" to identify the number of environmental stories from the LexisNexis database. Following the content-coding scheme developed by Pollach (2014), we manually identified negative news (N = 116). Specifically, two authors went over all the news pieces associated with the 136 corporations, discussing and reaching agreement on whether the tone and framing of the news coverage was positive, negative, or neutral. Among the 136 corporations that had at least one cross-sectoral tie, 20 corporations were associated with negative environment-related news.

Corporations' industry types. Following Shumate and O'Connor (2010b), we coded each corporation in one of the 11 industries: (a) chemical; (b) tobacco;

(c) mining minerals or other geological materials; (d) petroleum and gas mining and refining; (e) electric and new energy; (f) general merchandisers; (g) specialty retailers; h) motor vehicles and parts; (i) telecommunications; (j) hotels, casinos, and resorts; and (k) commercial banks. Ten dummy variables were created with "commercial bank" (the largest industrial group) being the reference group.

Corporations' financial conditions. A corporation's financial condition was measured by the corporation's annual revenue in 2014, collected from the online report published by the Fortune magazine (http://fortune.com/fortune500). All revenues were converted to U.S. dollars. Following the common practice of transforming variables of high skewness, logarithmic transformation was made before entering the variable into the model.

NGOs' tenures. To measure an NGO's tenure, the founding year of each environmental NGO was collected. The tenure was calculated by subtracting its founding year from 2014, which ranged from 5 to 78 years ($M = 26.00$, $SD = 15.28$). Logarithmic transformation was made before including this variable in the model.

Environmental performance ratings. Following Delmas, Etzion, and Nairn-Birch (2013), we used the KLD Research and Analytics dataset to evaluate the corporate environmental performance. KLD dataset reports a range of variables. Specifically, we used the number of total concerns (a scale ranging from 0 to 4, which measures the total number of environmental concerns such as hazardous waste and substance emissions) and the number of total strengths (a scale ranging from 0 to 5, which measures the total number of environmental strengths such as beneficial product and services). Overall, 57 U.S. companies in our sample have KLD ratings and were included for further analysis.

Analysis

To simultaneously test H1, H3 through H7, Bipartite ERGM was conducted. In addition, H2 was tested with the ANOVA.[2] Bipartite ERGM is a network modeling method uniquely equipped for predicting the formation of ties within a two-mode network (Wang, Pattison, & Robins, 2013)—that is, a network comprised of two different types of actors, such as corporations and NGOs (for a detailed review of the method, see Lusher, Koskinen, & Robins, 2013). The dependent variable in this model is the statistical likelihood of hyperlink tie formation between an NGO and a corporation. The independent

variables are parameters based on hypotheses (such as NGO and corporation characteristics) as well as network structural features (such as the network density).

The model estimation procedure included the following steps. First, based on hypotheses, we constructed variables and included them in the model (for details about parameter specification, see Lusher et al., 2013). After specifying the model configuration using the ERGM package in *R*, the program then ran a series of simulations and produced both parameter estimates and standard errors for variables. The interpretation of parameter estimates and standard errors is similar to that of a logistic regression, where the parameter values stand for the log ratios of a given variable in predicting the likelihood of cross-sector tie formation. In ERGM, statistical significance is assessed by dividing a parameter estimate by its standard error, and t greater than 1.96 suggests a significant relationship (Lusher et al., 2013), meaning the hypothesized process significantly predicts the formation of cross-sectoral ties.

We composed two bipartite ERGM models separately due to excessive collinearity. Collinearity is a common issue resulted from a significant level of correlations among independent variables (Lubell, Scholz, Berardo, & Robins, 2012). Collinearity can be adequately addressed through entering correlated variables into separate models.

Results

Table 2 presents descriptive statistics of organizations' cross-sectoral hyperlinking levels by corporations' industry types and NGOs' issue areas. Among the 136 corporations and 94 INGOs, the global distribution of cross-sectoral ties mostly existed among regions such as Europe, North America, South America, South East Asia, and Australia, whereas other regions such as East Asia, Africa, and East Europe rarely participated. Among the 136 corporations with cross-sectoral hyperlinks, commercial banks constituted the largest industry group (N = 26, 19.12%), followed by the petroleum and gas mining industry (N = 23, 16.91%). Corporations from the chemical, motor vehicles and parts, general merchandise, and special retailing industries each made up about 10% of the sample. The average revenue of these corporations was US$84.7 billion in 2014. Corporations from telecommunication ($N_{\text{cross-ties}}$ = 79), commercial banks ($N_{\text{cross-ties}}$ = 74), and petroleum/gas industry ($N_{\text{cross-ties}}$ = 61) had the highest level of cross-sectoral hyperlinking with environmental NGOs. For NGOs, research and information sharing (N = 16, 27.66%), animal rights (N = 15, 15.96%), and sustainable development (N = 13, 13.83%) are the top three issue areas where NGOs had cross-sectoral ties. Furthermore, environmental issues including climate change ($N_{\text{cross-ties}}$ =

Table 2. A Summary of Organizations' Cross-Sectoral Hyperlinking Level by Corporations' Industry Types and NGOs' Issue Areas.

	Number of organizations	%	Number of cross-sectoral hyperlinks per industry
Corporations (N = 136): By industry types (n = 11)			
1. Chemical	13	9.6	32
2. Tobacco	0	0	0
3. Mining minerals	3	2.2	5
4. Petroleum and gas	23	16.9	61
5. Electric and new energy	9	6.6	34
6. General merchandisers	14	10.3	46
7. Specialty retailers	11	8.1	19
8. Motor vehicle and parts	13	9.6	33
9. Telecommunications	24	17.6	79
10. Hotels, casinos, and resorts	0	0	0
11. Commercial banks	26	19.1	74
Sum	136	100	383
NGOs (N = 94): By environmental issues (n = 14)			
1. Sustainable development	13	13.8	65
2. Biodiversity	5	5.3	14
3. Animal rights	15	16.0	16
4. Forestry and plants protection	4	4.3	12
5. Climate change	7	7.4	103
6. Energy	4	4.3	39
7. Extractive industry	1	1.1	2
8. Water resources	9	9.6	17
9. Waste and recycling	5	5.3	13
10. Indigenous people's rights	1	1.1	2
11. Research and info sharing	16	16.0	62
12. Global connection and networks	8	8.5	21
13. Grant foundations	4	4.3	13
14. Mixed aimed	3	3.2	4
Sum	94	100	383

Note. NGO = nongovernmental organization.

103), sustainable development ($N_{\text{cross-ties}} = 65$), research and information sharing ($N_{\text{cross-ties}} = 62$) were the top three issue areas attracting the greatest number of cross-sectoral hyperlinks.

A closer examination suggested that a few organizations enjoyed extremely high in-degree centralities (defined as links an organization *received* from its cross-sectoral partners). These organizations were as follows: Google (normalized in-degree = 10.390), ING Group (normalized in-degree = 7.792), and General Electric (normalized in-degree = 7.359). Given that in-degree centrality indicates acknowledgment and authority, these organizations were well-respected in this cross-sectoral network. We also noticed that organizations with the highest out-degree centralities (defined as organizations who *sent* links to the largest number of cross-sectoral partners) were NGOs such as International Emissions Trading Association (normalized out-degree = 16.883), Greenhouse Gas Protocol Initiative (normalized out-degree = 16.017), and World Environment Center (normalized out-degree = 13.853). As out-degree centrality indicates an active pursuit of associations, those NGOs could be seen as actively seeking for collaboration.

Among the 57 corporations with KLD environmental performance ratings, the average value of environmental concerns is 0.75 ($SD = 1.12$) and the average value of environmental strengths is 2.33 ($SD = 1.46$). When we compared our sample against samples reported in other studies, corporations in our sample exhibited better environmental performances. For instance, Chava's (2014) analysis based on all KLD firms between 1992 and 2007 reported the mean of number of concerns variable at 0.37 and the mean of environmental strengths at 0.19. Overall, the majority of corporations 57.9% ($N = 33$) in the sample posed low levels of environmental concern, with exceptions such as Chevron, Conoco Phillips, and Exxon Mobil. Meanwhile, about 88.5% ($N = 51$) corporations were identified to have at least one area of environmental strength. Boeing, Procter & Gamble, Ford Motor, General Motors, Intel, and IBM were the six corporations that had the highest strengths ratings.

Two separate bipartite ERGM models tested multiple hypotheses (see Tables 2 and 3). The following results and coefficient estimates were obtained from converged models.[3]

H1 predicted that negative environmental news coverage significantly affected corporations' cross-sectoral hyperlinking level, and it was supported. The result suggested that corporations with negative news coverage were associated with more cross-sectoral ties (Estimates = 0.46, $p < .001$). Compared with the rest of the corporations, those with negative environmental news coverage exhibited 22.6% more ties with environmental NGOs.

To assess whether corporations that received low KLD environmental ratings might build more cross-sectoral ties to greenwash their performance (H2), two one-way ANOVAs were conducted. The analysis assessed how (a) the total number of environmental concerns and (b) the number of environmental

Table 3. Parameter Values of Bipartite ERGM Model 1 and 2 Predicting the Likelihood of Cross-Sector Tie Formation ($N_{corporations}$ = 136, N_{NGOs} = 94).

Corporations			Environmental NGOs		
Structural parameters (for control)	Parameters	*SE*	Structural parameters (for control)	Parameters	*SE*
Density	−3.73***	0.48	Density	−3.73***	0.48
Concurrent nodes in corporation network	−1.84***	0.38	Concurrent nodes in INGOs network	−1.61***	0.30
H1: Corporations' Negative News Relevance	0.46***	0.10	H3: NGOs' Issue Areas (*N* = 14)	1.60**	0.50
			Sustainable development	1.31*	0.54
H5a: Corporations' Industry Fields (*N* = 11)			Biodiversity	0.69	0.50
Chemical (reference)	—	—	Animal rights	1.50**	0.57
Tobacco	—	—	Forestry and plants protection	2.46***	0.50
Mining minerals and geological materials	−0.23	0.41	Climate change	0.31	0.62
Petroleum and gas mining and refining	−0.07	0.18	Energy	1.03	0.78
Electric and new energy	0.17	0.20	Extractive industry	0.69	0.52
General merchandisers	0.11	0.19	Water resources	0.93	0.55
Specialty retailers	−0.25	0.24	Waste and recycling	1.26	0.80
Motor vehicles and parts	−0.02	0.20	Indigenous people's rights	1.06*	0.50
Telecommunications	−0.02	0.17	Research and information sharing	0.59	0.52
Hotels, casinos, and resorts	−0.03	0.17	Promoting local and global networks	0.94	0.54
			Grant foundations	1.60**	0.50

(continued)

Table 3. (continued)

Corporations			Environmental NGOs		
Structural parameters (for control)	Parameters	*SE*	Structural parameters (for control)	Parameters	*SE*
H5b: Corporations' Annual Revenue	−0.49	0.34			
			H4: Issues' Media Coverage		
H7: Neighboring Organizations' Hyperlinking Level	0.05***	0.01	LogIssueMedia.1	0.82	0.46
			LogIssueMedia.2	1.12*	0.50
			LogIssueMedia.3	0.92*	0.46
			LogIssueMedia.4	1.83***	0.47
			H6: NGOs' Tenure	0.54**	0.13
			H7: Neighboring Organizations' Hyperlinking Level	0.05***	0.01

Note. ERGM = exponential random graph model; NGO = nongovernmental organization; INGOs = international NGOs.
$p<.001$***, $p<01$**, $p<.05$*.

strengths affected the number of cross-sectoral hyperlinks, respectively. Neither analysis identified statistical significance, $F_{concern}(4, 52) = 0.751$, $p = .562$; $F_{strength}(5, 51) = 0.881$, $p = .501$, suggesting that corporations' environmental performance did not significantly affect the propensity to build cross-sectoral ties. H2 was not supported.

H3 predicted that NGOs' issue areas would significantly affect cross-sectoral hyperlinking level, and it was supported. With "mixed-aims" NGOs being the reference group, the results showed that "sustainable development" NGOs were significantly more likely to establish alliances with Global Fortune 500 corporations (Estimates = 1.60, $p < .01$), so were NGOs working on "biodiversity" (Estimates = 1.31, $p < .05$), "forestry and plants protection" (Estimates = 1.50, $p < .01$), "climate change" (Estimates = 2.46, $p < .001$), and "environmental research and information sharing" (Estimates = 1.06, $p < .05$).

H4 predicted that the amount of issue coverage positively affected cross-sectoral hyperlinking level, and it was also supported. Results showed that the volume of coverage was positively associated with the number of cross-sectoral ties that NGOs received. In other words, NGOs working on social issues with a high level of public attention would be favored by corporations as cross-sectoral partners.

H5a, H5b, and H6 explored how corporations' industry types, annual revenues, along with NGOs' tenures may affect cross-sectoral hyperlinking level. H5a and H5b were rejected. Results suggested that neither corporations' industry types nor their financial conditions significantly predicted cross-sectoral ties. On the contrary, NGOs' tenures were significantly related to the likelihood of receiving corporate ties (Estimates = 0.54, $p < .05$), and H6 was supported.

H7 predicted that the number of neighboring organizations that engaged in cross-sectoral ties would positively influence an organization's cross-sectoral hyperlinking level, and it was supported. Our analysis revealed that this variable was a significant predictor (Estimates = 0.04, $p < .01$). The coefficient (see Table 3) further showed that if an organization's same-sector contact built one cross-sectoral tie, it would increase the chance for the focal organization to build cross-sectoral ties by 1.20%.

In sum, the analysis revealed an uneven global distribution of cross-sectoral hyperlinking pattern with some regions (e.g., Europe, North America) more densely connected than others (e.g., East Asia, Africa, and East Europe). Corporations that built cross-sectoral hyperlinks with NGOs tended to have good environmental performance ratings. When these corporations faced negative environmental news coverage, they were even more likely to strengthen their connections with environmental NGOs to showcase their commitment to environmental causes. The article also found that corporations selected NGO

partners by issue areas. In general, mainstream issue areas such as sustainable development appeared to be more attractive than obscure issues like animal rights. In addition, when certain issues received high levels of public attention, corporations would increase the level of cross-sectoral hyperlinks with NGOs working in these issue areas. Finally, certain organizational characteristics also attracted cross-sectoral hyperlinks: NGOs with long tenures were more attractive to corporations than newer counterparts. Corporations' decisions to enter cross-sectoral hyperlinking were also affected by a mimicry mechanism: When peer corporations built NGO connections, the focal corporation was more likely to follow suit.

Discussion

This article argues that corporations build cross-sectoral hyperlink networks with NGOs as a form of CSR communication to manage social issues. The article embraces the networked nature of digital communication and offers new theoretical and methodological approaches to studying online CSR communication. Several important findings emerge from the analysis. Specifically, the article finds that corporations' relevance to issue areas, the amount of media coverage associated with the issues, and NGO characteristics all influence the likelihood of cross-sectoral hyperlink tie formation. Moreover, network dynamics also significantly explain the structure of cross-sectoral hyperlink networks.

CSR Communication in the Networked Sphere

Online environmental CSR communication is not necessarily a one-way process where corporations broadcast messages to stakeholders. Rather, it could take the form of communication networks, where corporations and NGOs are embedded in issue networks and are connected by hyperlinks. In addition, different issue contexts may involve various types of stakeholders. The networked view of CSR communication further suggests that the previous approach of studying corporate communication in isolation may overlook important structural features that provide the reference of interpretation. The networked context, as investigated in the current article, may become increasingly influential in a digital media-saturated society. As more and more CSR communication takes place in the online sphere, CSR research needs to embrace new theoretical frameworks and research methods.

Furthermore, findings highlight the importance of media coverage and public opinions in CSR communication. As argued earlier, CSR communication supports and reflects the dialogues between business and society on a

range of social issues. In the process of CSR communication, corporations monitor their environment to identify issues of concerns. In addition, businesses respond to social concerns and stakeholder interests through the communication of corporate responsibility. For example, society may voice its concerns on business practices through negative media coverage. In turn, corporations use CSR communication to explain relevant corporate perspectives and actions. The communication process could potentially shape corporate policies and actions.

In addition, the symbolic and representational nature of corporate-NGO online alliances makes hyperlink networks an important component of CSR communication. Compared with traditional approaches to studying CSR communication, such as through corporations' CSR reports, hyperlink networks provide an alternative, yet important venue to understand how corporations can build links with NGOs to manage issues and fulfill CSR communication goals. As noted by Basu and Palazzo (2008), given the trend of increasing homogeneity and standardization in CSR reporting, analyzing corporations' annual CSR reports may yield limited insights to the underlying CSR communication patterns. By contrast, findings from the current article reveal that depending on a variety of factors, such as issue relevance and organizational characteristics, corporations may demonstrate distinctive patterns in their choices of hyperlinking partners.

Moreover, as CSR communication serves corporate goals and objectives (Ihlen et al., 2011), it is unlikely that corporations randomly select issue topics or NGOs with which to build connections. To understand how corporations make such complex decisions, the current article introduces the issues management approach to CSR communication to shed light on how organizations respond to issues through hyperlinking activities.

Issues Management and CSR Hyperlink Networks

In the current article, we focus on one important form of CSR hyperlink networks: the cross-sectoral hyperlink network that consists of corporations and environmental INGOs. The application of issues management in this context makes several assumptions. First, the issues management approach conceptualizes organizations as stakeholders of various social issues, and their collaboration is, thus, a reaction to issue-related social pressure (Waddell, 2005). Second, following previous research (McPhee & Zaug, 2001; Shumate & O'Connor, 2010b), hyperlink networks are defined as a form of symbolic and representational communication. Finally, corporations are strategic entities that are motivated to maximize profits and, at the same time, manage stakeholder relationships and expectations. When corporations go out of their

routine business to build connections with NGOs, the management does not make such decisions randomly, but with strategic intentions (Arenas, Lozano, & Albareda, 2009). Grounded on these assumptions, the theoretical framework and empirical findings from this article identify the following factors that influence corporate responses: corporations' relevance to an issue, issue context factors, organizational characteristics, and network mechanisms.

Organizations' relevance to an issue. Organizations' relevance to environmental issues strongly influences how corporations communicate cross-sectoral alliances through hyperlinks. We find that the amount of negative news that corporations receive was significantly associated with more hyperlinks with environmental NGOs. In representational communication, such as the hyperlink networks, relationships represent the public expression of affiliations with selected actors. Therefore, the connections with NGOs may allow corporations under scrutiny to enter the public sphere with different organizational claims and narratives (Shumate & O'Connor, 2010b).

Nonetheless, our findings suggest that we should not simply dismiss cross-sectoral hyperlinks as greenwashing. The current article does not offer support for such a speculation that corporations mainly link with NGOs to cover up negative environmental performance. The analysis actually identifies incidences where corporations with high environment performance ratings are active in building cross-sectoral hyperlinks. Building alliances with NGOs is potentially not a cost-effective tool for greenwashing, because NGOs may closely monitor their corporate partners. As noted by Delmas and Burbano (2011), NGOs often play crucial roles as informal monitors of firms' greenwashing behaviors. When collaborating with corporations, NGOs put their credibility under the spotlight and they need to carefully scrutinize corporate partners to protect their own reputation. For instance, Nature Conservancy, a NGO that received a sizable donation from British Petroleum (BP) after the company's oil spill, was harshly criticized for its association with the environmentally irresponsible company (Stephens, 2010). In other words, cross-sectoral hyperlinks may actually indicate certain levels of NGO endorsement.

Issue context factors. Although previous studies have found that corporations strategically select NGO partners in different issue areas (Elkington, 1998), little theoretical explanation to date has offered why certain issues are more readily sponsored by corporations than others. The issues management framework helps to explain corporations' choice of issue areas, and this article demonstrates that mass media coverage (which may affect stakeholder expectations and public attention) can be central to such choices.

In the current article, we find that issue areas such as biodiversity, forestry and plants protection, climate change, and research and information sharing tend to receive more corporate recognition than other environmental issues. Previous studies suggest that certain issues are more directly related to tangible, investment-related benefits and could demonstrate that corporations are investing in the future (Rondinelli & Berry, 2000). When working on those issue areas, it is relatively easier for corporations to communicate such cross-sectoral alliances to stakeholders, due to the greater alignment between these issues and the profit-making goals inherent to corporations. By contrast, areas such as animal rights and indigenous peoples' rights, though important to certain issue publics, may be perceived as less relevant to corporations' key stakeholders (e.g., investors, shareholders, etc.). Future studies may explore additional mechanisms that shape stakeholder perceptions of issue importance.

Moreover, the current article found that NGOs working on issue areas that have received more media coverage (e.g., climate change, waste processing and recycling) tend to receive more corporate connections. One possible explanation is that for issue areas with extensive media coverage, stakeholders may expect powerful corporations to take actions and to contribute to issue solutions (Jaques, 2009). As corporations increasingly find themselves living in digital "goldfish bowls," the power of social issues and public monitoring to shape CSR and cross-sectoral alliances may continue to grow. As such, corporations' publicly expressed alliances with these NGOs represent a move toward meeting stakeholder expectations. An example is that in 2015, after media extensively covered gender inequality issues in U.S. corporations, many American executives identified "gender equality as becoming powerful driver of corporate reputation" and expressed the willingness to enhance gender diversity (Harrington, 2015, para. 2). Similarly, in 2017, after media intensively covered Donald Trump's controversial Muslim ban, many corporations made high profile donations to American Civil Liberties Union (ACLU) and other human rights groups in support of refugee rights (Stack, 2017).

Another explanation for corporations' eagerness to collaborate with NGOs in popular issues may reflect a public relations tactic of media catching (Waters, Tindall, & Morton, 2010). In other words, working on salient issues allows corporations to easily tap into existing hot topics, and such actions help corporations attract more media coverage and maintain high visibility in the public sphere. In light of the findings, what seem worrisome are issues that attract scant media attention but are in urgent need of action. Future studies should explore communication strategies that help obscure environmental issues to attract media attention. For example, it is likely that international

conferences such as the United Nations Conference on Climate Change help elevate the public visibility of climate issues. For NGOs that have received limited corporate or social support, NGOs and policymakers need to explore ways to better communicate the value of these issues.

Organizational characteristics. Although our findings do not identify any corporate characteristics that might influence the cross-sectoral alliance networks, we find that established NGOs with a longer history are more popular among corporations. NGOs with a long tenure might be more institutionalized and less radical (Arenas et al., 2009), thus being perceived by corporations as more legitimate and less controversial choices.

Network mechanisms. Findings of the current article also highlight the importance of studying CSR communication through a network approach. The analysis reveals that network mechanisms powerfully shape the structure of the cross-sectoral hyperlink network. We find that connections with corporations that already establish cross-sectoral relationships enhance a focal corporation's likelihood to build hyperlinks with NGOs. Mechanisms such as interorganizational mimicking or the diffusion of business practices may explain this tendency (Monge & Contractor, 2003). Future studies may explore how CSR actions of highly visible corporations may affect other companies' participation in the CSR issue networks.

Finally, this article demonstrates that bipartite ERGM can be applied to examine connection patterns between corporations and civil society organizations. This method recognizes these organizations as two types of different entities while allowing the modeling of their interactions in the same models. In other words, this method is especially useful for examining cross-sectoral social networks. The emergence of inferential network statistics, such as ERGMs, has enabled researchers to test various mechanisms that explain or predict different forms of network configurations. Compared with traditional network analysis that was largely descriptive, this cutting-edge approach helps uncover more complex and emergent processes driving the evolution, development, and dissolution of complex relationships. In addition, given the abundance of information available online, this article exemplifies how innovative research methods, which combine automatic data mining and the rigor of human coding, can be integrated as a valuable approach for future research.

Limitations and Future Research

The current article has a few limitations. First, the article examines the cross-sectoral hyperlink network among corporation and NGOs. Although this

network represents a typical example of CSR hyperlink network, corporations may also initiate and maintain networked relationships with other CSR stakeholders such as local communities and individual stakeholders. Those forms of communication networks are also likely to form on social media platforms such as Facebook and Twitter. Future studies may examine how communication networks shape CSR discourse in a range of online contexts, and how corporate perspectives and practices evolve in the communication process. Second, although we examine the structure of the cross-sectoral hyperlink network, it is unclear how key stakeholders (e.g., employees, consumers, etc.) perceive these connections in this network, and whether corporate-NGO alliances are able to effectively communicate organizations' commitment to issue solutions. Future studies may conduct in-depth interviews to explore stakeholder perceptions. Furthermore, as we did not interview managers about their intentions or decision-making regarding initiating or maintaining hyperlinks, we do not know for sure if such decisions reflect executive-level corporate policy or the decisions of professional communication practitioners. Future studies may investigate the internal decision-making processes regarding online CSR communication. Finally, although we collected hyperlink data for 2014 and used media coverage from the year before, we cannot reliably assess when corporations created each hyperlink. As such, we cannot claim causal relationships between negative news and cross-sectoral hyperlinks. Future studies should collect data at multiple time points to reach more conclusive insights.

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Notes

1. Following Shumate and O'Connor (2010b), 11 industrial fields were used to code the World Fortune 500 companies. Detailed coding categories were specified in the "Method" section.
2. Given KLD only provided ratings for less than half of our sample corporations, the large amount of missing value rendered it inappropriate to enter KLD environmental ratings as covariates in the bipartite exponential random graph model (ERGM). Therefore, a separate ANOVA was conducted to test Hypothesis 2.

3. The modeling process of ERGM involves running an iterative simulation algorithm until obtaining a set of stable parameters. The model reaches convergence when the set of stable parameters are obtained. On the contrary, if the model fails to converge, the parameters obtained cannot be reliably interpreted. Therefore, a converged model is commonly regarded as the prerequisite for obtaining valid parameter estimations (Lubell, Scholz, Berardo, & Robins, 2012).

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