

# Power Dynamics and Corporate Power in Governance Processes: Evidence From U.S. Environmental Governance Systems

American Review of Public Administration  
2022, Vol. 52(3) 206–220  
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DOI: 10.1177/02750740211055221  
journals.sagepub.com/home/arp



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## Abstract

Prior research has documented involvement of government and civil society actors in governance processes, but has largely neglected a key player: corporate business interests. Combining insights from social-ecological systems, organizational systems theory, theories of governance and power, interest group rule-making participation, and non-state alternative environmental governance, we examine corporate involvement and power in environmental governance systems. Drawing on a sample of Twitter messages about fuel economy standards, posted between 2012 and 2020, we offer a sector-level discourse analysis of corporate power and its interaction with the sociopolitical environment. The results suggest that business interests are gaining increasing power in the participation arena of U.S. fuel economy governance processes. The results likewise indicate corporations' response to a changing political landscape in the U.S. Taken together, our analysis advances current scholarship on power dynamics in governance processes and on empirical assessment of power, offering implications for governance system design and implementation.

## Keywords

power, social media analysis, discourse analysis, corporate involvement, non-state environmental governance

## Introduction

Corporate involvement in governance processes has not been emphasized in the public administration (PA) literature. This can be attributed in part to the disciplinary boundaries advocated by many early scholars (e.g., Musolf and Seidman, 1980; Rainey et al., 1976). In recent decades, although the proliferation of non-state involvement in addressing public issues has fostered increased attention to alternative governance efforts in PA scholarship (e.g., Bingham et al., 2005; Peters and Pierre, 1998), corporate governance involvement remains marginalized compared to the predominant emphasis on civil society and nonprofits. The complexity and diversity of many governance challenges, however, demands a more inclusive, systematic perspective on governance design and practice (Agranoff & McGuire, 2001; Boschken, 2017; Mahoney et al., 2009; Ostrom, 2009). Such a perspective requires considering the role of corporate actors (Ba, 2021; Cashore, 2002; Hsueh, 2013; Kraft & Kamieniecki, 2007; Scherer & Palazzo, 2011).

Better understanding corporate involvement in governance processes requires a detailed articulation of corporate power, as power is essential to convening stakeholders, managing resources, and addressing conflicts (Brisbois & de Loë, 2016; Bryson et al., 2006). This is particularly true in the environmental sphere, where many governance challenges

are cross-boundary, multi-scale, and dynamic in nature (Andonova et al., 2009; Ba & Galik, 2019; Boschken, 2017) and are plagued by conflict and an unwillingness to deliberate and contribute to negotiated decisions (Anderies & Janssen, 2013; Bodin, 2017; Yi & Cui, 2019). The need to examine corporate power in environmental governance (EG) systems is also suggested by recent shifts in global and regional political contexts, in which a reconfiguration of power and authority has been emerging due to retrenchment of state forces and proliferation of market-driven solutions (Cashore, 2002; Mol, 2016; Reed & Bruyneel, 2010).

Despite its importance, current scholarship on non-state alternative governance is insufficiently developed to lend the necessary insight into power and power dynamics. Research on this topic is often complicated by the ambiguity and fluid distribution of power in governance systems, as well as by the complexity created by interactions among stakeholders and between stakeholders and their

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environment (Boschken, 2017; Huxham & Vangen, 2000; Ostrom, 2009; Purdy, 2012). Further, research in this line tends to emphasize individual cases (see, for example, Cashore, 2002; Driessen et al., 2012; Heikkila and Gerlak, 2005; Purdy, 2012). While a meso-level (i.e., individual governance arrangements) focus does help provide ample in-depth insights into mechanisms within singular systems (e.g., stakeholder involvement in the Baker River Hydroelectric Project, a regulatory relicensing process in the U.S. (Scott et al., 2020)), we argue that a broader, sector-level exploration of power and power dynamics in scaled-up governance processes is necessary to advance knowledge on power and its interaction with dynamics in the broad sociopolitical environment.

Scaled-up governance processes are those that transcend conventional meso-level boundaries, involve a larger number of stakeholders and potentially a set of meso-level governance arrangements, and may or may not have immediate solutions or outputs (Ansell & Torfing, 2018). In this case, a scaled-up governance process represents a more enduring and overarching form of governance with a greater diversity of participants and more complex negotiation (e.g., energy efficiency governance process on a national scale). The literature on social-ecological systems (SESs) and organizational systems theory (OST) likewise emphasizes recognizing macro institutional complexity and endogenizing interactions between governance systems and their contexts (Anderies & Janssen, 2013; Boschken, 2017; Ostrom, 2009). Analyzing power dynamics in scaled-up governance processes accommodates such systematic properties and contributes to a broader understanding of governance arrangements operating on different scales.

Recent advances in social media data analysis present a promising analytical approach. Social media platforms can serve as public spheres with minimal barriers to entry (Shirky, 2011) and transcend conventional structural and authority boundaries (Feeney & Welch, 2016). In governance processes, while adoption and/or perceptions of social media tools may vary depending on factors such as agency/organizational culture, resource affluence, and the interplay of personal and organization use of these tools (see Fusi & Feeney, 2018; Mergel & Bretschneider, 2013), we argue that, in general, the sheer volume of messages can provide a window into social interactions and related power dynamics (Bennett, 2012; Lillqvist et al., 2016). This is particularly useful for examining the role of non-state actors, whose power manifests primarily in the form of discourse-based power—the ability to shape public discourse for individual agendas (Jungherr et al., 2019; Palazzo & Scherer, 2006). The involvement of the public and other institutional participants (e.g., media and academia) further helps frame the unique context in which such discourse plays out.

The current analysis seeks to offer a sector-level assessment of corporate power and its interplay with a changing

political context in governance processes. Specifically, the analysis employs a discourse analysis approach (Johnstone, 2017) and leverages a novel sample of Twitter messages posted between 2012 and 2020. Relying on a three-pronged theoretical framework concerning both sources and exercising arenas of power, our analysis shows that business interests are gaining growing power in the participation arena of EG processes and interact with a changing political context in the U.S. As one of the first attempts to empirically assess corporate power in governance processes, our analysis contributes to the limited but growing literature on corporate involvement and power in governance systems, echoing the broad call for empirical explorations of power and power dynamics in PA (e.g., Brisbois and de Loë, 2016; Choi and Robertson, 2013; Purdy, 2012).

Below, we first provide an overview of scholarly efforts around the concepts of corporate EG involvement and power. A theoretical account of corporate power is detailed next, along with a proposition regarding its trajectory shift in U.S. EG systems. Given the exploratory nature of our analysis, we follow a proposition-and-evidence approach rather than a hypothetico-deductive design (McNabb, 2013). This is followed by an introduction of the empirical context, methodology, research data, and our analysis and findings. Our study concludes with a discussion of potential contributions and limitations as well as their implications for PA research and practice.

## Corporate EG Involvement and Power

EG denotes the system of institutional efforts such as rules, norms, and organizations to influence and manage environmental resources, actions, and outcomes for the purpose of addressing environmental challenges and enhancing sustainability (Lemos & Agrawal, 2006; Ostrom, 2009). From a SESs/OST perspective, EG is crucial to steering social-ecological interactions and interdependencies and can function on multiple scales and/or in varied contexts (Boschken, 2017; McGinnis & Ostrom, 2014; Ostrom, 2009). Despite its importance, EG does not always succeed in yielding desired outcomes (i.e., sustainable SESs; Ostrom, 2009). Dysfunctions typically manifest as conflicts among competing beliefs and interests (Anderies & Janssen, 2013; Huxham & Vangen, 2010), a tendency towards symbolic adoption and consensus decision-chasing (Gerlak et al., 2013), transaction costs of decision-making and intergovernmental and intersectoral collaboration (Deslatte et al., 2021; Scott et al., 2018), and concerns over legitimacy and accountability (Sandström et al., 2014).

The hurdles facing EG can partially be attributed to power asymmetry (Choi & Robertson, 2013; Gerlak et al., 2013; Holzscheiter, 2005), along with effect(s) caused by factors such as resource availability, institutional alignment, and variations in the sociopolitical and ecological environments (Boschken, 2017; Huxham & Vangen, 2010; Purdy, 2012).

Yet elucidating power and power distribution in EG processes is difficult given the multiple and overlapping dimensions of power as a concept and the various arenas in which power can be exercised (Brisbois & de Loë, 2016). In general, power in governance processes entails the capacity and ability of one party to affect others in a compelling and/or disabling manner, with or without the acknowledgement of those being affected (Lukes, 2005). Distribution of power thus conditions the functionality and performance of an EG process (Brisbois & de Loë, 2016; Bryson et al., 2006).

The literature on non-state alternative EG and SESs/OST has posited that distribution of power in EG processes can be complicated by challenges such as time lags between human action and environmental effect, complexity and uncertainty of climate and ecosystem response as well as their linkages with social processes, the paradox between development and sustainability, and the longstanding dilemma of collective goods versus local actions (Boschken, 2017; Du & Yi, 2021; McGinnis & Ostrom, 2014; Underdal, 2010). Such challenges, paired with contextual dynamics such as shifts in political and economic landscapes, will likely be the ground of power imbalances in EG systems, highlighting the imperative of carefully examining power dynamics in such processes.

EG encompasses an array of participants including government agencies, business entities, civil society and non-profit organizations, and local communities (Bodin, 2017; Gunningham, 2009). Conventionally, government agencies were considered primary actors due to the public-good nature of many environmental resources (Agrawal, 2001) and to government's sovereign policymaking authority and leadership (e.g., administrative regulations enforced by government agencies; Light and Orts, 2015). In recent decades, however, owing to the continued constraints on government budgets (Hsueh, 2013) and the increasing competition and scrutiny induced by globalization (Bernstein & Cashore, 2000), the primacy of government agencies has been reduced and, to some extent, replaced by a growing emphasis on shared policymaking authority and market-based policy solutions. Examples include industry self-regulatory mechanisms such as the Forest Stewardship Council at the transnational level (Cashore, 2002) and the Flame Retardants in Printed Circuit Boards Partnership program at the national and subnational levels (EPA, 2015).

Among non-state actors, corporations may have competitive advantages in performing governance functions (Kraft & Kamieniecki, 2007). Such advantages derive from their economic prominence and political power in various policy agendas (Kraft & Kamieniecki, 2007; Scherer & Palazzo, 2011), their social gains from participating in environmental and social responsibility networks (Potoski & Prakash, 2005), and their organizational and institutional adaptability in coordinating and facilitating governance solutions (Cashore, 2002; Hsueh, 2013). Traditionally, corporate

power manifests predominantly via indirect means such as lobbying in policy/political venues and mobilizing the public with media strategies, and via direct means such as participating in bureaucratic notice-and-comment rulemaking. Such phenomena have been thoroughly studied in the interest group rule-making participation literature (see Golden, 1998; Nelson & Yackee, 2012; Yackee, 2020; Yackee & Yackee, 2006).

In recent years, the proliferation of non-state EG efforts and waning state leadership have furthered corporations' involvement in EG processes. Through increasingly extensive participation mechanisms, corporate involvement has become more direct and vigorous, shaping environmental regulatory practices and outcomes at various levels (Driessen et al., 2012; Hsueh, 2020). For instance, the Trump administration's 2019 attempt to lower light bulb efficiency standards failed due to challenges posed by a major group of investor-owned utilities and other non-state actors in the electric utility industry (American Council for an Energy-Efficient Economy (ACEEE), 2019). Furthermore, to deal with the lack of coordinated leadership at the federal level, business-led initiatives such as America's Pledge and We Are Still In have been actively mobilizing society to pursue decarbonization in the U.S. (Hale et al., 2021).

Despite this growing influence, attitudes towards corporate EG involvement are mixed. On the one hand, as mentioned previously, involvement of corporate and civil society actors is expected to fill governance voids resulting from the ongoing downsizing of state leadership (Lyon, 2010; Pattberg, 2005). Additionally, for corporations, improved transparency and knowledge sharing as well as the political, social, and potential economic benefits from participating in EG will likely stimulate their beyond-compliance environmental actions (Ba, 2021; Driessen et al., 2012; Hsueh & Prakash, 2012; Potoski & Prakash, 2005). At the same time, disaffection towards corporate involvement stems from concerns over the potential risk of commodification of the environment (Liverman, 2004). Enhanced corporate access to regulatory and environmental resources may likewise aggravate democratic deficiency and environmental inequality (Lemos & Agrawal, 2006). Also, corporate EG involvement has often been criticized as merely symbolic and marginal (Kraft & Kamieniecki, 2007), serving little purpose besides greenwashing (Idowu & Pappasolomou, 2007; Lyon & Maxwell, 2011). Such dissonance further reinforces the need for a detailed examination of corporate power in EG processes.

### **Assessing Corporate Power: Theories and Proposition**

The literature on power acknowledges that conceptualizing power entirely as a resource with a zero-sum distribution fails to capture the various dimensions and contexts of

power (Huxham & Vangen, 2010; Purdy, 2012). This aligns with the context-aware approach to studying power that is emphasized by critical discourse analysis (see Jungherr et al., 2019). The current study, therefore, adopts a three-pronged theoretical framework concerning both sources and exercising arenas of power in governance processes that are embedded in SESs (Brisbois & de Loë, 2016; Lukes, 2005; Ostrom, 2009; Purdy, 2012; Figure 1). Specifically, given the non-state nature of corporations and the lack of changes in the sources of authority and resources and instruments, which will be detailed in the following paragraphs, this study focuses on power from discursive legitimacy.

### *Sources of Power*

In general, power in governance processes derives from three sources: authority, resources and instruments, and discursive legitimacy (Lukes, 2005; Purdy, 2012; Figure 1). Authority refers to the right to govern (Green, 2013). It denotes the institutional capacity to shape governance agendas, decisions, and actions (Brisbois & de Loë, 2016). In EG processes, unlike the authority of government agencies that is based on the consent of the governed, authority of corporate participants arises from corporations' representation of stakeholders (Moriarty, 2012), the public acceptance of their legitimate business activities (Bernstein & Cashore, 2007), and their potential effectiveness in complying with governance rules (Fuchs & Kalfagianni, 2009). The involvement of public institutions in governance processes grants corporations an additional layer of legitimacy (Light & Orts, 2015).

Resources and instruments constitute the material and relational foundation of corporate power in EG processes (Purdy, 2012). Resources and instruments include both tangible assets (e.g., financial, technological, and human capital) and intangible assets (e.g., reputational gains and social connections; Potoski and Prakash, 2005). They help enable and sustain corporate power and thereby the stability and effectiveness of an EG process (Gerlak et al., 2013). While corporations may have resource and instrumental advantages in certain cases, particularly when the costs of deploying such means are unfavorable for other participants (Blackman et al., 2006), this type of power does have its limits given the extensive monitoring and scrutiny from customers, investors, regulators, and environmental groups that is required and facilitated by the current market and regulatory systems (Lyon, 2010; Martínez-Ferrero et al., 2015).

While the relevance of authority- and resource-based explanations has long been acknowledged, only in recent years has discursive legitimacy been recognized as an independent source of power, echoing the shift from a liberal to a deliberative focus of democracy more broadly (Palazzo & Scherer, 2006; Vaara et al., 2006). Discursive legitimacy refers to the ability of a governing unit to speak on behalf of an issue in the public sphere (Hardy & Phillips, 1998; Purdy, 2012). It represents the ability to gain consistency

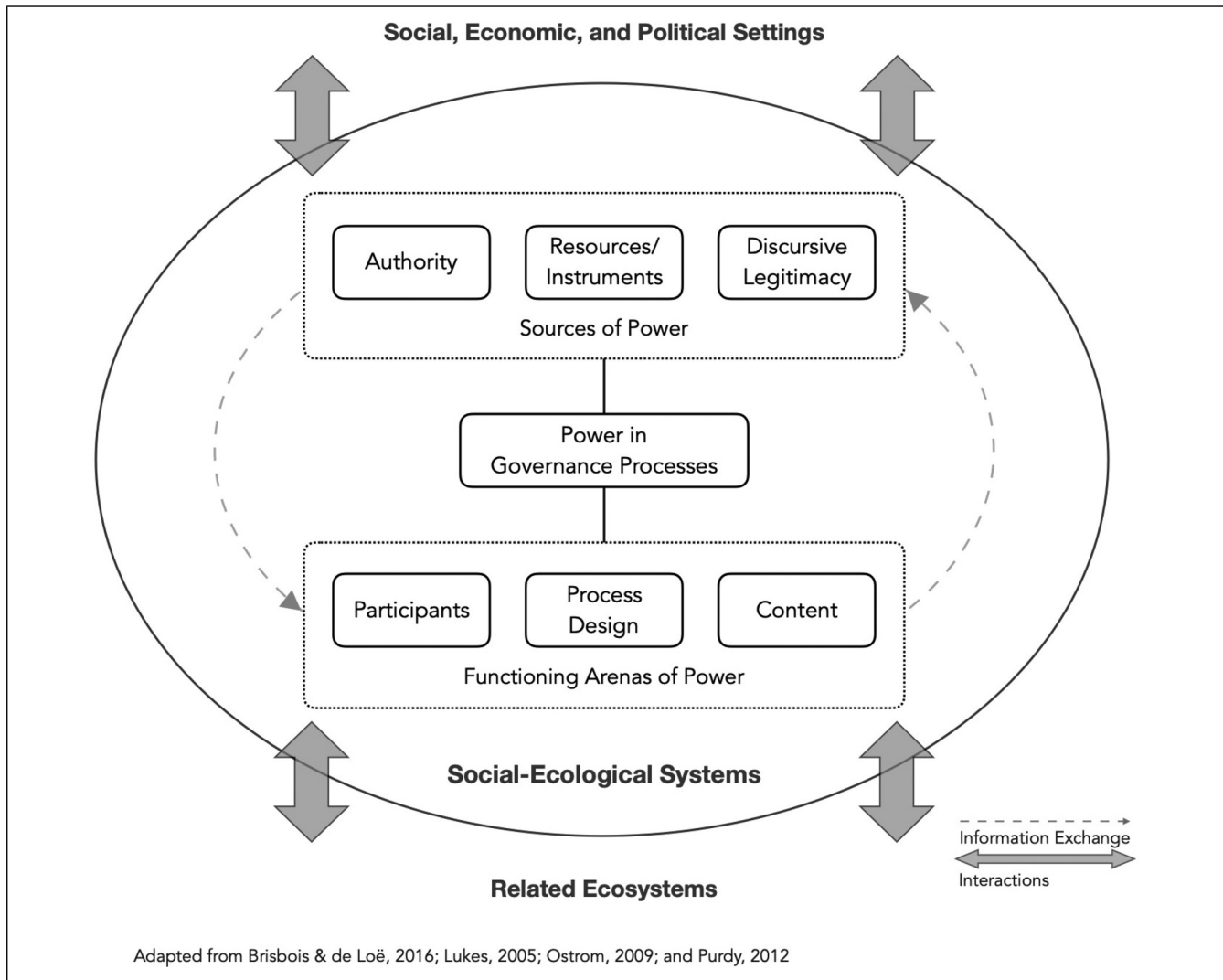
with associated public discourses by shaping social constructions pertinent to collective decision and action (Dryzek, 2001). For non-state actors such as corporations and non-profits, discursive legitimacy represents a vital basis of power as these actors lack the legitimacy, as traditionally defined in democratic politics, that is afforded to government actors (Palazzo & Scherer, 2006). As noted previously, given the lack of variation in authority and resources, discursive legitimacy holds a critical position in shaping power distributions in governance processes (Vaara et al., 2006). The current analysis thus focuses on discursive legitimacy to theorize corporate power in EG processes.

Discourse-based power can be broadly defined as access to, manipulation of, and dominance in public discourse and communication (Fairclough, 2002; Van Dijk, 1996). Theoretically, discourse-based power aligns with Lukes's (2005) view of power as control over what gets discussed and decided (i.e., the second dimension) and the discreet shaping of desires and beliefs (i.e., the third dimension). In this case, discourse-based power tends to be "persuasive and manipulative rather than coercive or incentive" (Lillqvist et al., 2016, p. 69; Van Dijk, 1996). In governance systems, therefore, discourse-based power might not yield immediate shifts in outputs or outcomes such as management strategies and practices, but rather the maintaining or altering of pertinent discourses and/or communicative interactions (e.g., content, structure, and frequency), and by extension power relations. Given that policy/political decision-making has increasingly become exclusionary of "certain modes of speaking, issues, and speakers" (Holzscheiter, 2005, p. 731), discourse-based power is vital to all types of participants in a governance process.

### *Arenas for Power*

Apart from the three aforementioned sources of power, there are likewise three arenas in which power can be exercised: participants, process design, and content (Purdy, 2012; Figure 1). Participants are the variety of actors involved in a governance process, whereas process design and content deal with immediate settings (e.g., means of negotiation and conflict resolution) and aims and deliverables of a governance process, respectively. In this study, given our focus on discourse-based power—which, as mentioned previously, does not always lead to immediate shifts in governance systems—it might be less appropriate to seek to examine variation in the process design and content arenas. We thus choose to concentrate on the participants arena for our proposition development and provide introductions of the process design and content arenas.

For non-state actors, participation in governance processes is one of their top influence tactics (Nelson & Yackee, 2012). In general, the range of participants varies based on framing of an issue (e.g., environmental challenge vs. public health concern), scope of involvement, willingness of stakeholders



**Figure 1.** A theoretical model for assessing power in governance processes.

to participate, and environmental and contextual dynamics such as policy shifts, economic turbulences, and ecosystem uncertainties (Anderies & Janssen, 2013; Boschken, 2017; Johnston et al., 2010; Paavola & Hubacek, 2013). The influence of these factors is, at least partially, contingent upon power and power relations (Niedziałkowski et al., 2012). This rationale lies in the potential effect of power distributions on the transaction costs of governance participants (Imperial & Yandle, 2005). Here, power emanating from authority and resources is instrumental in defining, legitimating, and sustaining governance participation (Johnston et al., 2010; Lukes, 2005), whereas power derived from discursive legitimacy aids in motivating, orientating, and rescoping participation (Lawrence et al., 1999; Purdy, 2012).

For corporations in EG processes, their power of shaping participation lies in their fiscal advantage and their capacity for leveraging involvement in pertinent discourses. Fiscally,

corporations can mobilize or demobilize other participants with financial approaches, particularly for the prevention of the potential crowding-out effects of state actions (Parker & Thurman, 2011). Additionally, firms are also found to provide financial support to environmental civil society groups to help pursue or maintain their competitive advantages in an industry (Baron, 2001). Yet as mentioned previously, this type of power appears limited to marginal variations given the stringent requirements for information disclosure from both investors and regulators (Martínez-Ferrero et al., 2015). This is particularly true in the environmental sphere where monitoring and auditing from environmental groups and public entities further curtails the use of financial advantages for corporate participants (Lyon, 2010).

In addition to portraying and rationalizing their own participation (Vaara et al., 2006), corporations can rely on discursive strategies such as media outreach and educational

efforts to channel competing interests and beliefs and to build coalitions (Brisbois & de Loë, 2016; Pattberg, 2005). This is because coalitions can help address the conflicts and mistrust that are pervasive in governance processes as well as the incompetence of individual voices in collective decision-making (Lemos & Agrawal, 2006; McGinnis & Ostrom, 2014; Nelson & Yackee, 2012). Compared to governmental and civil society members, corporations' organizational and institutional flexibility, connections to society that transcend jurisdictional and membership boundaries (Ruggie, 2003), and frontline involvement in a variety of environmental issues present an expanded space for their discourse-based power (Cashore, 2002; Hsueh, 2013). The increasingly constrained state leadership in both domestic and global EG systems is likely to provide additional grounds for corporate power as well (Cashore, 2002; Mol, 2016; Reed & Bruyneel, 2010). This leads to the following proposition: *Corporate power has increased in the participants arena of the U.S. EG processes over time.*

As for the process design arena, it accounts for variations in the immediate settings of a governance process. It defines both the means and the ends of decision-oriented interactions (Purdy, 2012). Specifically, process design operationalizes procedural and institutional agreements such as deliberation and negotiation channels, trust-building and conflict-resolution mechanisms, and learning- and resource-sharing approaches (Bingham et al., 2005). Along with the broader political, legal, socioeconomic, and environmental context, process design conditions how a governance process functions and adapts to changes (Ostrom, 2009). From a SESs/OST perspective, process design (i.e., organizational design) is vital to a governance system given that many governance challenges are caused by a misalignment between the governance structure and its context (Boschken, 2017). Due to its importance, process design has always been an influential arena to exert power. Here, authority-based power sets parameters for process design (e.g., membership status and communication modes) while resource- and discourse-based power modifies and confirms such parameters with tangible and intangible supplies and internal and external communications, respectively (Lukes, 2005; Purdy, 2012).

Lastly, the content arena deals with the aims and deliverables of a governance process. It builds on the outputs of participation and process design and represents the practices and outcomes associated with focusing a governance process on a certain set of missions and instruments (Purdy, 2012). Due to the limited capacity and attention of a governance process and to the conceivable resource constraints (e.g., time and budget), content-related decision-making is intrinsically a strategic sampling process from a limited range of alternatives (Birkland, 2007). The selective nature of the content arena again makes it a field for power confrontation. While carrying capacity of a governance system may be expanded with injections of new participants and resources (Pahl-Wostl & Knieper, 2014), the relatively restricted temporal and

institutional horizons may nevertheless bracket the list with a narrow set of options. Additionally, akin to participants and process design, the content arena is also subject to changes in the sociopolitical and ecological environments, which can lead to varied power distributions in EG processes. In this arena, authority- and discourse-based power aids in generating, disseminating, and prioritizing participants' preferred foci and solutions in an EG process whereas resource-based power helps further promote their respective preferences (Purdy, 2012).

## Empirical Context, Methodology, and Data

Our empirical analysis focuses on Twitter conversations about the Corporate Average Fuel Economy (CAFE) standards to assess corporate power in the U.S. EG processes. The CAFE standards are a set of federal regulations for improving fuel efficiency of cars and light trucks sold in the U.S. (National Highway Traffic Safety Administration (NHTSA), 2019). After more than thirty years in service since 1975 with marginal increments, the CAFE Standards were substantially changed by the Energy Independence and Security Act of 2007, which set a national fuel economy standard of at least 35 miles per gallon (mpg) by 2020, a 40-percent (10 mpg) increase from 2007 levels (the White House, 2007). Later, under the Obama administration, the standards were further raised to combat potential risks of climate change, yet the complexity of enforcement and compliance, due to the existence of various agencies and standards, complicated the regulatory process for both government and market participants. Specifically, the delegated authority of NHTSA to regulate fuel economy standards, the jurisdiction of the Environmental Protection Agency (EPA) over mobile source pollutant control, and the waivers granted under the Clean Air Act (CAA) that allowed states like California to set their own standards, created a complex three-fold regulatory architecture wherein a series of disputes and confusion took place (Oster, 2019).

Fuel economy regulations were harmonized temporarily in 2009 as part of a phased national program under the Obama administration, in which a set of less stringent standards were enforced nationally first (Phase I) with states able to apply more stringent ones later to model years 2017–2025 (Phase II). The national program, however, was challenged by the Trump administration in 2018 with an alternative set of regulations—the Safer Affordable Fuel Efficient (SAFE) standards—which lowered the Obama-era targets (Oster, 2019). As expected, the SAFE standards have led to yet another wave of controversy with challenges from a group of state governments as well as contingents from a divided auto industry, along with critiques from many environmental groups (Shepardson, 2019). With participants from across sectors working collectively towards a finalized set of regulations, the process of steering fuel economy in the U.S. is well suited for assessing corporate power in EG processes from a macro perspective.

Methodologically, the current study employs a discourse analysis approach and relies on social media data for the empirical analysis of corporations' discourse-based power as defined and described in the previous section. Discourse analysis entails the scientific study of "instances of communicative action in the medium of language or other media such as photography and architecture" for the understanding of such instances themselves and/or the information they reveal about the social world (contexts) in which they occur (Johnstone, 2017, P. 2). The rationale lies in a social constructionist view of discourses as meaning-making and bearing (Angermuller, 2015; Van Dijk, 2011). Discourse analysis is interdisciplinary and can apply to a variety of research topics including, for instance, power and social order in mass media, representation in culture and politics, and technologies of control and surveillance (Angermuller, 2015; Johnstone, 2017). In PA, discourse analysis has been applied to topics such as public value (see Wallmeier et al., 2019) and legal authority and privatization (see Mörth and Pierre, 2021). Given our interest in using social media data to assess corporations' discourse-based power in EG processes, discourse analysis proves a suitable approach.

The use of social media data to assess discourse-based power is justified by three arguments. First, from a discourse-analysis perspective, posts and interactions on social media (e.g., retweet and reply on Twitter) are themselves instances of communicative action that are meaning-laden and can reveal information about their social contexts (Johnstone, 2017). In other words, social media data can help identify structural relationships, such as dominance, discrimination, power and control, that are manifested in and through users' online activities (Wodak & Meyer, 2015). Along this line, similar to their more conventional counterparts such as newspapers and television, social media can also be processes of information calculation, manipulation, and design (Fairclough, 2002). Analyzing social media data thus helps depict power dynamics among users that post on shared topics (e.g., CAFE Standards) and/or interact with one another (Wodak & Meyer, 2015).

Second, access to public discourse is itself a form of power (Van Dijk, 2011), and social media have enabled an ever-larger number of participants in policy and political discourses, particularly non-state actors and those from traditionally less-heard communities such as individual citizens and consumers (Lillqvist et al., 2016; Shirky, 2011). The scale of such participation has made social media data uniquely advantageous in analyzing power dynamics in a more holistic manner, especially when the subject draws attention (e.g., public health and environment). While participation in other venues, such as bureaucratic notice-and-comment rulemaking, also can be useful in assessing power (see aforementioned Golden, 1998; Nelson & Yackee, 2012; Yackee, 2020; Yackee & Yackee, 2006), the scale of involvement of the public and other stakeholders in those venues is often much smaller compared to that of social media (see Golden, 1998; Richardson, 2016).

Third, social media have gone beyond being merely a technological communicative tool to become a political venue altering the power dynamics between states and their publics in nearly all policy areas (Seib, 2012). This is particularly the case for Twitter since the Trump administration. This is because activities on social media can easily translate into large-scale debates that shift offline political agendas and outcomes (Duncombe, 2019). Examples include the #MyNYPD protest against police brutality on Twitter (Hayes, 2017) and the more recent anti-vaccine movement on Facebook during the COVID-19 pandemic (Kalichman et al., 2021). This affective, political nature of social media (Duncombe, 2019), paired with their close relation to societal dynamics such as policy shifts and public crises, has made social media data useful in analyzing power dynamics in governance processes.

While using social media data to assess power appears fitting, it is not without limitations. First, given our focus on governance systems, other more power-laden means of communication such as text and email might be better suited to examine discourse-based power. Depending on level of confidentiality and purpose of use, text and email data might yield more information as well. Yet the difficulty in collecting them, particularly from across sectors, has prevented us from doing so in the current study. Future studies are thus encouraged to approach this line of research with these types of data. Second, and perhaps more importantly, caution must be exercised when using social media data, particularly from individual users and/or unverified accounts, because the quality of such data might be contaminated by challenges such as spam, colloquial usage, and information overloading (Agarwal & Yiliyasi, 2010). While our study focuses primarily on institutional users such as businesses and civil society members, it is important to acknowledge these potential biases.

Our data (tweets) were accessed with Crimson Hexagon in Brandwatch ([www.brandwatch.com](http://www.brandwatch.com)), a social media analytic platform providing subscribers with historical Twitter posts from all public accounts. For the purpose of this analysis, all tweets containing the phrase "fuel economy standards" and posted between February 24, 2012 and February 24, 2020 were collected. This resulted in a sample of 100,204 tweets. The period between 2012 and 2020 covers the four years before and after the 2016 U.S. presidential election, which marked a major policy shift in EG (Dallas & Waring, 2017; Popovich et al., 2019). The starting point of February 24 was selected as certain information (e.g., Number of Posts, Number of Followers, and Number of Followings) was unavailable in Crimson Hexagon's dataset for tweets posted prior to this date. The key phrase "fuel economy standards" was selected because samples based on "corporate average fuel economy" and "CAFE" yielded insufficient or too many irrelevant tweets, respectively. In our sample, each tweet is also associated with information such as time posted, author status (i.e., Number of Posts, Number of Followers, and Number of Followings), and

post type (i.e., Tweet, Retweet, and Reply; See Appendix A). A random sample of 10,020 (10%) tweets was pooled for empirical analysis.

Prior to empirical testing, all tweets were manually coded for Participant Category based on their author information. This was guided by both literature review on Twitter user classification research (Kim et al., 2017) and field experts (see Appendix B for the codebook). In our sample, six categories of users are identified with 7,910 (78.94%) being Individuals, 900 (8.98%) being News & Information, 514 (5.13%) being Civil Society (e.g., nonprofit organizations), 387 (3.86%) being Business, 242 (2.42%) being Research & Academia, and 67 (0.67%) being Government.

## Analysis and Findings

In order to assess corporate power in the participants arena, which highlights the constellation of actors involved in a governance process and their interactions, the current analysis focuses on two measures of influence. The first measure considers indegree influence at the individual user level and the second deals with involvement influence at the group level. Specifically, indegree influence measures the degree of recognition and leadership a user garners on a social media network (Riquelme & González-Cantergiani, 2016). We adopt an indegree influence measure developed by Aleahmad et al. (2015), which considers an exponential relationship between a user's audience size (i.e., number of followers) and its indegree influence (see Equation 1). Compared to conventional indegree influence measures such as the Twitter Follower-Following ratio (TFF), the Aleahmad et al. (2015) measure mitigates the potential biases due to inconsistency between the numbers of followers and followings and outliers in each of the two metrics.

$$\text{Indegree Influence } (i) = 1 - e^{-\lambda F(i)} \quad (1)$$

In Equation 1, indegree influence of user  $i$  is a function of its number of followers,  $F(i)$ , and  $\lambda$  is a constant factor for tuning

the influence score and needs to be adjusted based on the indegree centrality (i.e., number of followers) in each sample (Aleahmad et al., 2015). Given the distribution of number of followers in our sample (mean = 15,920.17, IQR = 2,124.75),  $\lambda$  is set to  $10^{-3}$ . The second influence measure considers involvement influence at the group level. Specifically, it measures the percentages of replies and retweets in the total posts by a type of users over a given time period. Put differently, the involvement influence measure aggregates the numbers of replies and retweets for different types of users over a certain timeframe and presents the relative shares. On Twitter, a reply represents a response to another user's post while a retweet is a re-posting of someone else's tweet to one's own followers (Twitter Help Center, 2019). Both are means of interacting with other participants and accordingly can help depict the scope and dynamics of corporate power in the participation arena of steering fuel economy in the U.S.

As for the measure of indegree influence, we focus on dynamics within each user category across the sampled timeframe on an annual basis. Given the lack of equal variances and limited numbers of observations for certain user categories in our data (see Appendix C), we perform a Kruskal-Wallis test (Kruskal, 1952) to examine variations in indegree influence for each user category. The Kruskal-Wallis test is considered a distribution-free alternative to the one-way analysis of variance (ANOVA) F test to detect statistically significant differences between two or more groups (Spurrier, 2003). Table 1 displays the average indegree influence scores of each user category from 2012 to 2020 and the Kruskal-Wallis statistics. A higher average indegree influence score indicates more influence. These results suggest that, for most of the user categories, their indegree influences present limited variations during the sampled timeframe. For business users, however, the results suggest an upward trend from the year 2016 to 2020, during which period the Trump administration assumed power and the SAFE standards were introduced. While this may not prove any conclusive relationship, it does indicate the growing

**Table 1.** Average Indegree Influence by User Category & Kruskal-Wallis Statistics (2012–2020).

Year	Business	Government	Civil Society	Research & Academia	News & Information	Individual
2012–2013	0.901 (0.250)	0.932 (0.202)	0.974 (0.125)	0.932 (0.209)	0.899 (0.303)	0.839 (0.262)
2013–2014	0.350 (0.321)	0.582 (0.288)	0.514 (0.387)	0.586 (0.377)	0.568 (0.283)	0.349 (0.370)
2014–2015	0.580 (0.423)	-	0.638 (0.350)	0.529 (0.373)	0.620 (0.407)	0.209 (0.288)
2015–2016	0.501 (0.364)	1.000 (0.000)	0.544 (0.354)	0.611 (0.403)	0.632 (0.315)	0.273 (0.322)
2016–2017	0.420 (0.338)	0.666 (-)	0.636 (0.321)	0.567 (0.371)	0.725 (0.318)	0.372 (0.348)
2017–2018	0.496 (0.337)	0.68 (0.408)	0.696 (0.332)	0.666 (0.366)	0.605 (0.322)	0.417 (0.349)
2018–2019	0.487 (0.401)	0.783 (0.327)	0.692 (0.338)	0.700 (0.342)	0.625 (0.343)	0.464 (0.354)
2019–2020	0.661 (0.359)	0.900 (0.229)	0.690 (0.311)	0.728 (0.348)	0.682 (0.313)	0.454 (0.357)
Kruskal-Wallis Statistic	73.711*** (0.000)	12.019 (0.062)	42.199*** (0.000)	14.434* (0.044)	139.800*** (0.000)	362.680*** (0.000)

Note: Standard deviations in parentheses for average indegree influence scores. P-values in parentheses for Kruskal-Wallis Statistics. \* $p < .05$ ; \*\* $p < .01$ ; \*\*\* $p < .001$ . - Zero or one record.



(indegree) influence of business interests in the governance process of fuel economy regulation since 2016, as well as business interests' interaction with dynamics in the broader sociopolitical environment.

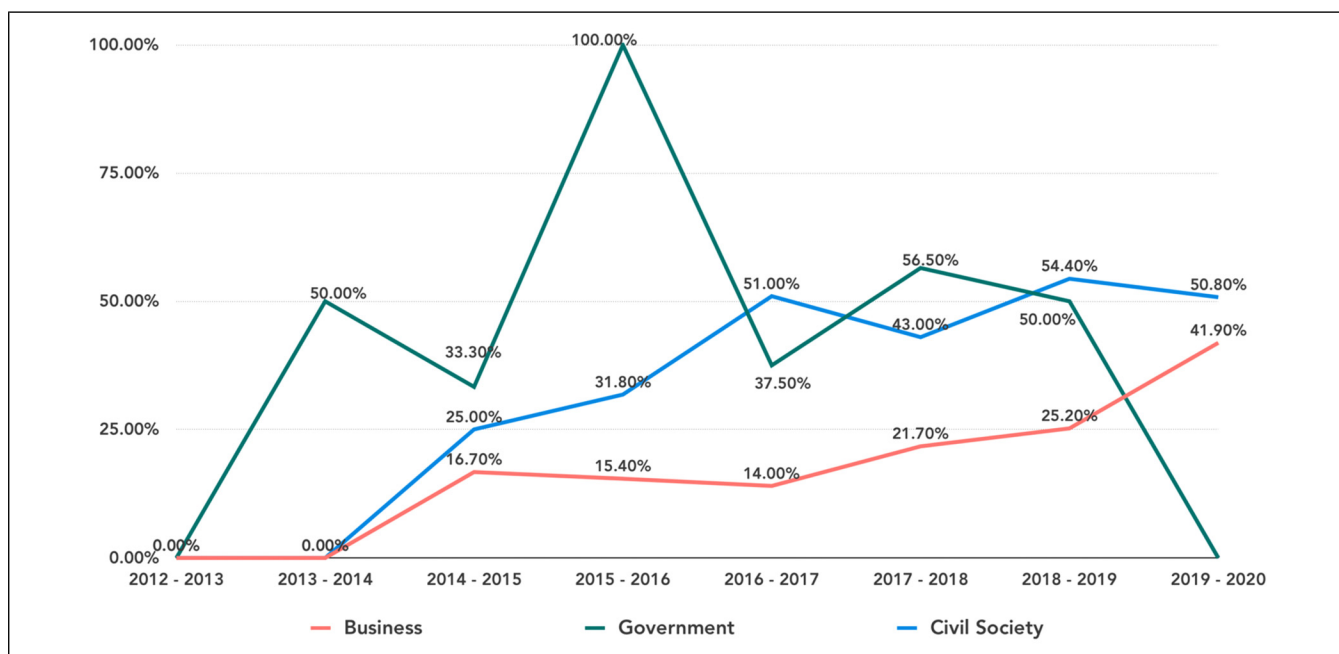
Regarding involvement influence, we focus on percentages of replies and retweets in total posts by certain types of users over a given time period. Figure 2 illustrates the variations in the involvement influence of three institutional users: business, civil society, and government. Over the sampled timeframe, an upward trend can be identified in shares of replies and retweets in total posts for both business and civil society users, while a downward trend is apparent for government users. This echoes the general landscape shift from a state-centered regime to non-state-involved governance in the EG sphere. The upward trend is further examined by a series of Chi-Square tests, which were used to determine the statistical significance of the variations in the proportions of replies and retweets over time. According to the results (Table 2), the growing involvement influence of business interests is statistically significant. Along with the evidence from the indegree influence dimension, this suggests that business interests have growing leadership and expanding interactions with other participants in conversations around fuel economy standards, which also indicates their increasing power in the participants arena of this EG process.

## Discussion and Conclusion

The current analysis offers—to our knowledge—a first attempt to empirically assess corporate power and its

trajectory shifts in governance systems in the PA literature. Theoretically, it draws on insights from SESs, OST, theories of governance and power, interest group rule-making participation, and alternative EG. Empirically, it employs a discourse analysis approach and is contextualized in Twitter conversations about regulating fuel economy standards in the U.S. Our results indicate that business interests are gaining growing power in the participation arena of the governance process of steering fuel economy efficiency standards in the U.S. The results likewise show the potential impact of the sociopolitical environment on governance systems (e.g., the 2018 proposal of the SAFE standards by the Trump administration).

Several factors may help explain corporations' growing power in EG processes. First, the escalating economic and social risks posed by climate change may have furthered the necessity for firms and investors to better navigate the regulatory process. This is because firms and investors need to balance short-term regulatory changes and long-term climate risks for sustainable value creation (Dallas & Waring, 2017). Second, technological innovations and financial pressures have been driving mergers and acquisitions among companies seeking to become megaplayers in varied fields such as agribusiness and biotechnology. Such megaplayers are likely more powerful in shaping the regulatory process and pertinent public discourse (see Clapp, 2018). Third, movements such as corporate social responsibility and triple bottom lines, as well as an ever-larger environmentally demanding society, have empowered corporations in EG processes by legitimizing their responsibility, and by extension



**Figure 2.** Involvement Influences of Three Types of Institutional Users over Time.

**Table 2.** Percentages of Replies and Retweets by User Category & Chi-Square Statistics (2012–2020).

Year	Business	Government	Civil Society	Research & Academia	News & Information	Individual
2012–2013	0.00% (0)	0.00% (0)	0.00% (0)	0.00% (0)	0.00% (0)	0.00% (0)
2013–2014	0.00% (0)	50.00% (0.707)	0.00% (0)	0.00% (0)	2.70% (0.164)	11.50% (0.321)
2014–2015	16.70% (0.389)	-	25.00% (0.452)	28.60% (0.488)	13.60% (0.351)	40.40% (0.492)
2015–2016	15.40% (0.368)	33.30% (0.577)	31.80% (0.477)	41.70% (0.515)	9.09% (0.294)	28.30% (0.451)
2016–2017	14.00% (0.35)	100.00% (-)	51.00% (0.505)	38.50% (0.506)	17.80% (0.384)	31.40% (0.465)
2017–2018	21.70% (0.415)	37.50% (0.5)	43.00% (0.497)	56.20% (0.501)	19.20% (0.395)	55.30% (0.497)
2018–2019	25.20% (0.436)	56.50% (0.507)	54.40% (0.499)	55.30% (0.5)	36.20% (0.481)	87.70% (0.328)
2019–2020	41.90% (0.502)	50.00% (0.522)	50.80% (0.504)	61.70% (0.491)	47.90% (0.502)	93.60% (0.245)
Chi-Square Statistic	30.733*** (0.000)	11.221 (0.082)	41.948*** (0.000)	27.685*** (0.000)	93.36*** (0.000)	2424.8*** (0.000)

Note: Standard deviations in parentheses for average percentages of replies and retweets. P-values in parentheses for Chi-Square Statistics. \* $p < .05$ ; \*\* $p < .01$ ; \*\*\* $p < .001$ . - Zero or one record.

their power, on environmental issues (Gond & Nyberg, 2017). Lastly, the growing power of corporations and other non-state actors (e.g., nonprofits and local communities) in EG processes likewise can be seen as a response to waning state leadership in confronting climate change (Blackman et al., 2006; Hale et al., 2021).

The contribution of this analysis is threefold. First, by combining insights from SESs, OST, theories of governance and power, interest group rule-making participation, and non-state alternative EG, our analysis provides a detailed empirical account of corporate power in EG processes, as well as of its interaction with the broader sociopolitical environment. Additionally, it serves as a response to calls for advancing empirical assessment of power and power dynamics in PA (e.g., Brisbois and de Loë, 2016; Choi and Robertson, 2013; Purdy, 2012). Second, the analysis furthers exploration of corporate involvement in governance processes. While extensive scholarly attention has been paid to non-state participation in governance systems, the focus has traditionally been on civil society and nonprofit organizations. The resulting void may diminish the capacity of the field to fully evaluate governance challenges where corporate involvement is necessary, particularly in areas such as EG, where corporate interests have been inextricably interwoven into both governance processes and outcomes. Lastly, the empirical design relying on discourse analysis and Twitter messages offers guidance for studies seeking to tackle multi-dimensional concepts such as power and participation in governance processes.

Despite the merits, it is also important to acknowledge some limitations. First, while the three-pronged participant-process design-content framework is advantageous in breaking down the complexity of power with different types of sources and exercising arenas, the classification is nevertheless theoretical. In practice, although different participants might have different preferences and priorities for different sources and arenas, the three realms of power and arenas tend to—though they do not always—function collectively in an interactive and iterative manner to seize a decision window in

governance processes (Purdy, 2012). Analyzing them separately here depicts a simplified projection of that reality. Additionally, caution needs to be exercised in generalizing the results across political contexts and policy domains. In the U.S., debates around policy and administrative behavior are common on news media and social media. In political environments where such debates are less common, it could be difficult to observe variation in pertinent discourses. The environmental policy domain is likewise somewhat unique, owing to the potential for individuals to become more involved due to their shared concerns over environmental wellbeing and potential hazards such as climate change.

Potentially promising points of departure for future efforts include empirical explorations of relationships between power and factors such as resource availability, institutional design, and shifts in the sociopolitical environment, as well as their impact on governance processes and outcomes. This could help advance our understanding of the internal mechanisms of governance systems. Building upon the current analysis, for instance, scholars can examine the roles of the aforementioned factors in different arenas of power and their interactions with power from different sources. Future research could also evaluate corporate power in different settings and/or different policy areas. Finally, studies with experimental designs and computer-based simulation (e.g., Choi and Robertson, 2013) are encouraged, to reveal individual-level variation in governance processes. For instance, an analysis of perceived process integrity from the perspectives of individual firms, governmental agencies, and nonprofits, and the effects of those perspectives on EG outcomes, could further add to the theoretical and methodological advancement of governance research.

### Acknowledgments

I am indebted to Drs. Christopher Galik, Thomas Birkland, and Walter Thurman for their invaluable advice in the preparation of this manuscript. I also thank the three excellent anonymous

reviewers and the extraordinary editorial team for their astute and helpful comments.

### Declaration of Conflicting Interests

The author(s) declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

### Funding

The author(s) received no financial support for the research, authorship and/or publication of this article.

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### Author Biography

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**Appendix A.** Variables in Twitter Data

Variable	Description
GUID	Unique identifier of a tweet.
Date (EST)	Date (EST) of posting.
URL	URL link of a tweet.
Contents	Content of a tweet.
Author	Author of a tweet (e.g., @EPA; @realDonaldTrump).
Name	Name of a tweet's author (e.g., U.S. EPA; Donald J. Trump).
Country	Country in which a tweet being posted (e.g., United States).
State/Region	State/Region in which a tweet being posted (e.g., Illinois).
City/Urban Area	City/Urban Area in which a tweet being posted (e.g., Chicago).
Category	Category (Classified vs Unclassified). All tweets are classified in this dataset.
Source	Source of social media platform used (Twitter).
Gender	Gender information of a tweet's author.
Posts	Number of posts of a tweet's author by the time of posting.
Followers	Number of followers of a tweet's author by the time of posting.
Following	Number of followings of a tweet's author by the time of posting.
Influence Score	A measurement of the % of posts that mention or retweet the user within a search's timeframe.
Post Title	The same as Contents.
Post Type	Tweet; Retweet; Reply.
Image URL	URL of image posted. Not available.
Brand	Brand identified in images posted. Not available.

Note: Geographic Information, gender information, and influence score are not available for all users.

**Appendix B.** User Classification Codebook for Manual Coding: Definition and Statistics

Type	Definition	N
Individual	The account of a person whose Twitter profile information and tweets reflect their individual thoughts and interests and whose primary post content is not about the auto industry, fuel economy, or environmental conservation and regulation.	7910
Business	The account of a business organization, coalition, or agency whose business relates to the auto industry, fuel economy, or environmental conservation and regulation. These may also be accounts of credible individuals affiliated with these organizations.	387
Government	The account of a governmental organization, agency, or credible individual affiliated with an organization.	242
Research & Academia	The account of a research organization, agency, or credible individual affiliated with an organization.	67
Civil Society	The account of a civil society organization, coalition, or campaign whose mission relates to the auto industry, fuel economy, or environmental conservation and regulation. These may also be accounts of credible individuals affiliated with these organizations.	514
News & Information	The account of a newspaper, magazine, news channel, etc.	900

Adapted from Kim et al. (2017).

**Appendix C.** Homogeneity of Variance Check – Indegree Influence

Group	Levene's test
Business	11.386*** (0.000)
Government	1.207 (0.316)
Civil Society	5.512*** (0.000)
News & Information	10.093*** (0.000)
Research & Academia	2.030 (0.052)
Individual	42.026*** (0.000)

Note: *P* values in parentheses. \**p* < .05; \*\**p* < .01; \*\*\**p* < .001.

governance systems; (2) interactions between governance systems and the policy process; and (3) governance outcomes and performance in the context of environment and sustainability.