

# Social Issue Emergence on the Web: A Dual Structural Model

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*In this paper, we unravel the complex ontological relationship between the empirical hyperlink networks enacted by strategic organizational actors and the epistemic issue networks enacted by decision makers who navigate hyperlinks to construct the boundaries of an issue. To conceptualize this relationship, we present a dual structural model of issue network emergence that demonstrates the processes by which decision makers come to read and structure their comprehension of an issue out of their experience navigating a hyperlink network. We then discuss how the emergence of an issue network from a hyperlink network has consequences for both the decision makers that wish to act on the social issue and the organizational actors who create links. The model is demonstrated using the Chicago Climate Action Plan, a climate change initiative underway in Chicago, as an abbreviated case study.*

**Key words:** hyperlink networks; social issues, issue networks; structuration theory; technology use.

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It is becoming increasingly apparent that, regardless of their type or orientation, most 21<sup>st</sup> century organizations must devote some time, resources, and attention towards social issues. Some organizations, like Greenpeace or People for the Ethical Treatment of Animals (PETA), devote themselves exclusively to raising awareness about and combating social problems like environmental degradation or animal cruelty. Other organizations, like petrochemical companies and accounting firms find themselves in an environment of intense media scrutiny and information transparency. This often compels them to take stances on social issues like water reclamation and corporate ethics, even though their core operations lie in other domains. And still other organizations, like government watch groups, federal, state, and foundation funding agencies, and community-based action coalitions, find themselves giving money and other support for research into and activism for social causes. In short, decision makers in many organizations find themselves proactively or reactively trying to figure out what social issues affect them and making determinations about how the organization will respond to or shape those issues.

Broadly defined, a social issue is a matter that directly or indirectly affects members of society and is considered to be a problem or point of concern in that it challenges a social standard. As decision makers in the kinds of organizations described above find themselves having to respond to a social issue,

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promote a cause, or plan budgets for topical research, they must learn what controversies are included in a social issue, what disciplines are needed to solve them, and which industries are most affected. Research on decision-making around social issues increasingly shows that the boundaries of any issue are equivocal such that multiple people might describe the contours of the same social issue very differently (Felstiner, Abel and Sarat, 1980; Lamertz, Martens, & Heugens, 2003). Consequently, organizational decision makers must seek out information from other sources to construct, for themselves, an understanding of what lies within and what falls outside a particular social issue, particularly one that is new or not well understood (Choo, 1996).

As social issues become more complex, so too do decision-making processes because the amount and diversity of information needed to understand and explicate them increase. As Simon (1957) famously argued, decision makers are limited in their cognitive capacity to formulate and solve complex problems. Therefore, they look for ways to satisfy information needs (as opposed to optimize them) and simplify the decision process by following learned rules and established repertoires of action to help reduce complexity. In this paper, we argue that one way that individuals who work for organizations affected by social issues but that are not actively involved in defining and promoting awareness of these issues (we call individuals of this type “organizational decision makers”) gather and process information to construct the boundaries of an issue is by turning to the web to see what people who work in organizations specifically geared toward bringing attention to social issues (we call these individuals “organizational claim makers”) have to say about the issue. Two examples, taken from interviews with organizational decision makers, illustrate the ecological validity of this claim.

We’re in the situation pretty often where we’re asked by policymakers for input, like on the feasibility of certain fuel economy standards. So in these situations you want to try and figure out where could we realistically be on MPG [miles per gallon] in 10 years given what we know about our technologies in development—and you also want to figure out what is the larger conversation around fuel economy because we can probably contribute to that too. So if we go to [fuelconomy.gov](http://fuelconomy.gov) and we see that the EPA’s linking to other websites about sustainability and reducing dependence on foreign oil and climate change, then you get a sense that these are the broader issues in the debate so we can do some research about how our technologies not only help fuel economy but these issues too, and we can use that information to inform our recommendations to them [policymakers]. (*Engineering Vice-President, Major Automobile Manufacturer, September 2010*)

Web linking patterns are incredibly helpful in figuring out the boundaries of an issue for funding. Take a disaster like [Hurricane] Katrina. It’s a terrible tragedy, but it provides opportunities for conducting science that will help reduce the severity and devastation of future tragedies. So if you go to the City of New Orleans website right after the hurricane and see they’re linking to the Orleans Parish Sheriff’s website, the Red Cross’s website, and like the Army Corps of Engineers site, or something, you get a sense of the complexity of the problem. So this knowledge directly affects how we shape our calls [for proposals]. We’ll make the call contain priorities for funding around questions of law enforcement, emergency medical care, and civil engineering because we have a sense that all of these areas are connected and, to some extent, define the boundaries of the issue. (*Program Officer, Large Federal Funding Agency, November 2010*)<sup>1</sup>

As the decision makers in these excerpts attest, even though they do not work for social movement organizations, they find themselves having to take a stance on certain social issues. To understand what boundaries demarcate the issue, they often turn to the web and navigate a system of hyperlinks,

reflexively monitor the associations (and lack of associations) between websites, and take the associations they do or do not see as evidence of the topics and players involved in a social issue.

Networks of hyperlinks bring an apparent structure to a social issue by situating deposits of information, such as websites and the actors behind them, in the context of one another, thereby carving out an 'issue space' online that organizational decision makers use to make sense of an issue space (Rogers & Marres, 2000; Shumate & Dewitt, 2008). Thus, while the actual content on a website informs an individual's understanding of an issue, the links between independent websites enable decision makers to actually place the content into a broader context of voices (Ackland & Gibson, 2004).<sup>2</sup> Although decision makers may navigate hyperlinks to aid them in constructing the boundaries of an issue, it is likely that those hyperlinks were not primarily created to signal an epistemic relationship between two claim makers. Instead, research consistently finds that hyperlinks tend to be established for more quotidian reasons - to reinforce offline relations (Rogers, 2004), to increase traffic to a website (Park, Barnett, & Nam, 2002), to signal affiliations, establish legitimacy, and mobilize resources (Rogers, 2004; Shumate & Lipp, 2008; Gonzalez-Bailon, 2009), and even to express power and authority over peers (Sereno, 2010).

No matter what their underlying motivations are for linking, the strategic linking practices of organizational claim makers produce a "hyperlink network," which we define as the set of web-based connections that emerge from the strategic linking practices of organizational actors. Because the hyperlink network was not necessarily created to objectively represent a social issue, decision makers interested in constructing the boundaries of a social issue must read a social issue out of a hyperlink network. That is, a hyperlink network, though it may be a primary vehicle that individuals use to learn about a social issue, is not an issue network itself. Rather, we argue that third party decision makers cognitively enact an "issue network" when they navigate a hyperlink system and attend to the presence and absence of links between specific websites and content. Specifically, we define an issue network in the context of this paper as the network of actors and ideas that emerges in the mind of a decision maker as she builds inferences about the connections between claim makers and the content they publish while navigating portions of a hyperlink network.

Building on a practice-based approach to technology use, we propose a novel "dual structural model" of hyperlink use and issue network emergence that outlines a process by which decision makers may structure their understanding of an issue out of their experience navigating a hyperlink network. In developing this dual structural model, we discuss the ways in which the development of a cognitive issue network from an empirical hyperlink network has consequences for both the decision makers that wish to act on the social issue and the organizational actors who created the hyperlinks. We conclude with a discussion of the implications of this conceptual framework for theory and practice.

## **Modeling Issue Network Emergence: A "Dual Structural Model"**

To establish an identity on the web, organizations have at their disposal two core tools: websites and hyperlinks. As the "virtual face" of an organization, a website conveys information about its producer to visitors through its content and design (Park, Barnett, & Nam, 2002; Ackland & Gibson, 2004; Shumate & DeWitt, 2008). However, in the interconnected world of the web, many argue that an organization's "net presence" is determined not only by the content and design of their website, but just as importantly, by the organization's "link economy" (Walker, 2002; Rogers, 2004).

To better understand how a decision maker engages with web content and hyperlinks as they cognitively structure their knowledge of a social issue from their navigation of a hyperlink network, we turn to Orlikowski's (2000) practice perspective on technology use. In the literature that examines the relationship between communication technologies and the actors who produce and consume them, structuration theory (Giddens, 1984) and its adaptations (DeSanctis and Poole, 1994; Orlikowski, 2000)

are widely used. Informed by Anthony Giddens' (1984) attempt to reconcile theoretical sociological dichotomies, such as debates over agency and structure, a structurational perspective dictates that to understand why and how social systems emerge as they do, they should be understood as the products of the interdependent relationship between individual actions and the social structures in which those actions take place. Orlikowski's (2000) practice lens represents the latest and one of the most influential structurational approaches to understanding the conditions that inform technology use and the outcomes they produce.

In her development of the practice lens, Orlikowski (2000) introduced an important distinction between a "technological artifact" and a "technology-in-practice." She claimed that if a single technological artifact like a decision support system could be interpreted and used in different ways, then scholars should trace organizational changes resulting from technology use not to the artifact itself, but to the specific structures (i.e., rules and resources) routinely enacted as we use the technology (Orlikowski, 2000, p. 408). Overtime, these rules and resources structure, or condition, decisions about how to use the technology such that repetitive patterns of use emerge. Sometimes these repetitive patterns of use provide resources with which individuals can change the institutional contexts in which they occur, but more often they tend to provide capabilities for individuals to reinforce them (Leonardi, 2009a).

A practice perspective and other structurational approaches have the advantage of providing a lens for understanding the relational patterns that emerge in a hyperlink network as a set of rules and resources that guide (or "structure") subsequent linking practices within that space. However, we argue that these models are limited in their ability to effectively conceptualize the enactment and consequences of issue networks. Most structurational studies of technology use have examined technologies like groupware decision-making software for which the use and consequences of these technologies are limited to the group who uses them. Thus, the use of the technology is *private* in the sense that it is not known by others, or is known only by those who are in close enough proximity to see or hear about usage patterns. In contrast to such private technologies, the web, is a very *public* technology. When someone establishes a link between two sites, anyone else with internet access can, in theory, see what was done with the technology.

Although the motivations that inform the establishment of hyperlinks remain imperceptible to most link navigators, hyperlinks themselves are observable and publicly available for others to use and interpret as they choose. It is possible that, in the absence of any information about why a hyperlink was established, link navigators who are presented with a hyperlink will attribute meaning to it by drawing on available heuristics to help them make sense of the relationship it signals between two deposits of information. These heuristics may include interpretive schemes of what hyperlinks signal and aspects of the navigator's institutional environment that may influence their perceptions.

We suggest that when technologies are public (like the web) two interdependent instances of structuration occur. The first instance involves the claim makers who establish links while the second instance involves the decision makers who must interpret those links. To properly conceptualize and operationalize the mechanisms behind issue network emergence, a model is required that accounts for both structurational instances, not as separate processes, but as part of a unified sequence of interactions between both agent groups and the structures they enact through their use of hyperlink technology. Such a model would bridge the disconnect between the linking practices of one agent group and the interpretation of hyperlinks by another.

To explain how issue networks emerge out of both the linking practices of organizational claim makers and the navigation of those links by third-party decision makers, we make the interdependent relationship between the agency of both groups of hyperlink users and the network structures that they enact an explicit feature of the dual structurational model presented here. Specifically, we identify six processes that are implicated in the emergence of an issue network: (1) the conditioned, strategic

linking practices of organizational claim makers; (2) the subsequent enactment of an empirical hyperlink network; (3) the conditioned navigation of that hyperlink network by third-party decision makers as they strive to discover (or, more accurately, as they actively create) the boundaries of an issue; (4) the enactment of an epistemic (cognitive) issue network; (5) the effect of this issue network on institutional decision-making regarding the social issue in question; and (6) the effect that those decisions then have on the continued strategic use of hyperlinks by the organizations that occupy the issue space.

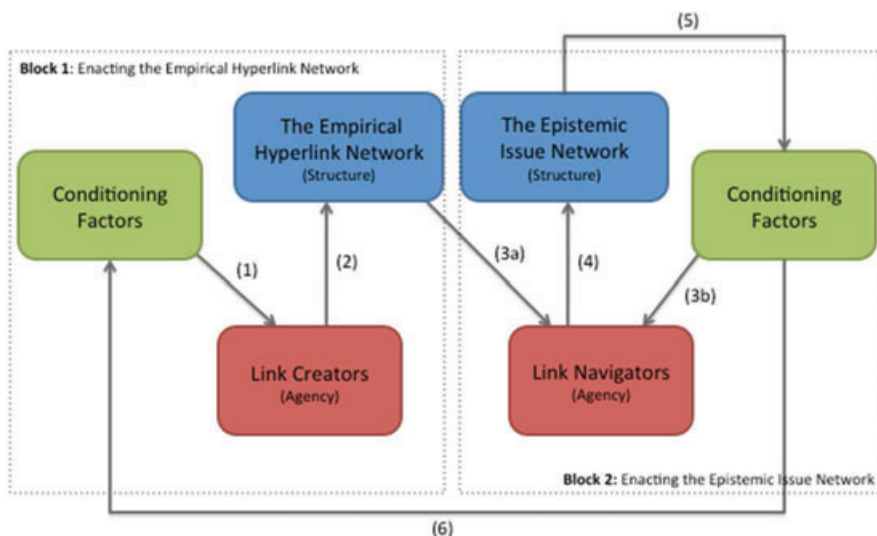
The model, illustrated in Figure 1, incorporates the three foundational elements of a practice-based framework, namely the *agents* who engage with hyperlinks, the *conditions* that affect how they use hyperlinks, and the enacted network *structures* that emerge out of that situated use. What is noticeably different from previous practice-based models, however, is that there are two sets of each element - one set representing the participation of claim makers who establish links and the other representing the participation of decision makers who navigate links.

To help interpret this model, we break its constituent elements into two components - or blocks of agency-to-structure transitions - tied together by the sequential ordering of processes introduced above. The first block (Block 1) represents the first instance of structural enactment in which organizational actors strategically direct hyperlinks to other organizational websites, thereby enacting an *empirical hyperlink network*. The second block (Block 2) demonstrates the second instance of enactment. Here third-party decision makers navigate the strategic hyperlink network created by actors in Block 1 to construct the boundaries of a social issue, thereby cognitively enacting the *epistemic issue network*. We now turn to the task of explaining these two blocks of enactment processes and the consequences they together have for the emergence of issue networks.

### Block 1: Enacting the Empirical Hyperlink Network from Strategic Linking Behaviors

#### *Conditioned, Strategic Linking*

From a practice perspective on technology use, organizational culture, past technology use, and institutional norms condition how the current technology is used. In considering the emergence of



**Figure 1** Dual Structural Model of Issue Network Emergence

a hyperlink network, we focus on two conditioning factors thought to affect organizational linking practices: (1) an organization's motivations for establishing a link to another organizational website (i.e., the need they are trying to fill) and (2) the norms of relationship building, or institutional order, that govern the external institutional environment to which they belong. This act of conditioned linking is identified as the first step in the dual structural model (see Arrow 1, Figure 1).

*Motivations.* An individual's motivations to use technology often mirror his or her understanding of the technology's capabilities (Leonardi, 2009b). For this reason, when referring to motivations what we are discussing are the interpretive schemes that actors apply when deciding where to direct a link. Perhaps the simplest explanation for why individuals in an organization choose to establish a formal link to another organization is to fulfill an expressive need to affiliate with a like-minded organization. From this perspective, links are motivated by the perception of topical similarity and, relatedly, the content quality of another website (Park and Thelwall, 2003).

More often, however, various modes of instrumental self-interest motivate link formation. For some, the motivation to link comes from a desire to enhance reputation or build credibility (Park, Barnett & Nam, 2002). Part of the process of building one's reputation in an online issue community involves manipulating the trust-logics of a web-surfer by establishing links to other websites that are themselves highly trusted (Fogg et al., 2001; Terveen and Hill, 1998). Another self-interested motivation to link to other parties is to mobilize resources (Gonzalez-Bailon, 2009; Park & Thelwall, 2003). As Gonzalez-Bailon (2009) notes, that the distribution of links often reflects offline resource or status hierarchies, which suggests that organizations poor in resources and influence may be compelled to establish connections with more powerful, resource-rich organizations to enhance their legitimacy within the network, and contribute to their public perception.

And finally, a third mode of instrumental self-interest that is less often discussed in the context of linking motivations, but which is just as relevant, is issue control or 'framing' rights. Within the context of public sphere studies (Dahlgren, 2007) and social movement research (Benford & Snow, 2000) scholars recognize that competitions often ensue amongst actors over who gets to speak for the issue. In the case of hyperlink networks comprised of claim makers, the act of linking has been theorized as an implicit endorsement of how an organization conceptualizes the issue of concern (Rogers & Marres, 2000). In their study of NGO hyperlink networks, Shumate and Lipp (2008, p. 194) found that those with niche objectives were less likely to establish links to those with more heterogeneous and mainstream goals, conjecturing that specialists may view variations in goals more discriminately than do generalist NGOs. Thus, the decision not to link to another organization that actually shares the same struggle may reflect an attempt to exclude them from the discourse due to differences in the way they conceptualize the underlying causes and the particular solutions to the problem.

*Institutional Order.* The aforementioned personal preferences underscore how a link creator's situation-at-hand (i.e., their motives for linking) can inform their choices of to whom to link in the issue space. But for many organizational actors, another layer of conditions operates at the institutional level. Within an organizational setting, social actions in general, and technology use in particular, will always be at least partially structured by the norms and conventions that undergird the organizational culture (Orlikowski, 2000). For example, in her research of technology use in the workplace, Orlikowski found that work groups with a collaborative, distributive culture tended to use technology to support cooperative ends. Whereas in another more competitive and individualistic work group, the use of collaborative software was considered a threat to the organizational culture and, therefore, was only integrated minimally into its work practices.

An important thread of research regarding institutional effects on linking practices comes from Richard Rogers and his colleagues (Rogers, 2004; Rogers & Marres, 2000). In their examination of a



climate change issue network, Rogers and Marres (2000) discovered considerable differences between the linking behaviors of NGOs, government organizations, and commercial enterprises. Specifically, they found that NGOs displayed the densest linking patterns, linking within and across institutional domains. On the other hand, government organizations were more exclusive, linking only to other government organizations, while corporate entities avoided linking to other corporate parties, reflecting a more competitive internal culture. What this body of research suggests is that institutional norms and conventions, whatever they may be, condition the approach that organizations within these cultures take when deciding to whom to link.<sup>3</sup>

### *The Empirical Hyperlink Network*

In the previous section, we identified several factors that are thought to condition the linking practices of an organizational actor looking to enhance its presence on the web. However, the specific factors that motivate one actor's linking practices are likely to differ from those that inform another actor's linking behaviors. As such, the first step of the "dual structural model" (see Arrow 1, Figure 1) is meant to explain the strategic generation of dyadic links, with the caveat that individual organizations do not strive to create a holistic hyperlink network. However, their self-motivated linking behaviors do eventually aggregate to constitute what can be read as a digitally instantiated and, as such, publically viewable and navigable hyperlink system (see Arrow 2, Figure 1).

## **Block 2: Enacting the Epistemic Issue Network from the Empirical Hyperlink Network**

### *Conditioned, Navigational Experiences*

Although the strategies that motivate link creation may be out of most link navigators' views, once established hyperlinks have public implications for decision makers who seek to mine the information embedded in link pathways. What connects the two instances of structural enactment in our model is the navigable hyperlink. Arrow 3a in Figure 2 indicates this transition. As structurationist researchers of technology have suggested, in enacting the structural properties of a technological artifact the pattern of use that emerges tends to serve as a "behavioral and interpretive template" (Orlikowski 2000, p. 410) for an actor's continued, situated use of that technology. What is novel about our claim is that the hyperlink network, as the outcome of patterned hyperlink usage by one group of actors, becomes the "behavioral template" for a third-party having nothing to do with its initial constitution.

But it is not the hyperlink network as a whole that structures a link navigator's experience because link navigators never know the organizational hyperlink network as a complete system. Rather, they are only ever presented with portions of that network as they make decisions regarding which links to follow and which to ignore. In the offline context, Perfetti, Rouet and Britt (1999) describe the cognitive processes involved as readers engage with multiple texts in learning tasks. They argue that reading multiple documents (like visiting multiple websites) produces cognitive representations that include connections between texts. For example, one text may have information that builds on the information learned in previous texts, forcing the reader to update their mental schematic of the issue. However, in an online learning environment, the process of making these mental connections between texts is facilitated for the reader by the physical presence of the hyperlink, which makes explicit that a connection indeed exists.

In their role as link navigators, decision makers are rarely privy to the motivations behind one organization's choice to direct a hyperlink to another organization. This means that when presented with a hyperlink, they must attribute meaning to it and the relationship it signifies by drawing on heuristics that are available to them, namely (1) their motivations for navigating hyperlinks and

(2) the institutional order in which their use of hyperlinks takes place. The relationship between these *conditioning factors* and a decision maker's use of hyperlinks as resources to help them organize their knowledge of a social issue is depicted by *Arrow 3b* in *Figure 1*.

*Motivations.* Numerous studies of cognitive learning processes amongst readers of traditional text have confirmed that the meaning and significance assigned to text and the relationships between texts is often conditioned by the learning goals of the reader and the nature of their task (Perfetti, Rouet, & Britt, 1999). Likewise, as online readers, link navigators' interpretations of which hyperlinks are most salient and worthwhile to follow are likely to be conditioned by what motivates their searching behavior. As argued in this paper, for most decision makers the broad learning objective is to construct and organize a schematic of the broader context in which the social problem or issue is situated. But within that broad context, different types of tasks will likely engage decision makers in different levels of cognitive learning, such as remembering, understanding, application, analyzing, evaluating, and/or creating (Anderson & Krathwohl, 2001). In an online search experiment, Jansen, Booth, & Smith (2009) found that subjects used different search strategies, focused on different types of content, and spent different amounts of time on websites, depending on the depth of cognition that the task demanded. While these authors did not look specifically at subjects' interactions with hyperlinks while performing the search tasks, their findings lend support to the assumption that hyperlinks, like content, will be differentially engaged depending on the cognitive learning processes that a decision maker's task demands.

*Institutional Order.* In many ways, decisions made about the relevance of a particular hyperlink are only indirectly based on a link navigator's attitudes toward the technology itself. In many instances, the broader social environment or institutional order in which the technology use occurs affects an individual's interpretation of the utility of a technological artifact (Orlikowski, 2000). Another feature of the institutional order that can condition decision makers' choices of which links are worth following are the personal principles they employ when determining in whom to trust (Park, Barnett, & Nam, 2002).

While trust-logics are often deeply personal and individualistic, they can also be institutionally honed (Mishler & Rose, 2001). The need to enact a cognitive issue network in the first place tends to be felt most strongly by actors who are themselves entrenched in an institutional order, for example corporate researchers, foundation representatives, and policy-makers, all of whom are charged with making decisions about issues. In that distinct institutional linking patterns have been identified (Rogers & Marres, 2000), the same cultural preferences that inform a link creators choice of to whom to link are likely to manifest in a third-party decision maker's choices regarding which organizational websites to visit during their navigational experience.

*Interaction between Agency and Structure.* Taken together, the points made about the effects of motivations and institutional culture emphasize the variability in how a hyperlink can be interpreted and how that interpretation affects a decision maker's navigational choices. Furthermore, regardless of what hyperlinks are taken to mean, their mere presence (or absence) structurally establishes which ideas and actors are more likely to be heard and their relative ranking in importance within the issue space (Shumate & DeWitt, 2008). The logical question to be raised, then, is: *How do agency and structure interact in the context of a decision maker's navigational experiences?*

As Rogers and Marres (2000) argue, what a decision maker comes to know about an issue is conditioned by a combination of personal choices (or agency) and hyperlinks (or structure). Specifically, where one chooses to begin their navigation of an issue space then determines the types of organizational websites one will have the opportunity to visit. For example, if a decision maker chooses



to begin her navigation of a climate change issue space with the website of a government organization, then the issue network that she cognitively enacts will likely be biased toward the viewpoints of other government agencies due to the demonstrated internal linking strategies of government groups (Rogers & Marres, 2000; Rogers, 2004). On the other hand, another decision maker may choose to begin his navigation of the same issue space with an NGO stakeholder. Given the tendency for NGOs to link trans-institutionally, he would have a greater chance of encountering a more diverse array of viewpoints. Thus, the choice of where to enter an issue space influences the nature of the information one is ultimately exposed to and how one is likely to “frame” the issue.

But one does not have to abide solely by a link dependent search technique for the hyperlink structure of an issue space to influence one’s navigational choices. Search engines like Google are also important mechanisms for organizing information. Search engines provide a user access to an issue space via a keyword search that produces hundreds if not thousands of relevant websites from which to start one’s search. While the choices appear to be limitless, these options are prioritized by the number of incoming links that each website receives from other websites. Presented with this prioritized list, web users tend to “satisfice” their information needs and limit their search time to the sites that are identified first in the search results as well as to the websites to which those sites link (Keane, O’Brien, and Smythe, 2008). Thus, which websites a user visits is still conditioned by the hyperlink structure of the online issue space.

### *The Epistemic Issue Network*

As we have emphasized, the boundaries of a social issue do not exist “out there” waiting to be found. They are enacted into being by those who have an invested interest in creating a framework of understanding for a particular social issue. Having navigated the issue space and monitored her interpretations of the content and relationships to which she was exposed, a decision maker is then able to construct a cognitive map (or network) of what the social issue actually is to them and who its most relevant voices are. For this reason, we describe the second instance of enactment as being *epistemic* in that it represents the structural embodiment of the knowledge gained from a decision maker’s navigational experience. This marks the commencement of the cognitive enactment of an epistemic issue network (see Arrow 4, Figure 1).

Scholars have noted that to understand how people deal with social issues it is important to study the structure and organization of their knowledge in addition to the content of that knowledge (Jones & Read, 2005). The idea being that the comprehension of an issue is contingent on the way that knowledge is patterned and tied together. Perfetti, Rouet, and Britt (1996, p. 99) write, “the intelligent use of texts entails mental representations of specific texts, situations described in texts, and relations among texts.” The phrase “intelligent use” is telling because in order for the acquired information to transform into actionable knowledge, it must be effectively organized into a cognitive model (or network) of information sources and claims positioned vis-à-vis one another.

That said, a decision maker’s perceptions of which actors and viewpoints relate to one another function as the constitutive elements of the cognitive issue network that a decision maker enacts after navigating the web. And, like the empirical relationships in the hyperlink network, the perceived relationships in the issue network function like a set of rules and resources that inform and have consequences for subsequent decisions about the issue. As the testimonies in the introduction revealed, issue networks become concretized in persuasive appeals to policymakers and in funding priorities for research and activist groups. Further, as is argued in the following section, what comes out of the decisions made by link navigators is likely to feed back and inform the subsequent linking strategies of claim makers who seek to reap the benefits of such decisions in the future.

### Consequences of the Construction of an Issue Network for Ongoing Structuration

Up to this point, we have described two processes of structural enactment. The first enactment is of the strategic properties of hyperlinks and the second is of the epistemic properties of hyperlinks, both of which feed into a larger process of issue network emergence. Despite the fact that each instance of enactment is performed by a different actor group and yields distinct structural outcomes, what connects them is that the hyperlink network enacted by link creators functions as a kind of behavioral template for a third-party decision maker's situated use and interpretation of its pathways. The structure that emerges out of the enactment of a hyperlink network has consequences for how other actors navigate that network to construct the boundaries of a social issue. In this section we stress how the enacted issue network directly influences subsequent third-party decisions about the issue at hand, as well as how it may indirectly condition future linking practices of organizational stakeholders. *Arrows 5 and 6 in Figure 1* represent these direct and indirect consequences.

According to a practice perspective on technology use, the structures that actors enact out of their use of technology are thought to function as a set of rules and resources for subsequent actions within the larger social system in which the technology use takes place. Accordingly, the relational properties of the emergent issue network functions as actionable information on which subsequent decisions will be made regarding which ideas and parties are most relevant to the issue discourse. For example, Boje and Whetton (1981) found a positive correlation between centrality in an interorganizational exchange network and attributions of influence. Their finding is relevant in that considerations of an actor's influence and power within an issue space are likely to weigh heavily on institutional decision-making regarding things like the allocation of resources. It is not just the organization that gets rewarded by having a strategic network location. The specific ideas advocated by that organization also gain preferential status in that those ideas come to be most associated with the issue at hand, granting the authors of those ideas framing rights in the battle over discourse control. As one can imagine, having one's ideas prevail when institutional actors make decisions that affect the course of an issue will likely benefit the authors of those ideas as well.

Evidence for this benefit has been found in social movement research. Like an issue network, a social movement is comprised of organizations bound together by a shared interest. However, despite their common concerns, social movement organizations, as claim makers, often find themselves competing for the attention of third parties, such as foundation patrons, media representatives, policy-makers, etc. as they aim to have their version of the social problem heard and rewarded in the public arena (Hilgartner & Bosk, 1988). For example, Brulle and Jenkins (2005) found that foundation funding tends to go to those organizations that express a more moderate, mainstream approach to environmentalism as opposed to those advocating more radical viewpoints.

We argue that the actions that ensue from the choices made by third party decision makers are likely to feed back and inform subsequent linking strategies of organizational claim makers who seek to reap the benefits of such decisions in the future. Thus, our dual structural model posits that the issue network will also have an indirect effect on the strategic linking practices of organizations, which is represented as a feedback loop connecting the decisions made by third party decision makers and the future linking behaviors of organizational claim makers (*see Arrow 6, Figure 1*). A practice theory perspective tells us that in their recurrent and situated use of a technology like hyperlinks, actors will draw on previously enacted structures, and by doing so will reconstitute those structures by reinforcing them or by transforming them into something new. We extend this logic to the case of hyperlink use by suggesting that the continued strategic use of hyperlinks by link creators and the subsequent empirical hyperlink networks that they enact, are likely to change as those actors become more aware of how third-party web users make decisions about a social issue in which they have a stake.

For example, funding is a key mechanism of change in the normative system governing interorganizational interactions. As such, an organization's future prominence in the issue space will be affected by the extent to which its relational interactions lead to funding or policy decisions that prove beneficial for them (Provan et al., 1980). When funding decisions go their way, organizational linkers will likely continue using hyperlinks in the same way. Conversely, when organizations find themselves consistently excluded from the benefits of institutional decisions, they might be compelled to alter their linking strategies by establishing connections to those organizations that *are* being rewarded or by mimicking the successful linking strategies of more prominent actors. These strategies may prove beneficial for an organization trying to buffer itself from the uncertainties of its environment and vying for more status in a competitive issue space (Monge & Contractor, 2003). However, the unfortunate consequence of this strategic linking behavior is that the viewpoints of the central organizations that others aspire to be associated with tend to gain more cognitive prominence in the minds of third-party decision makers as they navigate the issue space, thereby overshadowing less prominent, but equally merit-worthy points of view that have a weaker link economy.

## A Brief Illustration

The dual structural model proposed in this paper seeks to explain the process through which social issues are cognitively structured in the minds of decision makers as they navigate online issue spaces. In order to provide some context to the dual structural model, we turn to an abbreviated case study to illustrate its main points. While the case is used to contextualize the elements of the model, it is not meant to be a test of its propositions.

The case we selected is a network of organizational actors involved in a climate action policy initiative in the city of Chicago called the Chicago Climate Action Plan (CCAP). To tackle this challenge, the City of Chicago has sought the guidance and participation of organizations in government, business, and civic domains at the national, state, city, and community levels. Organizations range from city agencies like the Department of Environment, foundation partners like the Chicago Community Trust and the William J. Clinton Foundation, research institutes such as The Field Museum and the Shedd Aquarium, commercial groups like utility companies and other industry groups, and a variety of community-based outreach organizations. Thus, the network of actors involved in the CCAP initiative is quite diverse and reflects a variety of perspectives and claims regarding the issue of climate change in Chicago.

A generous philanthropic organization interested in promoting corporate sustainability practices charges a funding advisor (an organizational decision maker) to learn more about Chicago's climate change programs so that it can make an informed decision about how to invest money in industry projects that will reduce carbon emissions in the Chicago area. To properly advise the organization's senior management, the advisor must first learn more about the social issue of "climate change" as well as the projects and programs underway in Chicago.

To begin, the advisor decides to visit the website of the City of Chicago's Department of Environment to see what the city itself is doing in an official capacity about climate change. Here she reads about its waste reduction programs, energy efficiency programs, and its green building initiatives, to name a few. She then clicks on a link to something called the Chicago Climate Action Plan (CCAP) and she is taken to a website dedicated to this initiative. In addition to providing information about climate change itself, the website includes links to formal reports, sponsored programs, and organizational collaborators. The advisor continues her navigation of links using the CCAP website as her central information hub. She follows links to several of the sponsored projects as well as to many of the organizational partners involved, from which she either continues following relevant links from these new websites or, when she feels that the thread is no longer useful to her information needs, she returns to the CCAP website to start again.

As she performs her search, the funding advisor reflects on what she has learned about the issue of climate change itself and the programs and players involved and makes connections between the distinct issues raised in order to draw out important trends. She comes to the conclusion that the primary goal of Chicago's climate change efforts is to bring together major industry players in the Chicago area to encourage cross-sector cooperation in establishing integrated "green" business plans, with an emphasis on energy efficiency and waste reduction projects. Based on her assessment, she recommends to the potential donor group that their philanthropy should be focused on these areas. However, what the funding advisor did not see during her search was a second thread of climate action efforts underway in Chicago that emphasized bottom-up, community level changes. These programs, led primarily by community development coalitions, assess the range of opportunities and challenges that face the diverse communities of Chicago and devise outreach plans that are uniquely suited to each community's needs and interests.

In the end, two things happened that prevented the advisor from identifying this second thread of actions. First, because her client was interested in industry programs, she biased her navigation and attention to only the organizational websites with an industry affiliation. Second, because the industry groups were not well connected online to the community development organizations, there was little opportunity for her to have encountered a hyperlink that would have exposed her to information about the community oriented actors and programs. Thus the nature of her search task, in conjunction with the structure of the hyperlink network led the advisor to structure her knowledge of the climate change initiative with a bias toward industry themes while minimizing the presence and relevance of community-level concerns and actions.

In the end, the philanthropic organization invested funds in a retrofit initiative aimed at making commercial and industrial buildings more energy efficient. The primary beneficiaries of this decision were a consulting firm specializing in energy efficient design, a LEED certified commercial contractor, and the two primary utility providers in Chicago, all of which had established hyperlinks to one another's websites to signify their joint involvement in the CCAP initiative. However, there were several community-based organizations also involved in retrofit projects whose work went unnoticed and, hence, unrewarded. These organizational claim makers had not been strategic enough in their hyperlinking practices to gain the attention of third party decision makers. So to improve the likelihood that they might benefit from similar funding decisions in the future, several of the smaller community-groups decided to directly hyperlink to the websites of the groups who had received funds and, amongst themselves, mimicked the reciprocal linking strategy demonstrated by the rewarded groups with the hope that it would bring attention to their collaborative partnerships.

## Conclusions

In line with the testimonies provided in the introduction of this paper, research shows that perceptions of relevant relationships between actors and ideas have very real consequences for funding decisions, policy decisions and other important social changes precisely because they create boundaries of salience, which include some parties and marginalize others (Rogers, 2004). In an era when individuals turn to the web as a primary information source, it seems both timely and important to examine how the social and technical properties of the web may influence how decision makers construct the boundaries of important social issues. Our goal in this paper has been to establish a framework that is useful for unraveling the complex ontological relationship between empirical hyperlink networks and cognitive issue networks in a way that enables us to conceptualize their distinct, yet interrelated character.

An issue network is like a cognitive map that charts perceived relations between concepts, between organizations, and between concepts and organizations. As such, these perceived relations provide

structure and definition to what is otherwise a complex and often amorphous set of problems. The dual structural model proposed herein posits that the boundaries of a social issue are constructed out of a decision maker's choices of what content and what organizations appear most related but also by the strategic linking practices of organizational stakeholders that give form to the digitally instantiated environment in which a decision maker's navigation occurs.

There are at least three implications of our approach that hold promise for innovation in the theory and practice of issue network formation in an era of pervasive web use. First, the dual structural model helps us to understand that hyperlink networks are related to issue networks but only in as much as they are recognized and used as epistemic resources by third-party web users. In other words, the fact that actors who occupy a shared issue space establish links to one another does not mean that the resulting hyperlink network *is* an issue network. Rather, a social issue must first be read out of a hyperlink network by outside agents before it can be considered as having epistemological value.

Second, the dual structural model is specifically designed to capture contemporary organizing technologies that are less contained. The phenomena we seek to explain—the emergence of an issue network—involves engagement with an inherently *public* technological artifact—the web. In the past, structural scholars have examined technologies such as groupware (Orlikowski, 2000) or computer-assisted decision-making platforms (DeSanctis & Poole, 1994), for which the use and consequences of these technologies are conceptualized as being contained within the primary agent group, thereby being construed as *private* technologies. However, we argue that one must abandon assumptions of privately contained implications when studying content and hyperlinks on the web because the use and consequences of such technology extends beyond the initial agents who establish them. Any attempt to explain how structures emerge from the use of public technologies must integrate the perspectives of both the actors who establish hyperlinks and the actors who navigate them.

Finally, because hyperlinks have a public face, the structures that emerge out of their use create different consequences for the different groups who use them (e.g. those who establish or those who navigate them). The dual structural model allows us to identify multiple network structures that are implicated in the overall process through which issue networks emerge. This is in marked contrast to a more traditional structural approach, whereby the focus tends to remain on a single emergent structure. While we argue that hyperlink networks are often treated as issue networks, we also make it clear that despite sharing the same constitutive elements, they are in fact two different networks enacted by two different agent groups. The model also outlines a potential sequence of steps that connect the use of hyperlinks by each agent group with the network structures they enact, while also revealing how one group's enactment can place opportunity or constraints on the kind of structure that the other group enacts. We contend that without this augmentation of a traditional structural framework, it would be difficult to adequately conceptualize and/or model the interactions that take place between agents and the technologies-in-practice that they enact in online environments where most technological artifacts are publicly employed.

The theoretical extensions of a structural perspective on technology use put forth in this paper, as well as the development of a conceptual model that captures these augmentations, provide a foundation for future empirical work. One crucial next step in elaborating this theoretical framework is to identify living issue spaces as case studies for analysis, in which the processes delineated in the proposed conceptual model can be tested empirically. However, before we can fully operationalize the model, attention needs to be paid to deriving and testing suitable methods for capturing the appropriate data at each stage. The fact that the proposed model is a process-based one means that it is amenable to an array of quantitative and qualitative methods. For example, to capture elements of the enactment of hyperlink networks, methods such as formal techniques of social network analysis, surveys, and qualitative interviews with organizational leaders and webmasters could be used to gather

data regarding the motivations that underlie the structural properties of the network. As we argued, the use of technology is situation specific; thus, having a more precise understanding of what motivates linking in different situations will allow us to hypothesize in a more grounded way how these linking strategies might affect issue comprehension.

Additionally, qualitative interviews and experimental observations could be used to capture the more cognitive processes involved in a decision maker's enactment of an issue network. Specifically, these methods shed light on what decision makers think about as they navigate issue spaces and how they make sense of the content and relationships they encounter. And, finally, a controlled experimental study involving a link dependent web-browsing exercise could be employed to determine the extent to which the structure of an issue space determines the structure of an individual's comprehension of an issue after having navigated an issue space. Furthermore, an experimental study would reveal the precise nature of the effects of each conditioning factor under different search conditions.

The goal of building a program of research in this area extends beyond academic scholarship to also include pragmatic, praxis-oriented interests as well. Specifically, it is a socially relevant endeavor to leverage insight gained from theory-building and hypothesis testing toward upsetting what is often an uneven balance of power within these spaces by helping marginalized parties develop more effective linking practices that will position their goals and message more prominently in the minds of institutional decision makers.

## Notes

- 1 The extended quotes are used here only as anecdotes in order to exemplify and establish validity to the claim that third party decision makers will turn to the web and navigate its issue spaces to help structure their understanding of social problems. We do not draw on the sources' experiences throughout the entire paper.
- 2 Most organizational issue stakeholders are multiplex entities with a variety of interests that constitute their identities on the web. Only some of these interests pertain to the issue at hand. For example, labor associations, like *United Steelworkers*, have become increasingly involved in climate change politics, particularly as the discourse relates to how jobs and the economy. However, climate change is only one of many issues with which *United Steelworkers* is concerned. As such, organizations are likely to have a variety of interests that motivate to whom they strategically direct a hyperlink.
- 3 It should be noted that there is no guarantee that actors will use technologies in ways that simply reinforce their institutional cultures. In fact, a salient tenant of the technologies-in-practice perspective is that transformative enactments do take place when actors choose to use the technology to substantially alter their existing way of doing things (Orlikowski, 2000). However, even when enactments of change do occur, actors are still basing their use of technology in reference to rules of conduct that they either seek to reinforce or change. Thus, the institutional effect is still thought to be in play.

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