

THE MULTIPLE INSTITUTIONAL LOGICS OF INNOVATION

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ABSTRACT: *How do decentralized systems deal with innovation? In particular, how do they aggregate the myriad experiences of their component parts, facilitate diffusion of information, and encourage investments in innovation? This is a classic problem in the study of human institutions. It is also one of the biggest challenges that exists in the governance of decentralized systems: How do institutions shape individual behavior around solving problems and sharing information in a fashion that is reasonably compatible with collective well being? We use a particular decentralized institution (the U.S. House of Representatives), wrestling with a novel problem (how to utilize the Internet), to explore the implications of three archetypical principles for organizing collective problem solving: market, network, and hierarchy.*

INTRODUCTION

How do decentralized systems deal with innovation? In particular, how do they aggregate the myriad experiences of their component parts? This is a classic problem in the study of human institutions—at all scales, from small groups of individuals wrestling with common problems to policy learning across national boundaries. It is one of the biggest issues in collective action and thus governance: How do institutions shape individual behavior around solving problems and sharing information in a fashion that is reasonably compatible with collective well-being? In fact, much of human history can be viewed through the lens of information production and sharing: how different ways of organizing humans provided reasons for individuals to solve other people's problems (Diamond 1997). Innovation presents a particular governance challenge within the public sector because the market-based mechanisms (e.g., intellectual property rights) that have evolved to encourage innovation seemingly do not apply to the public sector. There is no way for an innovative jurisdiction to profit from the successful adoption by another of its innovation.

We use a particular decentralized institution (the U.S. House of Representatives), wrestling with a novel problem (how to utilize the Internet), to explore the implications of three archetypical principles for organizing collective problem solving: market, network, and hierarchy (Powell 1990). We find that these three institutional logics intertwine in this particular case. The market turns out to be a powerful mechanism for fueling innovation, because an array of vendors has emerged that supplies Web services to House offices. These vendors provide the scale necessary for the development of cutting edge features for House Web sites. Information about vendors, in turn, flows through interpersonal networks, although there is relatively little consultation among House offices about how actual features on Web sites work. There are multiple hierarchical mechanisms that direct and limit what members do with their Web sites. There are House rules that limit the content of Web sites, and parties play a limited role in subsidizing innovative practices. We do find, however, evidence of underinvestment in innovative practice within offices, with little critical examination of what constituents want and need from member Web sites. That is, while there are powerful drivers of conformity (DiMaggio and Powell 1983) with respect to Internet practices, the system fails at harnessing the collective capacity of these offices for problem solving.

PROBLEM SOLVING IN DECENTRALIZED SYSTEMS

Imagine a system where the agents in the system are each playing the same game against the environment. Because these games are similar to one another, the lessons learned in one game have implications for the best strategy in the other games. These potential informational externalities create a governance challenge: How do different principles for organizing collective human efforts affect the pooling of experiences and create incentives to innovate and share the lessons learned from a particular experiment?

Here we explore the role that three institutional mechanisms for organizing collective human effort play in the aggregation of problem solving: market, hierarchy, and network (cf. Powell 1990). By *market* we mean that the problem is solved through an arms-length transaction between actors with a problem (consumers) and actors who can address that problem (producers). By *hierarchy* we mean that the problem is solved through authoritative fiat or through concentration of power and resources in a system. And we define problem solving in *networks* to refer to the informal exchange and flow of favors and information within a given system, outside the existing hierarchical reporting structures.

The governance challenges with respect to decentralized innovation revolve around the production, sharing, and aggregation of information:

Challenge 1 Information Production. The very possibility that the lessons learned by one actor would be useful to another means that there may be a mismatch between private incentives and public benefits to experimentation. Innovations that will diffuse and benefit others may be underproduced or not shared, because actors do not incorporate those benefits to others in their calculations. The incentive issue creates a subsidiary issue of scale where there may be some innovations that only produce net benefits if there are multiple adopters. To take an extreme example, imagine an actor could invest c to yield benefits less than c , but where many other actors could then receive those benefits for free. In the absence of some type of return from the benefits others receive, it will not be in the interest of any single actor to produce them.

Challenge 2 Information Sharing. The fact that innovative practices can be public goods where the innovative practices of one actor do not reduce the value those practices offer other actors, means that communicating those practices can greatly increase collective welfare. However, sharing sometimes comes with a cost perhaps quite high, depending on the quality of information being conveyed. A key question, then, is whether actors share private information when it would increase overall welfare.

Challenge 3 Information Aggregation. Even if information is being shared, it does not mean that there will be a convergence to an optimal array of practices. For any given domain, there are likely many alternative practices, and a key question will be whether the system of communication facilitates a convergence toward optimal practices. As the information cascade literature highlights (Bikhchandani, Hirshleifer, and Welch 1992), it is eminently possible that communication that does not convey all private information may result in the collective convergence on suboptimal practices.

A key question, then, is, how do these various institutional mechanisms succeed or fail at addressing these governance issues? We consider each institutional archetype in turn.

The issue of market failure and information production has been well explored in economics. Economic models emphasize a few mechanisms to address the issue of informational externalities. The first is intellectual property protection. That is, if an actor produces an innovation that produces value for others, intellectual property

rights provide a mechanism for the innovator to gain some rents from other beneficiaries. In principle, intellectual property protection addresses much of the issue of information production and sharing, because actors internalize some of the benefits other actors receive from an innovation. Apple invested in the iPhone because it gained substantial profits from its sales; similarly, it has not been shy about telling the world about the benefits of the iPhone. Finally, one of the potentially compelling features of markets is that they aggregate information through price signals (Hayek 1945).

These mechanisms of governance are seemingly inapplicable to the public sector, because there is limited capacity to gain rents from successful policies that are emulated elsewhere (e.g., Massachusetts cannot charge other states for lessons learned from its health coverage reforms) and constitutional limits on consolidation (e.g., New York cannot launch a hostile takeover of New Jersey). However, as the case study below illustrates, for some policies, there is significant potential for market actors to “join” the informational ecosystem that includes the relevant government actors, developing and offering innovations that can then be transferred to other government actors through payment. Indeed, much production of various kinds in the public sector has been outsourced—sometimes called the hollowing out of the state (Milward and Provan 2000)—where the same private firm serves multiple jurisdictions. The potential of this market mechanism depends on:

1. *The capacity of actors to contract out production.* Certain types of policies can be contracted out and others not, e.g., because of their complexity (Brown, Potoski, and Van Slyke 2010). For example, implementation of IT policy, to some extent, can be outsourced, which means that lessons learned from implementation in one location can be utilized by the contractor elsewhere, providing the incentive to the contractor to innovate if they can capture some of the resulting rents. This example also highlights that nongovernment consumers on the demand side are also part of the broader information ecosystem, because the same contractors are providing services to both government and nongovernment entities.
2. *Formal or informal mechanisms of intellectual property rights.* There will only be an incentive for contractors to innovate if those innovations are not easily emulated. If another actor could easily copy what was done in one location, then it is not possible for the original innovator to capture rents from successful innovations. Such emulation can be blocked through formal property protection (e.g., through the development of proprietary systems), or through informal mechanisms (the development of systems that are difficult to copy because of their complexity).

Market-based approaches create their own dysfunctions. The existence of intellectual property rights creates market power, and necessarily shifts surpluses from consumers to producers (contractors). An exclusive market arrangement also means that innovation will be biased toward the development of systems that are protected by formal or informal intellectual property rights. Some of the support for the development of open source software for government use has derived from this dual critique

(Hamel and Schweik 2009). That is, the open source software movement may be seen as support for outsourcing to the “commons” rather than to private sector entities.

As the U.S. system of dual sovereignty (and the case study below) highlights, systems can have strands of both hierarchy and decentralization. That is, one can embed certain elements of hierarchy in an essentially decentralized system. Hierarchical governance resolves the scale issue by, essentially, removing (at least partly) “decentralized” from decentralized decision making. There are no informational externalities for a centralized decision maker (Strumpf 1999). Thus, a hierarchy can consolidate systemic production, potentially eliminating the issues of externalities. A hierarchy can also subsidize innovation, providing resources to subsidiary actors for experimentation. Alternatively, a centralized decision maker can authoritatively constrain or mandate particular behaviors e.g., mandating that particular units attempt innovative policies that might not be in their self-interest to pursue. In the U.S. many policy domains have a blend of these relationships between the federal and state governments, where, for example, with Medicaid there is a mix of some flexibility with federal mandates and dollars.¹

Hierarchies, of course, have their own failings in the creation and dissemination of information. First, if production is consolidated, the hierarchy is creating an internal monopolist that may have the same issues around pricing (or efficiency) that a monopolist in the market would have (Williamson 1971). Second, even in a world where agents confront identical problems, they might have different information (or perspectives) on what are promising solutions, thus potentially reducing the exploration of alternative policies. As Brandeis pointed out long ago, one of the presumed benefits of a decentralized system is that it promotes experimentation, and subsequent dissemination of successful policies.² Constraints on the behaviors of actors would, from this perspective, reduce innovation.³ Third, the central actor may confront vast informational overload in terms of its capacity to aggregate different information, especially if peripheral actors have subtly different problems. In fact, this was the primary Hayekian critique of central planning.

The premise of a network approach to innovation is that agents have differentiated connections and/or finite attention. That is, A can emulate B only if it sees what B is doing. Visibility depends on the nature of the innovation. Some “innovations,” by their nature, are publicly visible. This is part of a larger pattern of systems where units can cheaply observe or refer to particular other units, where that link requires no reciprocal effort.

The literature on networks and governance has emerged in the breach where market or hierarchy are clearly missing and an informal system has emerged that apparently addresses the underlying governance problem. Notably, Ostrom (1990, 2009) has focused on the role that networks regulate behavior in the provision of collective goods in the absence of a hierarchy. This research has focused on the provision of common pool resources (e.g., Ostrom, Gardner, and Walker 1994), but, as discussed below, much of the logic could apply to the creation and dissemination of innovative information. The emergence of enforced norms is likely one key component of information production and sharing e.g., recognition of helpful behavior

and punishment of actors who do not share information (Mergel, Lazer, and Binz-Sharf 2008).

The economic sociology literature, in contrast, has focused on the role of networks where markets fail. Much of the work on social capital (in particular, the vein of work following from Bourdieu 2001; Coleman 1988) is really about how networks govern dimensions of exchange that would otherwise fail because of asymmetric information. A substantial literature has emerged around “network industries” e.g., Broadway, construction, apparel where economic actors are repeatedly reconfigured around existing projects (Uzzi 1999; Jones 1996; Jones, Hesterly, and Borgatti 1997). This literature has focused on the role that (1) relational embeddedness (repeat interactions with the focal actor) and (2) structural embeddedness (reputation vis-à-vis third parties) play in regulating the behavior of individuals (Uzzi 1996).

There is also a rapidly emerging literature on networks in public organizations, which has focused, for example, on the role that networks play in the success of public managers (Meier and O’Toole 2001); as well as the role that network structure plays in the provision of public services (Provan and Kenis 2008; Milward et al. 2010; Provan and Milward 2001). Most of this literature, we would note, focuses on formal networks, rather than the emergent, informal networks (Isett et al. 2011) on which we focus on in this article.

How do informal networks address the three governance challenges outlined above? Part of the answer may lie in reciprocity (Axelrod and Hamilton 1981), where dyads of actors with long-run relationships develop cooperative relationships. However, reciprocity can be at most a small part of the answer, because the benefits of exchange within a dyad will not reflect the broader systemic benefits resulting from information sharing. It is not clear how dyadic reciprocity will encourage investments in innovation that reflect the benefits to the whole system. It is unclear whether dyadic reciprocity will also reflect the benefits that third parties (tied to one or both members of the dyad) get when that information is subsequently shared with them. It is possible that information exchanged within a dyad offers currency for exchange in other dyads, but it is not at all obvious that this should lead to a healthy equilibrium of information sharing. Finally, as the information cascade literature highlights, it is not clear that dyadic informational exchange should yield effective information aggregation. In short, reciprocity in networks may be a weak mechanism to support effective governance. Informal networks may play other, more important roles in supporting governance, for example in fostering the emergence of pro-social norms that encourages information sharing (Mergel, Lazer, and Binz-Scharf 2008). Norms that reward risk taking and innovation with status would certainly increase innovation. Communities where knowledge sharing is publicly recognized and seen as appropriate would likely have higher levels of information sharing. And settings where sharing otherwise private information regarding failure as well as success is encouraged would likely improve and information aggregation.

As a general proposition, all of these organizational forms coexist, in different degrees. For example, if you look at one of the classic studies of diffusion tetracycline (Coleman, Katz, and Menzel 1957) all three mechanisms were at work

within the system. At its core, this was a study of the decentralized decision making of doctors, whose objective was to take care of their patients. Coleman and his collaborators focused on how doctors learned through their network whether tetracycline was effective. However, not too far in the background was the fact that there was a market for drugs, with powerful intellectual property rights, which facilitated the creation of the drug in the first place, and which created an incentive to share information about the drug. In fact, a recent re-analysis (Van den Bulte and Lilien (2001)) of the Coleman data suggest that the network had little effect on behavior once one controlled for who was targeted for marketing. Further, in the background was a legal and regulatory regime (i.e., hierarchy) that (1) protected those intellectual property rights and (2) approved of the drug for circulation.

Our objective is to use the emergence of a particular “problem,” the use of the Internet by members of Congress, to explore how these mechanisms for organizing collective problem solving coexist. We now turn to a discussion of our methodology.

METHODOLOGY

Case Selection and Context

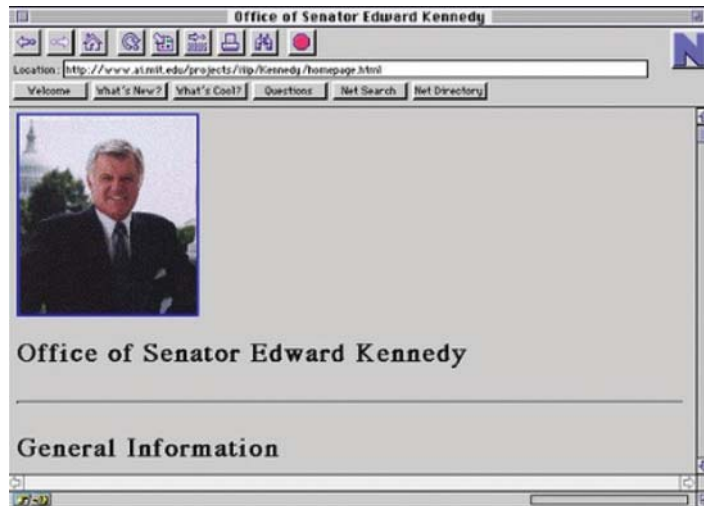
The empirical focus of this article is on use of the official Web sites by congressional offices. There are two primary reasons that we chose this as a setting in which to study innovation. First, is the novelty of the medium, and second is the decentralized management of congressional offices. We discuss each in turn.

Novelty of the Medium

Every member of the House currently has an official Web site. These Web sites present a virtual representation of the member to the world, and most notably to his/her constituents. The existing rules, such as the Franking rules, focus on the use of paper-based communication with constituents, so that the Internet is still a relatively novel medium for offices with a lot of uncertainty to what is acceptable practice.

Given the wide reach of the Internet, these official Web sites offer a potentially powerful means to communicate with constituents and the public in general. However, it is also a relatively novel medium for communication – as of the late 1990s, only about half of the members even had a Web site, and a few years before that the World Wide Web did not even exist. A casual perusal of Web sites suggests a substantial degree of convergence, but also nontrivial variation and experimentation. From our perspective, learning about the power of the medium is still fresh. This provides the opportunity for us to examine this learning process.

The screenshots in Figure 1 show (a) an example of one of the first Web sites of a senator (in this case Senator Edward Kennedy in 1993) and (b) an example of a highly developed Web site by Representative Mike Honda, who used a crowd-sourcing approach to include his constituents’ feedback into the Web-design process.



Edward Kennedy: First Senator with a Web Site 1993



Mike Honda's Crowd-Sourced Web Site in 2009

Figure 1. Sample Congressional Web Sites (Color Figure Available Online).

Decentralized Nature of Congress

Congressional offices can be considered as 440 small, functionally identical, and independent public organizations (Salisbury and Shepsle 1981). As one staffer we interviewed stated, “There’re 435 small businesses here, and each ‘CEO’ can do what

they want.”⁴ There are some House rules that limit how offices can use their Web sites, but within those constraints, congressional offices collectively come close to matching the assumption that decision making is truly decentralized.

There is clearly some interdependence of payoffs in the success of members e.g., Democrats have a stake in the success of other Democrats and in the failure of Republicans, and vice versa. However, the payoff a *particular* member gets out of the effective use of the official Web site by a specific *other* member is surely fairly tiny.

We would also note that members confront somewhat different challenges in communicating with constituents. The communication needs of a member from a rural Colorado district differ from the needs of a member representing Manhattan. However, all offices are operating under similar resource constraints, and similar desires to satisfy constituents and portray a positive image of the member. Further, much of this heterogeneity is visible both to the offices and to the researcher; and one key subsidiary question we pursue is how this heterogeneity affects the search process.

Data Collection

We conducted interviews with the congressional staff person who had primary responsibility for the official member Web site of 99 members of Congress in the summer of 2006. We were assisted in recruitment by the Congressional Management Foundation (CMF), a small nonprofit organization dedicated to helping members of Congress better manage their offices. The sample was constructed purposively to be roughly reflective of the body as a whole, but, due to the vagaries of who was willing to cooperate, is biased toward affluent urban districts, Democrats, and offices with above average Web sites (see Table 1). In our analyses below we examine

TABLE 1
Key Descriptive Comparing Survey Sample and House

	<i>Comparison of Sample and House</i>	
	<i>Sample</i>	<i>House</i>
MC Democrat	62%	47%
MC Republican	38%	53%
MC Female	22%	15%
MC Freshmen	11%	9%
MC term (average)	5.65	4.5
Median district income	\$51,050	\$43,318
District % urban households (average)	81%	67%
District % bachelors degree (average)	25%	24%
Region of country		
Northeast	15%	19%
South	33%	36%
Midwest	22%	22%
West	29%	22%

Note: MC = member of Congress.

whether our observations are robust across subsamples, focusing, in particular, on underrepresented strata. We note where we find significant deviations across subsamples.

The semistructured interviews each lasted about 45 minutes. The interviews were transcribed and each statement in every interview coded in an iterative process using the qualitative data analysis program NVivo 2 (QSR 2002).

At approximately the same time we conducted the interviews we also conducted a survey of the communications directors in House offices. This survey was more broadly about communication strategy but did include a few items regarding where offices got information about what to do with their Web sites. We received 100 responses from the 440 offices, for a response rate of 23%.⁵

Our core research question is to understand the ways in which Congress pools the experiences of congressional offices vis-à-vis the use of the Internet. We break this down into three subsidiary research questions, matching the three governance challenges laid out above:

1. *How do offices learn about which of their practices are successful and which are not successful?*
2. *How do offices learn from other offices? In particular, how do they learn which of the practices of other offices are successful and which are not successful?*
3. *What institutions outside of offices have a major impact on the aggregation of information?*

The first question focuses on feedback from the environment e.g., do offices gather data on constituent preferences? Do they track what information Web-surfers look at, and what proportion of hits are from the district? This information has possible positive externalities, because what is learned by one office potentially has relevance for others. For example, if an office finds that particular content is viewed more than others, this could be beneficial to other offices if this observation has relevance to what issues they might place on the Web site. This information might be transmitted through interpersonal communication, or through the simple observation of what that office is and is not doing with its Web site. Finally, what role in aggregating information do the institutional structures within Congress play? The two obvious institutions with an interest in the successful aggregation of information are (a) the parties and (b) the administrative infrastructure of Congress.

FINDINGS

Our analytic interest is how the system pools together the experiences of various offices' use of their official Web sites. Viewing the member's office as the relevant locus of decisions about how to use the Web site, we split our analysis up into (1) environmental feedback, (2) market-driven influences on decisions regarding Web sites, (3) hierarchical drivers of practices, and (4) interoffice (network) flows of experiences.

Innovation: The Role of Environmental Feedback

The Internet is a communication medium. The primary function of an official Web site is to facilitate communication with constituents. A key part of viewing the innovations around the official Web sites is to understand how offices assess whether a particular intervention was effective. In this case, do offices find out what works and does not work through feedback from their constituents? The Internet offers a particular promise for learning from the environment, because it is possible to track with some detail what visitors to the Web site are doing (e.g., number of hits, pages visited, referrers, etc.).

We therefore evaluate two questions: To what extent do offices (1) proactively assess what their target audience (generally, constituents) wanted from the Web site and (2) ex post assess whether their Web site was hitting the target?

The data definitively show that there was remarkably little effort by offices to proactively assess what constituents wanted. In fact, only two out of 99 offices (both representing districts with above average educations and incomes) indicated any type of research into what their constituents wanted, as one of them describes:

We . . . sent out a survey to about 40,000 constituents . . . asking whether podcasting was a feature they'd use, and whether tele-video conferences, online town halls, all [that] stuff, what did they want, what should our very limited resources be devoted to. The website was one of the top ones, without a doubt. Podcasting, in contrast, had a very limited response. . .

The lack of proactive research on what constituents want is, perhaps, unsurprising given the expense of surveys, focus groups, etc. The monitoring of the use of the Web site, however, is much cheaper. Readily available data which are usually automatically collected include: number of unique visitors and page views, what parts of the Web site are viewed, the approximate geographic location of each visitor to the Web site, who is linking to the Web site, where traffic to the Web site is coming from. It should therefore be easy to produce regular reports indicating how much traffic the Web site is getting, and from what part of the district, looking at which Web pages. It is therefore surprising that few offices reported looking regularly (or even recently) at these data (although the offices, when asked about this, very often noted this lack with regret). Only four of the interviewees specifically stated that they used Web traffic reports on a regular basis to help determine how they should operate their Web sites, and two other interviewees indicated that they collected information about their Web traffic but did not state how they used this information. All other offices stated that they did not get the information, did not use the information, had not looked at it recently, or did not know the current specifics about their Web site's traffic. Even those offices that reported tracking what parts of the Web site got hits did not examine the data carefully, as this one exchange highlights:

[Q: Do you look at what pages on your website get the most hits?]
We do.

[Q: Do you do anything with that?]

We used to do it more, I actually need to find out. (Sigh)

From another office:

We don't monitor as closely as I think would be helpful in terms of the Web traffic. We do an email program that runs separately that I can tell what links people are clicking on, but we don't often go back to the website to see, okay, this page was the most visited.

In short, assessment of practices with respect to these Web sites was quite limited. There was certainly evidence over time of the emergence of novel practices e.g., new features to a Web site but there was little assessment of whether those practices were effective, even in the minimal sense of a count of how many times they were used.

Markets

As noted above, markets resolve collective problem solving through the development of proprietary information, which is then monetized and sold (oftentimes in the form of services). In this case, we did observe that a population of small companies that caters to the Web needs of congressional offices has emerged during the past decade. Congressional offices are provided with a fixed budget, with which they have a fair degree of discretion. For some services, they therefore confront a build-or-buy decision do they use staff to build a Web site, or purchase expertise to do so? Many offices have pursued the latter route, where a small cottage industry of firms has sprung up to offer Web services to members; thus, those firms are divided along Democratic and Republican (e.g., one Republican oriented firm was called "Right click") lines. Fifty-eight percent of the offices in our survey reported hiring an outside consultant, where the following were typical comments from interviews:

We had a great vendor that allowed us to change our whole front page. We could do a lot of things internally.

[O]ur vendor came up with the ideas for how exactly to make the tour pages, a lot of pages, automated. Because when we did that, that was almost five years ago, so that was when nobody was doing it. Now it's pretty standard to have some of those features.

The essential market logic behind the outsourcing of the Web site is that there are economies of scale in the problem solving process, where the unit cost of production for many Web sites is lower than the cost of producing a single Web site. In principle, the resulting surplus can be divided among profit, quality of Web site, and the ability to offer lower prices to offices.

The effectiveness of the market in part rests on how well information can be protected. That is, if one vendor comes up with an innovative solution at some cost, and either offices or other vendors are able to copy that solution cheaply, there will be an underinvestment in innovation. In this particular domain, protection likely does not come in the form of intellectual property rights, but through the development of expertise that cannot be easily copied or built internally. However, that may still leave much relevant information unprotected, as highlighted by the statement of one clever staffer who made use of vendor services in another way:

One of the things that I've seen several external consultants do to pursue our business is send us a review and a report on our website, sort of analyzed by their staff and saying this really should be updated, this really should be changed to meet the standard government configuration or whatever... I then see that and I say, okay, I think I'm going to implement these things myself.

In this case, the staffer is essentially free riding on the insights provided by a vendor.

An additional issue with respect to vendors is that there will be a natural push from vendors to homogenize their products, because it is cheaper to offer a limited set of options, and in part because they are using off-the-shelf software designed for commercial purposes. Individual solutions for the different offices are then adapted from the standard set of solutions plus a personalized configuration. As one individual noted, "Looking at some of the other companies, it sounded like they were trying to sell us more of a template of what a website would look like, instead of... just completely designed for us, and how we wanted it." In short, vendors play a critical role in aggregating experiences and standardizing practice through their provision of services to multiple offices.

Hierarchies

There are two layers of hierarchy within the House: one based on authority and one based on power and resources. With respect to the former, the Committee on House Administration (CHA) sets budgets and rules constraining off-budget behavior (e.g., postings to official Web sites were constrained in the last 30 days before the election). They also run the technical infrastructure of the House, House Information Resources (HIR).⁶ HIR provides essential IT support to the House. A part of that support is the hosting of member Web sites, as well as basic consulting on design, providing a number of templates for offices to choose from (at no cost) and checking the security of content that goes up on the Web site. It is clear, however, that those templates are seen as somewhat constraining for some offices.

Part of the logic behind a hierarchical model of problem solving, like the market model, is that economies of scale in the provision of services can emerge. Production for offices may thus be consolidated at significantly lower cost. However, there is not

a mandate that offices use HIR, creating a mixed model of production, through HIR, vendors, and self-production, where only 15% of offices in our survey reported using an HIR template.

As a point of comparison, interview responses suggest that while HIR is cheaper (free) private vendors generally provide more customized service and innovate faster than HIR is able to do:

[HIR] are more involved than we'd like them to be...for instance, someone found a typo on her [member's] biography this weekend and I have to email them and wait for them to change it on that site. Also they just updated our content editor, which we have yet to make work... also, any time you want to put streaming media up, or, we can't actually put streaming media up, but floor speeches, it has to go through them.

In short, the hierarchical model, in this setting, does not offer enough flexibility for many offices, and adds an additional layer of transaction costs.

The second layer of hierarchy is based on the party organization of Congress. Parties have no direct authority over what members do with their Web sites. They do, however, have what we would label "problem-solving" resources. Earlier analysis of Web sites from 2003 suggested that Republicans had systematically better Web sites than Democrats (Esterling, Lazer, and Neblo 2005). This may have reflected a residual of the high priority that Speaker Newt Gingrich put on technology. Our interviews suggest that while the perception (especially among Democrats) persists that Republicans put a high priority on member Web sites, in fact the Democratic Party made Web sites a high priority after Nancy Pelosi became minority leader. Thus, for example, many Democratic interviewees said that under Pelosi Democrats put a lot of energy into developing the Web site www.HouseDemocrats.gov. Further, as an example of the resources of the parties, the Democratic Caucus provided a customized analysis of every Democrat's Web site. One staff member described the consequences of this formal analysis as follows: "[A] couple of months ago the Democratic caucus...audited everyone's website. And told you what they thought was wrong with formatting, or telling you what rules you might have accidentally broken.... So that was a very... individualized report."

One office that was just starting out used the report to help them get their Web site off the ground and followed all the rules laid out by the party:

[T]hey also gave a document of the highest scoring Democratic websites... the highest scoring was, [specific member of Congress], and so I looked at his website and I thought it was very clear. And, as you can tell, ours is really similar. So I just worked with our HIR consultant, [name], a very good guy, and we created this.

The caucus thus plays a particular role in conveying to members how to utilize new Web-related innovations. The following interviewee works in the

leadership, and talks about their role in conveying lessons about online video and e-newsletters.

I was one of the first to get video up and running on my website. . . . I took the initiative. . . . We held a large meeting. . . , and I spoke and told them . . . it's really easy and everyone needs to do it. . . . And . . . at six months I was helping offices left and right copy that function. . . . We did it more recently with . . . e-newsletters . . . saying . . . you've got to do them. Such an easy, great, cheap way to reach all your constituents.

In 2006, the Democrats also played a key role in pushing online town halls, in part by centralizing the capacity to provide online town halls, thus subsidizing online town halls, and in part by educating Democratic offices on how to do town halls:

[T]he online town hall was done through the Democratic office. It's cost prohibitive for every office to have their own online town hall run on their own. . . . So . . . that's all centralized through the Democratic office.

Yeah, the e-town hall was pretty neat. We worked with the House Democratic Caucus and they helped us set up the program that made it easy for us to post it.

The Democratic Caucus also played an important role in conveying the party's message via the Web. Thus, for example, predictably, the audit that the Democrats conducted in part had a party-oriented tilt: "[The] survey was more focused on the party message than it was on the individual site. . . . So . . . if we had a link to the Appropriations Committee website, but not the Democratic Appropriations website, then we had points taken off because we should have been linking to the Democratic site. . . ."

The Democrats also more directly pushed for certain content and messages on member Web sites. Unsurprisingly, the election was playing a big role during this period; a large number of Democratic offices expressed similar experiences with party leadership encouraging a unified message for the fall election:

[T]he Democrats in July and August rolled out their message platform. It's called A New Direction for America. . . . The main thing was one sheet, a description of what the new direction for America was. And the leader's office encouraged members to put it up on the website. . . .

[T]he leadership office sent out a template on the New Direction for America, and they made an announcement at our press secretary's meeting on Mondays, asking us to immediately put this up on our websites, because Leader Pelosi wanted all Democrats on message.

I thought that her [Pelosi's] office would just keep calling and telling me that I had to put it [New Direction template] up. (Laugh) But also, you

know, it's party unity and people should see what the Democrats are standing for.

More generally, leadership plays a role in providing content to offices, as these comments make clear:

I think it's gotten better over the past year. The Democratic leadership will offer suggestions, templates, links . . .

If you look at our website, there's something about veterans on there right now which came basically straight from Pelosi's office. There's also something about cuts to college loan programs, which is another email that was sent to us.

The Republican leadership also played a role in disseminating information regarding Internet-related practices to their caucus, as this example highlights:

The House Republican Conference has a blog seminar, probably twice a year, and I attended that. And they have bloggers come in from all the different popular websites and sit down and talk about what they like to see and what they can do. And then, there's also a segment on how to create and start your own blog, which is very helpful.

This example aside, it is clear that at this time the Republican leadership played a far less important role vis-à-vis their members than did the Democratic leadership. Not a single Republican staffer indicated that the support from their party was an important driver of any feature on their Web site. The following two individuals were among the most complimentary of the Republicans for the support provided by their leadership for office Web sites:

I never once spoke with [the Republican conference] about developing our website . . . I'm trying to think. I'm sure at some point in time they . . . provided examples of different types. I can't remember any specifics . . . but I'm sure if I did they would have given me great tips. But I didn't.

[The] conference does a really good job . . . putting out . . . best practices . . .

[Q: To what extent have you gotten insights?]

Not much.

In short, even those Republican staff most positive about the support from party leadership did not report using any feedback from leadership. Other staffers were less positive regarding what the party had to offer:

[T]he Republican Conference will send out stuff electronically to us . . . I've had this conversation with [them], like ninety-five percent of what you send me is useless. It's too broad. It wouldn't work in my district anyway.

I think the Republican party's a little bit behind the Democratic party as far as . . . their commitment to technology . . . I don't know if they've been the leader that maybe [other staffer] and I feel that they should be. You know the Republican party being the leader and having its members really devote resources to internet communication . . . in my opinion, I think [other staffer] and I have really had to take it on ourselves, and it's our prior commitment to it, and our commitment to it that has made us really work hard on this, and not really our party's commitment to it.

In short, during the period of our interviews, it is clear that the Democrats were more proactive in providing both form and content for member Web sites than Republicans, and that they had a real impact on Democratic Web sites. We would note that the relative importance of the party to Democrats as compared to Republicans in part reflects the relative popularity of Democrats as compared to Republicans during this period. In particular, while Democrats were trying to present a national focus in the election of 2006, Republicans were trying to keep races local. That is, identification with the Democratic Party was clearly a plus and with the Republicans a minus in 2006, and this almost certainly affected party strategy and member receptiveness during this period.

INTERPERSONAL VERSUS ATTENTIONAL NETWORKS

Do congressional offices learn Web site practices from each other? The relative similarity of the situations of members creates substantial potential for informational externalities. This potential of cheaply copying the practices of other members is not lost on harried staff, as one observed: "I was not in the business of trying to reinvent the wheel. I just wanted to . . . go out and steal the best ideas I could from other people."

There are two pathways by which offices may directly affect each other: interpersonal communication and passive observation. The particular practices we are studying are, by their very nature, in significant part public. Member Web sites are observable to all other offices, and viewing what other offices are doing is quite cheap and convenient. This is a contrast to many other practices, such as the use of particular types of databases to manage correspondence, which are essentially invisible to outsiders. We also note that the capacity to observe is finite for example, in this case it is only (generally) possible to observe some subset of other member Web sites. What is interesting about member Web sites is that while one component is easily observable (the actual Web site) there is much information that is not visible, such as the experiences of the office (e.g., failed experiments that are no longer on the Web site) and the management processes underlying what is on the Web site. These experiences are only accessible interpersonally by talking to someone in another office and engaging in a give and take about their management practices and experiments. The following interviewee illustrates searching both through observation and communication: "We looked at every single website. . . . We probably had [a list of] the top 30 sites. I individually contacted every single

one of those offices, and found out, who do you use for your website, who does the upkeep of it, who designed it, got all of the specifics of it. . . .”

Unsurprisingly, the vast majority of offices reported looking at other Web sites for insight. However, most interviews suggested that interpersonal interactions with other offices were minimal; the following represents the typical response: “I didn’t talk to other staff members. I definitely looked at other members’ sites very carefully and tried to see what they were doing that might work for us.”

Notably, in the interviews, only one office reported talking extensively to other offices about internal processes (e.g., Web site design; how to get content on the Web site, etc.). Interpersonal communication was largely focused on identifying vendors, where the following two responses are typical:

We’ve looked at basically every other member site there is. . . . [W]e picked out the ones we liked the best, and I contacted their staff, and we found out who their . . . vendor was.

I mean, I just talked to a bunch of my friends that are press secretaries basically. I just called them and said hey, who do you guys use, or, you know, is there anything you’d recommend? I really like your site, who did you use? Yeah, you know, basically word of mouth. [Name] did the same, our chief of staff. And he talked to some other chiefs of staff, in terms of cost and benefits, and customer service.

These last two quotes illustrate two different strategies for identifying who to talk to. The first relied on an extensive search of what was observable to guide personal contact. That is, the passive observation guided interpersonal information seeking. The second indicates a reliance on friends; that is, a particular type of interpersonal network, friendship, guided interpersonal information seeking.

In short, search largely takes place with respect to things that are publicly available—offices looking at each others’ Web practices, but not talking to each other frequently, and rarely delving into issues beyond vendor-related issues. We do not have a definitive explanation for this. This may be partly because offices do not look at each other as prime sources of best practices, as two individuals explain:

[Q: Have you talked to other people around the Hill who are running their websites]

I haven’t really, because, to be honest with you, there aren’t a lot of people who really know web design that well.

I looked around at most of, of the congressional websites on the web and most of them I kind of found to be relatively unimpressive. You know, I’ve often heard the complaint from web savvy people that congressional websites all look the same. And basically they look very average. They might have some information on them about what the member is doing,

but as far as being visually appealing they just can't hack it with some of the big private sector sites.

Further, there was also evidence of a "not built here" mentality within offices, that a particular office is so idiosyncratic that lessons regarding management practices are unlikely to be successful (Katz and Allen 1982). As one individual states, "[E]very congressional office just runs . . . their organization . . . in their own way."

Unsurprisingly, only a tiny fraction of the individuals we spoke with reported looking at every other Web site in Congress. Where did offices focus their attention? Some staff reported randomly browsing other members' Web sites. Many were more purposeful, looking at Web sites that had received an award from the CMF (see discussion below). A smaller group reported looking at salient other members, e.g., from nearby districts, or of prominent members: "We [looked] at all the neighboring congressional districts . . . as well as leaders in Congress. . . : Nancy Pelosi, the Hoyer site, Denny Hastert. . . . So we copied a lot of . . . the best ideas from other websites."

Another subset explored non-Congressional or nongovernmental Web sites:

I researched other sites, both commercial, Hill, other government entities, other things in life and you know jotted down ideas . . . what I liked about certain things . . . There are two [that stand out] . . . One was Senator Kennedy's website. In fact his website was pretty solid at the time . . . the other was Wine Inspector, wineinspector.com. They don't have a lot of information on their homepage, it's easily navigable.

Figure 2 summarizes the distribution of network strategies we observed among the people we interviewed (based on a coding of their responses to our structured interviews). The heavy reliance on passive observation—with 62% of interviewees indicating that they looked at other Web sites but did not talk to other offices about Web practices—is particularly striking.

The relative unimportance of interpersonal networks is striking, where only 26% of interviewees indicated that they talked to other offices about their Web sites. This seemed like a particularly favorable environment for interpersonal networks to matter: the obvious potential for lessons that would cross offices, the physical proximity of offices, and the potential for perceptions of solidarity, at least for offices affiliated with the same party. However, there were other powerful factors that clearly undermined the importance of networks. First, the position of communication director/press secretary had remarkable turnover—e.g., the median tenure of our communications directors is about two years (CMF 2004).⁷ Second, we saw little evidence that staff saw their responsibilities as transcending the office—i.e., making the member look good was vastly more important than making the party look good. Third, as noted above, many staff felt there was little potential in learning from other offices.

What were the drivers of the attentional networks? The interviews suggest that proximity of district plays a role, as did the Web sites of particular members, either because of the prominence of the member, or because the Web site had been

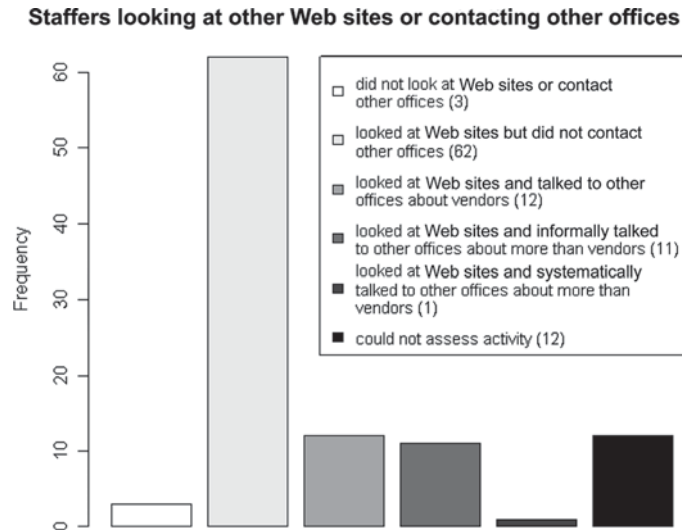


Figure 2. Search Strategies of Offices for Information About Web Practices.

identified as particularly good. In the survey, we queried respondents about Web sites that they thought were “particularly good” (see Table 2). We would view this sociometric construct as capturing the views of respondents as to which Web sites were worth paying attention to for their design. That is, the selection of a Web site as “particularly good” suggests that the respondent is aware of that Web site, and views it as a good model. Below are the Web sites that were identified more than once.

In Table 3 we present the results of a rare events logistic regression to assess the key determinants of a member’s Web site being mentioned by respondents as “particularly good.” As possible determinants, we included: whether the member in question was in leadership, the tenure of each member mentioned, whether the member was in the Democratic Party, and whether the target and the subject were from the same state and party. We also included a proxy for quality, the quantitative grade that each Web site received from the CMF (see discussion below). We included whether members were part of party leadership and tenure in House, because senior members, and especially members in leadership, are generally more salient. We also include a dummy for “Democrat” in case there is a difference in how much Democratic versus Republican Web sites are paid attention to.

The above analysis suggests that while quality of the Web site was quite important in driving the structure of the attentional network, a number of institutional factors were extremely important as well. Unsurprisingly, the Web sites of members who were in leadership were also far more likely to be mentioned ($p < .001$). State and partisan boundaries were extremely important ($p < .001$) in which Web sites were evaluated as “particularly good” i.e., the bulk of Web sites identified were from the same state and party of the respondent. This is consistent with a related,

TABLE 2
Congressional Members' Web Sites Viewed by Others as Particularly Good
(Mentioned More than Once)

<i>House</i>	<i>Last Name</i>	<i>First Name</i>	<i>State</i>	<i>Party</i>	<i>Mentions</i>
Rep.	Kingston	Jack	GA	R	5
Rep.	Pence	Mike	IN	R	5
Rep.	Capps	Lois	CA	D	3
Rep.	Honda	Mike	CA	D	3
Rep.	Sanders	Bernie	VT	I	3
Sen.	Clinton	Hillary	NY	D	3
Sen.	Kennedy	Ted	MA	D	3
Rep.	Barrow	John	GA	D	2
Rep.	Blumenauer	Earl	OR	D	2
Rep.	Boozman	John	AR	R	2
Rep.	Conaway	Mike	TX	R	2
Rep.	Fattah	Chaka	PA	D	2
Rep.	Mack	Connie	FL	R	2
Rep.	Musgrave	Marilyn	CO	R	2
Rep.	Pryce	Deborah	OH	R	2
Sen.	Hagel	Chuck	NE	R	2
Sen.	Snowe	Olympia	ME	R	2

quasi-experimental paper, in which we found that the quality of Web sites was strongly correlated with the quality of other Web sites from the same state, and not proximate congressional districts (Esterling, Lazer, and Neblo 2009).

TABLE 3
Determinants of Respondents Mentioning a Particular Member's
Web Site as "Particularly Good"

Web grade of Web site mentioned	0.032* (0.001)
Member mentioned was in party leadership	1.160* (0.340)
Tenure of member mentioned	0.060 (0.040)
Member mentioned was a Democrat	0.408 (0.252)
Respondent and member mentioned were of the same party	1.222* (0.288)
Respondent and member mentioned were from the same state	1.459* (0.364)
Constant	8.789* (0.510)

Notes: Rare events logistic regression coefficients. Standard errors are included in parentheses. $N = 44,239$ instead of the expected 54,400 (all potential Web site mentions of the 100 survey respondents) because not all respondents answered the question and a few members' Web sites were not graded by the Congressional Management Foundation.

*significant at $p < 0.001$.

We also have some hints at what the structure of the interpersonal network might look like. We asked in the survey about what other offices they communicated with.⁸ Only 52 offices were named, with some respondents naming multiple offices, so caution needs to be exercised in interpreting the data, but of those 52, 86% were within the same party, and (when combined with 11 responses indicating the state delegation), 60% were within the same state delegation.⁹ That is, interpersonal networks were largely determined by party and state.

The emulation process begs the question: How do you know when you are looking at a good Web site? How do you know what is good practice on any Web site? There are virtually no available objective data on “success” or “failure” e.g., approval/disapproval numbers from constituents, traffic, etc. The general criteria used by staff were based on their own subjective experience of a particular Web site as one individual stated: “[Y]ou know a bad one when you see it, and you know a good one when you see it too.” Further, the very presence of a feature on Web sites was an endorsement, as reflected in the reasoning of one staffer: “It was obvious everyone had a kids page, so we should definitely have a kids page...”

We would also note that sometimes practices were emulated simply because they solved a technical problem that an office was trying to solve, where presumably it was clear whether the solution in question worked or not. How this particular staffer, who was trying to figure out how to podcast, learned from another Web site is a case in point:

[T]here was no...huge database of websites to explain how to do [podcasting] on the Internet... The Committee on Government Reform figured out how to do it... I just looked at their source code and... deciphered how that's done just by studying the code and understanding... the way it's structured.

Obviously, in the case of technical issues like this, it is easy to evaluate whether the solution of a particular Web site works (e.g., is it possible to play the file on an iPod).

The CMF was also an important actor in the informational network, in particular as a norm setter. Beginning in 2002, CMF began issuing the Gold Mouse Report, in which it identified best practices, as well as those Web sites best complying with those practices.¹⁰ The Gold Mouse awards were based on a detailed set of criteria that the CMF developed, in part based on focus groups it conducted, in part in consultation with staff on the Hill. The influence came through the construction of a set of norms as to what members were supposed to do on their Web sites—the explicit identification of recommended practices. Thus, for example, many staff, given the responsibility for their member's Web site, began by consulting the CMF report:

I basically took the CMF book from a couple years ago [to] see what the Gold Mouse winners were doing, and used those techniques.

[A]bsolutely. I've been to the CMF website and I've looked to see what their best practices are or what they say these members are doing

correctly...to me, CMF, they're experts in what they recommend, and they look at every single House... website and they critique them. And to have that information that's available online for free, in my mind you'd be nuts not to look at it and use it and try to integrate that into your own website design.

The second theme that came up repeatedly was that the Gold Mouse award created a competitive environment among the offices to win the award in 2006, as the statements by the following three staff make clear:

I think, if we don't get at least a silver, it's off with my head. [laughter]... Powerful people, they like to compete with other old powerful people, and then show their little awards.

[T]he Congressman really wants to have a Gold Mouse... That was part of the deal when he was going to hire me.

[K]nowing that, the whole Gold Mouse thing was going to be coming around again I wanted to make sure that anything that we did for the Congressman was going to be very, very content rich, very, very content driven, and as one or two click friendly for a visitor as possible.

CMF thus has played a key role in influencing the direction of what is perceived as good practice of congressional Web sites. CMF set the normative environment, creating an environment that rewarded or punished staff that performed well based on CMF's standards.

DISCUSSION

How do institutions structure how people and organizations collectively solve problems? We have examined the multiple types of institutional processes that govern the production and dissemination of a particular innovation among Congressional offices. Market, network, and hierarchy have their distinctive logics in organizing human activity, and each plays an important role in this setting. Offices can be seen as consumers of a service, where a small industry has arisen to supply their needs. Information about the innovation flows through the network and within the multiple networks that exist, more attentional than interpersonal. Multiple hierarchies govern office behavior, with both the administration of the House (through CHA) and the powers within the House (through the parties) playing key roles. Table 4 summarizes these findings.

Notable as the key drivers of problem solving aggregation were: (1) the emergence of an array of small firms to serve the specialized market niche of Web services for members of Congress, (2) the parties especially the Democratic Party in pushing particular practices, (3) passive observation in spreading practices among the Web

TABLE 4
Factors Influencing Congressional Online Practices

	<i>Environmental Feedback</i>	<i>Market</i>	<i>Hierarchy</i>	<i>Network</i>
Definition	Private information garnered from direct engagement with environment	Concentration of problem-solving capacity in private actors, from whom services are purchased	Authority and power	Relational influences
Examples	Surveys and focus groups of constituents Tracking usage of Web site	External vendors	CHA directives and HIR templates Party advice/subsidies	Attentional networks Interpersonal networks Norms set by CMF; Gold Mouse Award
Summary of finding	There was minimal evaluation of the effectiveness of Web sites.	There was very heavy reliance on external vendors.	CHA was important in setting general parameters, and Democratic Party was more important in affecting practice than Republican Party.	Attentional networks were very important and interpersonal unimportant in spreading information; the CMF played a critical role in setting the normative environment.

Notes: CHA = Committee on House Administration; HIR = House Information Resources; CMF = Congressional Management Foundation.

sites of other members, and (4) the informal norm-setting role of the CMF. These institutional logics interact, with the interpersonal networks, for example, playing a key role in creating market share (through reputation) for the relevant firms and the formal structure of the House clearly playing a key role in the emergent informal network. Particularly surprising to us was the dog that did not bark: the relative unimportance of direct interpersonal exchange networks. The relative importance of the *attentional network*—where ties are directed from the actor who pays attention to actors that receive attention—has fairly broad applicability. That is, in a world where everything is visible, individual capacity to process information may be quite limited relative to the amount of information available. The pattern of who is paying attention to whom may thus be viewed as a network structure.¹¹ The social science literature on networks has typically focused on ties where the information being transmitted is private. Examples of private informational networks include, for example, sharing of information about employment opportunities (Granovetter 1974/1995), or lobbyists sharing information with each other about political or policy information (Carpenter, Esterling, and Lazer 1998). As compared to private informational networks, the incentive issue discussed above may be exacerbated in attentional networks, because the innovator has no control over the information created by the innovation, and therefore reciprocity cannot sustain information development and exchange. However, there may be particular benefits to an actor providing a model which subsequently receives substantial attention. For example, in academia, citation patterns may be viewed as an attentional network, and receiving many citations is considered a mark of success; on the World Wide Web, similarly, incoming links drive traffic. Thus, the role of norms in providing a reward for receiving attention is especially important in the case of attentional networks.

This particular case has a number of strengths and weaknesses. The distinctive strength of this study is that Congress is a well-understood institutional microcosm. There is significant homogeneity in the resources that offices have—eliminating many alternative explanations—and the sources of heterogeneity are generally well understood. It is therefore a useful petri dish in which to study innovation in a decentralized system. However, there are certainly ways in which the institution and the particular innovation that we study (use of the Internet) are unusual that limit the generalizability of our findings—particularly to a federal system of decentralized government. As a point of comparison we compare the results found here to two other studies that have similarly structured data. The first involves the diffusion of practices among state and local forensic DNA laboratories (Mergel, Lazer, and Binz-Scharf 2008; Binz-Scharf, Lazer, and Mergel, forthcoming); the second knowledge sharing among state health officials (SHOs) (Lazer and Mergel 2011). Both cases involved a similar combination of quantitative and qualitative data. A comparison of the findings in this article highlights the contextual variables that interplay with the factors that we focused on for this article.

The most striking difference among the cases is the role that interpersonal networks play. Our theoretical prior belief was that the apparent homogeneity and physical proximity of congressional offices would lead to networks being more important in this case than in the other two. The reality was the opposite: interpersonal

communication was least important in this case, and most important for DNA laboratories. A comparison across cases suggests two factors as important. The first is longevity in position. As discussed above, most individuals in charge of their Web sites in congressional offices had those responsibilities quite briefly. Personnel in DNA laboratories are typically in a particular position, and in a specific laboratory for many years (SHOs are in between). The second is longevity in career. The Hill is a starting point for many careers and end point for few. Except for a small group of individuals, the bulk of staff visit for a few years and move on to positions elsewhere. The resources embedded in relationships are highly perishable and, thus, less likely to be worth the investment. In contrast, personnel in DNA laboratories are self-consciously building task-related relationships across the country because of the long-run resources embedded in those relationships. Even if people shift organizations, they rarely shift careers.

However, attentional networks were far more important in the case studied here than the other two. This clearly reflects the nature of the innovation, where merely observing what other congressional offices are doing with their Web sites is quite cheap. By comparison, much of what other DNA laboratories or SHOs are doing is impossible to observe without interpersonal contact.

In all three systems, there are important hierarchical mechanisms that play the functions of constraining and subsidizing experimentation, as well as disseminating information. In the case of the DNA laboratories, the FBI has a key authority role, because it guards access to the national database system if local agencies do not adhere to national standards, local profiles will not be uploaded to the national database. The FBI sets those standards and also pays for attendance at an annual conference on the DNA database system. For SHOs, because of the many policy domains in which they are involved, there is a multiplexity of mandates, in which the SHOs are less directly involved in (likely because subordinates are directly overseeing more homogeneous areas).

Markets play a key role in the DNA domain, because the tools (e.g., equipment and DNA kits) used by DNA analysts are complex and expensive. As a result, market actors play an important role in the DNA informational ecosystem through support of those tools. This closely parallels the role that market actors play in the congressional ecosystem (although on a much larger scale). In contrast, the SHOs, as managers of large organizations, are somewhat insulated from information provided by market actors.

While our main focus is on illuminating the presence of multiple institutional logics of innovation, a natural question is what the joint failings or success of the overall system is. The research highlights a number of troubling patterns with respect to this particular informational system. First, there is relatively little feedback into the system regarding success and failure. From what we observed, there is rather little evidence with respect to what actually works. This, we would argue, reflects a serious failing of the system, where it is in no single actor's interest to conduct costly experiments from which others might benefit.¹² Second, there is relatively little interpersonal knowledge sharing regarding experiences within the institution. Instead, there is a reflective mimicry process, with subjective evaluation of others' visible

practices. The net effect, perhaps, is a consolidation of practices, but without a strong foundation of information on what actually works. In fact, these are exactly the conditions under which one might expect information cascades, because the sharing of public information is high and private information low.

These observations also point to places for follow up research. Our data collection here focused on the points of sovereignty in the system—the offices that make decisions as to how to create their Web sites. What was not included, generally, was research on other key actors in the system—the vendors, leadership, and HIR. It is clear that these actors played a key role in driving the homogenization of the system; what role did they play in addressing the three governance challenges we outlined initially? Did these actors, for example, aggregate information, by analyzing the relative effectiveness of different Web sites? Did they invest resources, more generally, to evaluate what features of congressional Web sites were and were not effective? The indirect evidence that we gathered from offices suggests relatively meager investments in this regard. Follow-up research can also focus on the second generation of Internet tools, such as the inclusion of social networking services as innovative parts of congressional Web sites and how these new technologies are integrated into the existing Internet strategy.

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NOTES

1. Of course, federal state relationships entail an array of interdependencies beyond policy information (Esterling 2009).
2. *New State Ice Company v. Liebmann* (285 U.S. 262, 311).
3. Analytically, this is a tricky question, since the central actor would presumably have greater capacity to extensively evaluate policy alternatives than peripheral actors.
4. There are 435 voting members, and five non voting delegates.
5. There was an overlap of 53 offices between our two samples.
6. For additional information on CHA see <http://www.cha.house.gov>.
7. These data were gathered by the CMF's 2004 House Staff Employment Study (2004). The CMF sampled 211 offices in the House of Representatives. The survey gathered data on characteristics of the personal staffers of members of Congress, including the time they have spent in their current position.
8. The specific item was: "For those Congressional staff that you talk with frequently *from offices other than your own*, what offices are they from?" (emphasis in original question).
9. We also asked about who the member was friends with, with similar results: of 90 "friends" named, 87% were same party, and 44% were the same state.
10. All of the reports are available at www.cmfweb.org.

11. Attentional networks likely have distinctive topographies with, for example, constraints on the number of outgoing ties and no constraints on the number of incoming ties. Thus, for example, while some academic papers have many thousands of references to them by other academic papers (and most have just a handful), no academic papers contain thousands of references. By contrast, there are likely significant upper limits in terms of the number of reciprocal friendships an individual can sustain.

12. A potential exception might be if the parties or the firms invested significantly in evaluating potential effective practices. However, no one suggested this was the case, and there certainly would have been an incentive for firms and parties to reveal such investments in order to persuade offices to purchase new services (for the firms) or adopt effective, new practices (recommended by the parties).

REFERENCES

- Axelrod, R. and W. D. Hamilton. 1981. "The Evolution of Cooperation." *Science* 211(4489): 1390-1396.
- Bikhchandani, S., D. Hirshleifer, and I. Welch. 1992. "A Theory of Fads, Fashion, Custom, and Cultural Change as Informational Cascades." *The Journal of Political Economy* 100(5): 992-1026.
- Binz Scharf, M. C., D. M. Lazer, and I. Mergel. Forthcoming. "Searching for Answers: Networks of Practice Among Public Administrators." *The American Review of Public Administration*.
- Bourdieu, P. 2008. "The Forms of Capital." Pp. 280-291 in N. W. Biggart, ed., *Reading in Economic Sociology*. Oxford: Blackwell Publishers.
- Brown, T. L., M. Potoski, and D. M. Van Slyke. 2010. "Contracting for Complex Products." *Journal of Public Administration Research and Theory* 20(suppl 1): i41.
- Coleman, J. S. 1988. "Social Capital in the Creation of Human Capital." *American Journal of Sociology* 94: S95-S120.
- Diamond, J. 1997. *Guns, Germs, and Steel*. New York: W. W. Norton.
- Esterling, K. M., D. Lazer, and M. A. Neblo. 2009. "Explaining the Diffusion of Web Based Communication Technology Among Congressional Offices: A Natural Experiment Using State Delegations." Paper presented at CELS 2009, the 4th Annual Conference on Empirical Legal Studies Paper, Los Angeles, November 20-21. <http://ssrn.com/abstract=1437660>.
- Esterling, K., M. Neblo, and D. Lazer. 2005. "Home (Page) Style: Determinates of the Quality of House Members' Websites." *International Journal of Electronic Government Research* 1(2): 50-63.
- Hayek, F. A. 1945. "The Use of Knowledge in Society." *The American Economic Review* 35(4): 519-530.
- Isett, K., I. Mergel, K. LeRoux, P. Mischen, K. Rethemeyer. 2011. "Networks in Public Administration Scholarship: Understanding Where We Are and Where We Need to Go." Special Issue: Minnowbrook III. *Journal of Public Administration Research and Theory* 21(Suppl. 1): i157-i173.
- Jones, C. 1996. "Careers in Project Networks: The Case of the Film Industry." Pp. 58-75 in *The Boundaryless Career: A New Employment Principle for a New Organizational Era*.
- Jones, C., W. S. Hesterly, and S. P. Borgatti. 1997. "A General Theory of Network Governance: Exchange Conditions and Social Mechanisms." *Academy of Management Review* 22(4): 911-945.

- Lazer, D. and I. A. Mergel. 2011. "Tying the Network Together: Evaluating the Impact of an Intervention into the Advice Network of Public Managers." *SSRN eLibrary*. <http://ssrn.com/paper=1881674>.
- Meier, K. J. and L. J. O'Toole. 2001. "Managerial Strategies and Behavior in Networks: A Model with Evidence from US Public Education." *Journal of Public Administration Research and Theory* 11(3): 271-294.
- Mergel, I., D. Lazer, and M. C. Binz Scharf. 2008. "Lending a Helping Hand: Voluntary Engagement in Knowledge Sharing." *International Journal of Learning and Change* 3(1): 5-22.
- Milward, H. B. and K. G. Provan. 2000. "Governing the Hollow State." *Journal of Public Administration Research and Theory* 10(2): 359-380.
- Milward, H. B., K. G. Provan, A. Fish, K. R. Isett, and K. Huang. 2010. "Governance and Collaboration: An Evolutionary Study of Two Mental Health Networks." *Journal of Public Administration Research and Theory* 20(Suppl. 1): i125-i141.
- Ostrom, E. 1990. *Governing the Commons: The Evolution of Institutions for Collective Action*. Cambridge: Cambridge University Press.
- Ostrom, E. 2009. "A General Framework for Analyzing Sustainability of Social Ecological Systems." *Science* 325(5939): 419-422.
- Ostrom, E., R. Gardner, and J. Walker. 1994. *Rules, Games, and Common Pool Resources*. Ann Arbor: University of Michigan Press.
- Provan, K. G. and P. Kenis. 2008. "Modes of Network Governance: Structure, Management, and Effectiveness." *Journal of Public Administration Research and Theory* 18(2): 229-252.
- Provan, K. G. and H. B. Milward. 2001. "Do Networks Really Work? A Framework for Evaluating Public Sector Organizational Networks." *Public Administration Review* 61(4): 414-423.
- Uzzi, B. 1999. "Embeddedness in the Making of Financial Capital: How Social Relations and Networks Benefit Firms Seeking Financing." *American Sociological Review* 64(4): 481-505.
- Uzzi, B. 1996. "The Sources and Consequences of Embeddedness for the Economic Performance of Organizations: The Network Effect." *American Sociological Review* 61(4): 674-698.

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