

Regulatory Capitalism as a Networked Order: The International System as an Informational Network

By
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This article conceptualizes the international system as an informational network—where the sovereign units in the system produce and process information, and linkages among units in the system are conduits for information. Building on a substantial literature that documents the diffusion of policies across nations, this article draws on concepts from network analysis to ask a critical question: what governance issues are raised by viewing the international system as an informational network? The author asserts that the core governance challenge is to balance the benefits of eliminating costly reinvention of the wheel, while maintaining continued innovation and minimizing the dissemination of welfare-reducing policies (fads). Increases in the linkages in the system, while improving the availability of information to all actors, may decrease innovation and increase fads.

Keywords: network; regulation; governance; international organization; diffusion

1. Introduction

Regulatory policy choice by any nation is not a solitary event. The tug and push of the international environment is more evident now than ever—through international agreements, desires to attract international capital, and needs to have compatible policy regimes with major trading partners. The international environment also provides information as to what desir-

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able policies are. Policy makers may look to other states, asking what has and has not worked before. This article, focusing exclusively on “horizontal interdependence” (Levi-Faur 2005 [this volume]; Slaughter 2004), takes the view that it might be useful to conceptualize the international system as an *informational network*—where the sovereign units in the system produce and process information, and where linkages between units in the system serve as conduits for information. This article builds on a substantial literature that documents the diffusion of policies across nations (national diffusion, in contrast to sectoral diffusion—see Jordana and Levi-Faur 2005 [this volume]). The critical question it focuses on, drawing on concepts from network analysis, is what are the governance issues raised by viewing the international system as an informational network.

In particular, the article argues that there is a potential trade-off between facilitating the spread of information and producing information. The technological and institutional developments of the past decade and beyond have potentially greatly aided the dissemination of information. These developments have a clear upside: greater accessibility of more information to more decision makers. However, it is plausible that such increased accessibility of information will (1) decrease investments in innovation as decision makers wait for other jurisdictions to create policy solutions, (2) decrease the “biodiversity” of policy solutions available in the system, and (3) increase the spread of misinformation (fads).

This article begins with a brief overview of the literatures on diffusion and policy learning. The next section outlines some of the mechanisms of diffusion in the international system. The subsequent section turns to the critical governance challenges that an informational network perspective reveals. The conclusion points to further avenues of research that this perspective points to.

2. International Diffusion of Policy Innovation

States, in an informational network perspective, are simply *policy choosers* and *information producers*. Policy choosers are those units in the system with the authority and power to pick their preferred policy.¹ Those choices and resulting experiences, as discussed below, produce information about what are desirable options for other states. Elsewhere I have argued that there are three modes of regulatory policy interdependence: coordinative, competitive, and informational (Lazer 2001; Lazer and Mayer-Schoenberger 2002). Coordinative interdependence exists when there are benefits to having the same standards as other states—for example, having identical standards with respect to agricultural products so as to maintain market access. Competitive interdependence exists when there are benefits to having distinctive standards—for example, having more relaxed (or efficient) regulatory regimes so as to attract capital. The objective of this article is to develop the informational dimension.

Informational interdependence exists when the policy decision processes in one state create informational externalities for other states. When a policy actor adopts a policy, that adoption and subsequent experience convey information to other pol-

icy actors. Some of those choices may be a matter of public record (statutes and regulations) and in principle accessible to all, and other important information will remain private. Policy actors thus simultaneously suffer from information overload and information deprivation. Actors need to adopt both network strategies—selective attention to help sift the public information and access private information as well as internal filtering strategies to eliminate the large majority of information that is publicly available.

Epistemic communities and international organizations . . . likely play an especially important role in the efficient diffusion of information because ties that bridge otherwise unconnected communities play a critical role in information dissemination.

The informational network perspective is not unique to regulatory policy—one might use it to understand, for example, the spread of educational policy. However, it is a perspective that has been neglected until recently in the study of regulation because of other explanations (competitive and coordinative) for regulatory convergence. However, overlap of the regulatory age with the information age is likely not coincidental. Regulatory policy is information intensive, and the development of information technology has greatly facilitated accessibility to information about regulatory policy, inadvertently shifting the role of regulators from primarily being somewhat isolated decision makers to rich informational nodes in an international network.

One may therefore usefully construe the universe of policy actors as a set of nodes among which there is a set of evolving connections (Slaughter 2004, 19). Over these connections flows information and attention about adoption success and failure, as well as raw data. It is the assertion of this article that the architecture of connections matters, that some architectures are better at facilitating information transfer than others, and that it is necessary to understand how this structure emerges.

There exists, of course, a substantial body of literature on the diffusion of policy innovations—and adjacent topics such as policy networks, policy transfer, and policy convergence (e.g., Dolowitz 2000; Dolowitz and Marsh 1996, 2000; Rose 1993; Walker 1969).

Similarly, there is a large literature on the diffusion of innovations through interorganizational networks within and between corporations (e.g., Dyer and Nobeoka 2000; Kogut and Zander 1992, 1995). This literature suggests that a tremendous amount of information flows through interorganizational networks (typically measured through overlap of corporate boards).

This voluminous research examines the process of diffusion, how innovation evolves as it diffuses, the characteristics of early versus late adopters, and so on (Rogers 1995). The objective of this article is to consider what are the generic processes by which the architecture of diffusion emerges—the network—and what are the normative implications of different architectures.

Information diffusion through intergovernmental networks is quite different on certain dimensions from diffusion in the private sector. First, in the private sector, many innovations are proprietary, thus increasing both the cost of adopting an innovation, as well as the likelihood of the innovation in the first place, since the innovator may extract most of the benefits of that innovation.² The profit motive also means that the innovator has an incentive to spread information about the innovation. Second, where innovations are not proprietary, a corporation has an incentive to keep information secret from competitors as long as possible. The public sector, in contrast, has relatively little incentive to suppress information about successful innovations. Third, with survival less of an issue, and relative performance more difficult to measure, bureaucratic inertia is likely a greater barrier to adopting successful innovations in the public sector than in the private. Fourth, many policy makers are clearly moved to innovate and to spread the word to increase their impact on the world beyond their jurisdiction.

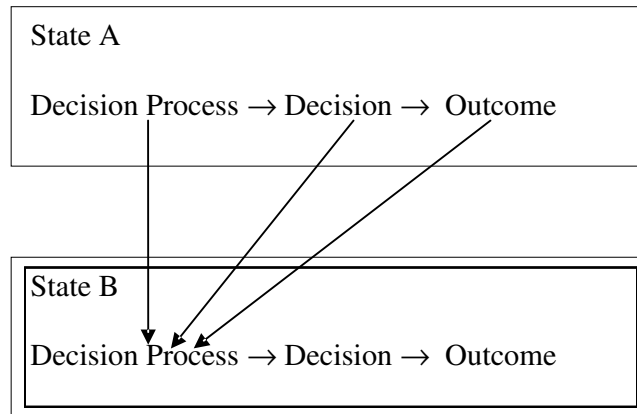
There is therefore substantial potential for diffusion of successful policy innovations, both intranationally and internationally. The question asked here is what is the impact of the shift from local to global informational networks. The next section examines the mechanisms of information diffusion in the international system.

3. Processes of Informational Diffusion in the International System

As noted above, states, in an informational network perspective, are simply *policy choosers* and *information producers*. Those policy choices produce information prechoice through decision processes that involve the gathering and analysis of data and postchoice through the outcomes of those decisions. Some of the data that may affect policy choice may be information generated by the choices of other states, where that information may include predecision or postdecision data or may simply be the policy choice of those other states (see Figure 1). It is this decisional interdependence through the spread of information that the informational network perspective focuses on.

This section of the article examines some of the mechanisms through which these types of information spread in the international system. In particular, it

FIGURE 1
THREE TYPES OF INFORMATION DIFFUSION



focuses on the role of epistemic communities, international organizations, cross-national corporate entities, institutionally mediated networks, and interpersonal networks.

Epistemic communities. Epistemic communities are cross-national collectives of individuals with common interests and institutionalized mechanisms for communication. Academia is the prototypical epistemic community, where academics have identifications and missions that transcend national boundaries (economist, physicist, etc.) and have well-developed institutions to facilitate cross-national communication (journals, conferences). In the environmental realm, for example, Clark et al. (2001) documented how debates regarding environmental policy in a large range of developed countries closely tracked each other in the 1960s and 1970s. Notably, the debates in these different countries were largely framed in terms of domestic circumstances, where it seems likely that the common thread was the existence of a cross-national community of scientists. A recent such community is the Climate Policy Network (see cpn.zew.de). Epistemic communities thus serve as bridges (see below regarding network architecture) among nations.

Epistemic communities and international organizations (discussed below) likely play an especially important role in the efficient diffusion of information because ties that bridge otherwise unconnected communities play a critical role in information dissemination (Granovetter 1973; Burt 1995). As Watts and Strogatz (1998) demonstrated, a few distant ties dramatically reduce the “degrees of separation” within a network. Informational mechanisms (e.g., epistemic communities, international organizations) that bring together policy makers that would otherwise be separated by geography, culture, and political and economic factors likely

have an especially large impact on the degrees of separation in the international informational network.

International organizations. International organizations sometimes play a critical role with respect to the dissemination of information about regulatory policy (e.g., Slaughter 2004, 37). For example, the Organisation for Economic Co-Operation and Development (OECD) conducted a series of studies in the 1990s about regulatory reform. These studies produced an enormous amount of information about the policies of various countries—there are more than one hundred documents about Japanese regulatory policies alone (see www.oecd.org). These studies were widely disseminated to policy makers and easily downloadable on the Internet. This availability of information in turn has the potential to influence policy; for example, the formulation of the Government Performance and Results Act of 1993 in the United States drew extensively on the experiences of other countries through the studies of the OECD (Breul 1996). The OECD thus played three roles in the diffusion process: (1) It defined a menu of alternative policy options—what policies are considered options (and which policies, through lack of mention, are not options)? (2) It provided evaluative information, aggregating the experiences of multiple policy makers (see discussion below regarding information aggregation)—that is, what policies worked where? (3) It provided exemplars for policy options—who should be looked at for emulation? The OECD thus both provided a cover of legitimacy (normative isomorphism—see DiMaggio and Powell 1983) to policy makers seeking policy options and reduced uncertainty regarding the consequences from any particular option.

Certain institutions of higher education play a similar role in the international informational network—for example, 41 percent of students at Harvard's John F. Kennedy School of Government are non-U.S. students, and many of them will play critical policy-making roles in their countries in the future; furthermore, a perusal of the major courses at the Kennedy School on regulation reveals cases from the regulatory policies of nineteen countries in addition to the United States.³

Cross-national corporate entities. There are, of course, many corporate entities that cross national boundaries—for example, multinational corporations and nongovernmental organizations. These corporate entities have interests that enter the political calculus in the countries that they exist in (very often pushing for compatible cross-national standards) but, furthermore, also serve as (nonneutral) vessels for policy information. That is, these entities will circulate information about the experiences of other states that bolsters the policy choices that entity would support. For example, Vogel (1995) documented MNC interests in harmonious regulations, which drove lobbying by firms—which is partly about information provision (Carpenter, Esterling, and Lazer 2004). Consultants, such as Accenture, and international law firms also serve as knowledge brokers, trying to retain the value of the lessons from one jurisdiction and capture some of the potential gains in other jurisdictions as rents.

Institutionally mediated. There may also exist institutionalized mechanisms of communications—regular channels through which information may flow. For example, in the EU the ministers charged with telecommunications policy conduct monthly meetings of the Independent Regulators Group (Lazer and Mayer-Schoenberger 2002). The original reason for these meetings was to informally resolve coordination problems that arise in telecommunications policy. However, they also serve as conduits for conveying information about policy innovations. International organizations such as the Commonwealth also play an important role in information diffusion in a very different way than the OECD by institutionalizing peer-to-peer networks. One can point to numerous policy ideas that initially spread through the Commonwealth. A case in point is the development of the “New Public Management” in New Zealand, which was in part grounded in experiences from Australia, the United Kingdom, Canada, and Ireland, and which then recycled back to those countries after their recombination in New Zealand (Boston et al. 1996).

Peer to peer. There are also ad hoc cross-national relationships between policy makers that might serve as a conduit for information flow. That is, there are relationships that emerge because there are particular occupants in particular roles, where those relationships do not outlast that context—as an example, there were substantial efforts during the Reagan-Thatcher years at transatlantic Anglo-American emulation (e.g., see Dolowitz 2000).

Interplay of diffusion mechanisms. The above mechanisms operate in both additive and interactive fashions. Thus, for example, the model of seafood safety regulations changed dramatically across the world during the 1990s toward a focus on intervening with respect to processes that result in safer seafood (see Lazer 2001; Coglianese and Lazer 2003). This rapid change was the culmination of a decades-long process, starting with the management challenges in the 1950s when Pillsbury was evaluating how to produce food for astronauts, where the consequences of contaminated food for astronauts would be catastrophic. The answer it developed was to evaluate and control the processes that might result in contaminated food. Over the subsequent decades, the scientific community converged on process regulation as the best model for the regulation of food safety (most notably, seafood), where traditional models of inspection (“poke and sniff”) were inadequate to detect microbial contamination. This cross-national scientific consensus found a governmental home in the United States, which in 1989 adopted a voluntary version of this approach. A few years later, a mandatory program in Canada was promulgated, and following the Canadian program, the Food and Agricultural Organization (FAO) developed guidelines for this model, touting the Canadian experience. The Canadians proactively promoted their approach internationally, with missions to Southeast Asia, and shortly thereafter, the EU and then the United States adopted mandatory process regulation.

Clearly, an important part of the story was the need by states to maintain access to major world markets—the coordinative mode, discussed above. However, this

misses the critical internationally grounded informational processes that served as the genesis of this regulatory model.

The first challenge of an increasingly networked world is that increased communication may decrease incentives to produce information.

The impact of the Internet. Processes of information diffusion precede written history, as Diamond's (1999) discussion of the spread of agricultural innovations illustrates. Arguably, the development of the Internet, just as the development of key communication media before it, has resulted in a qualitative shift in some of these modalities of dissemination. A perusal of any major policy area reveals that the Internet has facilitated the "broadcasting" of policy information—a policy maker in a peripheral state considering his or her options can rapidly access many of the printed procedures/policies/rules of other countries, as well as analyses of many of those policies. It is also possible that the Internet has facilitated the creation and maintenance of peer-to-peer networks, although the impact of the Internet on person-to-person relationships is still ambiguous (Wellman 2001).

It is important to note that in a world in which everyone is a broadcaster (which to some extent every state is), not everyone tunes in to every broadcast. Research over the past decade suggests that networks based on citation processes—including actual academic citation networks and the World Wide Web—tend to have a very uneven distribution in who gets paid attention to. A few nodes are paid attention to, and most are not. The basic logic of these systems is that there is a self-reinforcing process by which those that initially get paid attention to are then referred to often and get still more attention paid to them (Barabasi 2001). The logic of these citation processes may plausibly be mapped to who is paid attention to in the international sphere. One can point to a number of examples where there has been a convergence of attention on particular exemplars of policy in the international sphere—for example, electricity deregulation in the United Kingdom or pension reform in Chile.

4. Producing and Preserving Information

The preceding section examined the determinants of how fast information disseminates in an informational network. All other things being equal, it is arguable that having more information available for making a decision is better than having

less. However, there are three important caveats to this assertion; in particular, that increasing the effectiveness of information dissemination may (1) affect the incentives to produce information, (2) reduce the diversity of information available, and (3) increase the spread of “bad” information (fads). Each of these is discussed below.

Information production

The first challenge of an increasingly networked world is that increased communication may decrease incentives to produce information. Generally, the absence of property rights discourages investment in producing information in the public sector (although see caveats to this general proposition below).⁴ A system that is more effective at spreading information may aggravate this institutional flaw of the public sector. Specifically, governments may become more complacent with respect to innovating, in the hope that someone else will bear the costs of a successful innovation.

An illustration highlights why this might happen. Imagine a potential innovation that yields \$1.10 worth of benefits and costs \$1.00 to produce if a government produces the initial innovation or is free if some other government produces the innovation. Assume, furthermore, that there are 100 governments. In the absence of any information diffusion (call this the “island scenario”), every government will spend \$1.00, and produce \$1.10 worth of benefits, for a total of \$110 of benefits for \$100 of costs. In the networked world where there is rapid diffusion of information, assume that there is an initial innovator that spends the initial \$1.00 and reaps \$0.10 worth of net benefits. All other states then adopt the innovation, for \$1.10 worth of net benefits. From the systemic point of view, that \$1.00 of cost has yielded \$109 of net benefits, as compared to just \$10 in the previous scenario. From a systemic point of view, this is an enormous success. From 99 governments’ point of view, this is an enormous success. For the 100th government, this is, in absolute terms, exactly the same as the island scenario.

The networked world scenario is therefore pareto superior to the island scenario. However, it is not a stable scenario if you assume that the choice to innovate is endogenous. If you assume (1) that each government is choosing whether to innovate and (2) that governments are in part benchmarked by each other’s performance (Besley and Case 1995) and that therefore the innovation decision, over the long run, is itself modeled on the decisions of the governments that produce the highest net benefits, the equilibrium scenario is *zero* innovation by any government—zero net benefits.⁵

The impact of free riding is particularly acute because the benefits of an innovation would be so much greater in the networked scenario—in fact, innovations that result in net absolute losses for an innovator could result in welfare gains for the system. If one assumes that the initial costs of an innovation are F , the costs of adoption for each government after the initial innovator are c , the benefits for each government from that innovation are B , and N governments benefit from that innovation, then the innovation would result in net benefits if $N(B - c) - F > 0$. For example, if $N = 100$, $c = 0$, and $B = \$1.10$, that innovation would produce net sys-

temic benefits even if $F = \$109$. The innovator, however, would face net losses of \$107.90. If the innovator retained rights to its information, then it could, in principle, extract many of the benefits that everyone else in the system receives.

The danger of free riding is determined, in part, by whether governments have different underlying preferences or circumstances with respect to a potential innovation, as highlighted by the literature on transplantation (Wilson 2005). Free riding is a great danger where “one size fits all”—governments have identical preferences. It is no danger if each government requires a unique solution (of course, in this latter scenario, there is no benefit to the networked world either).

The possibility of free riding may be reduced to the extent that policy makers value the possibility that their innovation will spread beyond their jurisdiction. If one assumes that rather than being egoists, policy makers are promoters of policies and their spread, then the rate of innovation in the networked scenario will be greater than the rate of innovation in the island scenario. That is, those who seek to maximize their impact on the world rather than their jurisdiction will have greater opportunities to affect a networked world. Alternatively, it is conceivable that emulation by other states will increase the prestige of the leaders of the state that originated the innovation, creating an incentive to innovate even if most of the benefits of the innovation go to others (Busch, Jörgens, and Tews 2005 [this volume]).

Preserving information: The value of diversity

The second challenge in the highly networked world is that some diversity of policy solutions will be lost, to the detriment of the system. The decision to attempt an innovation will rely in part on a government’s assessment of the innovations adopted by other states and whether there is a consensus in the system as to what best practice is. In a poorly networked world, a government will occasionally look at what a small number of other governments are doing—if none has a clearly superior alternative, that government may experiment. A successful innovation somewhere in the system will spread slowly, resulting in continued experimentation in the rest of the system during a slow “take-off” period. If that innovation is the optimal solution, this is clearly dysfunctional; however, if it is not, the continued experimentation in the rest of the system may uncover a better solution.

Alternatively, even if the successful innovation is optimal, it may not be optimal in the future, and maintaining a diversity of approaches would therefore be healthy. Heterogeneity is a systemic property that may yield benefits to all within a system. Adherence to unconventional and suboptimal policies today may provide diversity in the system for all to benefit from tomorrow. It also serves as a platform to experiment from. Excellent policy solutions may only differ from policy disasters on a few dimensions. A world where everyone rapidly converges to “best practice” will likely have better policy outcomes in the short run than a world where everyone experiments in different “neighborhoods” of the policy space and then only slowly converge to best practice. However, the latter world will have more experimentation and may be more likely to produce better policy outcomes in the long run.⁶

A classic example of premature convergence is the convergence on the QWERTY layout of keyboards. Early in the typewriter industry, there was substantial diversity of key layout. The QWERTY layout was originally designed to slow typing to prevent the mechanical jamming of the typewriter, and, over time, through a diffusion process, the QWERTY layout became standard. While the mechanical jamming of typewriters is no longer a problem, the QWERTY standard remains.⁷ One might hypothesize that QWERTY-type of outcomes are more likely in an informationally efficient system.

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The likelihood of A adopting B's innovation should drop as the similarity of A's and B's policy objectives drops, since B's innovation would presumably be tailored to its policy objectives. Differences in underlying policy objectives should therefore help maintain a diversity of policy approaches (although limit the benefits to policy diffusion as well). For example, Canada, while it has easily available all of the epidemiological studies and all of the policy choices and outcomes from other OECD nations, still has by far the most relaxed regulation of the use of asbestos of any OECD member (perhaps the result of its very large asbestos industry). Other examples along these lines would include Indonesia's relatively relaxed regulation of tobacco (Moore 2003) and the EU's restrictions on genetically modified organisms (Prakash and Kollman 2003).

Separating the good from the bad: Aggregating information

The third potential challenge in the highly networked world is how well that network *aggregates* information. Bad information as well as good spreads in informational networks. A more efficient network at spreading information is also a more efficient network at spreading fads, manias, and so on. As the information cascade literature demonstrates, a system where the decision (rather than decision process and/or outcome; see Figure 1) is the only thing that one actor can observe about another can easily result in the spread of misinformation (Strang and Macy 2001;

Banerjee 1992; Bikhchandani, Hirshleifer, and Welch 1992). Essentially, if one imagines that each node in the system has private information about the value of an innovation, but that this private information can be outweighed by the observation of the adoption decisions of others, then all it might take for the system to get rolling in the wrong direction is for a few of the initial adopters to have incorrect signals. At that point, the private information of subsequent adopters is outweighed by what they observe others to have adopted, resulting in a potential bandwagon going in the wrong direction. The consequence of such a bandwagon would be the adoption of dysfunctional policies.

These potential bandwagon effects might be ameliorated by a number of factors, most notably by the size of the pipeline of information. First, potential adopters could pool their private information regarding an innovation. Given a large enough set of nodes sharing their private predecision evaluations, this pooled knowledge could outweigh the information conveyed by a “bandwagon” (since, actually, bandwagons do not convey that much information). Second, adopters might send information about their postdecision experiences. This would vastly increase the amount of information conveyed in the adoption process, and every bandwagon would contain the seeds of its own destruction since the bandwagon would create a body of data about its failings. The potential of success/failure information to eliminate bandwagons depends on (1) the lag between adoption and success/failure data and (2) whether such data are even generated by the process (as noted above). It is in fact not in the interest of adopters to produce data that demonstrate that they chose failing policies. There is an incentive to suppress negative feedback and, even worse, to suppress any feedback at all in fear that it could be negative. International organizations and epistemic communities thus can play a critical role in information aggregation, (often) having less invested in defending particular policy choices.

5. Conclusion

The objective of this article has been to conceptualize the international system and the diffusion of regulation within it as an informational network: each state producing information and potentially transferring information to other states. The outlines of this network can be seen through a large variety of mechanisms, including cross-national scientific communities, international organizations, and subnational communications (some informal, some institutionalized). Developments in information and communication technologies over the past decade have likely increased the availability of information to decision makers by orders of magnitude.

The article highlights a potential trade-off between information dissemination and information production, where improvements in the dissemination of information, while in the short run increasing the information available to decision makers, may in the long run reduce the production and diversity of information in the system overall and also increase the amount of “bad” information provided.

The informational perspective points to a fundamentally different research agenda than more traditional models of regulatory competition and cooperation. Four research questions are particularly important: (1) What is the actual *architecture* of information diffusion? Where do which policy makers get information on what? This article has taken as a stylized fact that, due to the development of information technology and the proliferation of international institutions, there are generally more linkages than there used to be. This, of course, remains to be empirically demonstrated, and even if there is a larger quantity, there may not be a qualitative difference in the global information network. Furthermore, what may matter is not the increase in overall connectedness but the distribution of that connectedness. (2) What are the *motivations* of policy makers for innovation? Much (but not all) of this article assumed that policy makers are parochial egoists—attempting to free ride as much as possible off of other jurisdictions. However, very often policy makers have an interest in the dissemination of policies, either because of motivations around the beliefs of what is for the greater global good or because there is some benefit to the adoption by other jurisdictions of the policy maker's innovation. (3) What are the implications for *who wins and loses* from a given change in the network? Kindleberger (1983) and others have highlighted the role of hegemony in the production of global public goods. How does an increasingly networked world interplay with hegemony? Does it, for example, result in the disintermediation of the hegemon? Alternatively, does it mean that because there is more information available about the hegemon, the hegemon is increasingly seen as the model for the rest of the world? Finally, do large states increasingly carry the burden of policy innovation? (4) What are the *prescriptive governance implications* of an informational network perspective? This article highlighted problems but not solutions. How might the architecture be augmented through strategically increasing certain linkages and not others? How might incentives for the nodes in the network (states, as well as other entities) be reshaped to encourage continued experimentation? What is the appropriate public and private division of labor in policy innovation? The increased role of consulting firms effectively privatizes the knowledge created in policy innovation. This may decrease the free-riding problems enumerated above, but it also shifts many of the benefits of that knowledge to private hands. These four questions around network architecture, motivations of decision makers, distribution, and governance are the pillars to the “informational network” paradigm of regulatory interdependence.

Notes

1. Obviously, there are subnational and supranational units in the system that also choose policy and thus produce information. Analytically, from this informational perspective, it does not really matter where sovereignty lies—for example, it does not matter whether it is Canada, the European Union, or California that makes a regulatory choice that in turn affects Germany. However, for the purposes of exposition, this article will assume that sovereignty exists solely at the nation-state level.

2. Spillovers occur not just in the public sector but in the private as well, despite the protection of intellectual property law. Baumol (1999), for example, estimated that innovators retain only approximately 10 percent of the gains from their innovations.

3. Those courses are BGP 256, 257, 260, 265, and 268. The countries are (where there is more than one case, the number is in parentheses) Argentina (3), Australia (2), Brazil (2), Canada, Chile, China, Colombia, India (2), Indonesia (2), Mexico, Mozambique, New Zealand, Philippines, Singapore, Sri Lanka, Thailand, Uganda, United Kingdom (3), and Venezuela. For the domestic/international student breakdowns for the Kennedy School, see <http://www.ksg.harvard.edu/apply/students.htm>.

4. See Strumpf (2002); Rose-Ackerman (1980).

5. More technically, “no innovation” is an evolutionarily stable strategy—see Axelrod (1984).

6. See March (1991) more generally on the trade-off between exploration and exploitation.

7. See David (1986). Also see Liebowitz and Margolis (1990) for a critique of David’s analysis, which debunks Dvorak as a superior alternative to QWERTY. The convergence on QWERTY also clearly reflects network externalities as well as informational externalities.

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