Virtual Policy Networks

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INTRODUCTION

As information cascades across the Internet and human communication patterns are transposed into computer-mediated environments, governments around the globe race to garner the benefits of ICTs and Web-based communications (Bannister & Walsh, 2002; Chadwick & May, 2002; Falch & Henten, 2000; Heeks, 2002; Ma, Chung, & Thorsona, 2005). Increasingly sophisticated user-citizens can now access numerous electronic services, collect policy-relevant information, and communicate with governments through electronic channels (Dahlberg, 2001; Lenk, 2003). Contemporary e-government, while variable across states, has evolved significantly in the last decade, pursing increasing transparency and accountability through the implementation of various e-government measures (Jaeger & Thompson, 2003; Reddick, 2005). While theoretical contentions concerning the authenticity of e-democracy have yet to abate, collections of policy actors that seek entrance and participation in the public policy process have also emerged online (Chadwick & May, 2002; Della Porta & Mosca, 2005; Klein, 2002). This article considers these online policy communities.

BACKGROUND

The Networked Polity

As government's increasingly look to outside sources for information, effectiveness, and legitimacy, virtual policy networks provide an ideal avenue for engaging citizens in the participation and consultation processes associated with policy decision-making (Hajer & Wagenaar, 2003; Roch, Scholz, & McGraw, 2000). Virtual policy networks are online collectives that seek to influence the policy process through the use of information and communication technologies. These networks represent the contemporary coalescence of technological and social organization, and are inscribed with key insights into human behaviour. Applying network theory to virtual policy communities provides a powerful analytical lens to study online constellations of policy actors.

Employing network analysis to understand the organization of governance, public management and policy communities is a well-established approach in the policy sciences (Carlsson, 2000; Klijn & Koppenjan, 2000; Mattila, 2003; Montpetit, 2003). The network approach is a particularly attractive conceptual option for identifying the various interactions between state and society, and for explaining variations across sectors, policy domains and states. Network theory addresses the complexities associated with new modes of governance and policy-making, recognizing the importance of categorizing actors and institutions into certain groups of policy-relevant interactions. The increasing reliance on ICTs in politics and policy-making, supports and advances the growth of network participation (Mutch, 2002). As Donald Kettl (2002) observes "networks have provided a framework for understanding the growing connection between various organizations that find themselves working together to implement public policy" (p. 112). ICTs have become crucial policy tools expanding national forums through extended online participation opportunities, altering both the policy process and the core relationship between the citizenry and governing bodies Chadwick (2003).

A network approach also provides important insights into modern governance and the complexity of contemporary policy processes. Governments today must be extremely consciousness of network dynamics and how to best manage the multitude of interests vying for particular policy outcomes. As an applied approach network analysis offers an appreciation of the challenges faced by modern government, and the variable processes conditioning the political landscape including the impact of ICTs, global policy initiatives, the burgeoning number of policy actors, and the increasingly interdependent and decentralized relations in and among states.

The state's accommodation of these interests requires overlapping networks of governance that provide policy space in which business, civic networks, and governments co-exit and collaborate to resolve policy challenges (Lowndes & Skelcher, 1998). Throughout this process network, coordination has become critical and thus one of the primary challenges for public administration and contemporary policy actors is to devise strategies that operate effectively in globalized and decentralized policy spheres. Although traditional hierarchal state's with top-down governance tendency will inevitably continue to characterize Western nations, the demands of the

networked polity oblige states to effectively adapt to the "horizontal networks that have been layered on top of the traditional vertical system" (Kettl, 2000, p. 495).

VIRTUAL POLICY NETWORKS

Policy Communities Online

Policy network scholars advance two primary assumptions concerning social behaviour. The first assumption contends that actors' social systems typically include a myriad of other actors, and that the interactions among these actors will significantly effect the decisions of both the group and the individuals embedded within the group (Carlsson, 2000; Hamm, 1995; Kilduff & Tsai, 2003). The second core conjecture of network theory assumes that structure matters, and that particular actors within the network will enjoy "regularities" in their patterns of interaction (Howlett, 2002). Thus, policy network analysis recognizes "that policy is made in complex interaction processes between large numbers of actors, which takes place within networks of interdependent actors ... co-operation, however, is by no means simple or spontaneous, and it requires types of game management and network constitution" (Klijn & Koppenjan, 2000, p. 139).

Online communities have also garnered extensive attention from academic researchers seeking to understand online behaviour and distill the social aspects of this technology from the more utilitarian uses (Wellman, 2001). Current research shows that online clusters tend to gravitate towards topical interest activities premised on identity, politics, social knowledge, entertainment, gaming, commerce and crime (Della Porta & Mosca, 2005; Döring, 2002; Matzat, 2002). While Internet-mediated identity and personas are malleable online, Web-based communication patterns are closely tethered to traditional social organization (Watts, 2003). Current empirical findings have already borne out the existence of online network communities that attract membership on the basis of political interest articulation and democratic engagement (Jeffery & Mayman, 2001; Mansell & Steinmueller, 2000), which is combined with significant increases in both the number of individuals using the Internet as a resource for political information, and the entry of new users engaged in online political activity (Bakardjieva, 2003; Mowbray, 2001). Combining the recently determined global properties of the Web with policy network theory allows for the discovery of virtual policy networks (Gibson, Kleinberg, & Raghavan, 1998).

Human Shadows in the Web

The Web is a massive network with a typological structure determined by the arrangement in which the nodes of the network are connected to each other. The Web is comprised of approximately 1.5 billion pages, which are connected through hyperlink text. Hyperlinks, the glue that holds the network together, provide critical network information as connections record the direction of information flows and identify strong interconnections among particular actors. The technique used in the VPN discovery process is referred to as link-structure analysis and captures data using the latent human information embedded in Web pages and hyperlinks (Woo, 2003). For instance, hosts will publish various topical pages that provide links to alternative sources on the same subject. Among government organizations, corporations, NGOs and policy institutes, there has been a strong tendency to publish various partnership/membership lists that contain critical information concerning dominant actors of various policy communities. These processes of social organization and Web-based communication patterns leave what has been described by Farrall and Delli Carpini (2004) as "shadows in the Web graph." These technological imprints provide observable patterns of change, coalition building, and information flows, which are organized in networked environments and stamped on the sub-graph of the Web.

Using mathematics, graph theory, physics, computer science, engineering, and the new science of networks, several global properties of online communities have been identified including strong regularities among information gathering methods, hyperlink attachment, and structural traits characterized by the collective dynamics of the small world phenomena (Watts, 2003). Albert-László Barabási (2002), the first academic to map the Web, discovered that online networks are clustered, following a power law as opposed to the original assumption that they were uniform and followed a bell curve. In the case of random networks, a bell curve distribution results from the various nodes having similar probabilities of connecting with new nodes. Alternatively, in a scale free network, new nodes entering the system have a far greater probability of linking to the most connected nodes in the network, and as such, the distribution of nodes results in a concentration of links.

The application of small world networks to the structure of online communities is associated with the popular theory of six degrees of separation, which measures the structural properties of the network through path lengths (the average separation between two vertices within the network). In the case of the Web the degrees of separation, the average number of mouse clicks it take to locate

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