

The Journal of Networks and Civil Society

**Scanning and Networking Routines
for Discovering the Unexpected**
by Linda Lehrer

The Permeable Organization
by Michael C. Gilbert

The Physics of Friendship
by Lisa Zyga

**Blogs and Community:
Launching a New
Paradigm for Online
Community**
by Nancy White

**Social Innovation:
What It Is, Why It
Matters, and How It
can be Accelerated**
By Geoff Mulgan, et al

**Towards Network
Centric Philanthropy**
by Michael C. Gilbert

**Relationships:
The Basic Building Blocks of Life**
by Margaret Wheatley

**and Over 100 Annotated Resources
From Nonprofit Online News**

**Connecting the Dots:
Institutionalization of
Technology in Networks**
by Eli Malinsky

**Civil Society
Empowerment through
Participatory Processes**
by Daniela
Sanchez Lopez

**Explorations
in Community
& Civic Bandwidth**
by Hannah Cho

**The Internet
as a Tool for
Empowerment
& Mobilization**
by Sonora Jia

The Journal of Networks and Civil Society

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The Journal of Networks and Civil Society

Introduction to:

Connecting the Dots: The Institutionalization of Technology in Networks of Nonprofit Organizations

In addition to opening up new connections with traditional stakeholders, civil society organizations are finding themselves with evolving connections to each other. In *Connecting the Dots*, Eli Malinsky examines three networks of organizations in Ontario, Canada, and explores how ICTs shape, and are in turn shaped by, the activities of staff and the properties of the institutions involved.

The discoveries of this two way relationship are both fascinating and useful. For example, the original cohesion of a network had a substantial influence on institutionalization of new tools and channels of communication. The close relationships between organizations in one network led quickly to institutionalization of an extranet into the daily workflow of staff, in contrast to a network that lacked a history of such relationships. Within networks there is as much or more variation reflecting existing dynamics of trust and collaboration. Conversely, new computer mediated connections helped reverse slide in collaboration in at least one network in the study. The relevance to practitioners is profound, suggesting substantially greater adoption of new tools and openness to deeper connections across organizational boundaries if technology initiatives are mapped onto existing structural elements of the network.

This study opens the door to other inter-organizational research, including looking at different network configurations, longitudinal data, and comparisons with networks formed in the context of new computer mediated communication. The latter may well take new forms right from the start. The growing amount of practice in this field, by consultants, funders, and network hubs, opens an exciting and valuable field of investigation.

The Journal of Networks and Civil Society

Connecting the Dots: The Institutionalization of Technology in Networks of Nonprofit Organizations

By Eli Malinsky

What is new is the preponderance of new forms of collaboration and the roles of technology in facilitating their growth and operation. New types of network structures are springing up across the globe and the introduction of information and communication technologies have helped breach geographic boundaries like never before.

Abstract

This article explores the interplay among technology, human action and institutional properties in three networks of nonprofit organizations. The aims of the research have been two-fold: to make a contribution to theory by applying the structurational model of technology to a unique organizational form; and, to make a contribution to practitioners by identifying strategies for the improved deployment and use of communication technologies within networks of nonprofit organizations. The study employed a collective case study methodology that included 13 semi-structured interviews, 44 qualitative surveys and copious document and website analysis. The findings indicate that technology is not institutionalized uniformly within the network structures but instead comes to assume different roles within different segments – or constellations – of the networks. This leads to an extension of the structurational model of technology and highlights the importance of flexible technologies that can be adapted to the variable contexts that exist within a single network structure.

Introduction

Nonprofit organizations of all stripes have been surrounded by the buzz of collaboration for years. Facing increasing resource and capacity challenges, many nonprofits have entered into collaborative relationships ranging from formal partnerships to informal networks. The underlying assumption has been that, by sharing resources among multiple parties, collaboration provides opportunities to conduct work and effect change at a lower cost. Collaboration is also deemed to increase resiliency, efficiency and impact by drawing on members as they are needed and by tapping a breadth of perspectives to create holistic responses and programs.

Of course, working together is nothing new for a sector that is values-driven and which has been historically under-resourced. What is new is the preponderance of new forms of collaboration and the roles of technology in facilitating their growth and operation. New types of network structures are springing up across the globe and the introduction of information and communication technologies have helped breach geographic boundaries like never before. Accompanying this growth has been a raft of research probing and exploring network experiences, pushing forward thinking and practice about collaboration within civil society.

The Journal of Networks and Civil Society

Connecting the Dots: The Institutionalization of
Technology in Networks of Nonprofit Organizations

But the institutionalization of technology – how a technology comes to find its place in an organization or network – remains relatively understudied in the nonprofit sector. A fair amount of research has explored the institutionalization of technology in private firms and even in private sector networks. But the growth of civil society networks has not been matched by rigorous analyses of how technologies are institutionalized therein. This research is one attempt to fill this gap. An understanding of how technology is institutionalized helps nonprofit organizations to better plan technology implementation and, as such, is one key to more efficient and effective use of technology within civil society.

Some students of organizational theory have argued that networks represent the next epoch of organizational form.

Background

Over the past three decades there has been increasing attention to network organizational forms (Knoke 2001; Nohria 1992; Podolny and Page 1998; Powell 1990; Thompson 2003). Although initially interpreted as hybrid structures (Williamson 1975), subsequent research and a mushrooming body of literature have proclaimed networks to be a distinct type of organizational structure (Lipnack and Stamps 1994; Nohria 1992; Powell 1990; Thompson 2003). Indeed, some students of organizational theory have argued that networks represent the next epoch of organizational form (Anheier and Themudo 2002; Castells 2001; Lipnack and Stamps 1994).

The increasing interest in network structures is reflected in civil society. The past fifteen years have witnessed a dramatic surge in the number and types of interconnections within civil society (Anheier et al. 2001; Anheier and Themudo 2002; Keck and Sikkink 1998; Tarrow 1998). These interconnections have allowed impoverished or isolated civil society organizations to access additional resources and to maintain service and program delivery in the face of increasing capacity constraints (Barr and Stowe 2005; Bartling 1998; Meinhard and Foster 2003; Pace and Panganiban 2002).

The introduction of information and communication technologies (ICT) has enhanced the ease by which such affiliations have been created (Castells 2004; O'Brien 2002). The use of ICT has permitted greater fluidity and diversity in collaborative initiatives and recent years have seen the adoption, evolution and disbandment of new organizational forms at an increasing pace (Anheier et al. 2001; Anheier and Themudo 2002; Clarke & Dopp 2001; Garrido 2003; Surman 2003). These technologies enable civil society actors to share information, maintain communicative ties, and reach new members across spatial and temporal distances with unprecedented ease (Diani 2000; Hajnal 2002; Keck and Sikkink 1998; Naughton 2001), while simultaneously offering new opportunities for otherwise isolated social actors to join forces and assert a stronger role in political decision-making (Anheier et al. 2001; Frederick 1992; Holland and Lockett 1997; Pace and Panganiban 2002).

Some authors go so far as to posit a natural symmetry between civil society networks and ICT. Bach and Stark (2004) propose an affinity between the flexibility and adaptability of civil society organizational structures and the network properties of

The Journal of Networks and Civil Society

Connecting the Dots: The Institutionalization of
Technology in Networks of Nonprofit Organizations

The structurational model of technology synthesizes two dominant perspectives of the relationship between technology and organizations. The first is a deterministic view which finds that technology shapes human action and institutional properties. The second perspective claims that technology is shaped by institutional properties and human action.

ICT. Warkentin (2001) further argues that the inherent qualities of the internet facilitate the development of global civil society's network relations and that the historical development of the internet is paralleled in the growth of global civil society. Both authors see ICT and civil society organizations as co-evolving agents, reinforcing and shaping each other's growth. The proliferation of connections among civil society actors in recent years is thus seen in part as a result of new technologies, which have facilitated a movement from isolation to increasing collaboration.

Nonetheless, the bulk of academic work on this topic is concerned with sensational but unrepresentative examples of ICT use among a few prominent international advocacy networks (Malinsky 2004). Cases such as Jubilee 2000, the NGO Coalition for an International Criminal Court and the International Campaign to Ban Landmines have consumed a disproportionate amount of academic attention. While these examples of ICT use for international campaigning are most certainly noteworthy, the interplay between ICTs and civil society networks merits far greater study. How does technology come to find its place within the network? What are the influences that guide its institutionalization? Answers to these questions could go a long way in helping civil society networks make better use of technology.

Theoretical Framework

This study uses the structurational model of technology as a theoretical lens to explore the relationship between technology and networks of nonprofit organizations. The structurational model of technology was first proposed by Orlikowski and Robey (1991) and has been subsequently modified, extended and adapted through the contributions of other scholars (e.g. DeSanctis and Fulk 1999; DeSanctis and Poole 1994; Roberts and Grabowski 1996). The structurational model of technology synthesizes two dominant perspectives of the relationship between technology and organizations. The first is a deterministic view which finds that technology shapes human action and institutional properties. The second perspective claims that technology is shaped by institutional properties and human action. The structurational model of technology instead leverages Giddens's (1984) theory of structuration to blend the two perspectives, positing a recursive interaction among human agents, technology and institutional properties. This process is captured in Figure 1.

The Journal of Networks and Civil Society

Connecting the Dots: The Institutionalization of Technology in Networks of Nonprofit Organizations

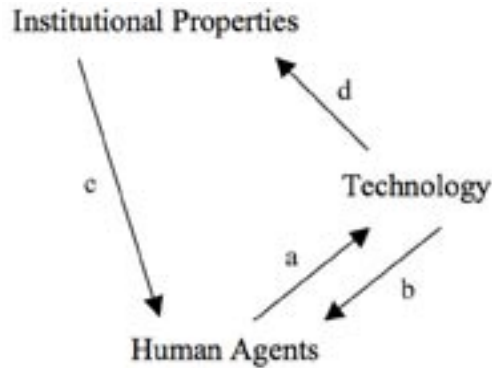


Figure 1. Structural Model of Technology (from Orlikowski 1992a: 410)

Technology as structure, therefore, is both the product of human action and the medium for human action. This is particularly true in the case of information and communication technologies, given their inherently modifiable characteristics.

Orlikowski (1992a) argues that these three elements interact in four different ways. First, technology is the product of human action, shaped by both its designers and subsequent users (a). Second, technology is the medium of human action, facilitating and constraining particular types of activity (b). Third, institutional characteristics condition the interaction of individuals with technology (c). Fourth, technology influences an organization's institutional properties by reinforcing or transforming existing structures (d).

The structural model of technology emphasizes the duality of structure; the notion that "structural properties of social systems are both the medium and outcome of practice that constitute those systems" (Giddens 1979: 69). As Barley (1986) notes,

Structure can be viewed simultaneously as a flow of ongoing action and as a set of institutionalized traditions or forms that reflect and constrain that action. More important than either realm, however, is the interplay that takes place between the two over time. Through this interplay, called the process of structuring, institutional practices shape human actions which, in turn, reaffirm or modify the institutional structure. Thus, the study of structuring involves investigating how the institutional realm and the realm of action configure each other. (pp. 80)

Technology as structure, therefore, is both the product of human action and the medium for human action. This is particularly true in the case of information and communication technologies, given their inherently modifiable characteristics (Orlikowski and Robey 1991; Roberts and Grabowski 1996). While a given software program or website feature may prescribe certain uses, these technologies can be appropriated and modified by users to a far greater degree than a more stable technology, such as a drill. Within an organizational context, ICT is employed as a tool to serve certain organizational interests but subsequently influences and is influenced by the organization and its staff through the process of its institutionalization. In the words of Orlikowski,

The Journal of Networks and Civil Society

Connecting the Dots: The Institutionalization of
Technology in Networks of Nonprofit Organizations

Technology is the product of human action, while it also assumes structural properties. That is, technology is physically constructed by actors working in a given social context, and technology is socially constructed by actors through the different meaning they attach to it and the various features they emphasize and use. However, it is also the case that once developed and deployed, technology tends to become reified and institutionalized, losing its connection with the human agents that constructed it or gave it meaning, and appears to be part of the objective, structural properties of the organization. (Orlikowski 1992a: 406)

Since Barley's 1986 work on the introduction of CT scanners in the radiology departments of two distinctly different hospitals it has become evident that use of technology is shaped by institutional characteristics and that technology itself can "occasion different organizational structures by altering institutionalized roles and patterns of interaction" (pp. 78). As Barley discovered, identical technologies can lead to different structural outcomes and this variability is a function of how the technology interacts with the social system rather than an attribute of the technology itself. Given the variety of organizational contexts in which a given technology may be introduced, even identical technologies can be institutionalized in radically different ways.

Unfortunately, there are only a handful of studies exploring this topic. Existing research has applied the model to the implementation of Lotus Notes in services firms (Orlikowski 1992b; Orlikowski 2000), the implementation of enterprise resource planning software in the manufacturing industry (Volkoff 1999), the introduction of computer-aided design systems in industrial design companies (Brooks 1997), and to groupware use and impact in local government structures (Josefsson and Nilsson 1999). However, there is no work exploring the structuration of technology within networks of organizations, nor any work applying the model to the civil society sector. This research study has been one attempt to fill this gap and to make a contribution to both the theory and practices of civil society networks.

Research Questions

The following four research questions have guided the study:

1. How do the activities of network staff shape the use of ICT?
2. How does ICT shape the activities of network staff?
3. How do the institutional properties of the network shape the use of ICT?
4. How does ICT shape the institutional properties of the network?

The Journal of Networks and Civil Society

Connecting the Dots: The Institutionalization of
Technology in Networks of Nonprofit Organizations

Defining the Terms

Information and communication technologies: Information and communication technologies are understood to include any devices that will store, retrieve, manipulate, transmit or receive information electronically in digital form. Within this broad category this study concentrates on internet-based technologies and software that have been deployed to support network members.

Network: For the purposes of this study a network is understood to be any association of independent nonprofit organizations working in a common subsector (e.g., Health, Arts, Sports and Recreation, etc.) that is served by a hub agency – i.e., a third party convening organization whose mission is to advance the interests of the network members.

Network Staff: Network staff include people employed both within the hub agency and within the network member agencies.

Institutional properties: This term is intended to capture the wide array of factors that characterize and influence organizational structure and behaviour. This includes, but is not limited to, operational environment, funding sources, history, structural arrangements, policies, goals, activities, and organizational culture.

A collective case study – the study of multiple cases – adds additional support to the findings and relies on the belief that “understanding them will lead to better understanding, perhaps better theorizing, about a still larger collection of cases”

Research Methodology

The principal investigator employed a collective case study methodology. Case studies are appropriate when the focus is on a contemporary phenomenon in a real-life context, allowing researchers to describe and explore the research subject as it exists. A collective case study – the study of multiple cases – adds additional support to the findings and relies on the belief that “understanding them will lead to better understanding, perhaps better theorizing, about a still larger collection of cases” (Stake 1994: 137).

Selecting the Cases

Given the multiplicity of network configurations within civil society, boundaries were set to help ensure parity across the cases and hence to increase the reliability and generalizability of the findings. The following list of criteria was used to screen the field and was based primarily on the professional and academic interests of the investigator:

- The research would focus on a particular network configuration – a hub-and-spoke model comprising a single hub agency and multiple network members
- Hub agencies must have a specific mandate to support independent nonprofit and voluntary organizations
- Member agencies must be autonomous – i.e., no legal or contractual obligations to the hub agency

The Journal of Networks and Civil Society

Connecting the Dots: The Institutionalization of
Technology in Networks of Nonprofit Organizations

- Hub agency websites must show evidence of ICT use to support network members
- Advocacy (i.e., goal- or policy-oriented) networks are excluded, given the preponderance of existing research
- Single organizations with subunits in multiple geographic regions (i.e., a federative model) are excluded, owing to the lack of independence of member agencies
- Hub agencies must be willing to endorse the project and facilitate access to network members
- For the purpose of parity, three networks covering the same geographic region are preferred
- Hub agencies located in Toronto are preferred so that on-site interviews can be arranged
- Case study candidates should represent three different nonprofit subsectors

A lengthy list of potential case study candidates was filtered through these criteria and five suitable cases were identified. Two of the networks operated in the employment sector and it was decided that only one should be involved in the study. After further investigation, another candidate was found to have an insufficient number of members for adequate data collection. This further refinement identified the following three candidates, which have participated in the study:

- Ontario Association of Youth Employment Centres (OAYEC)
- Ontario Council of Agencies Serving Immigrants (OCASI)
- Ontario Association of Children's Aid Societies (OACAS)

Data Sources

This study included a mix of qualitative research methods, striving for a holistic interpretation of the cases under review. Resting on the assumption that “case studies are likely to be much more convincing and accurate if they are based on several different sources of information, following a corroborating mode” (Yin, 1999: 98), multiple research techniques and data sources were used. Table 2 provides a snapshot of the data sources used in the three cases:

The Journal of Networks and Civil Society

Connecting the Dots: The Institutionalization of
Technology in Networks of Nonprofit Organizations

Data Source	OAYEC	OCASI	OACAS
Number of Documents	25	18	21
Number of Websites	1	2	2
Number of Interviews with Staff at Hub Agencies	4	5	4
Number of Telephone Surveys with Principals of Network Member Organizations	14	16	14
Number of Email Surveys Completed by Staff of Network Member Organizations	N/A	4	23
Number of Meetings Attended / Focus Groups Held	1	N/A	

Table 2. Summary of Data Sources by Case

All the documents gathered were diligently read and detailed notes were taken. For each case, an electronic file was created and illustrative or important text was excised from the documentation and added to the file. Website statistics were accessed in two of the three cases and key findings (e.g., most visited web pages, most downloaded documents, etc.) were also added to the file, as was website content and a description of the website features and structure. Following this process each case had a 25-30 page file containing excerpts gathered through the documentation and website review. This file was coded as part of the analysis process.

Notes were made during each of the interviews. All interviews with representatives of the hub agency were audio recorded and transcribed by the investigator, and additional notes were made in the margins of the transcripts during this process. No transcripts were made of the member interviews but detailed notes were taken and the audio recordings were used to verify statements of the participants. All transcripts and handwritten notes were content analyzed.

Twenty-three codes were used in this process and were primarily grouped into three categories: Network Characteristics (statements describing the Hub agencies, members, their relationship and the operational environment); Technology Deployment and Use (statements on the experiences of implementing technology, including intended benefits, challenges and changes in use); and, Technology Impact (statements addressing the impact of technology on the Hub agency and network members). The codes were based on the research questions and also emerged from the interviews and the coding process itself. Member responses were colour coded by major defining variables (e.g., region) so that the impact of these factors could be more easily assessed.

Once all of the material, notes and transcripts were coded, each case had an electronic file of 100-130 single-spaced pages. The cases were analyzed separately to minimize the influence of the findings of the other cases. The data within each code was grouped and reviewed for emergent themes and patterns; it is these themes which form the basis of the research findings that follow.

The Journal of Networks and Civil Society

Connecting the Dots: The Institutionalization of
Technology in Networks of Nonprofit Organizations

Summary of Research Findings

The research process led to an initial report of over 100 pages. In an effort to condense this work into a digestible journal article, the principle investigator has, by necessity, excluded a sizable amount of data and findings. In this section, those findings with greatest relevance to the structural model of technology and to the work practitioners in the field are presented in summary form.

Case #1 – Ontario Association of Youth Employment Centres

The Ontario Association of Youth Employment Centres (OAYEC) was founded in 1988 with a mission to support and advocate for a sustainable youth employment delivery network across the province. The network comprises 70 agencies and is relatively homogenous, with all members providing youth employment services and a handful providing supplementary services to youth or employment services to other demographics. Members are divided by OAYEC into four geographic regions with somewhat distinct cultures that reflect their respective operational environments. Comments from OAYEC staff and member respondents suggest that three of the regions – Southwest, Eastern and Northern – are relatively closely knit with a strong history of inter-agency communication and fairly close involvement with the hub agency. The Central Region, on the other hand, is more distant from OAYEC and from other members. Members in this region report less need for support from the hub agency and also point to greater competitiveness within the region, owing to the close proximity of catchment areas and the relative density of service providers.

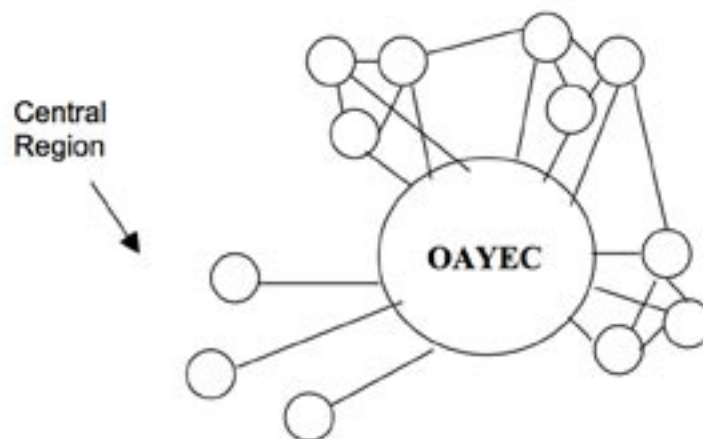


Figure 2. OAYEC Network

Figure 2. depicts the OAYEC network. Three of the regions - Southwest, Northern and Eastern - are portrayed as deeply interconnected, representing the relatively strong collegial and collaborative relationships among members. The Central region, however,

The Journal of Networks and Civil Society

Connecting the Dots: The Institutionalization of
Technology in Networks of Nonprofit Organizations

OAYEC began to invest in a robust technological infrastructure for the network in the early months of 2000. Three main technologies were envisioned and implemented in the following years: a shared resources database, a new website and a series of discussion boards.

appears further away from OAYEC and is lacking interconnections among members. This reflects the relative distance Central region members feel from the hub agency and the relative lack of communication and relationships among members in this region.

OAYEC began to invest in a robust technological infrastructure for the network in the early months of 2000. Three main technologies were envisioned and implemented in the following years: a shared resources database, a new website and a series of discussion boards. The institutionalization of technology proved more than a matter of OAYEC creating a particular technology and the membership adopting it accordingly. Indeed, institutional properties and staff activities proved to be complicating factors.

The Shared Resources Database was initially envisioned as an opportunity for member agencies to share news, events and information resources. However, OAYEC quickly ran into a challenge finding member agencies with the interest and resources to join the partnership. The Database was re-imagined to focus on information resources, but ultimately languished on the website due to a lack of sustained interest and support.

Similarly, the OAYEC website has not been used by members as originally intended. According to the original website proposal, OAYEC envisioned that the news, jobs and events features of the website would be actively used by members who would contribute their own information. According to the website statistics, however, the jobs, news and events sections receive fewer visits than the Workspaces and resources sections of the website. The overwhelmingly most common use of the site by members is to search for contact information of other agencies to provide referrals to clients or to contact their colleagues. This usage was not anticipated by OAYEC.

The Workspaces were originally envisioned by OAYEC staff as topic-specific discussion boards that would support inter-agency exchange. But early into their deployment, they realized that the discussion boards would need to be reconfigured if they were to be embraced by the membership. And so the discussion boards became virtual Workspaces intended to bridge the geographic distances between member agencies. Within one year, members of the Northern Region were actively using the Workspaces as a means to support their work and foster communication between face to face meetings. The Southwester Region was next to embrace the Workspaces during the following year.

Members from the Eastern region, however, have never requested a Workspace and indicate limited familiarity with the feature. Instead, they have established an email distribution list for the principals at all member agencies in the region, using this medium to exchange information, concerns, and best practices. Members from this region report that email seemed "simplest" and had already been comfortably used in the region for years. In stark contrast to the experiences in other regions, members from the Central region do not make use of email and have never made any use of the Workspaces to foster inter-agency exchange. Respondents indicate that this reflects the lack of a pre-existing culture of camaraderie and cohesion, as well as the relatively close proximity of members, who could meet face to face if so desired.

The Journal of Networks and Civil Society

Connecting the Dots: The Institutionalization of
Technology in Networks of Nonprofit Organizations

Table 3 summarizes the evolution and adoption of technologies within the OAYEC network.

Technology	Description	Original Intent of Coordinating Agency	Modification and/or Use by Members
Shared Resources Database	A dynamic database of youth employment resources	Active contribution of content and ongoing use by member agencies.	Member agencies do not contribute to the database, primarily due to lack of resources. This section of the site is static and minimally used.
Website	Contains events, news and jobs listing features	Active contribution of content and ongoing use of these features by member agencies.	Members do not contribute to these features of the website. The website is rarely accessed by members and is primarily used to obtain contact information of other member agencies.
Workspaces	Discussion Boards with varying levels of access	Topic-specific themes to facilitate exchange among members.	Topic-specific boards are completely unused. Discussion boards were reconceived as Workspaces to enable geographically dispersed groups working in a common area to communicate. The Southwest Managers Workspace and Northern Managers Workspace have seen tremendous success and are used to discuss a variety of operational, sector and project-specific issues.
Email	Electronic mail	To facilitate member involvement in the development of policy positions.	The network uses email for policy participation as it was intended. The Eastern region has institutionalized email as its means for inter-agency communication.

Table 3. OAYEC Network

The Journal of Networks and Civil Society

Connecting the Dots: The Institutionalization of Technology in Networks of Nonprofit Organizations

OCASI is the least cohesive network among the three studied, with the majority of members reporting relatively infrequent communication and relatively less need for ongoing engagement with each other and with the hub agency.

Members report little impact on their own activities as a result of OAYEC's technological platform. Several members did indicate that the Workspaces and website have improved their access to information, but by and large members were silent when asked how their own agency had changed as a result of technology. Far more considerable has been the impact of technology on their relationships with one another. Again, we see some variance among the different regions, most notably a discrepancy between the Central region members and all others. The Central region had little to say about the influence of technology on their relationship with other members or OAYEC, but representatives from the other regions were overwhelmingly positive in their assessments. These members reported that technology had fostered an increased sense of cohesion within their region, an increase in the number of members with whom they are in contact, and an increased sense of closeness with the hub agency.

Case #2 – Ontario Council of Agencies Serving Immigrants (OCASI)

The Ontario Council of Agencies Serving Immigrants was founded in 1978 with a mission to achieve equality, access and full participation for immigrants and refugees in every aspect of Canadian life. The network comprises 170 members and is extremely heterogeneous; members offer diverse services ranging from legal services and language classes to family counselling and job training. Members are divided by OCASI into seven geographic regions: Toronto, Central East, Central West, South, Eastern, North, and West. Although the distinctions among these regions serve an administrative purpose for the hub agency, OCASI has only demonstrated a lukewarm commitment to these divisions; there are no region-specific activities or lines of communication and, hence, many members do not recognize their assignment to a particular region. OCASI is the least cohesive network among the three studied, with the majority of members reporting relatively infrequent communication and relatively less need for ongoing engagement with each other and with the hub agency.

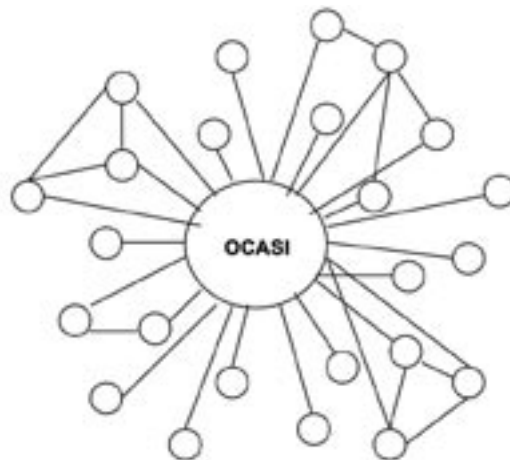


Figure 3. OCASI Network

The Journal of Networks and Civil Society

Connecting the Dots: The Institutionalization of
Technology in Networks of Nonprofit Organizations

Figure 3 depicts the OCASI network. OCASI is the largest and most diffuse network studied, represented here by the high number of members and their relative distance from the hub agency. OCASI does not have a well-entrenched regional structure and therefore connections among members do not follow an established pattern.

The research focused on three technologies deployed in the network: the Settlement.Org At Work website, the Settlement.Org At Work Discussion Boards, and the OCASI Issues list. Again, we observe that the institutionalization of technology is not simply a matter of members adopting the communicative practices projected and encouraged by the hub agency. OCASI has had a particularly difficult time encouraging its members to make ongoing use of the Settlement.Org at Work website. The new site was launched in 2004 with the hope that it would better encourage OCASI's membership to share information and form a cohesive community of agencies. However, subsequent adoption and use of the site has been minimal. Fully one-third of member respondents were unable to identify the website, another 14% had never been to the site or were unable to recall if they had ever visited, and another 17% indicated they access the site less than once per month. Among those who were knowledgeable about the site, the majority visited only when prompted by the Settlement at Work newsletter, while a minority report weekly use. Clearly, the site has not found a firm role within the network.

When asked specifically about the discussion boards, only one of sixteen member respondents had ever used this feature. The vast majority of respondents was unaware of the discussion boards or was unable to answer the question because they were unfamiliar with the entire Settlement.Org at Work website.

When asked specifically about the discussion boards, only one of sixteen member respondents had ever used this feature. The vast majority of respondents was unaware of the discussion boards or was unable to answer the question because they were unfamiliar with the entire Settlement.Org at Work website. Of those who did comment on the discussion boards, there was general accord that the purpose of the boards was to provide a venue of exchange for staff at settlement agencies in Ontario. This perception perfectly matches OCASI's intended purpose of the forums, but the fact remains that the boards are completely unused by respondents. This reflects, in part, the lack of a pre-existing culture of intimacy or inter-agency communication among network members.

OCASI has had mixed success institutionalizing the OCASI's Issues List, a moderated listserv that circulates among all of the principals at OCASI's member agencies. Typically, OCASI will initiate a discussion on the list by posing a question to its members about a "hot topic" or by inviting input into the development of a policy position. Use of the list is relatively infrequent and many of the requests for feedback fall flat, garnering only a minimal response from members. In some cases, however, the OCASI Issues List has spurred substantial discussion, most recently around the professional development funding cuts that saw the cancellation of the 2005 OCASI Conference. When seeking advice from its members on how to address this issue, OCASI received unprecedented support from members who rallied behind its lobbying efforts to reinstate the funding. The Issues List has helped ameliorate some of the disappointment felt by OCASI regarding the lack of use of the At Work discussion boards, but there is still general consensus among OCASI staff that the Issues List could be used to greater effect as a mechanism for sustained communication.

The Journal of Networks and Civil Society

Connecting the Dots: The Institutionalization of
Technology in Networks of Nonprofit Organizations

Table 4 summarizes the evolution and adoption of technologies within the OCASI network.

Technology	Description	Original Intent of Coordinating Agency	Modification and/or Use by Members
Settlement.Org at Work	A publicly accessible website	To provide online community, professional development and agency management resources for immigrant-serving agencies	Originally began as a password-protected Extranet. Was severely under utilized and a decision was made to relaunch as a publicly accessible site in hopes of increasing use. The new site remains under-utilized with only minimal traffic from member agencies. Approximately one third of respondents could not correctly identify the site.
Settlement.Org at Work Discussion Boards	Discussion Board	Intended to provide a forum of exchange for staff in Ontario's settlement sector.	Almost wholly unused. This lack of member interest was anticipated by OCASI based on their experience with the Extranet.
OCASI Issues List	email listserv	To communicate with and consult all principals at OCASI member agencies at one time. Some hope the Issues List would evolve into an ongoing venue of discussion.	Respondents indicated the Issues List is a valuable resource that keeps them connected with OCASI and other members. All exchanges are initiated by OCASI and the List has not become the free-flowing discussion that was hoped for.

Table 4. OCASI Network

Members generally report a subtle increase in the sense of intimacy they share with the hub agency as a result of technology. OCASI staff report similar changes to their relationship with members, indicating it is much easier and faster to receive feedback and share information with members than ever before. Members report negligible impact of technology on their relationship with one another. Several respondents mentioned that

The Journal of Networks and Civil Society

Connecting the Dots: The Institutionalization of
Technology in Networks of Nonprofit Organizations

they are in more frequent contact with other settlement agencies in their own regions and across the province, but most of these members indicated that this impact is a result of email in general and not a particular technology of the OCASI network.

Case #3 – Ontario Association of Children’s Aid Societies (OACAS)

The Ontario Association of Children’s Aid Societies (OACAS) was formed in 1920 as a means to support Children’s Aid Societies operating independently throughout the province. OACAS, in support of its members, “is the voice of child welfare in Ontario, dedicated to providing leadership for the achievement of excellence in the protection of children and in the promotion of their well-being within their families and communities” (Annual Report, 2005). The OACAS network comprises 52 members divided into six geographic regions, or zones. OACAS has a number of structures and programs in place which operate according to these regional divisions, as well as a number of inter-agency working groups supporting members by staff function (e.g., trainers, counselors, etc.). The OACAS is an extremely homogenous network; all members are Children’s Aid Societies or Family and Child Services Agencies legislated by the provincial government. The network has a relatively long history with well entrenched organizational structures, practices and relationships. Members report high levels of intimacy with the hub agency and with other agencies throughout the province.



Figure 4. OACAS Network

This figure depicts the OACAS network. OACAS is the smallest and most cohesive network studied, represented here by the low number of members and their close proximity to the hub agency. All members have multiple interconnections with each other, based on OACAS structures that organize members by both region and staff function.

The Journal of Networks and Civil Society

Connecting the Dots: The Institutionalization of
Technology in Networks of Nonprofit Organizations

Of the three networks studied, OACAS faced the greatest challenges in encouraging technology adoption among its membership. This was due to two primary factors: a sense among members that child services was intimate and personal work – and hence anathema to technological intervention; and the fact that only well seasoned individuals could become decision-makers in the field, resulting in the relatively high age – and hence relatively high degree of unfamiliarity and discomfort with technology – of network members.

The research study focused on the three principle technologies of OACAS' electronic platform: the Weekly Index, the Member's Only website, and the inter-agency discussion boards. Of the three networks studied, OACAS faced the greatest challenges in encouraging technology adoption among its membership. This was due to two primary factors: a sense among members that child services was intimate and personal work – and hence anathema to technological intervention; and the fact that only well seasoned individuals could become decision-makers in the field, resulting in the relatively high age – and hence relatively high degree of unfamiliarity and discomfort with technology – of network members.

Nowhere was this more evident than with the Weekly Index. For decades, OACAS had sent a package of relevant readings and materials to the Executive Directors of its member agencies in a practice known as "the Thursday mail." In 2001, OACAS decided that the Thursday mail would be delivered electronically to the inboxes of the EDs of its member agencies. There was an immediate backlash among members who were having enormous difficulty opening the material, who did not have the capacity to accept and store such large attachments, or who were resentful of the fact that OACAS had shifted the burden of printing onto its member agencies. As the chorus of complaints grew louder, OACAS changed the format once again so that the material was emailed as an index of links – the Weekly Index – which linked users directly to the documents housed on the member's website. Again, the decision was made without forewarning to the network members, who were once again taken aback by the sudden change. The experiences with the Thursday mail left a lasting impression on OACAS. The launch of the Weekly Index taught OACAS staff that the needs of members had to be more deeply considered and that member agencies should be forewarned and involved in changes to OACAS' communication strategy.

Use of the Weekly Index varies fairly significantly within member agencies. While it is read by most of the Executive Directors who participated in the research, they use the Index in different ways. Some Executive Directors circulate the Index throughout their agencies while others keep the information to themselves or forward the Index only to senior staff. Within the member agencies some staff who receive the Index read the material thoroughly while others delete it immediately upon receipt.

Respondents generally found the site to be quite valuable and a few in particular indicated that they had come to rely heavily on its use. Members were using the site as an information and education resource, which was the original intention of OACAS. This use of the website is also consistent with member perceptions' of the value of OACAS itself; the hub agency has long been regarded as a source of information and education on the sector for its members.

OACAS regional networks, despite being well entrenched as an in-person mechanism for communication among members, have not shaped the use of technology within the website; there are no Zone-specific email lists or discussion boards. Its web of network

The Journal of Networks and Civil Society

Connecting the Dots: The Institutionalization of
Technology in Networks of Nonprofit Organizations

The Executive of the group was keenly interested in the use of technology and decided to guide group members toward use of the discussion boards. This began with a decision to make available the minutes and agendas of meetings only via the website.

groups and committees, on the other hand, have manifested on the site. OACAS has established 23 separate forums for these groups, variously offering meeting agendas and minutes, news updates, information resources and other announcements.

OACAS was eager to facilitate inter-agency exchange of communication and information among members, and their initial foray began with the launch of two password-protected discussion boards on the member's website: one for human resources professionals and one for senior staff working in finances departments. The human resources discussion board is being used extensively by members throughout the province while the finance discussion board languishes on the site. The difference in usage among the two forums can be attributed to the differences in the working culture and leadership of the two groups. A member of the finance group made a request to have the forum hosted on the OACAS member website. However, staff respondents at OACAS indicate that the leader of that group is not particularly computer literate. Use of the forum immediately fizzled as the leadership did not make any effort to move away from previous practices of inter-agency communication.

The human resources group's experience has been radically different. The Executive of the group was keenly interested in the use of technology and decided to guide group members toward use of the discussion boards. This began with a decision to make available the minutes and agendas of meetings only via the website. As the already active culture of exchange and camaraderie began moving toward the electronic platform, the Executive continued to promote the technology as a means to share information between meetings. Despite some early hesitation, some members were hesitant at first, the discussion board has become a fundamental means of exchange among the Human Resources group and currently has over 380 posts in twenty forums. When asked why their forum had become such a tremendous success while the Finance group's forum remained wholly unused, representatives of the Human Resources network group point to their leadership and to a long history of collaboration and consultation with one another, factors which they perceived to be lacking in the Finance group.

The Journal of Networks and Civil Society

Connecting the Dots: The Institutionalization of
Technology in Networks of Nonprofit Organizations

Table 5 summarizes the evolution and adoption of technologies within the OACAS network.

Technology	Description	Original Intent of Coordinating Agency	Modification and/or Use by Members
Weekly Index	Weekly e-mail containing an index of recent news items and other relevant materials of interest	To provide ongoing sector and OACAS-specific information to members, and to drive members back to the site	The Weekly Index was originally distributed with pdfs of materials. A backlash from members caused OACAS to circulate an Index rather than the articles themselves. Most respondents rely heavily on the Index, which was an extension of a paper-based weekly mailout called the "Thursday Mail." Initial resistance to electronic dissemination appears to have subsided.
Member's Website	Password protected website	An information repository and, more recently, a platform for inter-agency communication.	No modification. On average, members appear to be using the site with relative frequency and have a clear sense of its function. Use of the site is more frequent at higher staff levels.
Discussion Forums	Password protected discussion boards, organized by staff role (e.g., Human Resources, Finances)	To facilitate exchange among staff in specific roles across the province.	The Human Resources discussion forum has become fully institutionalized while the Finances discussion forum remains unused. Differences attributed to the leaders, operating culture and nature of work among the two groups.

Table 5. OACAS Network

The Journal of Networks and Civil Society

Connecting the Dots: The Institutionalization of
Technology in Networks of Nonprofit Organizations

We see variation in the institutionalization of technology across the three cases. This institutionalization – or lack thereof – appears to be a reflection of the institutional properties of the networks.

On the whole, OACAS staff report that communication technology has improved their relationship with members. Members themselves had mixed assessments of the impact of technology on their relationship with OACAS. For some members, technology had a clear positive impact, while others indicate that their relationship has not been strongly affected. With respect to their relationship with one another, members again provide mixed reports on the impact of technology. For most, the impact has been negligible; their relationships with each other have not been altered and technology has played no role in increasing frequency of contact or the number of colleagues with whom they are in touch. For others, technology has in fact improved their ability to communicate with other members. Unsurprisingly, members of the human resources network group report considerable improvement to the quality of their exchanges as a result of their use of the discussion boards.

Discussion

Relevance to theory

The structurational model of technology posits a recursive relationship among technology, human activity and institutional properties. Technology is considered both the product and medium of human action, and institutional properties are understood to influence, and be influenced by, the institutionalization of technology. Unfortunately, there is a limited pool of research that uses the structurational model of technology to probe the experiences of different organizations and no work that applies the model to networks of organizations. As evident from the research findings, this structural form displays several unique characteristics that amplify and extend the existing model.

Variations across Networks

As expected, we see variation in the institutionalization of technology across the three cases. This institutionalization – or lack thereof – appears to be a reflection of the institutional properties of the networks. OACAS, for example, is the most cohesive network of the three, with a long-standing history of close relations and a clear value offering to its members. Despite the ‘natural resistance’ to technology expressed by both hub agency and network member staff, OACAS was able to overcome this and institutionalize its Member’s Only website in the daily work of its members, much as intended. OCASI, on the other hand, struggled significantly. As the least cohesive network, and lacking a history of close connection with its members, OCASI was unable to institutionalize its vision. OAYEC, which sits in the middle with respect to cohesion and role clarity, had mixed success with its technology implementation.

These findings are consistent with the structurational model of technology, which tells us that the institutionalization of technology will be a reflection of the interplay among

The Journal of Networks and Civil Society

Connecting the Dots: The Institutionalization of
Technology in Networks of Nonprofit Organizations

people, institutional properties and the technology itself. Clearly, there are differences in this interplay across the networks, and these differences are reflected in technology adoption and use.

Variations within Networks

But there is more to this story. The research findings not only point to differences across the cases but to differences in the institutionalization of technology within each case. Indeed, technology does not come to assume a uniform role within any one network as a whole but assumes different roles within different segments – or constellations – of each network, depending on the institutional properties and behaviours of actors therein.

As Orlikowski writes, “technology is interpretively flexible, hence the interaction of technology and organizations is a function of the different actors and socio-historical contexts implicated in its development and use” (Orlikowski 1992a: 405). This conclusion is based on the study of autonomous organizations and is therefore an insight into how a given technology may be differently institutionalized in different organizations (or, for example, how a technology such as discussion boards could be differently institutionalized in three networks of nonprofit organizations). But with networks we see “different actors and socio-historical contexts” co-existing within a single structure; each constellation of the network has its own unique institutional properties and patterns of activity. We therefore extend the structural model by forcing it to contend with a structure in which a multiplicity of contexts exist, each influencing the ways in which a given technology is institutionalized.

Indeed, we see as much variation in the institutionalization of technology within each case as we do across the networks. Within OAYEC, differences in the organizational cultures among the regions are reflected in the adoption of technology. The Southwest and Northwest regions, with a tradition of working collaboratively, have institutionalized the Workspaces as a means for ongoing communication between regular face-to-face meetings. The East, finding email easier than the Workspaces, has institutionalized email as a means for shared communication. The Central region, lacking a spirit of camaraderie and in competition with each other for funding and for clients, has not institutionalized any technology as a means for inter-agency communication.

Within the OCASI network it is difficult to conclude that any of their technologies have been formally institutionalized. But we do see considerable discrepancies in technology use within the network.. While the majority of respondents never visit the Settlement. Org at Work site or are even aware of its existence, a minority access the site on at least a weekly basis. There are also differences in the institutionalization of the At Work website among the staff at member agencies. Some respondents report that settlement counsellors make active use of the site while others indicate that their front-line staff have never used the site. The responses received directly from staff at this level validate these comments. Clearly, technology is finding a different role among different network members.

We see as much variation in the institutionalization of technology within each case as we do across the networks. Within OAYEC, differences in the organizational cultures among the regions are reflected in the adoption of technology.

The Journal of Networks and Civil Society

Connecting the Dots: The Institutionalization of
Technology in Networks of Nonprofit Organizations

Technology is not institutionalized uniformly within these three network structures and that this appears to be a reflection of the inherent variability of network configuration and the ways in which this variability manifests in the different operating cultures, practices and behaviours of members in different constellations of the networks.

In the OACAS network, variations in how technology is institutionalized can be most readily seen with use of the discussion boards. The Human Resources inter-agency group, with a strong tradition of collaboration and exchange, and led by an Executive with a keen interest in technology, has institutionalized the discussion boards as an indispensable means to support their communication. The Finances group, lacking any commitment to technology by its Executive, and by all accounts a less dynamic group with a limited history of inter-agency communication, has ignored its discussion board completely. Variations in context therefore appear to play a strong role in how technology has been institutionalized. As with OCASI, we also see in OACAS the variable institutionalization of technology as a reflection of the internal operating cultures of its member agencies. Some members actively distribute the Weekly Index throughout their organization and encourage staff access to the site, while others do not promote these resources to their junior staff.

We may thus conclude that technology is not institutionalized uniformly within these three network structures and that this appears to be a reflection of the inherent variability of network configuration and the ways in which this variability manifests in the different operating cultures, practices and behaviours of members in different constellations of the networks. This conclusion is supported by the structurational model of technology, which sees technology in part as the product of human action and the reflection of institutional properties. Through its application to networks of nonprofit organizations, this study extends the structurational model of technology by demonstrating that the diverse institutional properties and the multiplicity of human activity that exist within a single organizational network all bear influence on the institutionalization of technology.

Technology Impact

The structurational model also predicts that technology will influence human action and the institutional properties of an organization. And indeed, we do see some evidence of this process. Within the OAYEC network, regions already experiencing positive inter-agency relations report enhancement to their relationships as a result of technology. Similar findings emerge from OACAS, where the Human Resources network group's long history of collaboration was buttressed by the introduction of discussion boards. Technology appears to have the additional benefit of drawing the networks closer together, as the majority of respondents in all three cases report increased communication with other members and with the hub agency as a result of ICTs.

In a few examples we can observe more substantial impact of technology on institutional properties and human activity. In the Northern region of the OAYEC network, member agencies were challenged by the vast geographic distances between them and the declining funding available to support in-person meetings. Despite their positive relations members reported that they were meeting with decreasing frequency each year. The introduction of the OAYEC Workspaces had dramatic influence on inter-agency communication, allowing them to exchange with one another at no cost and on an ongoing basis. Similarly, the Human Resources network group of the OACAS network

The Journal of Networks and Civil Society

Connecting the Dots: The Institutionalization of Technology in Networks of Nonprofit Organizations

reported significant gains to their work processes. Despite a tradition of collaboration, existing methods of communication were proving cumbersome and, in the eyes of the Executive, inefficient. The introduction of a discussion forum that could house documents and archive an ongoing discussion was seen to improve efficiencies and effectiveness within the group.

Technology has also influenced the institutional properties of member organizations to varying degrees across the cases. In all three cases, members report an increase in information access and circulation as a result of new technology. These respondents indicate that this material has enabled them to better pursue their missions, but also note the threat of information overload as a result of more frequent communication. As regards the hub agencies, technology has primarily accentuated and advanced their existing roles and activities.

Overall, impact of technology on the network has not been substantial. One can surmise that this may owe, in part, to the fact that the research took a snapshot of the three networks in a moment of time. A longitudinal study would better assess technology impact by documenting and following such changes as they occur, and is hence an approach that future researchers should consider adopting.

Extending the Theory

In light of the discussion above, the unique case of networks of nonprofit organizations merits an extension of the structural model of technology, depicted in Figure 5.

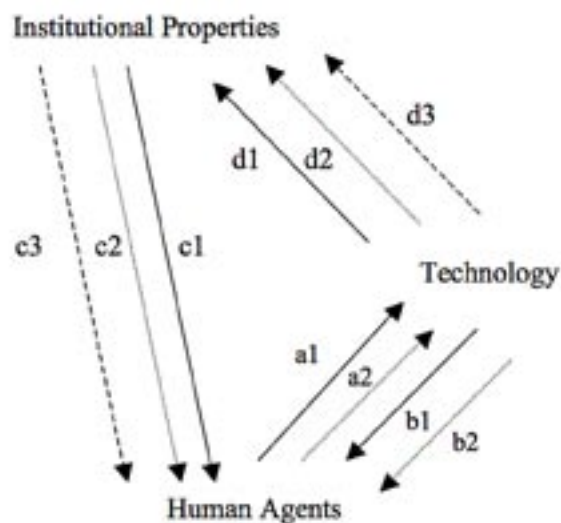


Figure 5. Structural Model of Technology, Extended

The Journal of Networks and Civil Society

Connecting the Dots: The Institutionalization of
Technology in Networks of Nonprofit Organizations

Here, we see a revision of Orlikowski's original depiction (see page 3). The solid lines, indicated by their respective letter and the digit 1, are identical to the original model. In this revised figure, however, this solid line refers specifically to the hub agency. The dotted lines, indicated by their respective letter and the digit 2, refer specifically to the network members. Finally, the dashed lines, indicated by their respective letter and the digit 3, refer to the network as a whole, which has institutional properties distinct from those of the member organizations and the Hub agency.

As in the original model there are four principal effects; however, these effects are multiplied by the complexity of the network configuration. This modification is explicated in the following table:

Arrow	Type of Influence	Nature of Influence
a1 a2	Technology as a Product of Human Action	a1) Technology is an outcome of its intended use and subsequent modification by staff at the Hub agency. a2) Technology is an outcome of its intended use and subsequent modification by staff at the member organizations.
b1 b2	Technology as a Medium of Human Action	b1) Technology shapes the activities of staff at the Hub agency. b2) Technology shapes the activities of staff at the member organizations.
c1 c2 c3	Institutional Conditions of Interaction with Technology	c1) The institutional properties of the Hub agency influence how staff members interact with technology. c2) The institutional properties of the member organizations influence how staff members interact with technology. c3) The institutional properties of the network as a whole influence how staff at the Hub agency and member organizations interact with technology.
d1 d2 d3	Institutional Consequences of Interaction with Technology	d1) Interaction with technology influences the institutional properties of the Hub agency. d2) Interaction with technology influences the institutional properties of the member organizations. d3) Interaction with technology influences the institutional properties of the network as a whole.

Table 6. Structural Model of Technology, Extended

The Journal of Networks and Civil Society

Connecting the Dots: The Institutionalization of
Technology in Networks of Nonprofit Organizations

Thus, the structural model is extended through its application to networks of nonprofit organizations. The three cases provide ample support for this extension, demonstrating the additional complexity of the institutionalization of technology in networks of organizations, where essentially three loci of influence exist: the hub agency's institutional properties and staff activity; the member organizations' institutional properties and staff activity; and, the institutional properties of the network structure as a whole.

Relevance to practitioners

Hub agencies should not seek to impose a uniform technological solution across the network. Instead, staff should find ways to map technologies onto the pre-existing characteristics or structural elements of the network, for example by creating role-based or regionally-based technologies.

Collectively, the findings discussed above offer several valuable lessons for networks of nonprofit organizations. First, the fact that technology is not institutionalized consistently within the network should be acknowledged and embraced. Hub agencies should not seek to impose a uniform technological solution across the network. Instead, staff should find ways to map technologies onto the pre-existing characteristics or structural elements of the network, for example by creating role-based or regionally-based technologies. Further, hub agencies should introduce technologies that are flexible enough to accommodate the varying conditions of these groups. Rather than deploy rigid technologies that can be used only in a prescribed way, hub agencies should empower their network with technology that can be modified to suit the unique character of member organizations and inter-agency culture within different constellations. Avoiding expectations of uniform use would be similarly helpful.

The variable institutionalization of technology is, of course, a reflection of the different operational contexts into which a given technology is deployed. This point must be emphasized. Technology appears more likely to reflect and reinforce existing organizational characteristics than it is to radically change them. The Southwest and Northern regions of OAYEC had a strong pre-existing tradition of inter-agency communication and collaboration. The Human Resources network group of OACAS displayed similar characteristics. On the other hand, OAYEC's Central region and the OACAS Finances group lacked such camaraderie and both groups ignored technology that was meant to stimulate and support their communication. Thus, organizations seeking to deploy technology within a network structure must recognize the limitations of technology and find ways to use technology to augment existing characteristics; technologies will have the most success in situations where they are appropriately matched to the circumstances to which they are introduced.

The notion that technology reflects institutional properties occurs not only at the micro-level of member organizations and their groupings, but also at the macro- or network-wide level. OACAS, the tightest network among the three cases, has had the greatest success in institutionalizing technology, most notably its website, within the network. OCASI, a far more diffuse network in which members report only moderate ties with the hub agency, has not been able to institutionalize its member's website or discussion boards. Hub organizations must therefore carefully consider the institutional properties of the network before deciding on their technology investment. Again, technology is

The Journal of Networks and Civil Society

Connecting the Dots: The Institutionalization of
Technology in Networks of Nonprofit Organizations

Networks of nonprofit organizations would be wise to tread carefully, slowly deploying and testing technology before making a costly investment that may drain valuable resources and ultimately prove a poor fit for the network.

unlikely to solve existing problems or radically alter existing conditions. Instead, a frank appraisal of institutional properties should inform expectations and identify areas in which technology can be of most assistance. Most particularly: What is the need for the technology and in what ways will it assist the network in general and member organizations in particular?

The pre-eminent role of members must also be deeply considered by networks of organizations seeking to implement ICTs. Not only do members operate in different contexts than hub agencies, but members themselves differ in their capacity, motivations and needs. It is of critical importance that these considerations are addressed and that hub agencies work to include members in their technology strategy. This last point is most dramatically illustrated in the OACAS network, in which members were not apprised in advance of the transition of the Weekly Index from a paper-based initiative to an email-based one, and responded with a negativity that has taken several years to subside. OCASI's forced reconfiguration, and ultimate loss of, the shared resources database accentuates this point. Members should not only be informed in advance of such plans but should be involved in their formulation. Through research that carefully assesses the needs and capacities of member organizations, hub agencies can better ensure that their technology plans are well grounded in the network and will subsequently stand a greater chance of success. One could surmise that, with greater research and consultation, OCASI may have discovered that discussion boards were not a priority for their members.

More generally, the experiences of the three cases reflect existing literature on the deployment of technology in network organizations and in the nonprofit sector. Leadership is critical to the successful institutionalization of technology and buy-in from internal staff and member organizations are of utmost importance. Resource and capacity limitations must be carefully considered, especially for a sector in which funding can be erratic and infrastructure under-developed. This is particularly important when considering the sustainability of a project, which must outlast its initial funding and exist to provide ongoing support to the network. Finally, networks of nonprofit organizations would be wise to tread carefully, slowly deploying and testing technology before making a costly investment that may drain valuable resources and ultimately prove a poor fit for the network.

Recommendations for Further Research

The research reveals a field of study that is ripe for further investigation. This section identifies three specific avenues of investigation, prioritized for their potential to contribute both to academia and to the work of practitioners.

Increasing Comprehensiveness – Multiple Levels and Longitudinal Analysis

There is clear benefit to additional and more comprehensive case studies on this topic. Further research would not only substantiate, refine and extend our understanding of the

The Journal of Networks and Civil Society

Connecting the Dots: The Institutionalization of
Technology in Networks of Nonprofit Organizations

The pace of change in communication technology provides ample opportunity to study the introduction, adoption, and subsequent modifications of new technologies in a network setting. Researchers should be prepared to observe the processes of institutionalization over time.

institutionalization of technology in networks of nonprofits, but would further test the relevance of the structural models of technology. In particular, future researchers should bear two considerations in mind. First, efforts should be made to increase the comprehensiveness of the research by ascertaining the experiences of different types of members and of different staff within the member agencies. Future research should endeavour to identify and assess the impact of these characteristics on the institutionalization of technology.

Second is the need for a diachronic perspective. Structural theorists emphasize the need for such analyses, arguing that the structuration of technology is a process that occurs over time, most particularly with ICTs, which are by nature modifiable throughout their existence. Fortunately, the pace of change in communication technology provides ample opportunity to study the introduction, adoption, and subsequent modifications of new technologies in a network setting. Researchers should be prepared to observe the processes of institutionalization over time.

Different Network Configurations

This research explored a particular network type – a ‘hub and spoke’ model. But networks are multifarious and one can presume that the processes of institutionalization of technology would differ among these configurations. What of network models in which there is no centralized hub agency, or in which multiple agencies collectively assume a leadership role? What of networks operating in a common geographic area instead of a common sector? Different structures will have varied experiences of technology implementation and use; scholars should use the theoretical tool of structuration to explore the implications of such differences.

Additionally, the three cases that participated in this study were each formed prior to the advent of the internet. They were subsequently forced to adapt to changes in technology and this has permitted an assessment of the impact of the internet on the operations of the network. But networks of nonprofit organizations created in the past ten years have used the internet as part of their communicative resources since their inception. What is the experience of networks that have relied on the internet as part, or central to, their operation? Potential differences in activities and structural arrangements merit additional attention and will increase our understanding of the recursive relationship between organizational structure and technology.

Distinctions between networks of nonprofit organizations and networks of for-profit organizations also merit attention. The bulk of existing research on structural models of technology concentrates on the for-profit sector. However, differences in network structure and purpose, and differences in the motivations and roles of network actors, in for-profit and nonprofit organizational networks would likely have substantial impact on the institutionalization of technology. Comparative investigation of these differences would yield additional insight into the processes of technology institutionalization.

The Journal of Networks and Civil Society

Connecting the Dots: The Institutionalization of
Technology in Networks of Nonprofit Organizations

Given the typically limited resources of nonprofit organizations and the good work they aspire to perform, outside analysis and support can be a great boon to the successful deployment and adoption of technology.

Action Research

Finally, this topic is aptly suited for action research. The research process revealed several opportunities for improved implementation of technology. Given the typically limited resources of nonprofit organizations and the good work they aspire to perform, outside analysis and support can be a great boon to the successful deployment and adoption of technology. Future researchers should explore this topic not only to contribute to our theoretical understanding of technology and organizations, but with an eye toward making a contribution to the performance of the networks under review. The practical application of findings not only returns some benefit to the participating cases, but opens up additional avenues for research as the results of such efforts are evaluated for their practical and theoretical consequences.

Conclusion

This study has applied the structurational model of technology to three networks of nonprofit organizations. The aims of the research have been to contribute to theory on technology and organizations and to contribute to the improved use of technology within networks of nonprofit organizations. Clearly, the experiences of the three cases under review have been illuminated by the theoretical lens and have themselves contributed to the literature on this theory. In particular, this study has extended the structurational model of technology by demonstrating the complexity of the recursive relationship among technology, human action, and institutional properties within organizational networks. Technology, it is discovered, has not found a uniform role within the three networks but is instead institutionalized differently in different constellations of the network – a reflection of network structure in general and organizational characteristics in particular. While this finding makes a contribution to theories of the interaction between technology and organizations, it is also of practical benefit to the nonprofit sector. Nonprofit organizations can make more effective use of ICTs by accepting and leveraging the variable roles of technology within their organizational networks.

This is an area of research that merits greater attention. Networks of nonprofit organizations provide ideal ground for the confluence of theoretical and practical study, and future researchers should continue to explore this unique organizational form with an aim of contributing not only to the development of theoretical constructs, but to improving the way in which these networks employ technologies in pursuit of their missions.

The Journal of Networks and Civil Society

Connecting the Dots: The Institutionalization of
Technology in Networks of Nonprofit Organizations

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Appendix A – Hub Agency Interview Guide

Questions About the Respondent(s)

Name:

Current Position:

Years with the organization:

Previously held positions with the organization:

Questions About the Network

1. In your own words, please describe the purpose of [name of network]
2. Why do members join the network?
3. How would you describe:
 - The [name of subsector] in Ontario (how is it distinct from other sectors)?
 - The culture of the network?
 - o The relationship among network members?
 - o The relationship between members and the Hub agency

Questions About the Role of Technology

4. How do you see technology fitting in the network – what is its role?
5. What was your vision for the website?
 - Probe: What need/gap was the website intended to fill?
6. Can you describe how you see the website serving your members?
 - Probe: Why do they visit the website?
 - Probe: How have you encouraged member use of the website?
 - Probe: Which features have been of most value to your members? Why?
7. How have members and member's needs influenced the features or information offered in the network website?
 - Probe: both expressed and unexpressed
 - Have you ever consulted members over their information or technology needs?

The Journal of Networks and Civil Society

Connecting the Dots: The Institutionalization of
Technology in Networks of Nonprofit Organizations

8. I'm particularly curious about the impact of the internet on what [name of network] does, so I'd like you to comment on the impact of the website on the operations of the network. Has the internet changed [name of network]?
- Probe specifically for the impact of the website on:
 - o the roles of [name of Hub agency] within the network
 - o decision-making processes, strategic or policy direction (do members have more input?)
 - o information circulation
 - o network culture / building a sense of community
 - o relations with members
 - o relations among members
 - Probe specifically for any perceived negative effects of the website, or constraints on pre-existing practices and processes.
9. Can you provide some examples of what the internet has allowed you to do that would have otherwise been impossible?

Questions About the Evolution of Website Features

10. How have decisions been made about the implementation and development of the website?
- Probe: Which staff have been primarily responsible for directing the development of the website?
 - Probe: What has been the role of technology vendors?
11. What was the intended purpose of the website?
- Probe: Has this changed over time? How? Why?
12. What was the intended purpose of [website feature x]?
- Probe: Has this changed over time? How? Why?
 - Repeat for other features

Reflections on the Use of ICTS

13. How have your perceptions of the Web as an instrument to serve your members changed over time?
14. What plans do you have for implementation of new features or for changes to the use of the current website? Why?

The Journal of Networks and Civil Society

Connecting the Dots: The Institutionalization of
Technology in Networks of Nonprofit Organizations

15. Inquire about other technologies – teleconferences, videoconferences, webconferences, document editing, etc.
16. What has frustrated/disappointed you about the deployment of technology in the network?
17. What has surprised you about the deployment of technology in the network?
18. What lessons have you learned about the implementation of information and communication technologies within your network?
19. Is there anything you would like to mention that we haven't had the opportunity to discuss?

Appendix B – Network Member Survey

Questions About the Respondent(s)

Name:

Current Position:

Years with the organization:

Previously held positions with the organization:

Questions About the Relationship with Hub Agency

1. How would you describe your relationship with [name of Hub agency]?
2. I'd like you to rate the importance of membership in [name of Hub agency] to your organization, using a scale of one to five, where one is "Not at all important" and five is "Extremely important."

1	2	3	4	5
Not at all				Extremely
Important				Important
3. Why is your organization part of [name of Hub agency]? What are the primary benefits your organization receives from its membership in [name of Hub agency]?
4. How would you describe your relationship with other members of [name of Hub agency]?
 - Probe for regional differences

The Journal of Networks and Civil Society

Connecting the Dots: The Institutionalization of Technology in Networks of Nonprofit Organizations

5. I'd like you to rate how important is it for your organization to be able to communicate and collaborate with other members of [name of Hub agency], using a scale of one to five where one is "Not at all important" and five is "Extremely important"?

1	2	3	4	5
Not at all				Extremely
Important				Important

QUESTIONS ABOUT WEBSITE USE

6. I'd like you to rate your comfort level using the internet (to find information and communicate with others) on a scale of one to five, where one is not at all comfortable and five is perfectly comfortable?

1	2	3	4	5
Not at all				Extremely
Important				Important

7. On a scale of one to five, where one is not at all comfortable and five is perfectly comfortable, how would you rate your comfort level using the [name of Hub agency] website?

1	2	3	4	5
Not at all				Extremely
Important				Important

8. What is the purpose of the [name of Hub agency] Website?

- Probe: Who is the [name of Hub agency] website directed toward?

9. How frequently do you access the [name of Hub agency] website?

- Daily
- A couple of times a week
- Weekly
- A couple of times per month
- Once a month or less

10. For what reasons do you usually access the [name of Hub agency] website?

- What is the main reason you access the [name of Hub agency] website?
- Why don't you access the website more often?

The Journal of Networks and Civil Society

Connecting the Dots: The Institutionalization of
Technology in Networks of Nonprofit Organizations

11. Who in your organization has access to the [name of Hub agency] website?
12. Who in your organization accesses the website?
 - Why do they use it?
 - Do you encourage use of the website? How?

Questions About Specific Website Features

13. Do you know about [specific website feature x]?
14. What is the purpose of [specific website feature x]?
15. Do you ever access [specific website feature x]?
 - If no:
 - Why not?
 - If yes:
 - Why do you use the [specific website feature x]?
16. On a scale of one to five, where one is not at all comfortable and five is perfectly comfortable, how would you rate your comfort level using [specific website feature x]?

1	2	3	4	5
Not at all				Perfectly
Important				Comfortable

Questions About Technology Impact

17. What impact have the [name of Hub agency] website and features had on your organization?
 - Have they affected your organizations' ability to pursue its mission?
 - Have they affected your access to information?
18. What impact have the [name of Hub agency] website and features had on your relationship with [name of Hub agency]?
 - Have they had any impact on your satisfaction with [name of hub agency]?
 - Have they increased the sense of participation or intimacy you have with [name of hub agency]?

The Journal of Networks and Civil Society

Connecting the Dots: The Institutionalization of
Technology in Networks of Nonprofit Organizations

19. What impact have the [name of Hub agency] website and features had on your relationship with other [name of Hub agency] members?

- Have they increased your ability to communicate and collaborate with other [name of Hub agency] members?

20. How has email impacted your:

- Relationship with [name of Hub agency]?
- Relationship with other [name of network] members?

21. Have there been any negative impacts, or constraints on previous ways of doing things, that have come out of [name of Hub agency]'s increasing reliance on communication technologies?