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The Democratization of Data:

How the Internet is Shaping
the Work of Data Intermediaries

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The Democratization of Data:
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Sarah Treuhaft

Executive Summary

This report looks at the efforts of nonprofit data intermediaries to provide the institutions and individuals working in low-income urban neighborhoods with access to neighborhood-level data resources and the ability to use them to effect positive social change. The rise of data intermediaries has been propelled by the rise and diffusion of advanced information and computing technologies, including the Internet and Geographic Information Systems (GIS). In the decade or so since data intermediaries first arose on the scene, they have overwhelmingly adopted the Internet as their primary means for disseminating data resources, creating online "neighborhood information systems" that can be freely accessed by the broad public. In this study, I investigate the development of data intermediaries within the community development and community building fields and look at how they are harnessing the Internet and GIS toward these ends.

The work of data intermediaries fits within the broader action frameworks of community capacity building and community technology. Operating at the intersection of these agendas, the activities of data intermediaries primarily address what has been called the "organizational divide," or the gap between community organizations' potential use for digital technologies and their ability to access and use these technologies. As community groups have taken on greater responsibilities in providing services and public goods to urban constituencies, they have become more professionalized and have demanded access to data and data analysis tools such as GIS. Despite the utility of these resources for community groups, they are resource-poor and often lack both access to these tools and the capacity required to apply them to their planning, service delivery and advocacy activities.

The ability of data intermediaries to "democratize data"—defined as enabling community actors to access data and to use it to build community capacity to effect social change—is influenced by the availability of financial resources, the local political context and the local organizational culture. One of the challenges faced by data intermediaries is the attitude toward data on the part of the communities they seek to

serve. These are often the same communities that data has historically been used against through practices such as redlining. Because of this challenge, I hypothesize that trust is an important bridging factor that allows data intermediaries to attain their goal of democratizing data.

Through a comparative case study analysis of data intermediaries in Oakland and New Orleans, I look at the practice of democratizing data and the constraints and opportunities faced by data intermediaries. In doing so, I pay particular attention to the ways in which each organization perceives the variable of trust and acts to foster trust between itself, its online data resources and its target audiences. I find that the process of democratizing data via the Internet is underwritten by trust-building efforts on the part of data intermediaries. In each case, trust-building is an important component of the data intermediary's work.

Each organization, however, has developed different methods of incorporating trust-building into their programs, methods which resonate with its overall organizing logic. Each provides a sort of model by which data intermediaries shape information and information technologies in ways that make them useful for the communities they seek to serve. In describing these models, I characterize the New Orleans group as *design-based* and the Oakland group as *partnership-based*. These cases illustrate a palette of methods by which data intermediaries can build trust and show the diversity of forms of practice within the field.

Activities engaged in by data intermediaries to build trust include collaborative program development, outreach and networking, iterative site design and user testing, culturally-relevant and community-specific site content, and online and in-person training modules. Through these methods, data intermediaries mitigate the negative unintended consequences involved in bringing expert spatial data technologies to marginalized communities and remake *information technologies* into *community technologies*.

The Democratization of Data:
How the Internet is Shaping
the Work of Data Intermediaries

Sarah Treuhaft

Introduction: Data Intermediaries and the Internet

This report looks at the efforts of nonprofit data intermediaries to provide the groups and activists working in low-income urban neighborhoods with access to neighborhood-level data and maps and the ability to use them to effect positive community change. Data intermediaries perform a number of functions, but their essential activities include gathering neighborhood-level data, integrating these data into a single navigable database—a neighborhood information system (NIS)—and making this database available to their target audience. This target audience consists of organizations and individuals that are working to improve conditions in low-income urban communities. Data intermediaries harness information technology (IT) in pursuit of their goal of "democratizing data" and have almost unanimously adopted the Internet as the mechanism by which they make their NIS available to both their target audience and the general public. With the rise of the Internet, more and more data intermediaries are providing Internet-based Geographic Information Systems (Internet-GIS) through their NIS. Internet-GIS enables users to map, analyze and visually represent vast amounts of geographically-referenced data.

The field of nonprofit data intermediaries was first outlined for an academic audience in 1996, in an article in the Journal of the American Planning Association entitled "The Democratization of Data: Bridging the Gap for Community Groups." In this article, scholar-practitioners William Craig and David Sawicki described, analyzed and lauded the work that data intermediaries were doing to bring data resources to community groups.[1] They claimed that community groups had the most to gain from Information-age data resources, but were unable to access them or to put them to use once they gained access. According to their analysis, data intermediaries were filling this gap between potential and reality, enabling community groups to access and use data in order to fully participate in

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[1] David Sawicki and William Craig, 1996. The democratization of data: bridging the gap for community groups, *Journal of the American Planning Association* 62(4): 512–523.

Figure 1.
An Example of an Online NIS:
The Piton Foundation's "Neighborhood Facts[2]
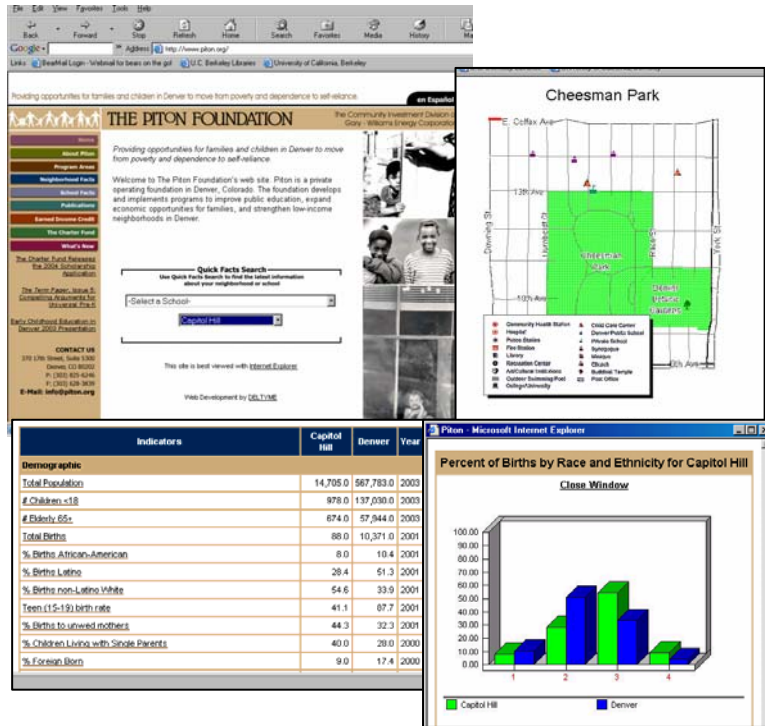
planning and policy discussions affecting the neighborhoods in which they worked.

Surveying the field of data intermediaries, Sawicki and Craig differentiated the organizational population in terms of institutional structure, sources of funding, nature of services, forms of data and information provided, level of customization of data for clients, and the degree to which the organization sought to transfer the ability to turn data into policy through training, education and technology provision. They also outlined a number of important challenges for these organizations. They found that data intermediaries had difficulty encouraging community groups to apply the data they supplied to policy analysis and policy research. In relation to this difficulty, they found that a strategic approach, helping groups find the data they need for specific issues, was more successful than a "data dump" approach. Another finding was that providing data on measures of "pathology" created distrust among

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[2] www.piton.org (Accessed April 2004)

community leaders. Speculating on the future of data use and access, they predicted that the diffusion factors of IT, combined with the growing need for these technologies in community groups, would result in a shift to increased data capture and mapping by community groups in the short term, but that in the long run data intermediaries would still be needed for policy analysis and research.

How has the field evolved since the time of this study? First, the population of nonprofit data intermediaries has grown tremendously, increasing almost threefold from eleven to thirty from 1996 to 2004.[3] Second, the Internet has become an essential part of their strategy to provide community actors with data and information. At the time of Craig and Sawicki's study, the Internet was not an important component of data intermediaries' strategy to transmit data or to reach their target audience.[4] In the past eight years, data intermediaries have adopted the Internet as a mechanism for implementing their mission and developed a strong online presence.

The Internet has a number of features that make it a useful medium for data intermediaries: the cost of hosting data is very low; it enables efficient data transfer and maintenance, enabling users to access data at any hour of the day; it includes interactive technologies that enable users to conduct queries, select data for retrieval, analyze data, and create maps and graphs; and, as a distributed network, it provides access to the broad public and infinite connectivity to additional sources of information.[5] But, how do these benefits of the Internet weigh against the challenges first outlined by Craig and Sawicki? How does a virtual presence enable data intermediaries to effectively help their users apply the data they provide to their social change-oriented activities?

The purpose of this study is to reassess the state of the "movement" to democratize data in light of the increasing reliance on the Internet and other information technologies such as Internet-GIS on the part of data intermediaries. In what ways do data intermediaries address the challenges of enabling community actors to take advantage of data resources? How are they remaking *information* technologies into *community* technologies? Studies of data intermediaries suggest that

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[3]   This figure is an estimate based on the Web- and literature review I conducted as described in Section 2.

[4]   Ibid. They say that intermediaries were "using standard microcomputer technology and sometimes communicating by modem" (p. 518).

[5]   Yang Chua and Sidney Wong, 1998. *Data intermediation and beyond: How the Web modifies the dissemination of GIS information*. Paper presented at the PPGIS conference.

Internet-based community support cannot stand alone; that it must be supplemented with human interactions between the intermediary and the users.[6] Do data intermediaries supplement their online NIS with social interactions? Are there other ways in which they are building trust and relevance into their online NIS?

In this report, I approach the problem from three angles. In Section 1, I outline the nature of the intervention of data intermediaries, linking the democratization of data to the broader agendas of community capacity building and community technology. This section further describes the problem data intermediaries seek to address and the social, political and technological context in which they work. The second angle I take to understand how the work of data intermediaries is changing with their adoption of the Internet, included in Section 2, is a population-level analysis of existing data intermediaries. This part of the report documents the extent and nature of data intermediaries in the U.S. The third angle I take is a case study analysis of two data intermediaries, INFoOakland and the Greater New Orleans Community Data Center. In these case studies, detailed in Section 3, I examine the nature of data intermediary practice, looking particularly at the role played by trust and relationships in data intermediaries' manner of democratizing data. The conclusion of the report, Section 4, summarizes the results of the research and outlines some areas for further study.

A Note on Perspective

The original impetus for this research project was my work as a graduate research assistant for the INFoOakland data intermediary.[7] I was hired to work on the redesign of the organization's online NIS: the "Oaktown Datahouse." From my brief work on this project, I gained a general understanding of the challenges and opportunities that data intermediaries face, and an interest in the future of data democratization initiatives. My impression of data intermediaries was that they were "learning organizations" that are reflexive and seek to learn from practice. This belief is built in to the design of this study, as my emphasis is on data intermediaries themselves: what they are doing and how they go about realizing their goal of democratizing data. This is an admittedly partial and incomplete view. Future research is needed to understand the relationships

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[6] Chua and Wong, 1998; Seedco, 2002b. *Opening the Door: Technology and the Development of University-Community Partnerships.* NY, New York.

[7] I worked on the Datahouse redesign from August 2002 to January 2003. As I will describe in Section 3, the site is still in the process of being developed.

between data intermediaries and their target audiences, as well as the local political context in which data intermediaries operate.

The perspective I adopt in looking at how data intermediaries democratize data and how they combine technology and community capacity building is that of social constructivism. Social constructivism can be broadly defined as a stance that understands technology and social forces as mutually constitutive.[8] Constructivists see technology as moderated by human actions and shaped by contingency, interaction and struggle. As one set of researchers explains:

> Research on technological change teaches us that the relationship between technology and society is never unidirectional. Rather technologies are often developed in response to the agendas of powerful social actors. Initially, they shape themselves to the contours of custom; ultimately, they follow paths selected through struggles among groups seeking to turn technologies to their own interests.[9]

The social constructivist perspective points to the potential significance of initiatives such as those of data intermediaries that seek to shape and reconstruct technologies for the use of social change agents in pursuit of social justice. If we see technologies as normally directed by powerful interests such as corporations and the state, then data intermediaries hold the promise of engaging in a counter-practice, remolding technology in the interests of the non-powerful.

Methodology

I gathered the information contained in this report through a variety of qualitative research methods including a review of the literature, a content analysis of data intermediary websites (Section 2) and interviews with intermediary staff (Section 3). The content analysis was guided by a protocol of questions that consisted of six categories: demographics; institutional structure and funding; mission and spatial/social aims; program components; forms of data; and serving user needs. Interviews were semi-structured according to a general protocol. The information contained in this report was collected between February 2003 and April

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[8] Constructivism as an epistemological approach is grounded in Science and Technology Studies (STS) as well as educational theory. This perspective can be juxtaposed against technological determinism, which views technology as independent of social forces and determining of social structures.

[9] Paul DiMaggio et al., 2001. Social implications of the Internet, *Annual Review of Sociology* 27:307-336. (p. 327)

2004. More details on the methods used in Sections 2 and 3 can be found within those sections. Protocols for the content analysis and interview are contained in the Appendix.

1. CONTEXT: DEMOCRATIZING DATA, COMMUNITY CAPACITY BUILDING, AND COMMUNITY TECHNOLOGY

In this section, I contextualize the agenda and the work of data intermediaries. I begin by defining the goal of data intermediaries: democratizing data. I then look at how the agenda of data intermediaries articulates with two broader realms of discourse and practice: community capacity building and community technology. This discussion leads to an examination of the relationship between marginalized communities and data resources. I then address some of the potential tensions involved in the agenda of data intermediaries. Lastly, I present a conceptual framework that illustrates important factors that structure the field in which data intermediaries operate.

Democratizing Data: Unpacking a Keyword

The primary goal articulated by data intermediaries is to democratize data or to democratize information.[10] As Raymond Williams reminds us, democracy is a *keyword* in the English vocabulary: its definition is contested, multivalent, mutable, and inherently linked to abstract ideals and concepts.[11] Although the democratization of data might be a fuzzy concept, its common use by data intermediaries signifies that it is meaningful to their work. They use this term to frame their actions, or to make their activities resonate with potential supporters, and to articulate their policy goals.[12] We might see the democratization of data as a "global concept" that refers to a multi-faceted, complex phenomenon and might be broken down into component sub-concepts.[13] Researching this global concept first requires deciphering its constituent sub-concepts.

One way to break down this concept is to look at how it has been defined by the institution that brings together many data intermediaries under a single agenda and articulates their collective policy goal as democratizing data: the National Neighborhood Indicators Partnership

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[10] David Sawicki and William Craig, 1996. The democratization of data: bridging the gap for community groups, *Journal of the American Planning Association* 62(4): 512–523.

[11] Raymond Williams, 1980. *Keywords: A Vocabulary of Culture and Society*.

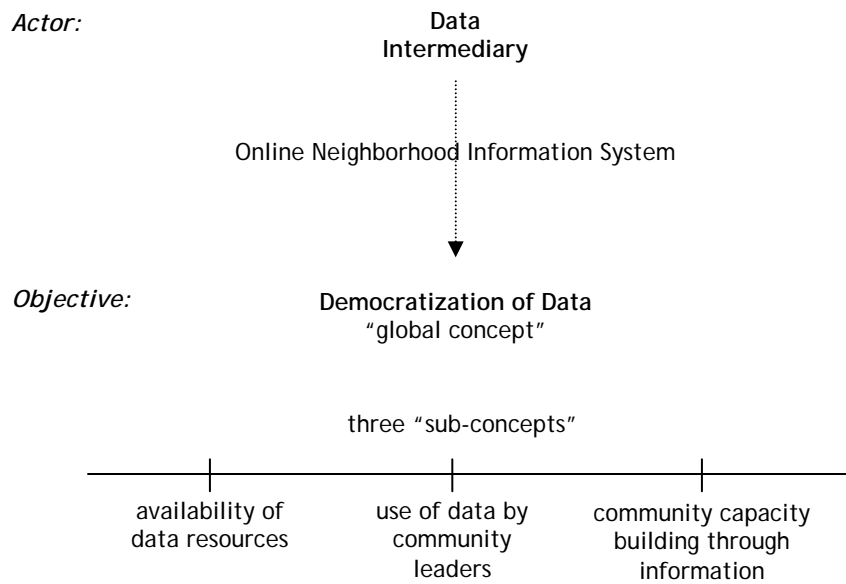[12] The importance of "framing" in social change has been well explored in the research on social movements. See Robert Benford and David Snow, 2000. Framing processes and social movements: An overview and assessment, *Annual Review of Sociology* 26: 11-39.

[13] Robert Mayer and Ernest Greenwood, 1980. *The Design of Social Policy Research.* Englewood Cliffs, N.J.: Prentice-Hall Inc.

(NNIP). NNIP, formed in 1996, is a collaboration between the Urban Institute, a Washington, D.C.-based research organization, and 21 local data intermediaries. NNIP has created what might be described as a loose network of data intermediaries. The purpose of this network is to share and disseminate information on using data to effect community change, to advance the field through building useful tools and to provide technical assistance and training to new groups.[14] NNIP advances the following definition of democratizing information:

> NNIP partners operate very differently from traditional planners and researchers. Their theme is *democratizing information*. They concentrate on facilitating the direct practical use of data by city and community leaders, rather than preparing independent research reports on their own. And all have adopted as a primary purpose using information to build the capacities of institutions and residents in distressed urban neighborhoods.[15]

Figure 2.
Schematic of Relationship Between
Data Intermediary and the Democratization of Data

Actor: Data Intermediary

Online Neighborhood Information System

Objective: Democratization of Data
"global concept"

three "sub-concepts"

availability of data resources   use of data by community leaders   community capacity building through information

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[14] See NNIP website: www.urban.org/nnip/
[15] Ibid.

This definition includes two key sub-concepts of the democratization of data: *facilitating the direct use of data by city and community leaders* and the *use of information to build community capacity*. Inherent in the sub-concept of facilitating the use of data by city and community leaders is the notion that data intermediaries help community actors develop the skills that allow them to use data for social change. The latter concept of using information for community capacity building requires a deeper explanation of the community capacity building approach, which I give in the following section. I also add a third sub-concept that is implicit in the first two: *providing access to data resources*. For the purposes of this report, I adopt these three sub-concepts as a working definition of the democratization of data.

In addition to these goals, NNIP also stipulates that its partners must be "building and operating an advanced information system with integrated and recurrently updated information on neighborhood conditions in its city."[16] This information system is the neighborhood information system (NIS). The NIS can be seen as an implementation vehicle that enables the data intermediary to carry out its goal of democratizing data.

Figure 2, above, depicts graphically the relationship between the data intermediary, the NIS and the democratization of data. It is important to note that these sub-concepts of access, use and community capacity building are not mutually exclusive categories, but are interrelated and interacting aspects of the "global concept" of democratizing data. These constitutive elements of democratizing data are linked to two fields of discourse and practice in which data intermediaries are embedded: community capacity building and community technology. I will address each of these aspects in turn to illustrate the agenda of data intermediaries.

Community Capacity Building

Community capacity building is a particular approach to community development that seeks to increase the ability of historically marginalized communities to participate in decision-making and access resources. Community capacity has been defined as "the interaction of human capital, organizational resources and social capital existing within a given community that can be leveraged to solve collective problems and improve or maintain the well-being of a given community."[17] Elements of

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[16]   Ibid.

[17]   Robert Chaskin, 2001. Building community capacity: A definitional framework and case studies from a comprehensive community initiative, *Urban Affairs Review* 36(2): 291-323.

community capacity building include levels of social agency, fundamental characteristics of community capacity, and functions of community capacity. Efforts to build community capacity focus on three levels of social agency: individual residents, community organizations and networks of relationships. Participants in two capacity building initiatives identified four fundamental characteristics of community capacity: sense of community, level of commitment, ability to solve problems and access to resources.[18] The ability to solve problems was the characteristic most stressed by activists.[19] The functions of community capacity include planning for the production of goods and services and mobilizing residents for collective action.

Community capacity building is related to the asset-based approach to community development popularized by John Kretzmann and John McKnight of Northwestern University and the research on social capital spearheaded by political scientist Robert Putnam. The community capacity building approach is asset-based in that it builds upon existing community resources and seeks to engage residents and harness local knowledge and wisdom for planning and policymaking. However, it is not exclusively internally-focused, and thus differs somewhat from Kretzmann and McKnight's asset-based community development approach.[20] The capacity building approach recognizes that neighborhoods are not self-contained entities but are embedded in larger socioeconomic systems operating at the urban and regional scale and beyond. Their prospects are inescapably tied to externally-created policies and macrostructural changes.[21]

Building social capital is an important part of the community capacity building agenda. Popularized by Putnam, the concept of social capital refers to the relationships among community members and institutions and the trust and norms that maintain such relationships.[22] With respect to community capacity building, developing social capital means building relationships within communities and also establishing

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[18] Ibid.

[19] Ibid.

[20] John Kretzmann and John McKnight, 1993. *Building Communities from the Inside Out: A Path Toward Finding and Mobilizing a Community's Assets* Evanston, IL: Institute for Policy Research.

[21] Chaskin, 2001.

[22] Robert Putnam, 1993. The prosperous community - social capital and public life. *The American Prospect* 26:18-21.

linkages with outside resources and organizations.[23] Two types of social capital have been identified: "bonding," or relationships within a neighborhood, and "bridging," or outside connections to private corporations, local government, and other actors that help to leverage resources and policy.[24]

As explained above, data intermediaries promote the use of data and information as a capacity building tool. They provide data resources, including data, maps and data technologies. They also provide assistance in applying data to community development and organizing goals. But how do these activities fit into the community capacity building agenda? Though there is not a large body of literature that parses out the connections between data resources and the specific indicators or characteristics of community capacity identified above, a number of studies have examined the ways in which community groups are applying data resources to their work and broadly to capacity building. The findings of these studies can help define the specific links between data and community capacity.

NNIP published a study in 1999 that highlighted 28 cases of how community actors are using neighborhood-level data, maps and data analysis tools such as GIS.[25] This study illustrated the multiple scales at which these actors work and at which data resources may be applied. The cases were divided into three categories: the use of data to address particular issues at the neighborhood-level; the use of data for more cross-cutting issues; and the use of data to address citywide or metropolitan policy issues that were affecting the poor. The data applications served a variety of purposes, including economic development, housing, social services, environmental health, community mobilization, and municipal policy development and implementation. The study also indicated that data resources are used for groups' internal activities and initiatives as well as to influence others.

Two other studies have looked specifically at how community groups have used maps and GIS in their work. One study examined mapping projects related to equitable development goals.[26] This study

23   Angela Blackwell and Raymond Colmenar, 1999. Transforming policy through local wisdom. *Futures* 32:487-497.

24   Manuel Pastor, 2000. *Regions That Work: How Cities and Suburbs Can Grow Together*. Minneapolis: University of Minnesota Press.

25   National Neighborhood Indicators Partnership, 1999. *Stories: Using Information in Community Building and Local Policy*. Washington D.C.: The Urban Institute.

26   Josh Kirschenbaum and Lisa Russ. 2002. *Community Mapping: Using Geographic Data for Neighborhood Revitalization.* Oakland, CA: PolicyLink.

identified five applications of maps: documenting, monitoring and analyzing neighborhood change; identifying development opportunities; extending community support systems; organizing and advocating for policy change; and tracking program success and sharing outcomes. Another study, based on interviews with 50 Minneapolis and St. Paul neighborhood organizations, found four main uses of maps: strategic (e.g. identifying needs, targeting resources); tactical (e.g. guiding activities, presenting issues); administrative (e.g. contacting residents); and organizing (e.g. gaining support, interest and participation).[27]

The findings of these studies show how maps, spatial data and data technologies such as GIS have the potential to enhance the fundamental characteristics and the functions of community capacity as I have outlined them above. Maps and spatial data can help organizations solve problems, the most frequently cited characteristic of community capacity.[28] Basic demographic and economic data can help organizations build a shared understanding of the baseline conditions of an area, including its assets and liabilities, and understand where to target resources. High-quality data at the parcel level is invaluable for organizations involved in housing and economic development and advocacy. One of the most sophisticated data resources available for such organizations are "early warning systems," based on the model that was pioneered by the Center for Neighborhood Technology in Chicago. Early warning systems contain up-to-date information on tax delinquencies, code violations and utility shutoffs for individual properties. These systems can be used to monitor neighborhood housing conditions, indicate areas that are under distress, and develop programs to address neighborhood decline.

As organizing tools, maps and visual representations of data can be used to mobilize support around issues, increasing people's level of commitment and sense of community. For example, a representative of The Figueroa Corridor Coalition for Economic Justice, a Los Angeles-based group, states that the organization uses its map daily to "talk to residents, community organizations, the Redevelopment Agency, and private developers. We can tell the history of our organization, talk about the different neighborhoods that we are organizing in, discuss who owns what and what's at stake."[29]

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[27] William Craig and Sarah Elwood, 1998. How and why community groups use maps and geographic information. *Cartography and Geographic Information Systems* 25(2): 95-104.

[28] Chaskin, 2001.

[29] Kirschenbaum and Russ, 2002.

Maps and data can also help organizations build social capital. Many organizations form collaboratives to gather and use data. In such cases, the process of working together to develop data resources can increase the "bonding" and "bridging" forms of social capital previously identified. Data and mapping projects that are connected to participatory planning efforts create opportunities for establishing relationships between community organizations and residents. In addition, as illustrated by the Figueroa Corridor group's use of its map, representations of data provide important visual communication tools and can spur engagement in and discussion around community issues.

Finally, the use of maps and data can lead to increased credibility of an organization, providing it with access to the policymaking table. In policy arenas where data are perceived as the basis for decisionmaking, the use of the same tools of bureaucrats and professionals can increase a group's legitimacy. Table 1, below, outlines some of the ways in which access to and the ability to use data resources can contribute to the fundamental characteristics of community capacity.

Table 1.
Data Resources and the "Fundamental Characteristics"
of Community Capacity

Fundamental Characteristics	Uses of Data
Ability to solve problems	• Understanding community needs and assets • Targeting scarce resources • Conducting spatial analyses
Level of commitment	• Mobilizing membership and community residents
Access to resources	• Identifying development opportunities • Proving knowledge of community • Making claims • Use of "expert" planning tools brings legitimacy
Sense of community	• Visual representations of data and maps create points for discussion and deliberation • "Bonding" social capital, a shared understanding of the community

Community Technology

The second broader agenda within which data intermediaries' goals are embedded is community technology. Community technology is an area of research and practice that seeks to bridge the "digital divide," or the gap between those who can access and use digital technologies and those who cannot. Despite the rapid rate of computer and information technology diffusion, and the federal government's characterization that America is a "nation online," 34 percent of U.S. households still do not have access to a computer, and 46 percent do not have access to the Internet.[30] Given these statistics, we must question exactly who is included in the nation online. Data indicate that access to IT is highly uneven based on characteristics such as race/ethnicity, income and education. Research has shown that the rise of digital technologies has not necessarily created new forms of marginalization, but has led to the deepening of these longstanding social cleavages.[31] Located both physically and socially outside the plugged-in networks, poor communities and communities of color are unable to harness the productive capabilities of IT and risk falling into what one researcher has called "digital destitution."[32]

As with most technological developments, however, the consequences of IT have been multidirectional and contradictory. If the coming of the information society has created advanced forms of marginality, it has also created novel possibilities for information exchange and dissemination, the production of alternative forms of knowledge and political participation. The creative use of the Internet by the Zapatistas in Chiapas, Mexico to organize and communicate with solidarity groups generated hope that the technology could be harnessed by the poor and the disenfranchised to advance progressive social goals and facilitate a new form of "globalization from below." This last suggestion provides a hopeful view of IT as a tool of resistance and transgression. But what is the possibility that IT can be used to benefit the

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[30] National Telecommunications and Information Administration, 2002. *A Nation Online: How Americans are Expanding Their Use of the Internet.* http://www.ntia.doc.gov/ntiahome/dn/html/anationonline2.htm

[31] Ibid. For example, the latest statistics (2001 Census data) show that families with incomes of $75,000 or more are over three times as likely to have access to the Internet than families with incomes less than $15,000, and over twice as likely to have access to the Internet than those in the $15,000 to $24,999 income category.

[32] Blanca Gordo, 2003. *Technology, Social Groups and Community Technology Development*. Presentation given to the Berkeley Center for the Information Society. April 22, 2003.

"informationless ghettos" of the informational city?[33] The have-nots left behind by the information society?

A number of community technology initiatives have sought to bridge the digital divide and provide poor communities with access to IT resources. Such initiatives originally focused on individual access to computers and training, often provided through community technology centers. In recent years, however, the community technology field has broadened in a number of ways. First, the notion of access itself has been expanded to include more qualitative dimensions relating to the extent and diversity of use, the quality of technical connections and social support, the relevance of content, and the ability to contribute to content development.[34] Second, in addition to this more nuanced perspective on IT access, some actors in the field have emphasized the need to link technology with specific social objectives, to view it as a tool or a means rather than an end in itself.[35] Third, some practitioners have been rethinking community technology through the lens of community building, asking questions of how to insert the power of IT into a community capacity building agenda.[36] This approach looks at the use of IT within community organizations as well as by residents. The gap in IT access and use among such institutions has been called the "organizational divide," and advocates have highlighted the need for increased technology capacity as well as local content development by and for community organizations.[37]

A recent survey of IT penetration, capacity and use within the community development field conducted by a national community development intermediary provides a useful snapshot of the organizational divide.[38] This survey breaks community development organizations into four groups: Community Development Corporations (CDCs), Community Development Financial Institutions (CDFIs), Community-Based

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[33] The term "informationless ghettos" is from Peter Hall, 2000. "The City of the Tarnished Belle Epoque: Infocities and Informationless Ghettos: New York; London; Tokyo, 1985-2000" in *Cities of Tomorrow*.

[34] DiMaggio et. al., 2001.

[35] Morino Institute, 2001. *From Access to Outcomes: Raising the Aspirations for Technology Initiatives in Low-Income Communities, Working Paper.*

[36] Josh Kirschenbaum and Radhika Kunamneni, 2001. *Bridging the Organizational Divide: Toward a Comprehensive Approach to the Digital Divide.* Oakland, CA: PolicyLink

[37] Ibid.

[38] Seedco. 2002a. *The Evolving Role of Information Technology in Community Development Organizations.* NY, New York.

Organizations (CBOs) and Intermediaries (INTs). Table 2 details the main findings of the survey. This table illustrates some key characteristics of IT access among these organizations:

- They have access to computers (all have a 1:1 ratio of computers per employee);

- For the most part, staff have regular access to the Internet;

- CBOs have less access to the Internet than the other types of organizations. The gap between the mean and the median signals that there are a few CBOs that have much lower levels of access;

- Between a quarter and a third of the organizations used GIS, but GIS use in organizations is concentrated among a small number of employees;

- GIS use is highest among CDCs and CBOs, and lowest among intermediaries; and

- GIS is mainly used for demographic analysis, mapping or tracking clients and client outcomes, and mapping locations.

Qualitative studies have highlighted some of the factors that influence the ability of community groups to access and use GIS. Though the diffusion of IT and GIS technologies has led to an overall increase in access, this access varies significantly depending on organizational factors[39] and the local political and institutional context.[40] Research has pointed to three factors that are key to accessing GIS resources: the willingness of local government to provide access to data, the openness to including citizen groups as stakeholders in planning, and government agencies' own experiences in applying GIS to their work.[41] The presence of supportive intermediaries is cited as another important local contextual factor for connecting community groups and GIS.[42] By providing online Neighborhood Information Systems, data intermediaries act as resource

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[39]   Renee Sieber, 2000. GIS implementation in the grassroots. *Urban and Regional Information Systems Association Journal* 12: 15–29.

[40]   Rina Ghose and William Huxhold, 2001. Role of local contextual factors in building public participation GIS: The Milwaukee experience. *Cartography and Geographic Information Science* 28(3): 195-208.

[41]   Sieber, 2000; Ghose and Huxhold, 2001.

[42]   Michael Barndt, 1998. Public participation GIS: Barriers to implementation. *Cartography & Geographic Information Systems* 25(2): 1051

Table 2.

IT and GIS Use Among

Community Development Organizations[43]

	Type of Organization			
	CDC	**CDFI**	**CBO**	**INT**
Number of Organizations Responding to Survey	209	113	25	8
Number of Computers per Employee	1	1	1	1
Staff with Regular Internet Access (%)				
Mean	80	78	67	100
Median	95	93	80	100
Proportion of Staff Using GIS (%)				
Most	4	2	0	0
Some	34	26	36	25
None	61	71	60	75
Purpose of GIS (%)				
Map showing locations	30	32	11	0
Mapping/tracking clients/client outcomes	39	35	33	0
Land use mapping	19	10	11	0
Market studies	10	19	0	50
Housing planning and development	15	10	0	0
Economic development planning	16	3	0	0
Demographic analysis	39	29	44	50
Organization Has a Website (%)	59	63	52	88

substitutes for the community actors that do not have access to GIS. The data resources provided by data intermediaries enable them to conduct demographic analyses and obtain location maps, two of the most cited purposes of using GIS, and to carry out other research, planning and advocacy-oriented functions.

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[43] Ibid.

Data and GIS: Supply and Demand

If data intermediaries act as resource substitutes, then understanding the nature of the supply and demand for the resources they provide to community actors can help contextualize their project. On the supply side, technological advancements have greatly lowered the cost of software and hardware required to process and analyze data, and design innovations have made it more accessible to non-expert users. In addition, the digitization of data has greatly increased the availability of online data (though it has also decreased the availability of paper data sources). Another influence is legislation regarding public access to government data. Since the 1960s, a number of public campaigns have led to legislative acts that require government agencies to make their data available to the public.[44]

Data intermediaries have arisen partly because of these supply-side "data democratizing" forces, and they are also working to further increase the supply of data available to the public. Despite the overall progress made in public access to data, small-area and local data often remain inaccessible. Data intermediaries have had difficulty obtaining parcel-level data sets on property conditions from local and regional governing bodies.[45] The greatest barrier faced by the Los Angeles intermediary, Neighborhood Knowledge Los Angeles (NKLA), was gaining access to data held by the County Assessor's office.[46] The county agency generated income through the sale of its parcel-level data, primarily to private companies that serve the real estate industry. NKLA's desire to purchase the data and make it freely available to the public through the Internet created a political crisis. To avoid a lawsuit, NKLA negotiated an agreement with the Assessor to only use one portion of the data for their site. This example illustrates how data intermediaries challenge the privatization of data in its myriad forms. By making GIS available through the Internet, they also challenge the privatization of data analysis tools.

On the demand side, I will suggest four broad changes within the field of community development that might contribute to greater demand

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[44] e.g. Freedom of Information Act of 1966 and 1996 amendment, the Emergency Planning and Community Right-to-Know Act of 1986, the Home Mortgage Disclosure Act (HMDA) of 1975. Another issue with geospatial data has been the integration of various datasets. In 1994, Clinton established the "National Spatial Data Infrastructure" to integrate federal data.

[45] Kirschenbaum and Russ, 2002.

[46] Stockholm Challenge, 2004. Neighborhood Knowledge Los Angeles Project Description. http://www.challenge.stockholm.se/WebAdmin/print_project.asp?id=2721 (last accessed April 2004)

for data and GIS on the part of community actors: (1) the growth, strengthening and professionalization of the community development sector in the past few decades; (2) the widespread adoption of GIS by planning agencies; (3) the rise of the neighborhood indicators movement; and (4) the demands of funders for quantitative data and outcomes measurements.

The incredible growth of the community development sector in recent years has resulted both from pressures "from above" for a less state-centered approach to social welfare and the provision of public goods as well as pressures "from below" for greater resident voice and influence in urban policy and governance.[47] In the past two decades, city governments have become increasingly entrepreneurial. In line with their neoliberal vision of a leaner state, they have increasingly shifted social responsibilities and the production of public goods to nonprofit community organizations. With this shift, community organizations have become increasingly powerful players in urban service delivery, engaging in neighborhood revitalization efforts such as housing development, economic development and social services.[48] One result of these changes has been an overall professionalization of community organizations and a greater demand for resources including data and data technologies.

With the professionalization and institutionalization of the community development field, community organizations have sought access to the same tools and techniques of professional planners. GIS is one such tool; its rise within land use and environmental planning has contributed to the organizational divide by widening the gap in resources available to professionals and the state versus residents and community groups. One researcher claims that the widespread adoption of GIS among professional users has "effectively created barriers to empowerment by creating exclusive, sophisticated user communities beyond the reach of less powerful, resource poor citizens."[49]

Community actors have also demanded data resources to use in developing alternative and equitable visions for neighborhood

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[47] Sarah Elwood and Helga Leitner, 2003. GIS and spatial knowledge production for neighborhood revitalization: Negotiating state priorities and neighborhood visions. *Journal of Urban Affairs* 25(2): 139-157.

[48] Rose Gittell and Mark Wilder, 1999. Community development corporations: Critical factors that influence success. *Journal of Urban Affairs* 21(3): 341-362; Avis Vidal, 1997. Can community development reinvent itself? *Journal of the American Planning Association.* 63(4): 429-438.

[49] Rina Ghose, 2001. Use of information technology for community empowerment: transforming geographic information systems into community information systems, *Transactions in GIS*, 5(2): 141–163. (p. 142)

revitalization and development. Neighborhood indicators projects exemplify such a strategy. Neighborhood-scale indicators enable the tracking of geographic disparities in health, services, and social and economic welfare across the neighborhoods of a city or region.[50] Such indicators projects are often related to sustainability, equity and environmental justice agendas. Equity-oriented indicator projects, such as the West Oakland Environmental Indicators Project, include community empowerment and capacity building goals, seeking to involve residents in developing relevant indicators, establishing desired future conditions or benchmarks, and gathering required data and monitoring neighborhood conditions.[51] These projects rely on the availability of quality data resources and often use GIS mapping—"equity mapping"—to analyze and illustrate the uneven environmental risks among neighborhoods.

If the neighborhood indicators movement might be seen as a "bottom-up" stimulus that creates knowledge of and demand for data resources on the part of community actors, the emphasis on data and outcomes measurements on the part of funding agencies might be seen as a "top-down" demand stimulus. Since the mid-1990s, the private grantmaking foundations that are important funders of community groups have pushed for the development and use of quantitative data for outcomes measurements by their grantees. Though the data required for outcomes measurements are different than the data provided by data intermediaries, the emphasis on data and quantitative measures has led to a greater demand for data within the nonprofit community.

This last demand-side influence on community actors illustrates how notions of supply and demand can become murky in the context of unequal power relations such as those that exist between funders and grantees, and between community actors and state actors. The use of data and maps by community groups might in part be an instance of conforming to the "rules of the game" that are set by more powerful actors in order to gain legitimacy and engage in policymaking. One researcher who has investigated the adoption of GIS by grassroots environmental groups found that such groups are under "considerable pressure" to adopt the technology: "Whether groups are ready or not, GIS might become essential to obtain grants and data, to create competing models, to 'talk the

[50] For a summary of the indicators movement, see William Huxhold and Rina Ghose, 2002. The role of multi-scalar GIS-based indicators studies in formulating neighborhood planning policy. *Journal of the Urban and Regional Information Systems Association* 14(2): 5-17.

[51] Pacific Institute, 2002. *Neighborhood Knowledge for Change: The West Oakland Environmental Indicators Project*.

talk' of the bureaucrats, and to appear more scientific."[52] But the findings of this study also point to the dynamic nature of technology adoption. Although the organizations initially "conformed" to the technology (which they viewed as linked to a power structure they were acting to oppose), over time they transformed the technology and shaped it to suit their own objectives. This reminds us that the adoption of new technologies is a social process that fluctuates over time.

Another complexity relating to the demand for data by community actors concerns the potential gaps between felt data needs, the available supply of data and the potential uses of data. InfoResources, a data intermediary in West Philadelphia, conducted two needs assessments of potential users (both organizations and individuals) and found that they gave low priorities to census data or detailed housing data, the data typically provided by data intermediaries.[53] Additionally, the potential users had few GIS needs, and the GIS needs they did have were highly specific, requiring significant amounts of data collection. They were most interested in other sorts of information: school environment and performance, lists of nonprofit organizations, details of social service programs, grant writing resources and planning studies and reports. These findings point to two potential gaps that could affect that ability of data intermediaries to democratize data. The first gap is between the types of data resources provided by data intermediaries and the felt data needs of the community actors they seek to serve. This gap could have implications for data intermediaries' efforts to reach its target population. The second gap is between the perceived data needs of community actors and the potential of other types of data to help them in their efforts. This gap also has implications for data intermediaries, relating to their efforts to facilitate the use of data resources through training and capacity building. In relation to data resources, "community capacity" is not only the ability to use data, but also the ability to recognize how resources such as data might be applied to existing or future activities.

The notions of supply and demand are useful starting points for understanding the factors that influence the agenda of data intermediaries, but it is important to consider the limitations of these economic concepts in relation to data intermediaries and the democratization of data. First, data intermediaries do not simply serve demand for data resources; they

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[52] Renee Sieber, 2000. Conforming to the opposition: the social construction of geographical information systems in social movements, *International Journal of Geographical Information Science* 14(8): 775–793. It is important to note that Sieber's study was on grassroots environmental groups, which not likely to be serving the resource-poor communities targeted by data intermediaries.

[53] Chua and Wong, 1998.

seek to stimulate and create demand. They see data and GIS as resources that can make community actors work better and more efficiently, as tools that can help them achieve their goals. It is perhaps more accurate to say that they serve a demand for community capacity, and have chosen certain tools and methods based on data and information to meet that demand. Second, the process of democratizing data is transactive and occurs through interaction. Data intermediaries and community actors often work together to create new data resources and apply existing data resources in new ways. The concepts of supply and demand are perhaps too static to explain these creative processes that are involved in the work of data intermediaries.

Tensions and Challenges

In the above section on community capacity, I outlined how data intermediaries' efforts can contribute to community capacity and strengthen the field of community development. It is also important to acknowledge the tensions that exist within the agenda of data intermediaries and the potential challenges they create. Three potential tensions stand out. The first is the negative historical legacy of the use of maps and data *against* low-income communities of color, which contributes to the distrust of data on the part of these communities. The second is the (actual or perceived) technocratic nature of the planning vision of data intermediaries, which relates to their position as experts and, potentially, as "outsiders." The third is the type of user the data intermediary focuses on, namely individuals or nonprofit employees, and the level of technical knowledge required to use the materials they develop.

The products that data intermediaries promote—maps, data and mapping technologies—have long been recognized as tied up with relations of power. Brian Harley describes two sorts of power in maps: the power entailed in the making of the map, and the use of the map to make claims to power.[54] Maps and data are socially constructed. They do not simply mirror the empirical world but are selective representations of reality that reflect multiple processes of categorizing and counting, of making the infinite easier to digest and analyze. The processes involved in constructing data and maps are often politically contentious and marked by struggle between actors of unequal power. As Lisa Peattie explained in her classic case study of the process of planning Ciudad Guayana in Venezuela, the visual and statistical representations of the city created by

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[54] Brian Harley, 1997. 'Deconstructing the Map', in *Reading Human Geography: The Poetics and Politics of Inquiry,* T. Barnes & D. Gregory (eds.), Arnold, London.

planners reflect their personal and professional biases (such as aesthetic concerns with spatial arrangements and an orientation toward future capitalist accumulation rather than present social welfare), which do not align with the understandings and experiences of residents.[55]

Maps and data have historically contributed to the marginalization of poor communities and this has led to their distrust of data. Three episodes of negative data use stand out: redlining, the Census undercount and data on measures of social pathology. The history of redlining, or discriminatory lending practices based on blatantly racist appraisals of neighborhood value, is an example of an abusive use of data and maps against low-income communities of color. The precise communities that data intermediaries intend to empower via increased access to data are likely to be the same communities that are skeptical of data based on their knowledge of its misuse. The inability of the most widely used source of data, the U.S. Census, to evenly represent the population, also contributes to the distrust of data.[56] This misrepresentation is shown by the "differential undercount," or the biased undercount of certain groups. In the 2000 Census, 12.1 million people, or 4.26 percent of the official count, were undercounted or imputed, the majority of whom are likely to be low-income, minority residents in major cities.[57] The undercount issue was worse for the 2000 Decennial Census than in previous Censuses. Under the current presidential administration, Census numbers were not adjusted for that undercount, whereas in previous years the undercount was imputed.[58] It is also important to remember that the undercount is geographically uneven: certain neighborhoods are much more "undercounted" than others.[59] A third reason for the distrust of data and maps relates to the needs-based versus assets-based nature of many of the indicators provided by data intermediaries. As previously mentioned,

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[55] Lisa Peattie, 1987. "Representation." in *Planning, Rethinking Ciudad Guyana.* Ann Arbor, MI: University of Michigan Press.

[56] Distrust for the Census was identified by a community group representative as an important factor at one of the INFoOakland meetings I attended. A suggestion was made for the data intermediary to re-census neighborhoods to gather their own, more accurate data.

[57] Eric Erickson, 2001. An evaluation of the 2000 Census, *Final Report to Congress*, U.S. Census Monitoring Board September 1, 2001. Undercounts are based on population projections and data imputations. Of the 12.1 million, 6.4 million were omissions and 5.7 million were imputations.

[58] Janny Scott. 2001, August 8. Study Puts Census Errors At $4 Billion. *The New York Times*, B-6.

[59] The effects of the undercount go beyond a lack of trust of data on the part of community actors. Portions of federal aid money are allocated based on Census population counts, thus the undercounted also get underallocated federal funds.

Sawicki and Craig found that community leaders were unappreciative of data on measures of pathology. This example shows how data are not perceived as politically-neutral, and might be linked to broader paradigms such as the "culture of poverty" that are widely discredited and perceived as racist and malicious by the communities that data intermediaries seek to serve.

Partially due to the power embedded in maps, the spread of GIS mapping technology spawned contentious debates about the relationship between GIS and society.[60] Out of these debates emerged an agenda on "public participation GIS" (PPGIS) which seeks to leverage the power of maps for communities and individuals who are engaged in social change and/or have been historically underrepresented in decision-making.[61] Researchers working within this agenda have focused on two geographical categories: inner-cities in advanced industrial countries; and rural areas in developing countries that are undergoing processes of land reform.[62] The ideas of the PPGIS agenda are captured by the concept of "countermapping," which refers to the construction and use of maps by such groups as a countervailing form of power. Data intermediaries that provide Internet-GIS can be seen as PPGIS providers.

The second potential area of tension for data intermediaries is their position as more expert institutions that operate according to a different sort of planning logic than some community groups. In a study that specifically investigated the relationship between progressive social change organizations in communities of color and nonprofit technical assistance providers, Guerro found that there was tension between the planning visions of each type of organization. Organizations whose activities challenged dominant paradigms perceived the strategic planning principles applied by technical assistance providers as problematic: system-supporting rather than system-changing. In the words of one activist: "A lot of the assumptions of the strategic planning process primarily come out of a corporate framework. It's difficult to get folks out of that framework…I am talking about the technology of strategic

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[60] Nadine Schuurman, 2000. Trouble in the heartland: GIS and its critics in the 1990s, *Progress in Human Geography* 24(4): 569–590.

[61] National Centre for Geographic Information and Analysis (NCGIA), 1998. *Empowerment, marginalization and public participation GIS*, papers presented at a specialist meeting, Santa Barbara, CA, 14–17 October; Nancy Obermeyer, 1998. The evolution of public participation GIS, *Cartography and Geographic Information Systems* 25: 65–66.

[62] Michael McCall, 2003. Seeking good governance in participatory-GIS: a review of processes and governance dimensions in applying GIS to participatory spatial planning. *Habitat International* 27: 549-573.

planning, even the linear thinking that it implies, all of that stuff comes out of a particular sector. I haven't seen any TA provider who doesn't bring some of those core assumptions from a linear and top-down structure"[63]

Ethnographic research on the use of data intermediary-generated maps and data by community groups within formal neighborhood planning processes has revealed a related tension between community groups and the agenda of data intermediaries. In these cases, the public agency driving the planning process mandated the incorporation of intermediary-provided data and maps within the community plans.[64] Data intermediaries were thus positioned as the experts in the process, and the types of neighborhood data they provided—primarily Census and administrative data—was emphasized over residents' local or experientially-based knowledge.[65] Within diverse communities, the members of the community groups who were more educated and adept at adopting the language and tools of experts were empowered by this process, while those community members who were less capable of using this language and tools were further marginalized by the process.[66] In addition, the community groups tended to use the data instrumentally rather than strategically, to gain status or power in the eyes of the government and justify existing programs rather than to develop data-driven strategies.[67]

These tensions and contradictions do not undercut the significance of data intermediary efforts to provide access to "expert" tools to less powerful actors who are normally marginalized within planning and policymaking arenas. They do, however, suggest that we need to pay attention to the ways in which data intermediaries go about democratizing data. Every policy action carries with it potential unintended consequences. It is only by recognizing these unintended consequences that policy agents (here, data intermediaries) might imagine and implement strategies to mitigate them.

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[63] Luz Guerro, 1999. Technical Assistance and Progressive Organizations for Social Change in Communities of Color: A Report to the Saguaro Grantmaking Board of the F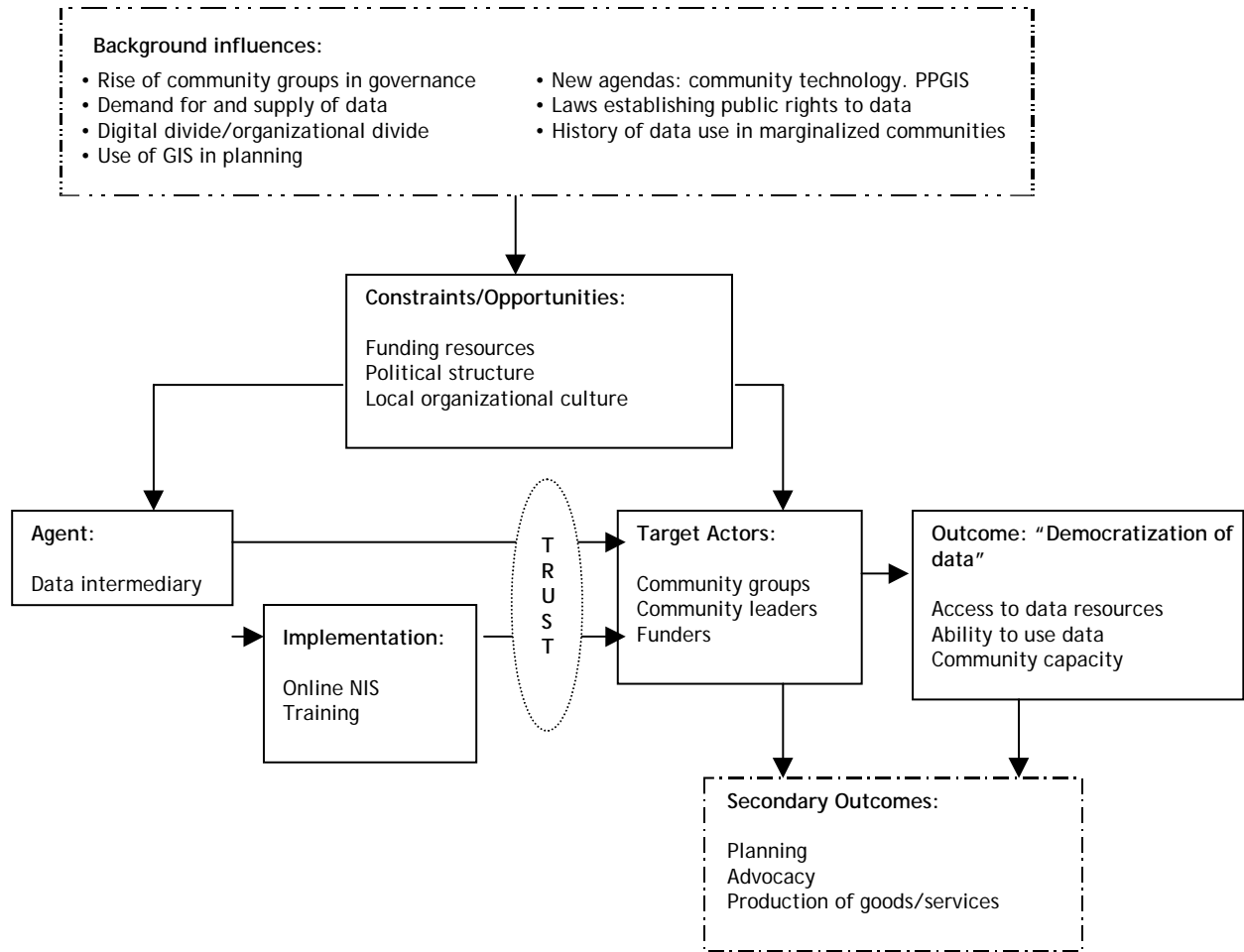unding Exchange. Paper located on the Comm.org website: http://comm-org.utoledo.edu/papers.htm (last accessed April 2004)

[64] Ghose and Huxhold, 2002; Elwood, 2002.

[65] Ibid.

[66] Elwood, 2002.

[67] Ghose and Huxhold, 2001.

Figure 3.
Conceptual Framework of the Context for Data Intermediaries

A Conceptual Framework

Figure 3, above, integrates some of the information from this section into a conceptual framework that serves as an analytical device for understanding the field within which data intermediaries democratize data. The "background influences" box includes the influences on data intermediaries previously described in this section. The "constraints/ opportunities" box brings in more proximal influences, such as funding resources, local political opportunities that provide access to data, and the local organizational culture of information use. The "target actors" are the user groups that data intermediaries seek to reach; here, community groups, community leaders and funders. In this diagram, I have added trust as a "bridging variable" between the data intermediary or the online NIS

and the target actors. The outcome of data intermediaries is the "democratization of data." This outcome is attained when the target actors can access and use data and have increased community capacity through data use. It can be reached through multiple pathways, as indicated by the arrows. The data intermediary can assist the target actors directly or through its virtual resource, the NIS, and both of these pathways are mediated by relations of trust in the data intermediary and in data. The final box, "Secondary Outcomes," indicates the ultimate goals of data intermediaries, which are to increase the capacity of their users in terms of planning, advocacy and the provision of public goods and services.

2. THE STATE OF THE FIELD

This section looks at the state of data intermediaries as a population. The primary questions answered in this section are: (1) What are the demographic and institutional characteristics of data intermediaries? What services are they providing? and (2) How prevalent are Internet-based neighborhood information systems, and what are the characteristics of these neighborhood information systems? After addressing the current state of the field of data intermediaries, I will look at how the field has changed since 1996, when Craig and Sawicki first wrote about the "movement" to democratize data.

SUMMARY OF KEY FINDINGS

DATA INTERMEDIARY CHARACTERISTICS

- There are 30 data intermediaries located in 25 cities throughout the country
- Some are related to or integrated within broader community capacity building efforts; others are stand-alone projects
- The majority are collaboratives, with Universities and nonprofits or foundations as their primary partners. Collaborations with private sector organizations are relatively rare
- Private foundations are their main source of funding, with the Annie E. Casey Foundation supporting a third of data intermediaries. Five have received large federal Technology Opportunity Program (TOP) grants
- Their spatial range varies: most serve cities or regions, a few serve neighborhoods, one serves a state
- Some focus on serving organizational users while others seek to serve a range of organizational and individual users
- About a fifth provide free customized data analysis and mapping assistance
- About a third provide some type of training, either an online tutorial or in-person workshop. Some trainings focus on how to apply data to advocacy and planning

NIS CHARACTERISTICS

- Almost all data intermediaries maintain an online NIS
- The most popular categories of neighborhood data are related to population characteristics, economics, housing, education, health, crime and community assets/resources, in that order.
- A few sites enable users to upload and map their own data
- The 2000 Census is the most common data source, followed by the 1990 Census. State, county and local government agencies are also important sources of data
- Data is most often presented in tabular form, maps or both. A few provide charts and graphs
- A third of the sites provide Internet-GIS; those that do generally also provide static maps
- Four sites are translated into Spanish; one site is tailored for disabled users

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Methods

The majority of the information in this section comes from a content analysis of data intermediary websites. For the data intermediaries that are NNIP partners, I supplemented the information on their websites with the "partner descriptions" available on the NNIP website. But it is important to emphasize that this information comes from online sources—primarily the self-representations of data intermediaries. Thus the degree to which it reflects the actual activities of data intermediaries depends on the "fit" between online representation and reality.

In relation to the content analysis, my first goal was to determine the current universe of nonprofit data intermediaries. It is important to note that I am looking at what is a sub-section of the larger universe of data intermediaries that would include government-produced Neighborhood Information Systems as well as corporate-produced sites. My reason for limiting my population to nonprofit data intermediaries was because I was interested in looking at data intermediaries that were similar to INFoOakland and that were expressly focused on serving low-income communities and the institutions that (broadly speaking) represented their interests. I perceived the many sites that have been developed by government agencies in recent years as oriented toward a broader notion of the "public" than are nonprofit data intermediaries, and I also saw them as working within a different (though overlapping) funding environment and thus subject to different sorts of institutional constraints and opportunities than nonprofit data intermediaries.

Three existing resources greatly assisted my research: the results of a previous survey of PPGIS providers conducted in November 1998;[68] the list of partners and affiliates of the National Neighborhood Indicators Partnership located on the NNIP web site; and organizations specified in the PPGIS literature. I also performed a number of web searches to find additional data intermediaries. I based my decision on whether or not an organization was a data intermediary on NNIP's partnership criteria explained in Section 1 of this report. In addition to these criteria, I considered geographic scale, institutional structure and the type, source and format of data provided.[69] Table 3, below, details the decision rules I used to determine whether to consider an organization a data intermediary. To guide my analysis of the data intermediaries and neighborhood

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[68] David Sawicki and David Peterman, 2002. Surveying the extent of PPGIS practice in the United States. In: Craig, Harris and Weiner (Eds.) *Community Participation and Geographic Information Systems.*

[69] These criteria were influenced by, but do not follow exactly, the selection criteria use by Sawicki and Peterman (2002) in their survey of Public Participation GIS providers.

information systems, I developed a content analysis instrument, or set of questions that I asked of each site. The questions were broken into six sections: demographics; institutional structure and funding; mission and spatial/social aims; program components; forms of data; and serving user needs. This instrument can be found in the Appendix of this report.

Table 3.

Decision Rules for Determining Data Intermediary Universe

Geographic scale:
Organization provides local-area data, i.e. at the level of the community or neighborhood. For the purposes of this analysis, I defer to the data intermediary's size-definition of the community or neighborhood. In the absence of a defined community or neighborhood scale, I consider the census tract as the largest geographical scale that should be provided by a data intermediary in order for its efforts to be directed toward neighborhood revitalization efforts.[70]

Use of Internet Technology:
I made the assumption that data intermediaries have an online presence, though not necessarily an online NIS. Seedco's recent survey of IT use by community groups found that 88 percent of (general) intermediaries maintained a website.[71] Chua and Wong also note that nearly all data intermediaries have websites.[72] Thus, it is my reasonable guess that almost all data intermediaries maintain a website. One exception to this rule is the Data and Policy Analysis (DAPA) intermediary at Georgia State University, which does not have its own website or online NIS, though it is described on Georgia State's website.

Institutional Structure:
Organization is a nonprofit entity. I include collaborative organizations that partner with local governments but I do not include government agencies that provide data and mapping services (with the exception of public universities and libraries). This decision is based on the assumption that public agencies act within a different funding and political environment than data intermediaries and thus are not comparable.

Type, Source and Format of Data Provided:
I sought to understand how "data" is being defined and/or redefined by data intermediaries. For this reason, the only limitations placed on data were its geographic scale (described above) and its timeliness. The timeliness factor only surfaced when I was determining whether two of the sites identified in Sawicki and Craig's article should remain categorized as intermediaries.[73] I noticed that some of the web pages had not been updated for over a year, and also that the data provided was from 1990, and decided that these sites were not timely enough to be included in my study population.

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[70] The increased recognition of the linkages between regional equity and the prosperity of low-income communities, often termed "community-based regionalism," exemplified by the work of Manuel Pastor and others increases the utility of larger-scale data for community groups but does not diminish their need for small-scale area data.

[71] Seedco, 2002a. *The Evolving Role of Information Technology in Community Development Organizations*. NY, New York.

[72] Y. Chua and Sidney Wong, 1998. *Data intermediation and beyond: How the Web modifies the dissemination of GIS information*. Paper presented at the PPGIS conference.

[73] SUNY Buffalo's University Community Initiative's South University Neighborhood Profiles site (http://wings.buffalo.edu/uci/UCI/University_Community_Neighborhoods/Neighborhoods_main.htm) and the University of Minnesota Map Library.

Findings

Demographics. I found 30 examples of data intermediaries located in 25 U.S. cities or metropolitan areas (see Table 4, below). Three cities—Atlanta, Chicago and Philadelphia—are each served by two intermediaries, and Cleveland contains three intermediaries. The two intermediaries in Philadelphia focus on different geographical areas of the city, with West Philly Data concentrating on the poorer western portion of the city and Philadelphia NIS providing data citywide. One intermediary —UCLA's Advanced Policy Institute—maintains three separate online NISs for three target audiences: Los Angeles County, the state of California, and the disabled population in Los Angeles County. From the information available through their websites, I found that most data intermediaries began their work between 1992 and 2002.

Institutional configuration. Many of the intermediaries are projects or spin-offs of foundations or larger nonprofit organizations (23 of the 30). For example, the Social Assets and Vulnerabilities Indicators (SAVI) intermediary is a project of the United Way Community Service Council and the Polis Center at Indiana University. INFoOakland, the data intermediary I profile in the following section, is the spin-off of Urban Strategies Council, an Oakland-based community-building intermediary.

Two-thirds of the data intermediaries are involved in some form of a collaborative. Almost all of the collaboratives include universities as partners, and many of those that are not involved in collaboratives are housed in academic departments or university research institutes. These results corroborate the findings of other researchers that university-community collaboratives are important institutional forms for information technology initiatives in low-income communities.[74] Universities are often important sources of technical expertise with regard to data maintenance and protocols, and can lend data intermediaries legitimacy and credibility.[75] Other institutional partners are government agencies, businesses and nonprofit organizations, including other intermediaries. Private sector collaborations appear are relatively rare and only occur when collaborations are extensive and include many partner organizations. Examples include the Providence Plan and the Baltimore Neighborhood Indicators Alliance.

Data intermediaries vary based on the strength of their linkages to specific community-building or community planning initiatives. The

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[74] Seedco. 2002b.

[75] Interviews, Junious Williams and Heather Hood, Director of the Community Partnerships Office at UC Berkeley, March 2004.

majority seem (from this analysis) to be fairly removed from action-oriented activities and give the impression of being unbiased technical assistance providers. Some of the University-community collaborative projects seem to be more heavily involved in supporting particular neighborhoods and working directly with residents.

Sources of funding. Private foundations are the most cited source of funding for data intermediaries.[76] About a third receive funding from the "Making Connections" neighborhood initiative of the Annie E. Casey Foundation. Additional or alternative funding sources included the federal government, including HUD grants, other government sources and fees-for-services. Five of the intermediaries—UCLA's Advanced Policy Institute, SAVI, Minneapolis NIS, Providence Plan and the Greater New Orleans Community Data Center—were awarded Technology Opportunities Program (TOP) grants, which are large, competitive federal grants offered annually by the Department of Commerce's Telecommunications and Information Administration.

Target audience. The target audience of data intermediaries was often not clear from their website descriptions. Some focus on serving community organizations, but their explanations of community organizations varies: some say nonprofits, others say community-based organizations or neighborhood groups. Many seek to serve a range of users, including organizational users and individuals.

Spatial aims. The spatial range considered by a data intermediary is generally bounded by city boundaries or regional borders. Over half provide data on geographies at the level of the region or larger, although sometimes (as in the case of the Greater New Orleans Community Data Center) data is provided at a coarser scale for areas located outside the central city, such as the place-level instead of the census tract-level. The great majority of the rest provide data for the central city, although a few provide only neighborhood or community-level data. Rutgers Community Outreach Partnership Center, for example, provides data exclusively for the West Side Park Community in Newark, New Jersey: a 120 square-mile area containing approximately 150,000 residents.

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[76] The amount of funding was generally not available on the intermediary websites.

Table 4.
The Universe of Data Intermediaries

Name of Data Intermediary / NIS	Area Served
1. Atlanta Census 2000	Atlanta, GA
2. Data and Policy Analysis Center (DAPA)	Atlanta, GA
3. Baltimore Neighborhood Indicators Alliance	Baltimore, MD
4. CAMConnect	Camden, NJ
5. Southeast Tennessee Information Service	Chattanooga, TN
6. Center for Neighborhood Technology / Neighborhood Early Warning System	Chicago, IL
7. Center on Urban Poverty and Social Change / Cleveland Area Network for Data Organizing (CAN DO)	Cleveland, OH
8. Northern Ohio Data and Information Service (NODIS)	Cleveland, OH
9. Cleve Info	Cleveland, OH
10. The Piton Foundation	Denver, CO
11. Human Services Planning Alliance	Des Moines, IA
12. East St. Louis Action Research Project / East St. Louis Geographic Information Retrieval System (EGRETS)	East St. Louis, IL
13. Community Research Institute	Grand Rapids, MI
14. United Way Community Service Council / Social Assets and Vulnerabilities Indicators (SAVI)	Indianapolis, IN
15a. UCLA Advanced Policy Institute / Neighborhood Knowledge LA	Los Angeles, CA
15b. UCLA Advanced Policy Institute / Living Independently Los Angeles	Los Angeles, CA
15c. UCLA Advanced Policy Institute / Neighborhood Knowledge CA	California
16. Community Resource Network Data Center	Louisville, KY
17. Nonprofit Center of Milwaukee / Neighborhood Data Center	Milwaukee, WI
18. Minneapolis Neighborhood Information System	Minneapolis, MN
19. DataHaven	New Haven Metro
20. Greater New Orleans Community Data Center	New Orleans, LA
21. Community Studies of New York / Infoshare Community Information Service	New York, NY
22. New York Public Interest Research Group / Community Mapping Assistance Project (CMAP)	New York, NY
23. Rutgers Community Outreach Partnership Center	Newark, NJ
24. INFoOakland / Oaktown Datahouse	Oakland, CA
25. Urban Data Center	Phoenix, AZ
26. Philadelphia Neighborhood Information System	Philadelphia, PA
27. West Philly Data & Information Resources	Philadelphia, PA
28. Providence Plan	Providence, RI
29. Richmond Neighborhood Indicators Project	Richmond, VA
30. DC Agenda / Center for Neighborhood Information Services (NIS)	Washington, DC

Data provision services. All but three intermediaries provide data resources through an online NIS. Two of the intermediaries that do not maintain an online NIS—CMAP in New York City and the Urban Data Center in Phoenix—operate exclusively on a fees-for-services model, charging for their data and maps and providing more targeted analyses. One intermediary, INFOSHARE in New York City, charges organizational users for the use of its NIS but provides free access to individual users. Two other intermediaries—the Nonprofit Data Center of Milwaukee and the Northern Ohio Data and Information Service (NODIS) in Cleveland—provide some data and maps online but provide additional data and data analysis on a fee-for-service basis. Four of the intermediaries—Baltimore Neighborhood Indicators Alliance, Greater New Orleans Community Data Center, Southeast Tennessee Information Service and DC Agenda's Center for Neighborhood Information Services—offer free customized data analysis and mapping upon request in addition to their online data. Most of these organizations provide online "information request forms" to enable users to access these customized services. A few intermediaries have a membership structure and offered additional services to their members.

Auxiliary programs. Over half of the data intermediaries provide some form of training in how to use the online NIS. 13 intermediaries have created online tutorials, and 8 provide in-person trainings. About a third of intermediaries described themselves as providing training on how to analyze and apply data to social change work. A few data intermediaries are working on a digital divide agenda to increase access to internet technology.

Forms of data. The most frequently presented data are demographic, housing, income and education data. Other available data relate to health/vital statistics, crime and safety, lending, community assets, environment/land use and civic participation (measured by voting statistics). A few of the intermediaries focus on providing parcel-level data on housing conditions to create "early warning systems" of neighborhood decline and disinvestments. A third of the intermediaries provided "Neighborhood Profiles" that include different types of data ranging from maps of neighborhood boundaries and demographic information to narrative histories and descriptions of important individuals from the neighborhood. Many of the sites also provide links to additional data resources.

The most common data sources are the 2000 and 1990 U.S. censuses. However, there is wide variation in the range of data sources made available by individual data intermediaries: some focus exclusively on repackaging Census data that are readily available, and others develop

extensive data-sharing relationships with administrative agencies and large nonprofit data collectors so as to obtain and make "new" data publicly available. The Philadelphia Neighborhood Information System, for example, lists seven government departments as data providers in addition to the Census Bureau. A number of the NNIP partner intermediaries use NNIP's "Neighborhood Change Database" which contains nationwide census data at the tract level with consistently defined tract boundaries and variables across the four censuses from 1970 through 2000.

Only a handful of data intermediaries collect data themselves or assist communities in collecting their own data. One unique project is Philadelphia NIS's "MuralBase" Project, which maps and catalogues many of the city's 2500 murals, including profiles of the artists. Another unique project is Neighborhood Knowledge Los Angeles's "I am LA" project, which allows users to upload their own data to the site. Neighborhood Knowledge California (NKCA) provides a similar function statewide, and plans are in the works for a nationwide system. Some of the sites—Philly West Data and the East St. Louis Action Research Project, for example—use the online neighborhood information system as means of returning the research to the community, placing dissertation abstracts, reports from urban planning courses and other academic research on the site for community users to access.

The data is generally repackaged in the forms of tables, maps, charts or graphs. Many sites enable users to select the format of data they would like to use. Data is usually available in tabular form, maps, or both. A third of the sites provide both formats. A number of sites enable users to download data into spreadsheet programs such as Excel so they can manipulate and format the data as they like.

Sites that provide maps can provide static maps, dynamic mapping (Internet-GIS) or both forms. Static maps are those whose features, attributes and scale are preselected by the data intermediary. These are the most common form of maps available. Dynamic mapping enables the user to explore different attributes and the ways in which they are distributed spatially. A third of the intermediaries provide dynamic mapping or Internet-GIS. Making Internet-GIS available online enables the data intermediary to provide mapping technology (GIS) to its users for free. All but two of the data intermediaries that provide Internet-GIS also provide static maps.

Access for underserved populations. Five of the neighborhood information systems provided Spanish language translation: NKCA, NKLA, CamConnect in Camden, the Piton Foundation in Denver and the Providence Plan. The Living Independently Los Angeles site

provides information and maps for the disabled community in Los Angeles County.

How the Field Has Changed Since 1996

In the years since the first survey was taken of data intermediaries, the field has almost tripled in size, increasing from 11 to 30 institutions. In terms of institutional composition, there have been slight changes that seem to be fairly logical progressions. The 1996 survey found that intermediaries were generally housed in larger institutions that helped them financially and lent them credibility. The high proportion of intermediaries that are collaborations with universities and/or very large nonprofits like the United Way indicates that this still holds true. Another consistency is the wide range of types of institutional types involved in these efforts. The most noticeable institutional change is the extent and variety of collaborations and partnerships formed by data intermediaries. The high number of partnerships with city agencies suggests that one way of accessing data is through collaboration. As I will discuss in Section 3, partnership can be an essential strategy for data intermediaries, one that is seen to bring many benefits.

The main change since the 1996 survey is the adoption of new information technologies within the work of data intermediaries. This includes their reliance on the Internet as their primary implementation mechanism and their increased provision of Internet-GIS. The use of the Internet as a distribution and communication mechanism has broken down time-space barriers for data intermediaries and provides a flexible mechanism for reaching the "online" public, though the persistence of the Digital Divide remains a huge barrier for reaching a broad and inclusive public. The technological innovation of Internet-GIS makes it possible for data intermediaries to provide a more limited version of GIS technology to all community actors without investing in the hardware and software that would be required to install the technology within community organizations themselves.

These technological developments have not ensued without friction and disagreement among data intermediaries regarding the best way of accomplishing the democratization of data. According to Kathryn Pettit of NNIP, the issue of whether to provide static maps or Internet-GIS has been contentious among data intermediaries for this reason.[77] Dynamic mapping is a powerful analytical tool, but it is a more complex technology

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[77] Telephone interview, Kathryn Pettit, National Neighborhood Indicators Partnership, January 2003.

and if it is not designed to be user-friendly it could alienate some users.[78] As I mentioned above, the data intermediaries that do provide Internet-GIS tend to also provide static maps and tables. Thus, the trend appears to be toward greater options in data resources rather than a general shift to one type of resource.

In 1996, the type of work done by intermediaries ranged from providing raw data to giving policy advice, with some intermediaries providing the whole continuum of services. This statement continues to describe data intermediaries, but with the rise of the Internet and the development of online NISs, intermediaries that provide raw data and maps but not assistance with data analysis and policy development are more prevalent. Given the methods used to understand the activities of data intermediaries, more qualitative research based on a survey or interviews would be required to verify this shift in services.

Craig and Sawicki had found that data intermediaries differed according to whether their products were standardized or customized based on client needs. My analysis indicates that the interactive capabilities of the Internet as well as the rise of Internet-GIS create greater possibilities for customized analysis. Both technologies can enable users to customize their data analysis based on available attributes, geographies and scales of viewing. Internet-GIS provides many additional customization features, enabling users to create thematic maps, select various map features to highlight and layer on top of one another and query the database in various ways. The NKLA feature that enables users to upload their own data is another example of how the NIS can be customized by users.

The increased technological capabilities for customized analysis, however, might not be paralleled by increased *assistance* with customization. One aspect of "customization" is the technical assistance and expertise provided by the data intermediary in helping users craft a data analysis project that specifically suits their organizational needs. The original survey of data intermediaries had found that they had difficulty encouraging community groups to apply the data they supplied to policy analysis and policy research and that a "data dump" strategy did not aid community groups in this respect. The flip side of the increased opportunities for customized analysis enabled by the data intermediary could be that the online NIS becomes similar to a "data dump," leaving users with infinite options but without direction with respect to the strategic use of data.

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[78]   Chua and Wong, 1998.

The original survey of data intermediaries found that the organizations varied according to the level to which they sought to "empower" community groups to turn data into policy through training and education. My findings indicate that this variation in "empowerment" strategies still exists within the data intermediary population. In this content analysis, I was able to differentiate between trainings on how to use the online NIS (either in-person or tutorials) and trainings that emphasized the application of data to social change campaigns. I found that a minority of data intermediaries emphasize training users on how to apply data to social change activities, and that most do not offer customized assistance with such applications of their resources. More intermediaries emphasize training users on how to use their NIS.

Conclusion

This extensive analysis has provided insight into the general, population-level trends for data intermediaries. These organizations are clearly gaining sophistication, securing more data and integrating datasets as well as providing new data analysis technologies (Internet-GIS). They are developing extensive collaborative relationships with various public agencies and community-serving groups. On the whole, with the development of online NISs, data intermediaries appear to be moving toward a more hands-off way of providing assistance. Most data intermediaries do not appear to be connected to larger community-building initiatives, they tend to focus exclusively on providing information generally and do not tailor their sites to specific purposes or sectors of the community building field.

The website content analysis also points to some important sources of variation within the data intermediary population. Though there is a general trend toward collaboration, the mix and extent of these collaborations varies tremendously. The format of data provided by the intermediary (maps, tables, charts, etc.), and the mix of formats available on the Internet is another source of variation. Another distinguishing factor is whether the intermediary provides Internet-GIS.

In Section 1, I had singled out trust as a key "bridging" variable between data intermediaries and users (Figure 3). My findings from this extensive, population-level analysis do not provide much insight into the presence or absence of trust, or how data intermediaries perceive trust-building in relation to their work. This analysis also does not tell us much about how data intermediaries function, and what sorts of work is involved in producing an online NIS. In the following section, I will look more

closely at two intermediaries to examine how they go about doing the work of democratizing data. In particular, I investigate how trust, expertise and partnership relate to their organizing philosophy and the manner in which they translate their mission of democratizing data into the online NIS.

3. LEARNING FROM THE FIELD

In this section, I look closely at the practices and mechanisms by which data intermediaries democratize data through the Internet. Case studies of individual data intermediaries enable us to look "behind the screen" in order to understand the work that goes into creating online resources, the challenges and opportunities faces by data intermediaries, and the nature of the added-value they create.

As previously discussed, research on community building and community technology have shown that trust and relationships are key to enabling community actors to take advantage of new resources and technologies. Here I examine how two data intermediaries—INFoOakland and the Greater New Orleans Community Data Center—take trust-building and relationship-building into account as they do their work. I find that each organization considers trust-building to be an important element of practice; however, each goes about addressing the cultivation of trust in ways that resonate with its overall organizing logic.

After describing the methods I used to research this topic, I will briefly describe each of the two data intermediaries that I chose as case studies and outline the main differences between them. I then look at how the proximal constraints and opportunities I outlined in the conceptual framework in Section 1 relate to these cases. Having laid out the cases, I will then examine how each organization incorporates trust-building into its work.

Methods

Information contained in the following case studies was gathered primarily through semi-structured, in-person interviews with intermediary staff members; written organizational documents and the organization's websites supplemented interview data. I conducted interviews with Charlotte Cunliffe and Denice Warren of the Greater New Orleans Community Data Center in February 2003. Written materials for GNOCDC included the organization's 10-year work plan, a draft guiding document that details the reasoning behind many of its decisions concerning site design and the organization's August 2003 proposal for the Technology Opportunities Program grant. I conducted in person interviews with Eric Zhang, Junious Williams, Heather Hood and Jeremy Hays of INFoOakland in March and April 2004. Written materials for INFoOakland included meeting minutes, the organization's funding proposal to the California Community Technology Center and the organization's draft sustainability plan. INFoOakland interviews were

supplemented with participant observation. As previously mentioned, I worked on the design of the Oaktown Datahouse from September 2003 to February 2004, at which time I attended three of INFoOakland's organizational meetings and one training session on the use of the Datahouse.

Greater New Orleans Community Data Center (GNOCDC)

Founded in 1997, the mission of the Greater New Orleans Community Data Center is to "build the capacity of the local nonprofit community to find, evaluate, analyze and use data for grant writing, planning and advocacy."[79] The main product of the Data Center is its online neighborhood information system, which contains maps and tabular data for four geographies—neighborhood, district, city and parish (county)—along with explanations of data categories and articles on how and why to use neighborhood data. Figure 4, below, illustrates the map content of the NIS. In addition to maintaining and developing the online NIS, the Data Center provides free one-on-one technical assistance for specific data requests (for up to one hour of work), engages in a dialogue with local funders about data use in the New Orleans nonprofit sector and works with other local capacity building organizations to create a system of resources for nonprofits. Training is not a large component of the Data Center's program but the Center does participate periodically in training workshops offered by another area technical assistance provider.

The impetus for creating the Data Center arose from a Tulane University project that involved mapping health variables in New Orleans.[80] While working on this mapping project, Charlotte Cunliffe, the Data Center's founder and current Director, looked for a means to disseminate these data to the broader community. With funding provided by the Baptist Community Ministries foundation, in 1997 Cunliffe began to research the situation of data use and mechanisms of information provision within the New Orleans nonprofit community. Through speaking to people working in New Orleans' nonprofit sector, she found that there were "silos of activity" in the form of data and indicator projects, but that there was not an integrated data system available to these groups. Moreover, she discovered that "data doesn't drive action" and that there was a "huge gap between expert use and the public." In addition, she saw a lack of (and need for) a common dialogue among funders, community groups and community members on the use of data in

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[79] GNOCDC website, 2003.

[80] Information on the historical development of the GNOCDC, unless otherwise noted, is from my interview with Charlotte Cunliffe, GNOCDC Director, February 2003.

community development work. At the same time that she recognized the absence of a data delivery network in New Orleans, she was influenced by the NNIP model information and community capacity building, which included data, technical assistance, social networks and technological networks.[81]

Figure 4.
Geographies and Maps Provided by
the Greater New Orleans Data Center

| Region | City | District | Neighborhood |

Cunliffe's original analysis of the situation of data use and data systems in New Orleans' nonprofit community led to the idea to design a neighborhood information system based on 2000 Census data as a demonstration platform. The core idea behind the creation of this system was that the design of data influences the ways in which people use it, thus the NIS design should be based on a conscious strategy with a friendly interface, a commitment to transparency regarding the selection of boundaries and data sources, and context like neighborhood snapshots that gives the data a "community voice."

After 5 years of planning and development work, the Data Center officially launched its online NIS in May of 2002. The organization operates under the fiscal sponsorship of the United Way of Greater New Orleans, which also provides the Data Center with office space and administrative infrastructure. GNOCDC has 5 full-time staff members including an information systems designer, and Internet database applications specialist, a web and data production manager, and a research

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[81]   Terri Bailey, 1997. *Building community capacity to use information: A framework.* National Neighborhood Indicators Partnership Report. Washington, D.C.: The Urban Institute.

and technical assistance manager. The Data Center operates on an annual budget of $.5 million. The organization became a NNIP Partner in 2002 and received a 3-year, $600,000 Technology Opportunities Program Grant in 2003. With this grant money, the Data Center will add a community asset mapping function on its NIS that uses dynamic GIS mapping.

INFoOakland

INFoOakland, the Information Networking Forum of Oakland, was founded in 2002 as a collaborative effort on the part of Oakland groups working for social justice to "promote equity and empowerment of residents and organizations in low-income neighborhoods and communities of color in Oakland and the region through increased access to good data, assistance in gathering and analyzing data, and collaboration in using data as a tool for organizing and positive social change."[82] INFoOakland's goals are to increase access to data for residents and groups, build the capacity of community organizations to use information technology and data, to reduce the Digital Divide, to engage the community in assessing neighborhood conditions and developing strategies for change, and to build its organizational infrastructure. INFoOakland's strategy includes expanding and improving the Oaktown Datahouse, (the organization's online NIS), providing access to and training in the use of IT resources, providing training and technical support on the use of use data and technology in social change, and building relationships in Oakland neighborhoods. The Datahouse contains data at the level of the census tract and the city. The site is based on dynamic mapping but also provides static tables on some indicators and ten ready-made thematic maps. Figure 5, below, illustrates the existing NIS interface design and the type of output one can obtain.

The historical development of INFoOakland is quite different from that of the Data Center. Whereas GNOCDC originated from an academic study, the idea for INFoOakland developed from two community technology projects of larger antipoverty initiatives in Oakland's low-income neighborhoods. Thus, the need for data resources in Oakland was perceived by organizations that were actively working in low-income neighborhoods as a practical concern. In late 2001, the Institute for Urban and Regional Development (IURD) at the University of California, Berkeley (UC Berkeley), was developing a neighborhood website for the Hewlett Foundation's Neighborhood Development Initiative in West Oakland. At the same time, Urban Strategies Council, was creating a data warehouse for the Annie E. Casey Foundation's Making Connections

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[82] INFoOakland, 2003. Draft Sustainability Plan.

Figure 5.
The Oaktown Datahouse Online NIS
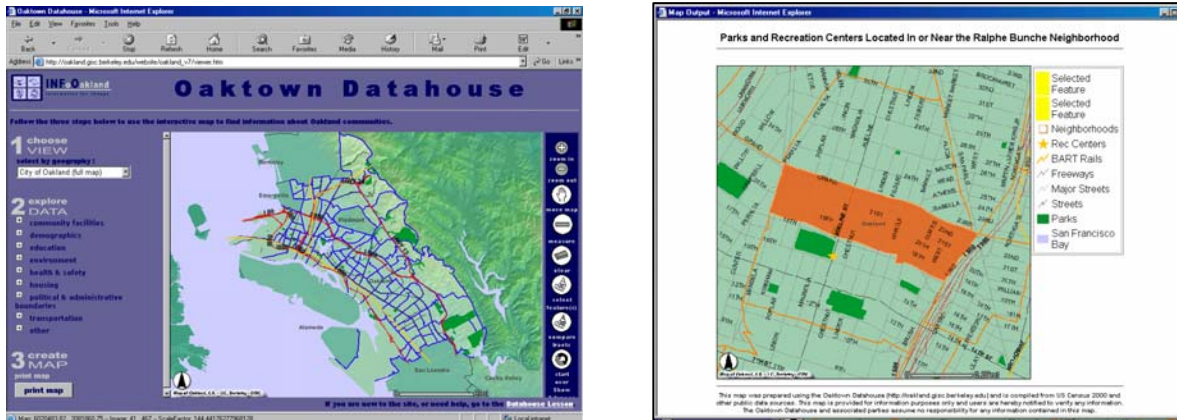
initiative in the Lower San Antonio neighborhood. In March 2002, a community organizing intermediary, the Movement Strategy Center, prompted the two groups to collaborate to develop a citywide data sharing resource that could benefit anyone working on community revitalization in the city. Nine other Bay Area organizations became partners in the new collaborative organization that called itself INFoOakland. IURD and Urban Strategies Council developed a prototype of the Oaktown Datahouse with technical support from the Geographic Information Science Center (GISC) at UC Berkeley. The initial funding pool for the project was extremely limited, and pieced together from the two foundation initiatives. During the entire period of initial site planning and development and organizational formation, not a single person was being paid to work full-time or even half-time on the project. I emphasize this fact not to imply that this is at all atypical for nonprofit start-ups, but because it is a major contrast to the site and organizational development process just described for the New Orleans group.

Given INFoOakland's resource constraints, the group has struggled to simultaneously improve the design of the NIS, obtain additional data, apply for grants, train users, maintain active partnerships in the collaborative and promote its agenda for using data and information to effect positive community change. To train users and get feedback on how it was working for users, staff at the Urban Strategies Center developed training modules and held training sessions with community organization staff in 2002. In the Fall of 2002, INFoOakland began to redesign the site with the goal of creating a more user-friendly interface. The site redesign is ongoing and INFoOakland expects to publicly launch a new and

improved site in 2004. In 2003, the collaborative underwent a sustainability planning process and developed a 3-year plan. In early 2004, the organization received a $50,000 grant from the Community Technology Foundation of California. With this grant, INFoOakland was able to hire its first paid staff member. The organization remains a collaborative and is currently developing its membership structure. The Urban Strategies Council serves as the fiscal sponsor for INFoOakland and provides office space and administrative infrastructure for the group. The Datahouse remains housed at the GISC.

Comparing the Cases

As should be evident based on these summary descriptions of each organization, the GNOCDC and INFoOakland diverge greatly in terms of institutional form and size, origins, type of technology used, and available funding resources. Table 5, below, provides a summary of the key dimensions of difference between each group. Each of these differences relates in some way to the organizing logic that underpins each group. This organizing logic might be seen as composed of three interrelated areas: the group's perspective on how to democratize data, in other words its principles and mission; the group's internal resources; and the group's ability to mobilize external resources. INFoOakland's organizing logic is based on the notion of partnership and networking; whereas GNOCDC's organizing logic is based on strategic planning and design.

The two groups differ greatly in terms of organizational structure. INFoOakland's structure is dispersed, both in terms of the location of its core workers at Urban Strategies Council and the online NIS at the GISC as well as its structure as a membership organization. GNOCDC has a very centralized structure, with its core employees located in a single office and with high levels of interaction with the online NIS. The organizational structure also relates to the relationship of each organization with the technology and resource it maintains and promotes. INFoOakland's workers are more removed from the online NIS, not only physically but also in terms of its content and day-to-day management. GNOCDC places its online NIS at the center of its activities; it is both located in the organization's office and its employees have regular contact with the resource.

The origins of each group have affected the strategic vision of each organization and its perception of its target audience. INFoOakland grew out of community-building initiatives and is geared toward community development/community organizing groups. GNOCDC, on the other hand, grew out of a health project that began at a university; thus its program

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was designed with social service providers in mind. What we see here is that although each organization technically serves the broad public through its online NIS and various technical support services, their resources and outreach are targeted to more specific "publics." The origins of each group have greatly influenced their understandings of who is "the community" and what are "community needs." As we see in the row describing the groups' target audience in Table 5, INFoOakland views organizations that are involved in community development and community organizing processes as its target community while GNOCDC perceives social services organizations as its target community. Organizational origins may also relate to the bridging variable of trust. INFoOakland's member groups have been active in the Oakland community for many years, whereas GNOCDC is a comparably "new" organization in the New Orleans community. Further analysis would be required to gauge the relationship between origins and trust; here I would simply highlight that the origins of each group can have a bearing on its place within the social infrastructure within the community it seeks to serve and that this place could have some bearing—positive or negative—on trust.

Table 5.
Key Dimensions of Difference Between Cases Analyzed

	Case Study	
	INFoOakland	**Greater New Orleans Community Data Center**
Institutional Structure	Dispersed Network	Centralized
Origin	Integrating IT in neighborhood development initiatives	University research project mapping health variables
Primary NIS Technology	Dynamic Mapping (Internet GIS)	Static Location Maps Linked to Tables
NIS Content	Thematic Maps, Tables	Tables, Location Maps, Narrative
Target Audiences	Community groups; funders; community residents	Nonprofit managers/ grantwriters; funders; community residents
	* Focus on community development	* Focus on human services
Funding	Minimal; insecure	Well-funded; secure

The differences that we see with each of these groups in relation to their NISs, both in terms of content and technological base, are influenced by each group's perspective on democratizing data as well as their internal and external resources. One important internal resource in relation to site design is employee knowledge and expertise. INFoOakland's site, as mentioned, was designed by the GISC at UC Berkeley, a technical institute that has a high level of expertise in GIS projects. The GNOCDC site, on the other hand, was designed by GNOCDC staff members whose expertise is in information design and the use of information in decision-making. The technologies used by each site reflect (in part) these differences in expertise. INFoOakland has chosen to provide Internet-GIS; GNOCDC has chosen to use static maps and tables.

One key point of difference between these two cases that is not represented in Table 5 is that the groups are at very different points in their historical development. GNOCDC, though a relatively "young" organization by conventional standards, is at an advanced stage in the design of its NIS and the implementation of its program. Its NIS is visited by approximately 4000 visitors per month and the Data Center receives about 15 requests for technical assistance per month.[83] The Oaktown Datahouse, on the other hand, remains a prototype: the site is completely functional but has not yet been publicly launched and promoted. Its goal is to reach 80 users per month.[84] In addition, GNOCDC has five full-time staff members, while INFoOakland has a single paid staff member. Clearly, comparing these cases requires taking into consideration the disparities in resources available to each organization. The essential resource for data intermediaries, one that is necessary but insufficient for any sort of organizational success, is access to regular funding. In the following section, I will look at funding as well as the other external constraint variables affecting data intermediaries in relation to these two cases.

Constraints and Opportunities

In the conceptual framework outlined in Section 1, I identified funding availability, political opportunities and local organizational culture of data use as three proximal constraints/opportunities for data intermediaries. Another factor that is both structural and proximal (I characterized it as a background influence in the conceptual framework) is the nature of the digital divide in the communities in which data

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[83] Interview, Denice Warren, February 2003.

[84] INFoOakland, 2003. Proposal to the Community Technology Foundation of California.

intermediaries seek to work. I will address each factor in relation to the case studies.

It is clear that the availability and security of funding has an enormous effect on the range of possibilities open to data intermediaries. INFoOakland, as I explained, was not able to fund its project until this year. This lack of funding severely limited its capacity to develop as an organization and to develop its online NIS. GNOCDC, on the other hand, has been well-funded from the beginning with start-up funding of $400,000. The organization has operated with a very long-term vision for the future based upon a Ten-Year Plan. As mentioned, GNOCDC spent five years planning and developing its online NIS. These cases validate the common sense assumption that there is a strong relationship between the availability and security of funding and the ability of data intermediaries to develop strategies and tools to carry out their vision.

Political opportunities relate to the ability of data intermediaries to access data that are held by government agencies and in some cases may also mean access to official planning processes. The stress placed on accessing new data sources varied between the two groups I studied. GNOCDC did not emphasize obtaining new data to the site. GNOCDC sees its value-added in repackaging data in more easily understandable formats. Access to data is not as relevant an issue for them. In contrast, obtaining new data sources was one of the driving factors behind INFoOakland's creation as a collaborative and one of the perceived benefits of collaboration.[85] They seek to obtain sources of data that are not freely available to the general public. Neither group was involved in institutionalized planning processes or had partnerships with government agencies.

The local organizational culture of data use is a third constraint/opportunity factor. Data intermediary staff view the lack of data use within the community development/nonprofit sector as a problem and/or an opportunity for them to provide their services. The cases I looked at blend supply- and demand-side approaches to this problem to varying degrees. GNOCDC takes a fairly firm supply-side approach whereas INFoOakland leans more heavily toward a demand-side approach. GNOCDC Director Charlotte Cunliffe explains that "it is a false assumption that access to data is the problem"; the problem is that "data does not drive action."[86] Their goal is to "mainstream data use." In the organization's TOP grant application, they explain that an evaluation of 74

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[85] Interview, Heather Hood, March 2004.

[86] Interview, Charlotte Cunliffe, February 2003.

grant proposals found that a third of the proposals "included no data to demonstrate need or justify program design." They perceive the barrier to data use as the design of the data itself. Information Designer Denice Warren explains: "people are sophisticated at knowing what they need and inserting our resources" into their strategies, thus "it is our job to meet people where they are and take advantage of their strengths."[87] INFoOakland similarly seeks to increase the use of data by community groups, though their approach retains less of a "systems" perspective than GNOCDC's approach. The organization's Coordinator, Jeremy Hays, explains that the goal is to increase the capacity of community groups to design policies and strategies based on data, but that "data is a megaphone," a tool that helps sharpen and supplement experiential knowledge.[88] They view data as something that can be strategically inserted into the campaigns and strategies of community groups. Visual representations of data, in particular, are viewed as helpful in building advocacy strategies. Each organization seeks to create more of a "culture" of data use within their respective communities, but their perspectives are different. GNOCDC sees the "system" in which nonprofit groups and funders work as irrational; they create user-friendly data resources to create a common platform of information that all actors within the system have the same basis of knowledge. INFoOakland is much more advocacy-oriented, viewing data as a tool and access to data as a right that has been denied community actors.

The fourth proximal constraint/opportunity for data intermediaries is the nature of the digital divide in the community in which they work. Both organizations focus on what I explained in Section 1 as the "organizational divide" or the lack of technical capacity and relevant content for organizational users. INFoOakland, however, also works on closing the digital divide in terms of technology training and access in low-income neighborhoods, and plans to develop neighborhood technology hubs in five pilot neighborhoods in Oakland.

Having examined each organization in relation to constraints and opportunities, I will now look at the ways in which trust-building and/or relationships are incorporated into each organization's approach.

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[87] Interview, Denice Warren, February 2003.

[88] Interview, April 2004.

Organizational Logics and Trust-Building: Two Forms of Practice

Despite sharing similar goals (democratizing data) and implementation tools (online NIS), the day-to-day programs and overall "organizational logic" followed by each data intermediary are quite different. The key insight that emerges from both cases, however, is that the cultivation of trust in the intermediary and in data is an important component of data intermediary practice. These data intermediaries take two approaches to building trust, and I will suggest that they provide two sorts of models by which data intermediaries shape information and information technologies in ways that make them useful for the individuals they seek to serve. The GNOCDC model I will describe as design-based; the INFoOakland model I will describe as partnership-based. These distinctions align somewhat with the supply-side and demand-side approaches to the use of data as described in the previous section.

GNOCDC's Design-Based Model. GNOCDC is an example of a design-based and supply-side model for data intermediaries. Its organizational logic is based on strategic design and strategic planning. Within this design-based model, they blend expertise in designing enduring and learner-centered online educational materials, MBA-style management and planning and a commitment to building trust between their users and data resources. They explicitly design their NIS with building and maintaining the user's trust in mind. They work in a community that is primarily African American, thus historic and current issues of race as well as data use in minority communities are key factors they consider in their organizational practices and in the design of their site.

An emphasis on information design, user-testing and iterative design. As previously explained, GNOCDC perceives its value-added as redesigning public data in ways that are more useful and useable by nonprofit groups. The organization spent a great deal of time designing its online NIS and continues to place great emphasis on iterative site design and maintenance. They consider the NIS a "living resource" that is constantly undergoing transformation.

GNOCDC is extremely deliberative in terms of site design and seek to design the site in a way that makes the user trust the site. They created a 25-page draft document that details the reasoning behind decisions made in relation to the site, including such topics as audience analysis, information architecture, geography and indicator selection, and

font choices. Every decision about the site is carefully considered in relation to both best practices of information design and knowledge of site users. Their practice for the original site design was to first research best practices and then conduct user testing.[89] The indicator that was used to evaluate site design during user testing was the number of clicks required to complete given tasks. GNOCDC's goal is to enable users to acquire the data they are looking for in 3 clicks. The idea here is that the site should be intuitive and user-friendly.

Now that the site is live, GNOCDC continues to monitor the use of the site through server statistics. Server statistics enable the organization to track how small changes in the site change user habits and thus continually adapt their site to user behaviors. This allows GNOCDC to continue to design the site in a way that reduces the amount of time required to obtain data from the site and steers users to additional useful resources. Paying close attention to server statistics also enables the organization to track whether or not its outreach activities effectively stimulate use of the site.

Designing learner-centered materials and learning opportunities. The attention placed on the design of the site is based on a constructivist learning model, the idea that "learners have questions and we design materials to allow them to learn."[90] GNOCDC recognizes that information is always designed and thus needs to be designed intentionally: "there is a myth of the neutrality of information…there is always an unintentional spin so you need to focus on intentionality."[91] Thus they believe that instructional materials that transmit complex information such as data need to be customized in order to meet learners where they are and enable them to answer their questions.

Aligned with their attention to learner habits, GNOCDC has sought to build into its NIS "just-in-time" learning moments, or "data interrupts," that catch users as they are perusing the sight and lead them to additional information about a certain topic. For example, presented with the demographics tables are hyperlinked leaders with titles such as "Are Census numbers accurate?" and "Race and Ethnicity in the Census." Such additional information might be useful to help users better understand and apply the data they obtain through the site.

Addressing race and data use. As data providers, GNOCDC has sought to address issues of racism within their work through staff

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[89]   Interview, Charlotte Cunliffe, February 2003.

[90]   Interview, Denice Warren, February 2003.

[91]   Interview, Denice Warren, February 2003.

training and through publishing resources on these issues. All GNOCDC staff attended an "Undoing Racism" workshop held by the Jim Dunn Center for Anti-Racist Community Organizing at the People's Institute for Survival and Beyond. In February 2003, the Center published (and sent out in its monthly email update) an article on the positive and negative uses of data in relation to the African American community. The organization is committed to anti-racism and believes that addressing issues of race is an important element of its strategy to build the trust required to democratize data.

Transparent site design and personal touches. GNOCDC has a commitment to making its site design as transparent as possible. Data sources are clearly described and they provide narrative descriptions of every data category, defining demographic terms clearly. The way in which neighborhood boundaries were chosen is also explicitly laid out on the sight through. Another element of trust-building through site design is GNOCDC's attempts to personalize the site by including photos of each employee and descriptions of their backgrounds. They also seek to personalize their communications with users. The monthly email newsletters, for example, are signed with staff members' first names. The request for technical assistance is also crafted as a personal request to an employee, titled "Ask Allison."

INFoOakland's Partnership-Based Model. Whereas GNOCDC's organizational logic is centered on the design of its NIS, INFoOakland's organizational model is based on partnership and developing relationships. The organization's collaborative structure is seen as a major source of strength in terms of sustainability, access to data and access to funding.[92] The partnership model, based on the idea of networking, is also one of the ways in which INFoOakland seeks to build trust in its Internet-based resources. Through word-of-mouth and conversations among colleagues, more people will be able to spread the word about the availability of the resource. For INFoOakland, the Internet resource it has created is underwritten by personal relationships and interactions.

It is important to keep in mind that INFoOakland is a less developed organization than GNOCDC, with a less-developed NIS, and therefore highly focused on organizational development. However, it is my impression based on my interviews with INFoOakland staff that partnership is not only a means to develop the organization but is a fundamental part of its strategy to democratize data.

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[92]   Interviews, Heather Hood, Junious Williams and Jeremy Hays, April 2004.

Institutionalizing partnerships as organizational infrastructure. INFoOakland, having recently hired its first full-time employee, is currently devoting much time to building its organizational infrastructure, and developing strong partnerships is the basis of this strategy. The structure of the organization is decentralized and participatory; in Table 5 above I referred to it as a "dispersed network." The organization since March of 2002 has convened meetings for interested community actors to be involved in planning both the redesign and expansion of the online NIS as well as planning the work of INFoOakland. In the fall of 2003, the organization went through a sustainability planning process. Involvement in these meetings, which have taken place on a monthly basis, has been voluntary, and the meetings have been open to any interested community actors.

For the past two years, the collaborative has had a very loose and open structure; with the hiring of a full-time Coordinator, INFoOakland is now working to more clearly define its organizational structure. The adoption of a membership structure will institutionalize the informal partnerships that have formed the basis of the organization. The membership and leadership structure is still being developed, but the basic elements are a classed membership structure open to both individuals and groups and dues based on a sliding scale. Members will have access to higher levels of service than will non-member users of the Datahouse, such as storage space and the ability to upload data to the site, and will be provided opportunities to be involved in determining the policy, goals and activities of INFoOakland through meetings and through email or Internet surveys. It is envisioned that a portion of members will be regularly involved in decision-making and that this group will meet regularly, every month or two. There will also be opportunities for participation that does not entail being involved in decision-making, such as periodic meetings (once or twice a year) that create spaces for networking and for sharing ideas about INFoOakland and the Datahouse. These opportunities for participation among INFo's membership will supplement the work of the Executive Committee, which is comprised of 6 to 8 members and is meant to be representative of the membership. This committee is envisioned to include public, private and nonprofit members, which will represent an expansion of the organization's nonprofit partner base to include government agencies and private corporations.

A network strategy of growth. INFoOakland's strategy to democratize data is based on the idea of "growing through networking."[93] Networking and relationship-building are key components of the

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[93] Interview, Jeremy Hays, April 2004.

development of the Datahouse and of INFoOakland as an organization. This idea of networking links organizational development to the democratization of data: through involvement in the collaborative, members establish the personal relationships and develop trust in data and in the data resources provided by INFoOakland.

As a collaborative, INFoOakland has been built on the foundations of existing social networks and relationships. Meetings have been open to any interested parties, but in practice, the organizations that are partners in the collaborative were previously connected the each other and Urban Strategies Council in various ways. Recognizing the organizational power that comes through developing strong relationships, INFoOakland's outreach strategies, both to build its membership base and to increase the use of the Datahouse, are also based on the idea of networking. The collaborative structure of the organization and the strategy of networking are seen as ways to build the trust necessary to increase the use of data among community actors.

Making connections between people and Internet resources. The strategies of networking and partnership, of developing trust through developing relationships, are echoed in INFoOakland's approach to connecting people to the online resource it offers. The organization focuses on making connections between users and its site through training activities and through personal connections. The organization considers training community actors in how to apply data to their work one of its essential activities. During the startup phase, the organization has developed training modules and held training sessions for potential site users. These trainings were primarily on how to navigate and use the Datahouse and secondarily on how to apply data to community organizing and development campaigns. As the Coordinator explains, the organization aspires to design its online NIS in such a way that it does not require training and would like to focus on training users on how to apply data resources to their work.[94]

What seems to be the more broad-based strategy to increasing the use of the Datahouse is the idea of promoting its utility through personal connections and conversations between INFoOakland staff and potential users and among INFoOakland members. The identity of INFoOakland as a collaborative of organizations that are heavily involved in community development that is under the sponsorship of Urban Strategies Council, a community-building intermediary, gives its non-technical staff a strong sense of the real and potential data needs of the target audience it seeks to

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[94]   Ibid.

serve. The partnership structure of the organization provides avenues for interaction and knowledge exchange between INFoOakland staff/members and the target audience of the organization.

Conclusion

The case studies of the Greater New Orleans Community Data Center and of INFoOakland illustrate the wide variation possible within the population of data intermediaries. Despite their similar goals of democratizing data, their similar manner of providing data resources, and their attention to the bridging variable of trust that I had previously identified as key to "democratizing data," their approaches are quite different. GNOCDC takes a more supply-side, strategic planning perspective toward democratizing data whereas INFoOakland takes a more demand-side, community-based perspective on democratizing data.

I have conceptualized their differing approaches in terms of "organizational logics," suggesting that the differences are related to principles and mission, or the organization's perspective on democratizing data, and the internal and external resources available to the organization. I then suggested that their approaches might be understood in terms of two "models" of bringing online data resources to the agents of change working in low-income and resource-poor communities. These models are not meant to describe the full breadth of practice within each organization, but they are meant to capture the general approach taken by each data intermediary. I consider GNOCDC's model of democratizing data design-based and INFoOakland's model of democratizing data partnership-based. Within each model, building trust is an essential aspect of democratizing data. The design-based model, which aligns with GNOCDC's supply-side, strategic planning perspective, seeks to build trust into the online NIS. The partnership-based model, which similarly aligns with INFoOakland's demand-side, community building perspective, seeks to build trust through the horizontal expansion of its organization.

4. CONCLUSION: DATA, TRUST, AND THE SOCIAL CONSTRUCTION OF NEIGHBORHOOD INFORMATION SYSTEMS

The purpose of this study was to analyze the ways in which the "movement" to democratize data has changed and developed in the decade since it was first documented by Craig and Sawicki in 1996. I was particularly interested in investigating how the Internet and other information technologies has affected this movement in light of the multiple contradictions and tensions embedded in the use of the Internet, data, maps and mapping technology such as GIS as tools for community capacity building. Based on previous studies of the data intermediaries, community building initiatives and community technology initiatives, I hypothesized that trust was an important bridging factor between data intermediaries, the online NIS resources they provide and the community actors they seek to reach.

To better understand the work of data intermediaries, I broke down their primary goal, democratizing data, into its three component sub-concepts: access to data, use of data and the use of information to build community capacity. I explained how efforts to democratize data fit under the agendas of community capacity building and community technology and how data intermediaries primarily seek to address the "organizational divide" between IT resources and community groups. I suggested a number of background influences that impact the field of data intermediaries. These background conditions include: the rise of community organizations in governance, increased demand for and supply of data, the existence of the digital and organizational divides, the increased use of GIS in public sector planning, the development of new agendas such as public participation GIS, legal victories regarding public rights to information and data and the perspectives of community actors toward data and data intermediaries.

In the context of these developments, the population of data intermediaries has tripled in the past eight years, and has increased from 11 organizations to 30. Data intermediaries have become more sophisticated, securing and assembling new datasets and providing new data analysis technologies including Internet-GIS, which provides some of the analytical and visual power of GIS mapping technology to the public via the Internet at no cost. They are developing extensive collaborative relationships with various public agencies and community-serving groups. However, it seems that the increased technological developments of these sites have not necessarily coincided with activities geared toward enabling community actors to apply data to their community building activities.

Only a fifth of data intermediaries provide customized technical assistance with data analysis, and only a third provide training and educational assistance. On the whole, with the development of online NISs, data intermediaries appear to be moving toward a more hands-off way of providing assistance. This trend would seemingly conflict with the understandings of good practice derived from studies of the use of data and technology in community capacity building, which point to the need for human relationships and direct assistance in building the capacity of community actors to use data resources in their activities.

The case studies of INFoOakland and the Greater New Orleans Community Data Center, which I detail in Section 3, shed light on the actual practices of data intermediaries: the ways in which they go about democratizing data, as well as the place of trust and relationship-building in their work. INFoOakland, though extremely resource-constrained, has crafted an approach to democratizing data that is based on partnership and networking efforts that are based within the community it seeks to serve. The organization grew out of community-building efforts, has collaboratively determined its mission and approach, and is in the process of institutionalizing an organizational structure based on participation and membership. INFoOakland's partnership-based model of democratizing data provides the organization with benefits at many levels. One key benefit is the development of trust and relationships, which form the social infrastructure that coincides with the Internet infrastructure provided by the online NIS.

GNOCDC, on the other hand, has been comparatively resource-rich and has developed an approach to democratizing data that is based on expertise in informational design and strategic planning. The organization is highly centralized, and while it occasionally partners with other organizations, the organization's perspective on partnership would appear to be more instrumental than essential to its identity and approach to democratizing data. The primary focus of GNOCDC is on designing user-friendly data resources and providing online educational resources that help its users clearly understand the resource it provides. The organization's design-based approach is based on the idea of developing and maintaining the trust of the users. GNOCDC sees relations of trust forming between the user and the NIS and thus builds trust into site design by making its site as intuitive as possible.

These case studies illustrate that trust-building is perceived by data intermediaries as an important component of their work in the context of their increasing reliance on the Internet as a means of democratizing data. The comparative analysis of these cases draws out the different ways in which each intermediary finds ways to build trust that fit with their overall

approach and capabilities. The case of INFoOakland shows how the online, virtual resource it provides is highly linked to the real relationships that are created and sustained by the organization through partnership, networking, outreach and training. Essentially, being present within the community it seeks to serve lends the organization credibility and knowledge. The case of GNOCDC indicates that the Internet is creating new spaces for interaction and that trust is a variable that affects both human-human interactions and human-computer interactions. The organization's expertise in designing user-friendly Internet resources and in developing ways of monitoring and understanding the use of its NIS indicates the ways in which new technologies can be reshaped in ways that benefit populations that would otherwise be marginalized from the technology.

The findings of this study provide substance to the claim that the adoption of new technology is a social process. The Internet is shaping the work of data intermediaries, but data intermediaries are also shaping the Internet. In her famous "cyborg manifesto," feminist theorist Donna Haraway claimed that we have a responsibility to engage with new technologies to ensure that they do not reinforce unequal relations of power or perpetuate social injustices.[95] Data intermediaries play a key role in this engagement, recreating data technologies and Internet technology in ways that make information technologies into community technologies.

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[95] Donna Haraway, 1985. A Manifesto for cyborgs: Science, technology, and socialist feminism in the 1980s. *Socialist Review* 15(2): 65-101.

APPENDICES

Appendix A: Website Content Analysis Instrument

Demographic Information:

1)   What is the name of the data intermediary?

2)   What is the name of the Neighborhood Information System (if different than intermediary name)?

3)   Is the intermediary a part of a larger organization/program?

4)   What is the Internet address?

5)   Where is the office of the organization located?

6)   What year did the organization begin?

7)   When did the online NIS begin?

Institutional Structure and Funding:

8)   What is the institutional configuration of the data intermediary? (e.g. University/nonprofit collaborative)

9)   What are the funding sources of the intermediary?

    a) Is the intermediary an Annie E. Casey Foundation grantee?

10)   Is the intermediary a NNIP partner?

Program Information: Mission, Spatial and Social Focus:

11)   What is the organization's mission? (copy statement)

12)   What is the geographical focus?

13)   What is the target population?

14)   How do we know this? (statement/quote):

Program Information: Mechanisms:

15)   What is the mode of data provision? (medium and fees)

16)   Does the intermediary provide training?

    a) If yes, what is the aim of training?

    b) If yes, how is the training provided?

17)   Does the intermediary seek to provide greater access to technology?

     a) If yes, through what means?

18)   Does the intermediary seek to create or track community indicators?

19)   Does the intermediary provide neighborhood profiles?

20)   Does the intermediary provide other programs?

     a) If yes, what are these programs?

Program Information: Forms of Data and Information:

21)   What type of data is provided? (housing, demographics, income/poverty, employment, education, crime, community organizations/assets, health/vital statistics, vacant land, investment patterns)

22)   For which geographical levels are data provided? (tract, neighborhood, city, county, region, zip code, other)

23)   What are the sources of data?

24)   Does the intermediary provide downloadable data?

25)   In what format is the data provided? (tables, charts, maps, etc.)

Program Information: Serving User Needs:

26)   Does the intermediary ask for user input? Via what means?

27)   Does the intermediary provide services for non-English speakers?

Appendix B: Interview Protocol for Data Intermediary

<u>Introduction to Research Project</u>

Introduce myself, my client, the professional report. Explain the purpose of the study (to research current strategies and best practices being employed by the developers of neighborhood information systems in the areas of outreach & site design, training, data procurement & government relations, funding & sustainability, and program evaluation & institutional learning).

<u>Individual Role</u>:

1. Could you explain your involvement with _____? How long have you worked at the organization and what are your primary responsibilities? What is your background in?

<u>Organizational Mission</u>:

2. What is your organization's mission? Can you tell me more about your organization's philosophy towards the use of internet & GIS technology by resource-poor communities?

<u>Role in Community Development</u>:

3. I am not familiar with community organizations in <u>name of city here</u>. What are the major issues being faced by low-income neighborhoods? (probes: Gentrification? Industrial decline? Commercial disinvestment? Lack of civic participation?) How would you describe your organization's role in the neighborhoods in which you work?

<u>Role as an Intermediary</u>:

4. There are two basic theories of technical assistance. One advocates that the organization become expert in technology to provide assistance to the community as they see fit, and the other argues that community members should decide which techniques they want to learn. What do you think is optimal? Why? What steps are you taking to move towards that situation? What are the barriers to reaching your goals?

<u>Institutional Structure & Networks</u>:

5. I read that your organization is composed of x, y, and z. Other organizations do things like a, b and c (provide a counter example). Do you feel like your organizational structure works well? How could it work better?

6. I am interested in the relationships between organizations working on neighborhood revitalization in _____. Do you partner with any other community organizations? In what ways?

<u>Programs</u>:

7. I have read the descriptive program materials that are available on the Internet, but I was hoping that you could tell me more about your organization's current programs. What is the geographic extent of your programs? What neighborhoods are you working in? What proportion of labor time and budget goes into each program area? Have your programs changed over time? If so, how and why?

<u>Outreach</u>:

8. Who is your target user or audience? What are the elements of your strategy to reach this audience? How do you gauge your success in doing so? Does your target audience use the resource? How might you improve their participation?

<u>Interface</u>:

9. How have you structured the data system to be user-friendly? Have you tested site usability by target groups (especially those who are not familiar with computer technology)?

10. What are the factors that influenced their decision to use a specific interface (funding levels, staff expertise with interface design, user input, etc.)?

<u>User Training</u>:

11. What types of training do you provide? How many sessions? Who has attended? What proportion of the budget and of staff time goes to training? What is the nature of the training (i.e. how extensive, how much follow up, short or long-term)? How has the training changed over time to reflect input from participants and knowledge gained from conducting the trainings? How are the trainings evaluated? What has been effective in teaching people how to analyze data and use it to affect policy outcomes?

<u>Local Political Context/Accessing Public Data</u>:

12. How cooperative have government sources been in helping you obtain data? What steps have you taken to cultivate relationships with government agencies that are also data providers? What have been the results? What do they think would help facilitate data sharing on the part of government agencies? What types of data have you been unsuccessful in obtaining?

<u>Privacy & Surveillance</u>:

13. How do you go about assuring the privacy of individuals when dealing with parcel-level and small area data? (i.e. what are the standards for aggregation techniques, etc.) Has the issue of privacy come up in your interactions with community members? If yes, how have you dealt with these issues?

<u>Sustainability & Financing</u>:

14. What have been your main sources of funding? Is your funding strategy sustainable? Why or why not?

<u>Evaluating Success</u>:

15. How have the projects influenced policy or changed the way planning and development occur in the neighborhood? (or some other outcome measure)

16. What would help build the capacity of CBOs to more effectively use data and GIS for revitalization initiatives?

Anything else you would like to tell me?

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