Knowledge Production and Use in Community-Based Organizations: Examining the Influence of Information Technologies

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Abstract

The dominant discourse about the adoption and diffusion of information technologies is surrounded by diverse and sometimes contentious debates regarding their capacity to ameliorate social and economic inequities. As academic debate continues, technology adoption and use by grassroots groups continues to grow rapidly. Although cyberutopians are quick to point to technology adoption by nontechnical users and community-based groups as an indicator of community empowerment, the linkages between technology use by grassroots groups and the overall development and empowerment of these communities remain tenuous. In this context the author addresses three major objectives in this article. First, a conceptual model that places information technology adoption and use within the context of organizational decisionmaking is presented. Second, data from case studies of advocacy organizations in two major U.S. cities, Boston and Chicago, are used to describe how and why community-based organizations (CBOs) use information technologies. Finally, it is argued that one of the most significant contributions of information technologies lies in their ability to assist CBOs in reframing problems to influence local and national policy decisions. The article concludes by arguing that CBOs that have developed the capacity to harness the benefits of information technologies while transcending both organizational and technical barriers associated with their adoption and use are more likely to be better advocates for their communities.

Amid diverse and sometimes contentious debates regarding their role, information technologies continue to spread rapidly in the developed and developing world. These technologies are characterized by their reliance on digital data, their capacity to create and sustain complex electronic networks, and their potential to serve as decision-support systems. In the context of the rapid proliferation of information technologies in the late

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1990s, this article examines the complex issues surrounding the use of information technologies by community-based organizations (CBOs). It reports on case studies of four grassroots groups in two large cities, Boston and Chicago. The study on which this article is based explored the complex relationships between information technologies and community-based decisionmaking processes. The study focused on three key points: (1) how information technologies were used in decisionmaking processes, (2) the role played by information technologies in facilitating/hindering participatory decisionmaking processes, and (3) the capacity of information technologies to support organizational leadership. This article further discusses themes arising from the research, including the ability of information technologies to support critical reflective practice in CBOs. Information technologies can play a prominent role in supporting critical reflective practice because of their capacity to integrate formal technical data with the everyday life experiences and concerns of citizens.

In this article information technologies refers to (1) text-based communications technologies that facilitate computer-mediated communication (for example, e-mail); (2) spatial technologies that facilitate the capture, storage, analysis, and retrieval of spatially referenced data (for example, geographic information systems [GIS]); and (3) display and presentation technologies that integrate online data/information transfer with other collaborative planning activities by linking text, graphics, multimedia, and other interactive features (for example, interactive mapping applications).

Framing the Study

Both academic and popular literature document the rapid proliferation of information technologies. Researchers and information technology advocates expect the use of information technologies (concepts and ensuing applications) to grow rapidly among individuals, organizations, and groups that are considered nontechnical users. Yet information about how CBOs use information technology is limited.

Since their emergence, information technologies have been surrounded by hype and hope. Enthusiasts like Naisbitt (1994) and the Tofflers (1995) have staked out a radical position, arguing that the smallest players are poised to become more powerful in the new information-based world economy. Naisbitt's (1994) "global paradox" posits that information technologies are a great leveler. He argues that simultaneous and almost instantaneous access to information will place people and communities with little or no formal power on a par with their more powerful counterparts within the rapidly expanding information economy. Understanding how decisions made by CBOs, which operate under relatively powerless circumstances, influence, challenge, or counteract established public policies and programs should provide the basis for challenging or endorsing Naisbitt's theory.

There are several reasons for exploring this topic. First, in many cities CBOs have largely assumed the responsibility for serving city residents who have limited incomes or special needs. These organizations carry out diverse tasks such as providing services and technical assistance as well as advocating for and educating this population subgroup. As researchers attempt to understand how information technologies transform spatial interactions in cities and how these changes affect different geographically or socially defined urban population subgroups, it may be beneficial to examine these themes in the institutional settings in which these interactions are most likely to occur.

Second, growing evidence suggests that many CBOs invest in these technologies to become more effective advocates for their clients and constituents (Ramasubramanian, 1995; Sieber, 1997). In addition, many users of information technologies believe that technology and data acquisition can increase individual and organizational effectiveness.

In addition, most research pertaining to the adoption and use of information technologies for decisionmaking has thus far focused on local governments, planning agencies, or private enterprises (see, for example, Kraemer et al., 1989; Huxhold, 1991; and Masser, Campbell, and Craglia, 1996). Research-based evidence regarding the adoption and use of information technologies at the neighborhood and community levels is only now beginning to emerge.

Relevance for Urban Policy

Information technologies seem to offer great potential for benefiting the public in the areas of education, health care, business, commerce, environmental management, and community. Recognizing this potential, corporations, governments, and nonprofit organizations have invested heavily in these technologies. For example, as early as 1995 the National Telecommunications and Information Administration of the U.S. Department of Commerce received approximately 1,800 proposals seeking funding to improve electronic telecommunications.[1] The large number of proposals is just one indicator of the value that the public, private, and nonprofit sectors place on these technologies.

At the same time, data and information managed and controlled by information technologies have become the centerpiece of what some characterize as a new civil rights debate. Powerful private interests use racial and economic demographics to locate customers and provide services. Yet, these technologies and the decisions made by using them will affect the lives of ordinary people, even those who are not directly involved in creating these technologies.

This article addresses the linkages between information technology use, community development organizations, and community power, raising larger social questions. For example, researchers have long argued that information is a key source of power. Will today's information-based society put sophisticated information technologies in the hands of citizens and community groups, thereby contributing to their self development and empowerment? Or will society restrict access to these technologies, further excluding ordinary people from decisionmaking spheres?

This article also attempts to further explain the complex social issues that affect the adoption and use of information technologies. It discusses the role of information technologies in developing and sustaining community control of data, information, and knowledge.[2] It should assist community advocates in making assessments about the appropriateness and usefulness of technology-based analyses for community-based planning and decisionmaking. Finally, this article is intended to contribute to the emerging debate on the appropriate domains of knowledge production and knowledge use.

Dominant Theories

This section reviews and critiques the major theoretical approaches that investigate the impacts of information technologies and presents conceptual links between information technology and community development.

Theories of Information Technologies

The diffusion of information technologies has been surrounded by diverse and sometimes contentious debates regarding their potential to ameliorate social and economic inequities. The major schools might be characterized as (1) the *true believers,* or *utopians,* (2) the *naysayers,* or *anti-utopians,* and (3) the *critical pragmatists.*

The true believers, proponents of the information technology paradigm, argue that emerging technologies are transforming the world in a positive way (Negroponte, 1995; Naisbitt, 1994). Negroponte's (1995) book *Being Digital,* which remained on the *New York Times* bestseller list for more than 6 weeks, offers an optimistic vision of the future transformed by the power of digital information. For example, he predicts that over the next few decades:

> Your phone will not ring indiscriminately; it will receive, sort, and perhaps respond to your incoming calls like a well-trained English butler. Mass media will be redefined by systems for transmitting and receiving personalized information and entertainment. Schools will become more like museums and playgrounds, enabling children to exchange ideas and socialize with other children from all over the world. (Negroponte, 1995)

The true believers eloquently point out that information technologies are already in place, influencing people's lives in myriad ways. They emphasize the inevitability of information technologies, arguing that people cannot avoid or work without them, because they are already entrenched in the everyday activities of business and government as well as in production, communication, and marketing processes.

The naysayers, for example, Stoll (1995) and Shenk (1997), in contrast, are wary of information technologies and are particularly skeptical of visionary views of powerful, yet benign, technologies. The title of Stoll's (1995) book *Silicon Snake Oil* seems to say it all. He comments, "The key ingredient of their silicon snake oil is a technocratic belief that computers and networks will make a better society. . . . I don't believe them. There are no simple technological solutions to social problems."

The power of both utopian and anti-utopian arguments is diminished by three factors. First, these arguments are weakened by their reliance on technological determinism (a unidirectional, causal relationship established between technological development and societal development). Second, both groups base many of their claims on anecdotal evidence or reliance on isolated examples, many of which have apparently been selected to support the author's point of view. Finally, both utopian and anti-utopian views tend to minimize the complexities of the processes of social change and therefore overestimate the potential social impact of technological innovation (Kling, 1997). However, both utopian and anti-utopian views make a significant contribution to help us understand the range of possible uses and abuses of information technologies.

At the same time, recent books, articles, and electronic Web sites and discussion forums reveal more pragmatic opinions. Pragmatists acknowledge the benefits of information technology while simultaneously drawing attention to different problems that lurk behind the benign façade of technological development. Pragmatists are typically less dramatic than utopians and anti-utopians in their views of technology-induced social change, which tend to range widely in scope and scale. Moreover, pragmatists are more likely to tie their work to specific scientific disciplines or domains of social thought.

Graham and Marvin (1996) suggest that pragmatists use the approach *social construction of technology,* or SCOT, to overcome the limitations of technological determinism:

> [SCOT] aims to identify, analyze, and explain causal relationships between social, institutional, and political factors and the development and applications of technologies. The purpose of research in the SCOT tradition is therefore to understand how technology and its uses are socially and politically "constructed" through complex processes of institutional and personal interaction, whereby different actors and agencies interplay over periods of time.

Some social theorists (Castells, 1996), geographers (Pickles, 1995), architects (Mitchell, 1995), urban planners (Graham and Marvin, 1996), and social activists (Sclove, 1995) track the impact of information technologies (individually or collectively) on one or more domains of social theory or practice. For example, Pickles (1995) discusses the social implications of GIS.[3] Pickles also addresses concerns such as the roles of these technologies in and their effects on existing geographic theories and practices. Wegener and Masser (1996) propose scenarios that present various alternative conceptualizations of the world in the year 2015, conceptualizations stemming from the various models of GIS technology diffusion and technology policies that were adopted in the 1990s. They present a so-called market scenario, for example, in which a highly commodified and powerful information sector severely diminishes the status and effectiveness of public planning. In an alternative scenario labeled the *beyond-GIS scenario,* the authors describe how information technologies can help democratize society and empower grassroots groups.

In early stages of the digital revolution, Rheingold (1993) documented the potential of computer-mediated communication to change people as individuals, as groups of individuals, and as a society. Rheingold suggests that the electronic communications network called the WELL (Whole Earth 'Lectronic Link), in which he participates, provides *social network capital* (the capacity to meet others with similar interests, the ready-made community), *knowledge capital* (the capacity to use the network to ask for help on a range of subjects from a gathered community with diverse experience and expertise), and *communion* (emotional support of a virtual community, whose members interact with one another primarily or solely through electronic communications).

Authors like Rheingold (1993) and Star (1995) distinguish themselves from the utopians in two ways. First, they give equal credence to utopian and anti-utopian views and urge the use of critical thinking, acknowledging their own ideological assumptions (such as a protechnology bias). Second, they provide an abundance of case study material that can be independently evaluated. In addition, they create linkages between real and virtual worlds, using familiar metaphors like home, neighborhood, and community. These metaphors provide those researchers who are studying and writing about these settings with ways to incorporate the virtual world into familiar concepts and evaluate the metaphors themselves. By stimulating an informed discussion, critical pragmatists extend the debate beyond conventional "either-or" dichotomies.

Critical pragmatists voice different levels of skepticism. Langdon Winner (1997) points out that some critics have labeled those advocating caution in evaluating the phenomena of information technology as *Luddites,[4]* or *antitechnologists.* Winner suggests the term *neo-Luddites,* or *pragmatists,* instead. He states, "They do not oppose technology per se; rather they present a collection of arguments about what good technologies would look like and how to cultivate the wisdom needed to choose them."

Critique of Information Technology Theory

Information technology literature extends along a continuum, with the extremes bounded by technological utopianism and anti-utopianism. Unfortunately, much of it veers toward technological determinism. The middle ground is covered by pragmatic realists. The ambiguity of the term *information technologies* and the lack of distinction among the many uses of the term are weaknesses that are immediately evident in these theoretical discussions. Information technologies are extremely diverse, being used to support a range of functions such as communication, information gathering, data analysis, marketing, simulations, and surveillance. Most of the information technology theory addresses only one of the capabilities of new information technologies: their capacity to facilitate almost instantaneous communication between individuals and groups. The theoretical

literature establishes a tenuous link between communication (whether it is through a bulletin board system where users post messages, within a chat room,[5] or through one-to-one or one-to-many electronic mail messages) and decision support, but this link is not well articulated.

Conceptual Linkages

The literature discussing the use of information technologies for decisionmaking is surprisingly limited at the theoretical level. Neither protechnology nor antitechnology theorists discuss the processes by which a set of new technologies is incorporated into the decisionmaking processes of individuals, organizations, or other entities. Even the pragmatists do not elaborate on the ability of information technologies to serve as decision-support systems. Gaining an understanding of the use of information technologies by CBOs therefore requires learning from the experiences of organizations that have previously attempted to adopt and use information technologies.

When this research was undertaken in the late 1990s, there was a surprising absence of research-based evidence that could shed light on the impact of adopting and using information technologies in the decisionmaking processes of CBOs. In addition, intellectual linkages between theories advocating the use of information technologies and theories advocating social change through community development did not exist.

Based on a review of the literature in four major domains—information technology theory, information technology practice, community development theory, and community development practice—a conceptual framework was developed to ground the research study. As expected, strong linkages were identified between theory and practice in the information technology literature. Strong linkages were also evident between theory and practice in the community development literature. However, there are some inherent tensions between technology advocates and community development advocates. Although the theorists in both camps share a common desire for social change, they disagree in many ways about what such a changed or transformed world would look like. For the techno-theorists, information technologies are an inevitable part of the future and are an intricate part of a transformed world. They tend to dismiss the popular "unscientific" perception that information technologies are merely tools and subscribe to a technologically deterministic view of the world (albeit in varying degrees). On the other hand, community development theorists strive to create economic and social progress while emphasizing community participation and initiative (Levine and Perkins, 1997).

Community development theorists emphasize social learning and, in some instances, advocate social mobilization as one of the logical outcomes of that learning. Furthermore, community development theories argue for the development of critical thinking and problem-solving capabilities among *all* citizens rather than a privileged few. Technological development is subsumed under human development and technology is generally considered a tool that can facilitate human development *if* used appropriately. In addition, some community development advocates have traditionally viewed computers and other sophisticated technologies as suspect, associating them with techno-rational methods of decisionmaking.

Although some authors such as Schön, Sanyal, and Mitchell (1999) are beginning to examine the potential role of information technologies to foster community development, they pay only cursory attention to the powerful mediating role of community-based institutions such as CBOs. Given the divergent philosophical values that underpin technology and community development theories, community development advocates abhor and resist the idea that some techno-elites can determine the future for all citizens, whereas

information technology advocates do not perceive a problem. Yet the rapid development and proliferation of information technologies in government and industry coupled with the explosion of data have challenged community development advocates to come to terms with the potential positive role that these technologies can play in their efforts to empower citizens.

The review identified points of convergence between and among the theories and practices of the four domains. These mediating factors served as a useful framework to investigate how information technologies were used and incorporated within the decisionmaking processes of the CBOs that were studied (exhibit 1).

Adoption and Use of Information Technologies. In discussing information technologies, both theoreticians and practitioners tend to be preoccupied with issues related to their adoption and diffusion. Although theorists are concerned about the eventual impact of information technologies on society irrespective of their world views, researchers concentrating on practice are more focused on the processes of adoption and diffusion. Although theoreticians tend to be concerned about the macrolevel factors (for example, the information economy) that influence adoption processes, researchers focusing on practice in a variety of organizational settings are concerned primarily with microlevel factors that influence adoption (such as the role played by technology advocates within an organization). The literature suggests that ordinary users, in contrast, are focused on *utilization,* or the usefulness of information technologies to accomplish their individual or organizational goals. In addition, users appear to be both interested in enhancing and willing to enhance their own awareness or understanding of these goals as they incorporate information technologies into their decisionmaking processes.

Exhibit 1

Emerging Conceptional Linkages Between Information Technology and Community-Based Organizations (CBOs)
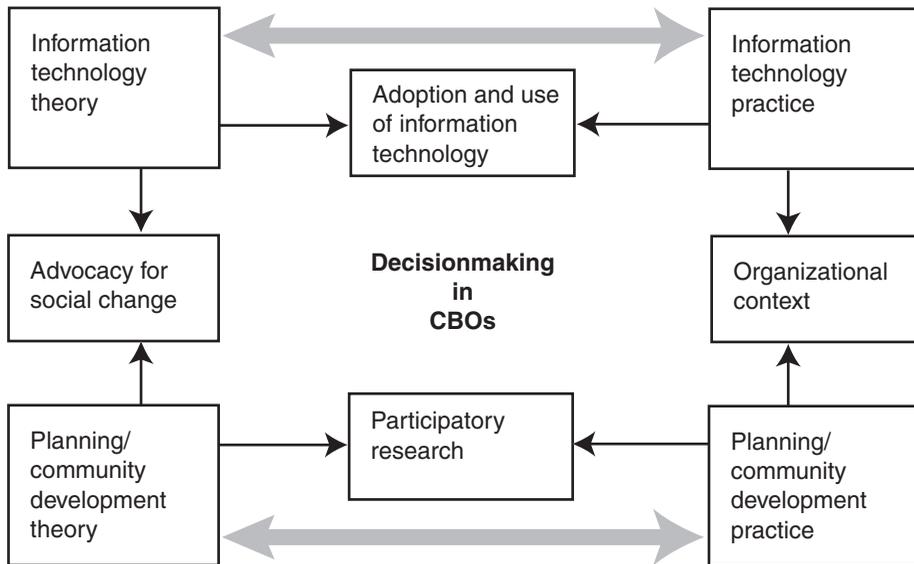
Participatory Research. Participatory research (a process that combines research, education, and action) (Hall, 1993) provides the conceptual and methodological link between community development theories and community development practice. Participatory research is instrumental in the development of critical knowledge, that is, knowledge that emerges from reflection and action and makes it possible for an organization to address questions that challenge the status quo, thereby becoming a catalyst to create social change (Park, 1993). This article examines how information technologies can support the goals of participatory research by facilitating organizationwide learning.

Institutional/Organizational Context. At first glance, community development practice and information technology practice seem to have little in common. Community development practice typically involves place-based strategies on a small geographic scale (such as a neighborhood or a group of neighborhoods) and is likely to occur in one or more dimensions of public life (for example, economic, social, or physical). For example, a case study of community development in the Dudley Street neighborhood in Boston (Medoff and Sklar, 1994) shows how citizens can come together to address quality-of-life issues ranging from performing basic community cleanups to creating new economic opportunities within their own neighborhood. Although they focused on many facets of development and gave human development a higher priority than physical redevelopment, their strategies were circumscribed within the neighborhood's physical boundaries. Information technology practice, however, typically involves user-oriented strategies in various institutional settings and without geographic limitations. Thus information technology in service of community development organizations takes on a unique character.

Information technology practice has been studied in specific types of organizations (for example, local governments) and has distinguished between types of users (for example, between technicians and middle managers). Presumably, studies of information technology adoption by decisionmakers in California's local governments can provide lessons for decisionmakers in Maine. Similarly, Dudley Street's development strategies are expected to provide some guidelines for community development organizations on the south side of Milwaukee. Many community development strategies are spearheaded by community-based institutions (for example, the creation of the Dudley Street Neighborhood Initiative to guide the development of the Dudley neighborhood). Therefore, this study focused its analysis on the CBO[6] to examine the dynamics of diffusion and its role in facilitating community development.

Advocacy for Social Change. Both information technology theorists and community development theorists are passionate advocates of social change. Within this conceptual link, however, information technology advocates are more likely to view the technologies themselves as agents of change, whereas advocates of community development are more likely to attribute social change to the decisionmakers who use new information technologies to make socially and politically conscious decisions. Electronic community networks and participatory GIS[7] demonstrate how community development organizations can use the benefits afforded by information technologies. This article, using case study evidence, provides additional insight to explain how information technology can enhance an organization's ability to be effective in its advocacy work.

Research Design

The research questions address three major themes: processes of information technology adoption and use, participatory decisionmaking, and leadership. Specifically:

1. How do CBOs use data and information to make decisions about shaping their physical or social environment? What role do information technologies play in (a)

defining or redefining problems that need resolution, (b) determining the action that should be taken, and (c) developing policies and programs?

2. How do information technologies facilitate or hinder the efforts of CBOs to create and sustain participatory and collaborative decisionmaking processes in their communities?

3. To what extent and under what conditions can the use of information technologies enable CBOs to assume a position of leadership regarding an issue or issues concerning the physical or social environment?

The first question examines adoption and use within a specific organizational and institutional context (CBOs), the second question examines the effects of information technology adoption on participatory decisionmaking in these organizations, and the third question examines the extent to which, and the conditions under which, information technology can enable leadership in CBOs. The research questions are organized hierarchically; the findings of the first provide the framework for examining the second, and the findings of the first and second guide the investigation of the third. Exhibit 2 graphically portrays the relationship between the conceptual framework described in exhibit 1 and the research questions.

Conceptual Assumptions

This study used the definitions and assumptions described below.

Information Technologies. Information technologies, as defined in this study, consist of (1) text-based communications technologies that facilitate computer-mediated communication; (2) spatial mapping and analysis technologies that facilitate the capture, storage, analysis, and retrieval of spatially referenced data; and (3) display and presentation technologies that integrate online data/information transfer with other collaborative planning activities by linking text, graphics, multimedia, and other interactive features. The term *information technologies* does not denote hardware and software alone but includes analyses that are generated using information technologies.

Decisionmaking Processes. Decisionmaking processes in CBOs were presumed to be similar to those described in the general organizational literature. Participatory decisionmaking is expected to occur when an organization (1) develops the capacity of the participants (stakeholders) to organize, analyze, and discuss concepts to the extent required by a particular endeavor; (2) develops a process to include participants in research and decisionmaking processes, such as formulating questions and selecting the research design and evaluation methods; and (3) returns research data to the participants.
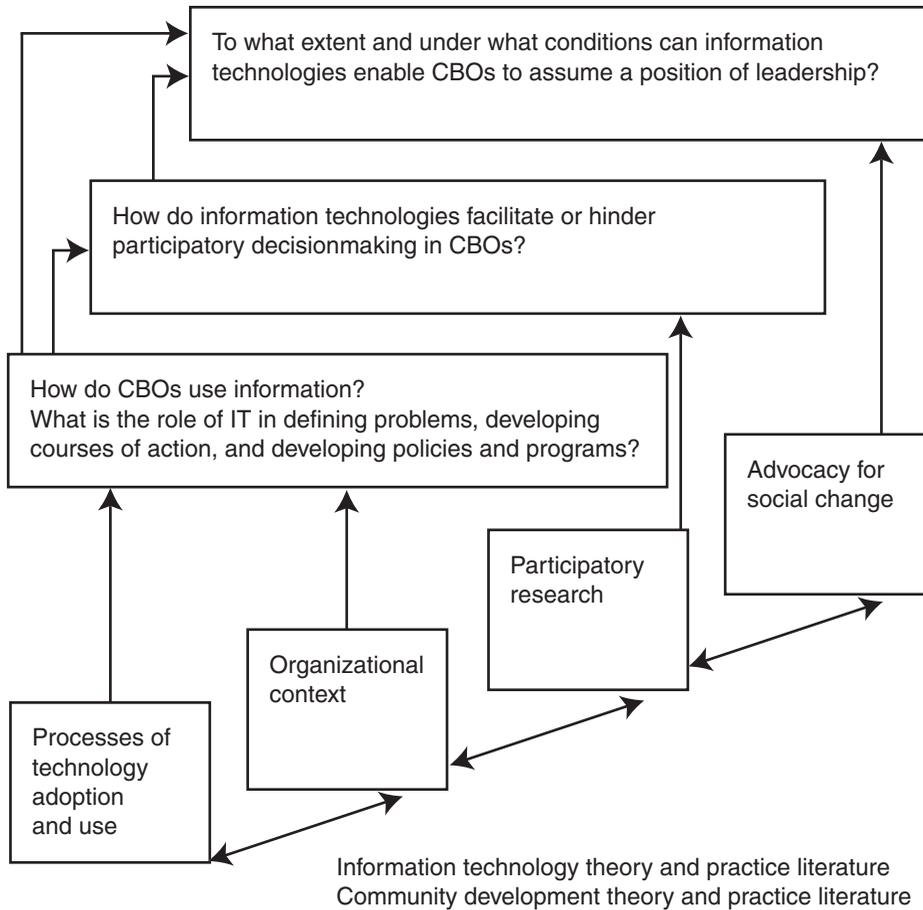
Adoption and Use of Information Technologies. This study considered only the adoption and use of information technologies in conjunction with the activities that directly serve the organization's mission. The use of information technologies was not considered relevant unless they were used in some manner to support particular aspects of that organization's stated mission.

Organizational Context. Information technology adoption and use were studied in the context of CBOs. CBOs are nonprofit, nongovernmental organizations that have a well-defined mission, address issues pertaining to the physical and social environments, and work within well-defined geographical boundaries.

Leadership. In this research, *organizational leadership* was defined as an organization's ability to integrate four interdependent forces: vision, knowledge, trust, and power.

Exhibit 2

Relationship of Conceptual Framework to Research Questions

To what extent and under what conditions can information technologies enable CBOs to assume a position of leadership?

How do information technologies facilitate or hinder participatory decisionmaking in CBOs?

How do CBOs use information?
What is the role of IT in defining problems, developing courses of action, and developing policies and programs?

Advocacy for social change

Participatory research

Organizational context

Processes of technology adoption and use

Information technology theory and practice literature
Community development theory and practice literature

Selection of Case Study Organizations

This research focused on the use of information technology in four community development organizations, two in Boston and two in Chicago. In this article the four case study organizations are identified by pseudonyms: (1) South End Community Organization (SECO), in Boston; (2) Boston Tenants Council (BTC); (3) Chicago Housing Corporation (CHC); and (4) Westside Community Development Corporation (WCDC), in Chicago. A detailed description of the organizational context, mission, technology infrastructure, and other salient features follows in the next section.

SECO and CHC made heavy use of information technologies and analyses in their day-to-day decisionmaking. The other two organizations, BTC and WCDC, tended to make less use of information technologies. However, the selected case study sites did not represent the extreme ends of a spectrum. Rather, they were aligned on a continuum of technology use.

The selection was made from a pool of community development corporations and CBOs identified through interviews with experts in the fields of community development and information technology. The pool consisted of organizations located in Boston or Chicago, cities with active community groups. The case study sites were comparable in terms of their advocacy missions and the kinds and scope of the services they provide. All case study sites made themselves accessible for open-ended interviews with staff and residents/tenants and facilitated onsite observations and participation in community meetings.

In Boston and Chicago experts in the field of community development and information technology, including university faculty, staff of governmental and nongovernmental agencies, and private foundation officials, nominated organizations for inclusion in the study pool and also provided references to additional experts. The final selection was made from a master list of 15 CBOs. Initial contact was made through a telephone conversation, which was followed with a letter explaining the project and the scope of the research.

Data Collection Methods

The study used the following primary data collection methods:

■ Onsite observations of general organizational processes as well as planning and decisionmaking processes.

■ Indepth interviews with key informants such as executive directors/chief operating officers, community organizers/planners, and technology consultants/managers.

■ Short conversational interviews with community residents, community leaders, and staff members administering individual programs at each case study site.

Additional data were gathered through:

■ Followup phone interviews with staff.

■ Archival research, which included content analyses of newspaper articles, research reports, case studies, press releases, and project briefs.

■ Focused interviews with experts, that is, information technology specialists and community development specialists in both cities.

In order to protect confidentiality, all interviewees with the exception of elected public officials are identified by pseudonyms.

Data Analysis

After the fieldwork was completed in November 1996, all available data for each case study site were collected and organized. The taped interviews were transcribed and verified. Preliminary coding was used to organize descriptive findings (see Yin, 1989). Descriptions of events and phenomena were documented in a holistic way that captured their complexity. Some of the codes included references to the use of data, the use of information technology-based analyses, organizations' activities, and technology and data infrastructure. Second-order explanatory coding was then undertaken to organize data on several hypotheses that were generated based on trends that emerged during the data-gathering phase. Two peer debriefers assisted in the refinement of hypotheses. One focused on the community development perspective, and the other focused on the information technology perspective. The hypotheses chosen for further investigation were analyzed across cases, and the initial hypotheses were further narrowed down using negative

case analysis, which ensured that the researcher's overarching explanations and interpretations of phenomena could account for a majority of observations that emerged from this study.

Descriptive data were presented in the form of matrices, and complex relationships were mapped in the form of schematic diagrams. Once the findings had been fully developed, they were recorded in the form of memorandums. To facilitate writing, brief outlines were developed using the memorandums as a guide. Promising comments from the interviews were flagged digitally and associated with a particular hypothesis.

A field journal was maintained. At the end of every day of fieldwork, extensive journal entries were made. During the process of analysis and writing, computerized journals were used to track decisions and observations (for example, reasons for rejecting certain hypotheses and comments of debriefers).

Special efforts were made to maximize the trustworthiness of the study, including prolonged engagement, use of a single interviewer, pilot testing of data collection methods, peer debriefing, and triangulation of methods and sources. Pilot testing of data collection methods also ensured dependability and credibility. Each phenomenon selected for detailed investigation was examined from multiple perspectives.

Case Study Sites and Organizations

Boston and Chicago are home to hundreds of CBOs that serve constituencies with diverse needs, concerns, and interests (King, 1981). However, both case study sites in each city operated within the same general geographic area; presumably, they were uniformly affected by the prevailing social, political, and economic environments.

Case Study Organizations in Chicago

Many architects and planners see Chicago as the quintessential American city. More than 3 million people consider this metropolis home. The Windy City is one of the nation's busiest transportation hubs and is the center of a booming service economy. With a vibrant downtown business and shopping district and an abundant array of cultural activities, Chicago is also a prominent international tourist destination. Chicago has always been considered a working-class city, with tensions existing between labor and management almost from the beginning of the city's growth. The shift from a manufacturing economy to a service-based economy has taken a toll on many of Chicago's neighborhoods (Wilson, 1996).

West Garfield Park and Uptown (the neighborhoods in which the case study sites were located) are considered transitional neighborhoods. West Garfield Park experienced flare-ups of race riots during the 1960s. Businesses that left then have not returned, and this neighborhood lost more than 50 percent of its population between 1970 and 1990. Uptown, originally an exclusive settlement, became home to people with limited resources coping with citywide housing shortages after the Second World War. In the 1970s statewide deinstitutionalization programs resettled many people with medical and mental problems in this area. Several older residential hotels were converted into halfway houses or sheltered-care facilities.

Chicago Housing Corporation (CHC). CHC has existed since 1985, when a small group of community residents, activists, and emergency shelter providers in Uptown organized to confront the destruction of dilapidated single-room-occupancy (SRO) housing in their neighborhood. The mission of CHC is to rehabilitate vacant and dilapidated SRO buildings or build them from the ground up. It then manages them as high-quality,

affordable housing. CHC advocates the provision of supportive housing, also called blended management, as a means of combating the problem of homelessness.

CHC offers its tenants several onsite support services such as preventive health care, counseling, treatment programs to address substance abuse problems, and life skills training. In addition, CHC provides them with a safe, clean place to live. The organization advocates for permanent supportive housing as a comprehensive and cost-effective solution to end homelessness. CHC points out that it can provide shelter and supportive services for less than $3,000 per person, per year, which is affordable for most of the target population. The average income of a CHC tenant is less than $8,000 per year.

CHC maintains its offices in two buildings that are physically several blocks away from each other. At the time of the study, almost every staff person at the main office had a personal computer at his or her desk. Some shared computers were connected to the Internet. The employment and training office (located in the annex) had several networked computers used to teach basic skills, such as word processing, to tenants. None of these computers had access to the Internet when this research was conducted. The new SRO housing being developed by CHC was designed to offer Internet access in each unit. CHC staff appeared to be very comfortable with the use of information technologies. Several staff noted that they used the Internet privately and that they communicated on e-mail networks. Community organizers and fundraisers said that they used the Internet to search for statistics and federal and state policies regarding homelessness. CHC staff use technology intensively for some aspects of their organizational decisionmaking but do not use digital technologies for spatial planning.

Westside Community Development Corporation (WCDC). WCDC, founded in 1979, is a faith-based organization that upholds a vision of a caring community. Although WCDC began as a volunteer organization that responded to the need for affordable housing in West Garfield Park, the organization currently supports a comprehensive, sustainable community development strategy that addresses economic conditions (for example, livable wage jobs), physical environmental conditions (for example, environmentally friendly, energy-efficient housing), and social conditions (for example, safe and good schools). These strategies are intended to eventually create and foster a collective sense of belonging.

With more than 400 employees, WCDC is a complex organization that manages several programs and projects. WCDC's ability to establish partnerships with private- and public-sector agencies and community groups to accomplish development goals has helped it attain a national reputation as a model CBO. WCDC has created more than 1,000 units of housing, including rehabilitation projects and new construction, serving users with diverse needs. WCDC advocates focused area development, which is characterized by participatory, comprehensive neighborhood planning that incorporates defensible space concepts and environmentally friendly places. Focused area developments are guided by a mixed-use/mixed-income housing policy. They incorporate reneighboring programs and facilitate community-based activities such as block watches and community policing.

When the study was conducted, very few people at WCDC had access to e-mail and the Internet. The organization's GIS and spatial planning capabilities were fairly advanced, and some of the departments used GIS-generated maps for organizing, community planning, and making community-wide presentations. However, many staff members were not familiar with the potential benefits or limitations associated with the use of information technologies, including GIS used within their own organization. Many were unfamiliar with the Internet or e-mail. Considering the organization as a whole, WCDC ranked lowest on the technology use continuum.

Case Study Organizations in Boston

Boston currently has more than 560,000 residents, and the Greater Boston area, which includes cities like Cambridge, Somerville, and Brookline, accommodates more than 5 million residents. Boston, an international tourist attraction, has become one of the major centers for finance, insurance, and real estate in the Northeast and is also home to several universities and many high-technology firms. Boston is a city of immigrants, and more than 40 percent of the city's residents are people of color.

Boston's South End, near Back Bay and with easy access to downtown, is often considered a prime location. However, by the 1950s and 1960s the South End was beginning to be viewed as a neighborhood in decline and ready for the renewal efforts of city planners. After tumultuous decades characterized by protest and activism, the Boston Redevelopment Authority (BRA) began rethinking neighborhood planning. By the early 1990s the city was advocating linkage programs in an attempt to join the prosperity of the downtown to the needs of poorer neighborhoods. This program required developers to commit funds to the "direct creation of affordable housing or to a trust fund created for this purpose" (Kennedy, 1992).

South End Community Organization (SECO). SECO has elected to uphold the original mission of the Economic Opportunity Act to empower low-income citizens by helping them become self-sufficient. According to the organization's publicity material, it strives to accomplish its mission by delivering direct services to more than 3,000 low-income families. SECO also organizes and advocates for institutional change by participating in coalitions.

SECO's advocacy work is accomplished through coalition building. The SECO staff spearheads coalition efforts, provides organizational support, and helps strategize collective community action. For example, SECO's Housing and Planning Coalition emerged almost as a direct response to BRA's new planning strategies in the 1980s. BRA created planning and zoning advisory committees to help formulate plans for individual districts (Kennedy, 1992). The agency also established a community-planning process in which city planners received input from various neighborhood groups before coming up with a unified plan for the district. BRA also instituted a public review process in which developers were expected to present their design schemes and alternatives in order to meet public scrutiny and ultimately receive public approval. SECO also became active in monitoring community-planning processes in the South End. When the research was conducted, the organization was monitoring the compliance of developers with previously established commitments, including a commitment to ensure the creation of low- and moderate-income housing within each new development.

At the time of the study SECO's offices were decidedly low-technology. A few personal computers were scattered around the office. However, the walls of the meeting room were covered with charts, maps, and graphics generated using digital technologies; several other display boards leaned against a wall. SECO had access to several data sources, including the Census and other real estate property data for the South End. Most of these data were available in a paper rather than a digital format. Most members of the SECO coalition observed that they were comfortable with the use of new information technologies. They emphasized the point that they were familiar with data analysis concepts and were thinking spatially even before technologies like GIS were introduced into the organization. However, they particularly appreciated the maps generated through spatial analyses, because the maps could be customized to suit organizational needs. SECO's members believed that spatial technologies such as GIS were relevant and appropriate technologies for their work. In terms of technology adoption and use for organizational decisionmaking, SECO fell at the highest end of the continuum.

Boston Tenants Council (BTC). The primary mission of BTC is to develop and empower the Esperanza Unida (a pseudonym) community in Boston's South End. Esperanza Unida (meaning *United in Hope*) is an architecturally designed, award-winning, 900-unit housing complex with simple pitched roofs and earth-toned row houses designed to create the ambience of a Latino quarter. The founders of Esperanza Unida envisaged it as a stable neighborhood, and to a great extent this vision has been accomplished. The annual turnover rate is only approximately 5 percent, and many of its founders still live there with their children and grandchildren. Despite occasional problems with youth gangs and violence, Esperanza Unida is considered to be an ideal place to live by many of its residents and also by Latinos elsewhere.

BTC is dedicated to fostering the human, social, and economic well-being of Esperanza Unida residents; promoting and advocating for Latinos citywide; and perpetuating the rich Latino cultural and artistic heritage. Over the past 20 years BTC has experienced turbulent times. As a community-controlled organization, it has had to balance differing and sometimes conflicting roles, such as housing manager, community developer, service provider, and organizer. In addition, BTC has had to raise additional resources from funding agencies to provide community services such as health care. As a result, the organization has become accountable to outside funders.

BTC employs more than 90 people, more than half of whom are involved in property management and maintenance activities. Several staff are also directly involved with service delivery and cultural activities. Although personal computer use was widespread throughout the organization, the offices were not networked to promote effective intraorganizational communication. For example, property databases (databases that provide basic demographic information about tenants and their tenure, building maintenance issues, and reports of crime incidents on BTC properties) owned and managed by BTC were not accessible for long-term or strategic planning because data sharing between departments was inhibited by technological and departmental barriers. Most of the staff, although proficient in basic computer literacy skills, had only a general understanding of GIS and the Internet. When the technologies and their potential applications were explained to them by this researcher, they acknowledged that the tools could become useful in their work. However, they thought that the organization would not become technologically sophisticated in the near future. BTC staff used technologies for collecting and managing information but were unsophisticated users of digital technologies for spatial planning and organizational decisionmaking. Consequently, BTC fell at the low end of the technology use continuum.

Research Findings
The case study investigation produced a wide variety of data on the use of information technology among the four community development organizations. The major results are highlighted in this section.

Uses and Benefits of Information Technology
The analysis showed that the four case study organizations used data and information for advocacy/organizing, planning, and marketing. SECO and CHC, in particular, used information technologies to reframe problems from the perspective of the community in which the organization of interest was located (Schön and Rein, 1994), verify the accuracy of perceptions about the physical and social changes occurring in the particular neighborhood or jurisdiction, facilitate analyses to support community organization initiatives, raise newer and more complex questions that could not be asked before (thereby allowing the problem to be reframed), develop innovative programs and policies based on new

information or understanding of a preexisting situation, reinforce the identity of a CBO as a competent community stakeholder and player, facilitate group processes, mediate situations within and among CBOs in the absence of trust (mediation may generate and nurture trust), and influence negotiations. The research uncovered several benefits associated with information technology use among CBOs.

Improving Efficiencies. At all case study organizations, interviewees said that the use of information technologies optimized their time and resource management. Many cited efficiency as a significant benefit. The contribution of information technologies was discussed at two levels: (1) expediting routine tasks or activities (for example Internet-based research replacing conventional library research) and (2) improving the quality of processes or outcomes (for example, using GIS to build better maps for community-based planning).

Facilitating Group Processes. Interviewees in all four case study organizations also reported that information technology offered simple ways (for example, through maps or other visual presentation techniques) to communicate complex concepts to community groups. The added value of information technology was associated with the real-time modifications that made it possible to demonstrate "what if" scenarios and show the impact of trends over time. Information technologies also allowed community residents to create and nurture a community memory of historical and recent events considered significant to the development of the community. CHC and BTC staff said that they found community e-mail networks to be successful.

SECO's executive director observed that, thanks to information technologies, his agency was able to organize and manage a community-oriented planning process during the development of a proposal for the Boston Empowerment Zone application.[8] The application included the definition of a geographic boundary for the zone, which had to meet precise sociodemographic criteria.[9] Participants included a diverse coalition of neighborhood groups and elected officials. The executive director, Pat Harrison, further credited the use of spatial analysis technologies with holding the coalition together:

> What [SECO staff] offered the coalition that enabled them to stick together was that we had totally accurate information. . . . [T]he information was available here [at SECO] faster than at City Hall and it was totally accurate. . . . [I]f we hadn't had the technology, I don't know if we could have held this coalition together. . . . [I]f we hadn't had this coalition, which held together, then we would have torn ourselves apart fighting over [the boundaries]. . . . [W]e might not have ever gotten a map drawn until it was too late.[10]

Mediating Situations in Absence of Trust. Typically, leaders and participants in the case study organizations did not trust information based solely on the data provided by government or private-sector sources, particularly when the information did not correspond to their own perceptions and assessments of their community. In these instances, information technologies enabled CBOs to use information technologies to conduct their own research and identify the underlying constructs, assumptions, and data models that supported these arguments. For example, SECO, BTC, and WCDC used GIS and other microlevel spatial analyses to highlight potential positive and negative consequences of large economic or residential development initiatives in urban neighborhoods. Many residents and organizers who talked to this researcher observed that organizing and strategic planning based on anecdotal evidence was risky because of the sheer complexity of urban problems that they encountered. SECO's executive director commented:

> I see this all the time, people saying, "the community". . . . what they mean is the people that they work with, or the last four people they talked to. People [tend to base their] conceptualizations on this [anecdotal evidence] and then they are really shocked when they see the real data on the community. [At SECO], we've gotten into the aspect of being technical and using technology, though not using technology for technology's sake.[11]

Similarly, they often needed data to understand how external (global trends or city policies) decisions impacted their neighborhood. In Boston Tom Mahoney, a city official, explained how community opposition to the development of a new dormitory complex for a major urban university changed over time because of careful analysis of available data:

> They [coalition of organizations including SECO] used it [technology] very effectively to demonstrate what everyone knew anecdotally, where students [attending urban universities] were having a tremendous impact (a) on the rents, (b) on the social life of the community—the keg parties and other student activities that are not necessarily conducive to quiet residential neighborhoods. So, it led [residents] to change their position to recognize that aggregating the students in dormitories or on peripheral institutional properties was a better idea than [giving] the students free reign [of] the housing market.[12]

In this situation, community members knew that large numbers of students lived in their neighborhood. The spatial analyses helped the community develop a consensual position to accept an urban university's proposal to construct a new dormitory, with a clearer understanding of both positive and negative consequences of the new development.

At the same time, outsiders (such as city agencies) came to rely on the use of data generated by the organizations and considered it to be a measure of the seriousness or the trustworthiness of some claims made by CBOs. In his interviews, the executive director of SECO and the research directors of CHC noted that they seldom interpreted data to accommodate or endorse predetermined policy positions. Rather than pounding on the table, they relied on the inherent strength of the evidence and the quality of their research and analysis to effect policy change. It is this approach that gives some community organizations access to broader coalitions and networks that are essential to creating sustainable community development strategies. For example, A. Texeira, a senior official at the Boston Redevelopment Authority acknowledged that some community organizations emerged as community leaders and were treated differently by the city:

> The level of sophistication with technology is directly proportional to the sophistication and stability of the organization in general. . . . [W]hile I am willing to go the extra mile with a certain [organization] and take a little bit more risk with a certain [organization] because of [its] technological base, [doing so] is as much because of [its] track record in accomplishment and the political acumen of [its] board and director. I think there is a direct correlation between those [organizations that] are attempting to use the technology and their ability to get things done in a leadership capacity in their own neighborhood or with external forces such as government.[13]

Both community organizers and city officials appear to recognize that community organizing and technology use go hand in hand. Pat Harrison, the executive director of SECO, said:

> I am convinced that organizing in the future should be a marriage of technology and old-fashioned community organizing. I don't think technology without the

organizing is going to work. And I think organizing without the technology is not [going to] work in the '90s [or] in the new century.[14]

Influencing Negotiations. Some organization directors and community leaders observed that information technologies provided them with additional support in their negotiations with developers or representatives from other city agencies. According to them, city planners and developers tended not to provide many design options for public/community spaces. Furthermore, when these design concepts were presented for review during community meetings or other public forums, planners were usually reluctant to modify their original concepts. They tended to overrule the objections of community residents, citing time and cost considerations, thus diminishing the value of community participation. In these instances, an understanding of the use of information technologies enabled organizations and community residents to effectively argue for modifications, for changes to be made and submitted for another public review. A prominent South End resident, J. Swallow, described it thus:

> I remember Byron[15] quoting to me. . . . [A member of] the community says, "Well, I don't want this there, I want it over here." [T]hey [BRA] say, "[I]t will take 6 months to come back with a new map." I [Byron] will now tell them, "[U]h-uh, you come back next week."[16]

Providing another example, the executive director of SECO commented:

> They [developers] needed a zoning variance, so we had a hook to get some community benefits before we gave our support. But before that, we didn't know anything about biotechnology, so we did a research study. . . . [W]e knew we would not get jobs [from the new developments]. . . . [O]ne of the things we asked for was that they use their influence to help locate and finance a new state-of-the-art community health center.[17]

When information technologies were integrated into participatory processes, they played a critical role in creating and sustaining a community memory that highlighted past successes and strategies that worked effectively. For example, in Boston, a South End resident committed to preserving community gardens in the neighborhood tells the story of organizing and activism in the South End. She said that they learned a lot from the experiences and mistakes of other neighborhoods:

> [In Bay Village] the neighborhood tried to sue the BRA [Boston Redevelopment Authority] for not going along with the original agreement [to preserve the community garden]. While they were going to court, the bulldozers came in and wiped out the garden. . . . That's not the way to save a garden![18]

Based on that memory, she and other members of her group who until then had been focused on a single issue (that is, creating and preserving community gardens) decided to get more involved in broader community coalitions around the preservation and creation of affordable housing. She said:

> If we could join them [the affordable housing activists] and support them, then they would support us. Since the gardens . . . [had] basically [been] created by low-income folks who were growing their own food, we were welcomed by them because we strengthened their position.[19]

The ability of technologies to store information and record different perspectives of historical events like those described above are vital in creating and sustaining collective community memory. Combined with the use of multimedia, community organizations are creating ways to share residents' stories, preserve and document architectural heritage,

and document the changing physical and social character of their neighborhoods. A community memory created by information technologies enables present-day South Enders to recognize the role that organizing and community activism has played in shaping their mixed-use, mixed-income, ethnically diverse neighborhood.

Advocacy for social change implies, in part, that the problems of a particular constituency are solved by asserting the claims of that constituency. For example, CHC advocates for supportive housing programs by establishing the need for these programs as well as identifying the costs that are associated with not meeting this need. Before community organizations can advocate for (or against) issues that affect the social or built environments that characterize their neighborhood, they must identify or delineate a comprehensive position on those issues. Determining that position, or set of positions, forms an integral part of organizational decisionmaking processes. Information technologies enable internal organizational decisionmaking by helping frame problems and facilitating group processes by increasing their trustworthiness and efficiency. The technologies also influence decisions at the community level because they position the community organization as an effective spokesperson for a particular set of issues; CHC, WCDC, and SECO were acknowledged by residents and experts as strong and articulate community advocates.

Constraints

Yet, for all the benefits of information technologies, they are not used extensively by CBOs. Information technologies are expensive, and many organizations still find them intimidating.

Staff at all four case study organizations noted that the cost of acquiring information technologies[20] was a major constraint preventing their acquisition and efficient use. They observed that it took considerable resources and energy to get an information technology-based research or analysis project up and running. According to the technicians at CHC, WCDC, and BTC, most software or automated analytic techniques had to be customized to be useful to CBOs. Customization, then, added to the already high baseline costs. In addition, organizations had to buy, or otherwise acquire, data through collaborative arrangements with city or university sources. Interviewees also pointed to the costs associated with teaching and training staff in the understanding, development, and use of information technologies for community-based problem solving and decisionmaking. Finally, both data and technologies had to be continuously upgraded, giving many staff the feeling that they were running harder, only to stay in the same place.

Many staff felt that it was too early for them to take full advantage of the potential benefits of information technologies. Many desirable analyses could not be performed because of the unavailability of data sets, technological startup problems, or lack of technical support. WCDC organizing staff concluded that information technologies promise much but deliver little to small CBOs with low overheads, limited budgets, and overworked staff.

Staff at all case study organizations expressed some wariness of the impacts of information technologies. Many expressed fear that information technology had a tendency to isolate the organization and tempt staff to retreat from the community into the virtual world. A comment that exemplified the tension between traditional community organizing and research using technologies was articulated by a WCDC staff member who observed that the staff's mission was to "be out there . . . on the street, not to stare at a computer screen."[21]

All staff seemed to feel that the value of the informal social and organizational networks built by their organizations would be lost if they relied completely on the technologies. Because they considered these informal networks integral to the organization's functioning, they tended to overlay electronic linkages with informal linkages. As a result, their work burden increased. For example, staff trainers at BTC and CHC remarked that they knew that some people in the organization responded better to e-mail, some to telephone messages. They acted accordingly when leaving a standard message (voice mail for some, e-mail for others) for all staff. Everyone got a paper copy of the announcement. This kind of duplicated effort, however, increased the workload.

Information Technologies and Participatory Planning

Information technologies were also found to contribute to participatory planning processes because they increased the trustworthiness of the process and its efficiency. Individual staff and other stakeholders interviewed who participated in collaborative processes that used information technologies acquired new technical skills and learned to reappropriate dominant research knowledge by contextualizing it. They created new knowledge based on their own life experiences. In addition, people were able to retrieve key pieces of strategic information and thereby influence decisions that affected their community/ organization. However, these strategic pieces of information were usually hidden within complex bureaucracies and database management systems and required people to rely on their conventional, informal networks. For example, E. Sivakumaran, a GIS consultant and researcher working with several Boston community organizations, was very emphatic about the value of informal social networks necessary to gather pertinent information in a timely manner. He commented:

> I have established a very good information network, a provider network. There-fore, how you cultivate a very good information network beyond technology [becomes very important]. For me, it's more important to know [individuals] than to have access to the technologies themselves. The classic case was this elder homelessness issue.[22] I searched for a single piece of [the] data. I didn't give up. I had already asked the conventional sources, but the information was not available. I went to HUD. There was a community relations person. I said, "I am looking for this information. Can you get me that?" [She asked me to wait] and [eventually] I got the information I needed. Somebody . . . sympathet-ic to your cause will give you the information. Once you standardize data, [they] [become] general. The most important information comes from knowing [indi-viduals] who [are skilled with] and [have] access to context-sensitive, special-ized data.[23]

Information technologies facilitated quick access to repositories of data and information from, for example, the Census. Knowledge of technologies, however, was overshadowed by the presence of informal human networks that were more successful in creating access to contextual, specialized information, especially data and information not available to the public. Information technologies demystified decisionmaking by making community-based planning and participatory processes meaningful and relevant to the community's needs.

Information Technologies and Organizational Leadership

For the purposes of this study, *organizational leadership* is defined as a complex con-struct integrating vision, knowledge, trust, and power. Based on the analysis of data from the four case study organizations, information technologies did not directly or indirectly determine an organization's philosophical vision. However, information technologies did help shape the immediate action goals and projects that an organization might take on. In

short, information technologies assisted in framing or delineating a particular aspect of the problem that the organization then decided to address. Having chosen an objective, CBOs typically equipped themselves with the relevant data and information. Information technologies played a significant role in the development of an organization's knowledge base about its constituents, the physical environment, the resources present in the community, and the national and local policies that might affect its work in the community. For example, WCDC created an office of evaluation and research to help identify a broad set of community health indicators and collect data about how the neighborhood performed with respect to those indicators to design programs and projects that were needed in the community and fundable based on national and regional policy priorities.

Information technologies increased the capacity of case study organizations to work in partnerships and coalitions and create strategic alliances with government and the private sector. In addition, information technologies proved to be invaluable to the organizations as they assessed the successes and failures of planning and policy initiatives. Finally, information technologies were very useful in communicating and representing information gathered from many sources. Therefore, the capacity of information technologies to serve as decision-support systems enhanced an organization's power.

The adoption of information technology as a decision-support system was affected by organizational characteristics, including key decisionmakers' attitudes toward information technologies, funding and organizational stability, and organizational learning that accrued from external influences such as communitywide research initiatives, university outreach activities, and the media. However, technology enthusiasts or early adopters in two of the organizations (WCDC and BTC) could not persuade their colleagues or the organization to adopt information technologies because upper management did not understand the potential benefits and constraints associated with the use or nonuse of information technologies. As one staff member at WCDC commented, "GIS and all that stuff—I don't have a sense that it has been of much use yet to the organization and to the community."[24]

GIS users at WCDC confirmed that it was difficult to sell the idea of GIS to upper management. They believed that management's lack of interest was directly related to the high costs associated with technology acquisition and use, data development, training, and the staff's failure to recognize the value of these tools. A community organizer's comment confirmed their observations. The organizer, M. Martin, said, "Personally, I think, at the moment, [information technologies] are sort of overrated. I do my job as I've always done. I don't spend any time online; I don't spend my time researching. . . . "[25]

Empowerment and Critical Reflective Practice

Over a period of time, some individuals and organizations developed the ability to harness the power and transcend the shortcomings of information technologies. A common theme, defined and described as *empowerment,* links the individuals and organizations that demonstrated this capacity. For instance, when the city of Boston and private developers came up with a plan to build a biomedical complex in the South End, the developers argued that biotechnology was a growth industry with the potential to generate many jobs. They stated that low-skills jobs and economic gains from smaller spinoff companies would trickle down to South End residents. SECO began asking very specific questions such as, How many jobs will be available? How many small enterprises will find their links to the biomedical chain? and What kinds of benefits can the community expect and ask for? Eventually, SECO's research concluded that there was a mismatch between the skills of poor South End residents and the new employment opportunities generated by the new project. SECO successfully argued that these new jobs were more likely to

benefit highly skilled professionals. SECO further argued that although biotechnology development was generally expected to create spinoff projects that would require low- and semiskilled workers, the prevalence of hundreds of colleges and universities in the Boston area, combined with a sluggish economy, was likely to result in college graduates' applying for and receiving jobs that would have been filled by a less skilled workforce. In addition, SECO argued that the lower wage jobs were migrating to more affordable locations in the southern United States or overseas. At the end of its research, SECO did not reject the proposed development. However, it negotiated for and received community benefits such as a neighborhood health center that would serve the needs of all South End residents.

Empowerment is the process and outcome of critical reflective practice. Empowerment is not a fixed resource; it is empowering instances, moments, or outcomes that occur when individuals or community groups comprehend the interconnected triad of psychological, social, and political power (Friedmann, 1987, 1992) as they negotiate the dialectic continuum between action (activism) and reflection (research and analysis). This linkage of action and reflection, or *praxis* (Freire, 1989), with an explicit recognition of power differentials is referred to as *critical reflective practice* (see Schön, 1983).

This researcher's definition of empowerment explicitly establishes a link between power and reflective practice. Empowerment is also conceptualized as a constantly evolving and changing process. For example, individuals who are able to examine their actions and reflect upon them while taking into account the larger social and political context in one situation may be unable or unwilling to engage in the same process in another. Therefore, the same individuals or organization can act in an empowered manner in one situation and appear disempowered in another. Finally, empowerment is not viewed as an end in itself to be attained by the creation of certain favorable conditions but as a guiding principle that forms the basis of problem solving and decisionmaking throughout the life of an individual or organization.

The patterns emerging from the case studies suggest that empowerment facilitates an organization's advocacy agenda. Information technologies can affect critical reflective practice and offer particular benefits when integrated into this process of reflection and action. The use of information technologies by themselves, however, cannot initiate and sustain critical reflective practice. This study, however, suggests that CBOs that engage in critical reflective practice will inevitably decide to use information technologies because the technologies provide an organization with a comparative advantage and help sustain its position of leadership. For example, in the negotiations between SECO and the city of Boston, it is clear that information technologies were used creatively to give SECO a competitive edge.

Research Contributions

This analysis suggests that CBOs that advocate social change have the potential to become centers of knowledge production and use when they engage in critical reflective practice. Exhibit 3 presents a model of critical reflective practice in CBOs.

The model in exhibit 3 shows how critical reflective practice may evolve within an organization. In this model the theory-practice continuum and the action-reflection continuum form two axes whose intersection creates four quadrants. The organization's long-term *vision* and its more immediate mission are situated in the theory and reflection quadrant. The organization's planning and decision *strategies* are developed from this vision and are situated in the reflection and practice quadrant. *Policies and programs* are a result of reflective practice and are implemented in the third quadrant, the realm of

Exhibit 3

Critical Reflective Practice in CBOs

Power

Theory

Reflection

Vision

Evolution of critical
reflective practice

New
explanatory
theory

Strategies

Policies and programs
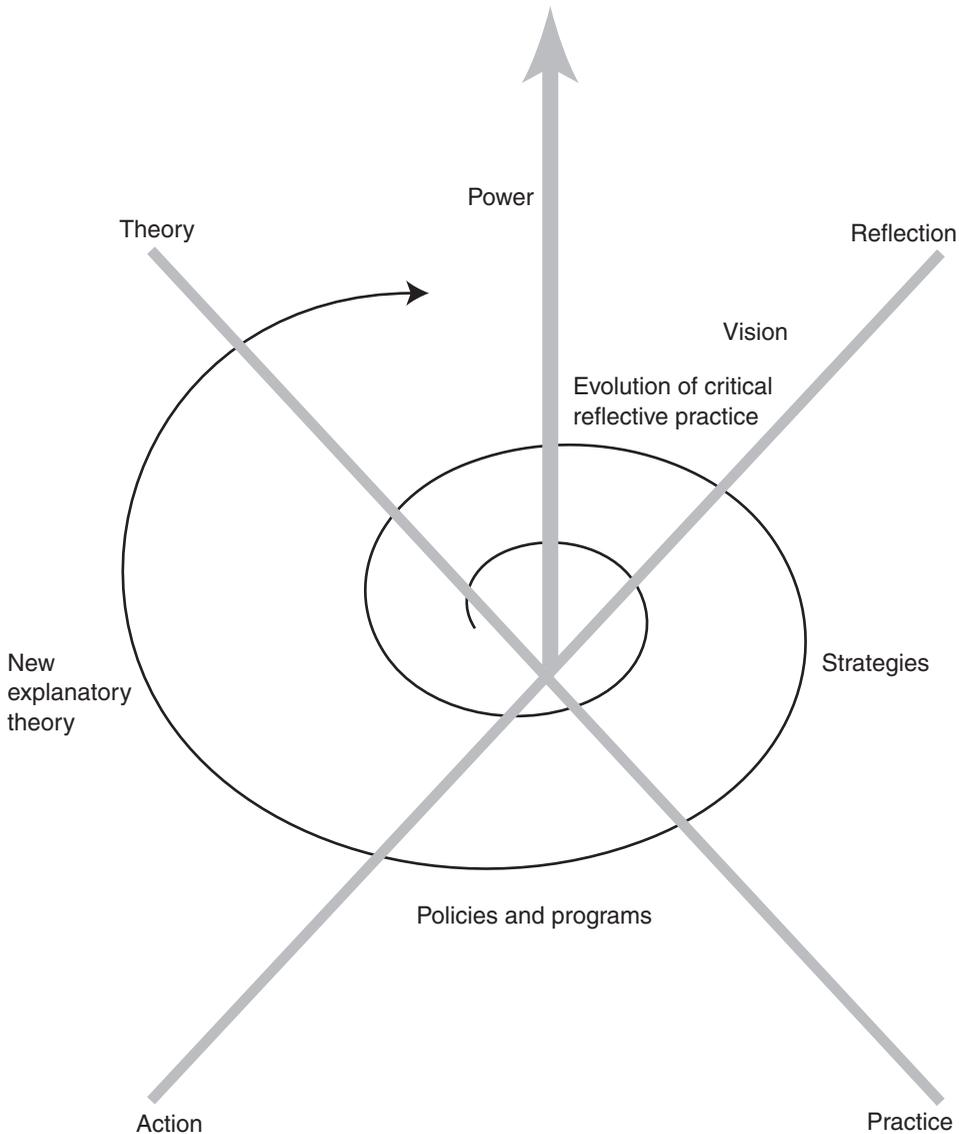
Action

Practice

practice and action. The process, however, does not end there. Programs that are imple-
mented generate new learning, or new knowledge, that is called new explanatory theory.
Critical reflective practice is iterative. As the learning process follows the spiral, it re-
volves around an axis of power that includes both individual and political power. Trust,
advocacy, and the organization's mandate to remain a community leader all move along
the power axis. Information technologies influence every quadrant of this model.

What is the unique contribution of information technologies to CBOs? The findings of the four case studies suggest that it lies in their comparative advantage over conventional means of research and analysis. It is the ability of information technologies to integrate formal technical data and empirical evidence with the everyday life experiences and concerns of citizens, thereby supporting participatory research and organizational learning, embedding the ideas of reflection in practice firmly in the mission and activities of the organization.

Acknowledgments

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Notes

1. The Telecommunications and Information Infrastructure Assistance Program (TIIAP), one of the programs of the National Telecommunications and Information Administration, was authorized by 47 U.S.C. 390–393A (1991) to provide resources for planning and constructing telecommunications networks that provide educational, cultural, healthcare, public information, public safety, or other social services. In 1995 the program received a total of 1,800 proposals in three major categories: demonstration projects with grant requests under $1 million and $1 million and over, access projects, and planning projects. The Technology Opportunities Program replaces TIIAP. See www.ntia.doc.gov/top.

2. The raw material produced by observation or measurement is data. Information is data processed for a particular purpose. Knowledge results from the processing of information into a coherent body of facts, theories, or scientific laws (Geiss and Viswanathan, 1986).

3. Definitions of GIS abound. In its simplest sense, GIS is a way to organize and manage spatially referenced data. However, GIS can be considered "a set of tools, technologies, approaches, and ideas that are embedded in broader transformations of science, society, and culture" (Pickles, 1995).

4. The original Luddites were displaced workers in early 19th-century England who resisted the destruction of their traditional crafts economy by mechanized industrial production. The followers of the mythical "Ned Ludd" smashed textile machines as a protest against a system whose rise spelled their eventual doom (Winner, 1997).

5. A virtual room with rules of entry, behavior, and protocol.

6. Although information technology practice can occur within noninstitutional settings, it is more common to find these technologies used at quasi-public or institutional settings, particularly in communities with limited financial resources. These settings include CBOs, service organizations, schools, libraries, and neighborhood technology centers.

7. Participatory GIS overcomes some of the limitations of traditional GIS by engaging citizens in the problem-solving process. Citizens are involved in many, if not all, components of the data collection and analysis process.

8. The U.S. Department of Housing and Urban Development allocated development grants within geographic boundaries called Empowerment Zones that fulfilled predetermined demographic and poverty criteria.

9. Some of the criteria required that only 10 percent of the city be in the Empowerment Zone, that 20 percent of the people living in the zone be 20 percent above the poverty threshold, and that 90 percent be 35 percent above the poverty threshold.

10. P. Harrison, interview by author, Boston, Massachusetts, April 1996.

11. *Ibid.*

12. T. Mahoney, interview by author, Boston, Massachusetts, May 1996.

13. A. Texiera, interview by author, Boston, Massachusetts, May 1996.

14. P. Harrison, interview by author, May 1996.

15. Refers to Byron Rushing, state representative, who represented the South End in the Massachusetts legislature when the research was conducted.

16. J. Swallow, interview by author, Boston, Massachusetts, April 1996.

17. P. Harrison, interview by author, Boston, Massachusetts, May 1996.

18. E. Fisher, interview by author, Boston, Massachusetts, June 1996.

19. *Ibid.*

20. Hardware, software and upgrades, data, training.

21. R. Rawls, interview by author, Chicago, Illinois, September 1996.

22. SECO was negotiating with a community group that was resisting the siting of a particular development (a "not in my backyard" situation) within a Census tract on the grounds that the Census tract in question already had far too many low-income people, exceeding HUD's guidelines. Recognizing that the community group was resistant to the project, SECO created a specialized map of the Census tract in question, showing the percentage of people living below the poverty line, receiving public assistance, and so on. Using this map, SECO argued before Boston's Zoning Board of Appeals that the Census tract being considered for the project could indeed accommodate low-income people without conflicting with HUD's guidelines.

23. E. Sivakumaran, interview by author, Boston, Massachusetts, May 1996.

24. O. Newton, interview by author, Chicago, Illinois, October 1996.

25. M. Martin, interview by author, Chicago, Illinois, October 1996.

References

Castells, M. 1996. *The information age: Economy, society and culture, vol. I. The rise of the network society.* Cambridge, MA: Blackwell Publishers.

Freire, P. 1989. *Pedagogy of the oppressed.* New York: Continuum Press.

Friedmann, J. 1992. *Empowerment: The politics of alternative development.* Cambridge, MA: Blackwell.

———. 1987. *Planning in the public domain: From knowledge to action.* Princeton, NJ: Princeton University Press.

Geiss, G.R., and N. Viswanathan, eds. 1986. *The human edge: Information technology and helping people.* New York: Haworth Press.

Graham, S., and S. Marvin. 1996. *Telecommunications and the city: Electronic spaces, urban places.* London: Routledge.

Hall, B. 1993. Introduction. In *Voices of change: Participatory research in the United States and Canada,* edited by P. Park, M. Brydon-Miller, B. Hall, and T. Jackson. Westport, CT: Bergin & Garvey.

Huxhold, W. 1991. *An introduction to urban geographic information systems.* New York: Oxford University Press.

Kennedy, L.W. 1992. *Planning the city upon a hill: Boston since 1630.* Amherst, MA: University of Massachusetts Press.

King, M.H. 1981. *Chain of change: Struggles in black community development.* Boston, MA: South End Press.

Kling, R. 1997. Reading "all about" computerization: How genre conventions shape nonfiction social analysis. In *Reinventing technology, rediscovering community: Critical explorations of computing as a social practice,* edited by P. Agre and D. Schuler. Greenwich, CT: Ablex Publishing.

Kraemer, K., J. King, D. Dunkle, and J. Lane. 1989. *Managing information systems: Change and control in organizational computing.* San Francisco: Jossey-Bass.

Levine, M., and D. Perkins. 1997. *Principles of community psychology: Perspectives and applications,* 2d ed. New York: Oxford University Press.

Masser, I., H. Campbell, and M. Craglia, eds. 1996. *GIS diffusion: The adoption and use of geographical information systems in local government in Europe.* Bristol, PA: Taylor and Francis.

Medoff, P., and H. Sklar. 1994. *Streets of hope: The fall and rise of an urban neighborhood.* Boston, MA: South End Press.

Mitchell, W. 1995. *City of bits: Space, place, and the Infobahn.* Cambridge, MA: MIT Press.

Naisbitt, J. 1994. *The global paradox: The bigger the world economy, the more powerful its smallest players.* New York: Avon Books.

Negroponte, N. 1995. *Being digital.* New York: Alfred A. Knopf.

Park, P. 1993. What is participatory research? A theoretical and methodological perspective. In *Voices of change: Participatory research in the United States and Canada,* edited by P. Park, M. Brydon-Miller, B. Hall, and T. Jackson. Westport, CT: Bergin & Garvey.

Pickles, J., ed. 1995. *Ground truth: The social implications of geographic information systems.* New York: Guilford Press.

Ramasubramanian, L. 1995. "Building communities: GIS and participatory decision making," *Journal of Urban Technology* 3(1):67–79.

Rheingold, H. 1993. *The virtual community: Homesteading on the electronic frontier.* Reading, MA: Addison-Wesley.

Schön, D. 1983. *The reflective practitioner.* New York: Basic Books.

Schön, D., and M. Rein. 1994. *Frame reflection: Toward the resolution of intractable policy controversies.* New York: Basic Books.

Schön, D., B. Sanyal, and W.J. Mitchell, eds. 1999. *High technology and low-income communities: Prospects for the positive use of advanced information technology.* Cambridge, MA: MIT Press.

Sclove, R.E. 1995. *Democracy and technology.* New York: Guilford Press.

Shenk, D. 1997. *Data smog: Surviving the information glut.* New York: HarperCollins.

Sieber, R. 1997. Computers in the grassroots: Environmentalists, geographic information systems, and public policy. Ph.D. diss., Department of Urban Planning and Policy, Rutgers University.

Star, S.L., ed. 1995. *The cultures of computing.* Cambridge, MA: Blackwell Publishers.

Stoll, C. 1995. *Silicon snake oil: Second thoughts on the information highway.* New York: Doubleday.

Toffler, A., and H. Toffler. 1995. *Creating a new civilization: The politics of the third wave.* Atlanta, GA: Turner.

Wegener, M., and I. Masser. 1996. Brave new GIS worlds. In *GIS diffusion: The adoption and use of geographical information systems in local government in Europe,* edited by I. Masser, H. Campbell, and M. Craglia. London: Taylor and Francis.

Wilson, W.J. 1996. *When work disappears: The world of the new urban poor.* New York: Vintage Books.

Winner, L. 1997. "Look out for the Luddite label," *Technology Review* 100(8):62.

Yin, R.K. 1989. *Case-study research: Design and methods.* Newbury Park, CA: Sage.