Social networks, social capital, and the use of information and communications technology in socially excluded communities: a study of community groups in Manchester, England

by

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To my mother, Patricia Perlitz Williams, who taught me order

To my father, Dave Harrell Williams, who showed me I could go my own way

To my closest colleague and dearest love, Abdul Alkalimat (Gerald A. McWorter), whose help mattered so much

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Abstract

Social networks, social capital, and the use of information and communications technology in socially excluded communities: a study of community groups in Manchester, England

by

Kathleen Hardin Williams

Chair: Joan C. Durrance

This study investigates grassroots community groups in low-income or (more specifically) socially excluded areas using information and communications technology (ICT) and the social ties that support their ICT use. How and to what purpose do groups not expected to use ICT—because they are formed from "digitally divided" populations—in fact do so? Who or what helps them use it?

The study makes a contribution primarily to the field of community informatics, drawing concepts from social capital and social network theory (Granovetter, Lin, Putnam, Wellman). Data concerning where community groups get help with ICT are analyzed to see whether and how strong and weak ties and bridging and bonding social capital play a role in helping the groups.

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The study finds that having more ties providing ICT help—and more strong ties, more bonding social capital—is associated with more extensive ICT use by the community groups. Based on 25 measures of ICT, the groups fall into three progressively more extensive categories of ICT use: downloading (using computers and the Internet, particularly e-mail), uploading (maintaining a group Web presence), and cyberorganizing (helping others to become uploaders or downloaders). These three categories align with group purpose (tenant groups, cultural groups, or social support groups), suggesting that the groups use a particularly social form of ICT (SICT) relating very closely to group purpose. The 31 groups are reaching across real or perceived digital divides in accessing help with ICT; the ties utilized are likely to be younger, more white, more male, and more in the workforce.

The method helps to move the new field of community informatics beyond the case study by analyzing a sample of 31 community groups and their 62 ICT helpers. Empirical proof is provided via statistical tests on closed-end responses (quantitative) along with narratives extracted from interviews (qualitative).

Social exclusion is often oversimplified, not taking into account the phenomenon uncovered here: groups that reach across ethnicity, class, gender, and generations for skilled help, yet stay close to their strong-tie, bonding-social-capital networks, relying largely on people in their own communities. Policy models might usefully take into account the relatively invisible but active networks within socially excluded communities.

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Chapter 1

Introduction

The research described here examines how 'community groups' in a set of 'socially excluded communities' adopt and use 'information and communications technology' (ICT). The research concerns a particular instantiation of the relationship between 'technology and society.' (Concepts within single quotation marks, along with others relevant to the study, will be defined in section 1.1, Definitions.)

In addition to describing the phenomenon, the proposed research identifies and characterizes the social ties that help these community groups adopt and use ICT. Following Granovetter (1973), are these ties weak or strong? Following Wellman and Berkowitz (1988) and Lin (2001), what can we learn about social networks and social capital from looking at the networks that provide people help with ICT?

The answers to these questions have implications for policy as well for theory. Knowledge about whom or what community groups rely on for help with ICT helps policymakers and funders better support efforts to overcome digital inequality. Such efforts include community projects, schools, libraries, e-governance, and even e-commerce. Moreover, new knowledge about social networks in socially excluded communities helps those same policymakers and funders understand how social exclusion functions or how it can be overcome. For instance, it appears that exchanging

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help with ICT is an activity that bridges gaps within excluded communities, or between them and other communities. Thus, it might be possible to activate additional such networks to tackle problems that parallel digital inequality: health, education, jobs, and so on.

A primary research tool is the theory and the method of social network analysis. This theory and method guides both the qualitative and quantitative analysis, for this is a mixed-methods study. The analysis is carried out on data from 32 semistructured interviews and contextualized by means of document review, secondary sources, and background interviews. The unit of analysis is the community group; one informed member of each of 32 groups served as a study participant.

The study site of Manchester, England, and the research partner, the Manchester Community Information Network, together afford the opportunity to examine a set of community groups in low-income urban districts of an industrial metropolis, one with a tradition of community ICT initiatives and a modest number of studies analyzing these.

The first chapter of this dissertation includes:

1. definitions of key concepts,
2. a brief overview of the literature in which the proposed study is rooted (preliminary to a full literature survey in chapter 2),
3. discussion of the policy context of the study, and
4. a statement of the research problem.

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1.1 Definitions

This section will provide working definitions of the following key concepts in this proposal:

1. community,
2. community groups,
3. socially excluded communities,
4. digital divide/digital inequality, and uploaders and downloaders,
5. less-wired people and communities,
6. information and communications technology (ICT),
7. use of ICT,
8. social networks, and
9. social capital.

Before enumerating the concepts to be defined, it must be said that the research described in this dissertation relies on a particular conceptualization of the relationship between technology and society. Although in everyday language we are accustomed to speaking of the social impact of technology, technology does not itself cause social change. Rather, any particular technology—itself a social product—generates social affordances (Gibson 1977, Norman 1988). These allow for certain possibilities and not others. Social forces then go to work on the technology, often combining it with old technologies still in place. They make real what designers intended, or far more often, what was neither expected nor intended (Merton 1976, Tenner 1996). In a social setting of relative stability and consensus, a technology may be adopted as intended; in a more typical social setting, characterized by social differences and conflicts which may

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themselves overlap, the results may be more surprising (Kling 1980). Therefore, society shapes technology; technology also shapes society (MacKenzie and Wajcman 1985, Bijker et al. 1987).

1. 'Community' will refer here to two different, interrelated concepts, and later (section 2.2) the proposal will discuss the tension between these two definitions. First, community will refer to 'a set of people living in a recognized geographic area.' The study will rely on official governmental districts identifying subareas (wards) within a city. Second, it will refer to 'a set of people who define themselves as part of a community.' This follows Hughes (1971, cited in Becker 1998, 2) who proposed that an ethnic group is a group "because the people in and out of it know that it is one." The proposed study may shed some light on the tension between these two (and other) definitions of community.

2. 'Community groups' will refer here to 'those groups also known as community-based organizations, non-profit organizations, non-governmental organizations, citizen groups, civil society organizations, and voluntary organizations.' A community group can also be defined negatively as neither a government entity nor a business. It sees to a goal or goals of some type of community, be it a geographic community, a community of identity, or a community of interest. As chapter 3 (on methods) will elaborate, the proposed study will emphasize local rather than regional or national community groups.

3. 'Socially excluded communities' will refer here to 'areas where residents are on average of lower income, less employed, in poorer health, more disabled, less educated, less skilled, more poorly housed, and have less access to services than residents

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elsewhere.' The current study relies on an empirical measurement in line with the concept of social exclusion. Social exclusion is a concept with roots in sociology—Weber (1924) elaborated the process whereby people exclude others—and in more recent French and European scholarship and social policy (Burchardt et al. 2002). In France *les exclus* are those who are shut out of the social contract and have slipped through government safety nets. The concept developed in distinction to and in dialogue with the American concepts of the underclass, the marginalized and the truly disadvantaged (Byrne 1999/2002). Wilson (1987, 1996) explicitly acknowledged and examined the process of geographic concentration of the truly disadvantaged.

When the UK government established its Social Exclusion Unit (SEU) to examine the problem and make recommendations, it likewise spatialized the phenomenon of social exclusion, affirming that the "causes and consequences of social exclusion cluster in particular areas" (UK Social Exclusion Unit 2004, 5). Accordingly, the UK government ranks all wards in Britain according to their degree of multiple deprivation, using data on the following dimensions: "income; employment; health & disability; education, skills & training; housing; and geographical access to services," (UK Office of the Deputy Prime Minister 2000). This ranking then guided research, policy, and funding. The socially excluded areas in this study are those identified by UK government indicators as in the top decile of the ranking.

4. When computers were first available for individual use, the concept of the 'digital divide' was operationalized as different rates of access to computers, in the workplace, at school, in libraries and elsewhere, but most especially in the U.S. model, at home (U.S. Department of Commerce 1995). As more and more people gained some

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level of access to ICT and made various use of all sorts of ICT, the digital divide began to look more complex (Loader 1998, Dutton 1999/2001, Schön et al. 1999, Wilhelm 2000, Compaine 2001, Norris 2001, Servon 2002, Warschauer 2003). With different rates of adoption by different strata, many different inequalities arose with respect to computers, and later, the Internet. Considering inequality with respect to the Internet, DiMaggio and Hargittai (2001) identify five dimensions of differences:

- technical means of access,
- autonomy over the conditions of access,
- individual skill,
- social support, both technical and emotional, and
- purpose of use.

For the purpose of the current study, the digital divide will refer to 'differences in ICT access and use across all five of these dimensions.' One specific divide that is considered in the study is that between 'uploaders' and 'downloaders', which will refer to 'the difference between those who post resources online and create interactive online resources and those who use and otherwise react to the material and the resources others have created.' Looked at under a microscope, this is a fuzzy line. A family photo collection may be created by one uploader, who then recruits relatives to post as well, turning downloaders into uploaders. The uploader/downloader difference is also a relative concept. If a person makes a purchase from Amazon, he or she is likely to post a credit card online in the process. In this example, though, Amazon is the uploader and the person is the downloader.

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5. Geographic communities are often defined by socioeconomic status as well as place, because the political and social boundaries that reinforce these communities develop along lines of class and ethnicity. Early and persistent measures of the digital divide (United States Department of Commerce 1995, 1998, 1999, 2000, 2002) enabled scholars (Dutton et al. 1987, Doheny-Farina 1996) to locate geographic communities along a continuum from 'wired' to 'less wired' to 'completely unwired.' This is because rates of access and use of ICT have followed socioeconomic stratification patterns, which themselves define geographic communities. 'Wired' is used here to refer to the extent to which a community has integrated the Internet and other digital tools into its daily life, and is relying on these tools. The term can also be applied to individuals.

6. 'Information and communications technologies,' or ICT, will refer here to 'those digital technologies that are now converging to handle data, text, sound, and still and moving images.' Although the study encounters ICT of various kinds, it primarily concerns community ICT, which is ICT applied to local communities. Community ICT has primarily taken the following forms:

1. A variety of public access points—community technology centers (CTCs) or telecenters, cybercafés, copy shops, public libraries or other forms of connectivity such as broadband or wireless provision. These constitute 'actual' community ICT.
2. A variety of virtual resources—sometimes called virtual communities or digital cities—but most often called community networks (CNs). These constitute 'virtual' community ICT.

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3. Some 'package' of the above two, often combined with technologies or price discounts to facilitate home ICT.

There have been projects that *only* provided home ICT—recycled or new computers, or set-top boxes to use e-mail and the Web, in exchange for permission to gather data from the household (for example, the HomeNet studies as reported in Kraut et al. 1996 and most recently in Kraut and Kiesler 2003). Sometimes these have included initial training. Since these projects did not aim at a particular local community except by accident—to get a computer, a recipient probably lived near the research institution—these are not treated here.

While community ICT today usually includes computers and the Internet, a more durable definition might be the digital tools—hardware and software—for storing, manipulating, and sharing text, moving and still images, voice and other sounds, and all other forms of information and communications. The technology is not yet stable, and different forms are often combined, as with the video camera and the computer to edit the video; the cell phone and the digital camera to take and share photos; the radio station's studio equipment and the Internet to Webcast streaming audio.

7. 'Use of ICT' will refer to 'a broad set of activities involving ICT as a tool.' Use of ICT also includes learning to use ICT, a process that is often nearly continuous, and cotemporaneous with other forms of use. This study is especially interested in groups that use ICT to be uploaders, to create content, to obtain and use content, and use that involves relatively novel tools.

8. 'Social networks' will refer to 'relations between people that, taken together, form a network where people, either individually or in organizations, are the nodes.'

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Every node is not tied identically to every other node, so a network has varying texture: denser, more closely knit regions and sparser areas of fewer or more tenuous ties.

Social network analysis models human society as composed of people and the relationships between them. The relationships or ties differ: they may concern sharing of resources and/or exchange of support; they may be ties of kinship, friendship, acquaintanceship, shared workplace; they may be weak or strong. They may reflect a common community of any type identified above. They may be bonding ties, within a given community, or bridging ties that form a bridge between communities. Research on social networks generally identifies only certain ties and drops others out of the model: Granovetter (1973), for instance, considered only ties where information was shared that led to a new job.

9. 'Social capital' has been most concisely and measurably defined as "resources embedded in social networks" (Lin 2001, 25). That will be the working definition here, although the literature review below will discuss other definitions.

As we shall see, in addressing gaps in our knowledge of these subjects, scholars have defined these terms differently. Their various definitions, to be discussed below, also create new knowledge gaps, at least one of which the proposal hopes to address.

1.2 At the intersection of three scholarly debates

Three distinct literatures inform the study and will be summarized below and elaborated upon in the next chapter: those concerning social networks, social capital, and community informatics. The first two are established theoretical literatures; the third is an emerging literature which is coalescing around various concepts and methods. Each

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of these literatures is a summation that, more or less often, adjusts to new data and analysis. This dissertation research aims to shed light on the two theoretical summations, one from the social capital literature and the other from social network theory. In addition it aims to apply, and thus demonstrate the usefulness of, these two realms of theory in elucidating causal or influential factors in the more empirical realm of community informatics.

1. The social networks literature examines social phenomena as activity across a network of actors with various ties between them. Granovetter (1973) asserted that weak ties were strong; in other words, as his data indicated, they were the dominant source of new information—information that led to a new job. Scholars have since explored the particular roles of both strong and weak ties. These roles are not completely understood, particularly in disadvantaged settings. By looking at the ties that help people in socially excluded communities use ICT [1], this study aims to shed more light on the question.

According to social network theory, weak social ties are generally thought to bring new information, strong ties to bring social support. How does this play out when community groups in socially excluded communities adopt and use ICT?

2. The social capital literature examines how resources are shared across social networks and how those networks relate to life success, civic engagement, community cohesion, and democracy. The concepts of bonding and bridging social capital (Putnam

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[1] While any social network model posits actors and ties, both Granovetter's study and this one focus on an actor seeking help via ties. Quite often in such work, the term 'tie' is also used to refer to the actor providing the help. This personal or egocentric network approach is discussed further below in chapter 2, section 2.1.

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2000) refer to a community's capacity for accessing resources within itself (bonding) or outside itself (bridging). Underresourced communities are said to depend on bridging social capital; yet others have asserted that social networks within these communities muster valuable resources and demonstrate a level of self-sufficiency. This is particularly true for social change, as studies of the U.S. civil rights movement have demonstrated. Others have theorized that such communities mobilize both bonding and bridging social capital. Looking at the question of how less-wired communities get wired (as defined in section 1.1), this study aims to shed more light on the question of where such a community relies on bonding social capital and where it relies on bridging social capital.

In social capital theory, bonding social capital is generally thought to serve to maintain resources in a community, and bridging social capital to bring new resources in. How does this play out when community groups in socially excluded communities adopt and use ICT?

3. The community informatics literature examines the relationship between ICT and communities, with particular emphasis on whether and how technology projects can strengthen communities, especially disadvantaged communities or those whose economies are dislocated by global economic shifts. With most of the projects originating in the late 1980s and 1990s, the research literature is still emerging. A recent review of 30-plus studies of community ICT pointed up social capital as one of the three most common conceptual frameworks (O'Neil 2002). Looking at how community groups are becoming wired, this study aims to shed more light on the question of what preexisting social ties and social networks help community groups use ICT, while

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helping ICT projects serve communities. Along the way, this study collects and analyzes new data about the process of ICT adoption and use by these community groups.

Although community informatics is a highly empirical literature, many scholars are experimenting with concepts that might provide explanatory power and help move the research from the particular to the general. Social capital and, to a lesser extent, social network theory are among a variety of concepts used to explain community ICT projects. More often, social capital is seen as a *result* of community ICT. A few scholars have examined the social capital or social network that influences community ICT. Can a better understanding of social networks and social capital *as an influence or input into community ICT* help us understand community ICT?

1.3 The policy context: digital inequality and democracy in the information age

The community informatics literature, including the current study, inhabits a terrain known as Pasteur's quadrant (figure 1). In other words, it aims to contribute both to theory and to practice. Stokes (1997) asserted that the American scientific community's focus on this terrain of "use-inspired basic research" is part of the reason for its success. Thus a necessary backdrop to the research problem is an examination of the policy environment of the study.

The current study is set in the context of research on the digital divide, which (as discussed in section 1.1, Definitions) has more recently been recast as the more complex concept of digital inequality (DiMaggio and Hargittai 2001). Behind this concept is the problem of an information society and a knowledge economy emerging simultaneously

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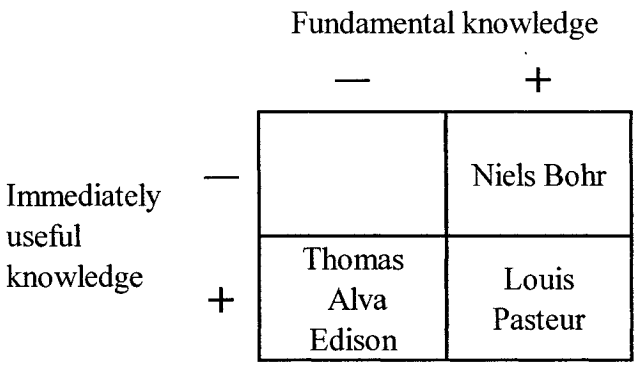

Figure 1. Pasteur's quadrant: scientific endeavor which is "use-inspired basic research." (Stokes 1997).

with increased social and economic polarization between rich and poor. (In other words, more people are at the ends of the rich-poor spectrum than in the past.) The middle ground is shrinking, whether one is looking at the world's regions, countries, cities, or classes.

Policy aimed at tackling digital inequality has directed a great deal of public and private resources towards resolving the problem. O'Neil (2001) provides a chronology. In 1993 a U.S. government report on the National Information Infrastructure called for extending universal service to include the new information superhighway. In 1994 the U.S. Department of Commerce and the U.S. Census Bureau began the Falling Through The Net series of surveys to track use of computers and the Internet. In 1996 the Telecommunications Act declared that "schools, classrooms, health care providers and libraries should have access to advanced telecommunications" (O'Neil 2001, 4), and the E-Rate program began to subsidize the rollout of equipment and services to implement this, spending up to $2.25 billion per year. Federal programs were set up at the National Science Foundation, Department of Agriculture, Department of Commerce, Department

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of Education, Department of Housing and Urban Development, General Services Administration, and the Universal Services Administration Company to fund programs providing access and training and developing governmental, health, and education online content.

These programs were joined by local government programs and private projects. For instance, in Ohio, a multiparty complaint against the telecommunications company Ameritech for "unjust and unreasonable rates" resulted in, among other things, a statewide fund for CTCs (Jacobs 1996). The city of Cleveland negotiated funding for a variety of digital inequality projects out of its cable TV franchise agreements. Bertot and McClure (1997) detailed how one of many states, Pennsylvania, rolled out computers to all its libraries. The Gates Foundation has provided $250 million in computer equipment, software, and training for local libraries (Gates Foundation 2004).

In Great Britain, telecenters were first opened in England in 1989 (Lancaster 1999, Bertin and Denbigh 1996). Foundations, companies, and local/regional governments have supported a variety of community ICT projects in the UK (Day and Harris 1997). The People's Network was set up to fund and organize Internet access and content development in public libraries, and since 2001 the government's UK Online project has funded more than 6,000 public Internet access points, including public libraries. Cybercafés are such a presence across Britain that the quarterly computer use survey by the UK Office of National Statistics includes a question about using the Internet in these locales. Accounts and analysis of the UK experience with community ICT can be found in a small literature (Ducatel et al. 1993, Cawood and Simpson 2000,

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Phipps 2000, Turner and Kendall 2000, Herman 2001, Selwyn 2003, Ellen 2003, among others).

The UK made a particular policy shift recently (Harris, personal communication) away from informal learning and open access towards formal learning, and scholars in this area have recognized the need for additional policy-oriented research to help make the case against this turn (Liff, personal communication; Day, personal communication). This shift is just an example of how policy-oriented research can inform governmental action and answer questions about effectiveness and sustainability.

As Manuel Castells titled his talk at a 1996 MIT conference on high technology and low-income communities, "The informational city is a dual city," (Schön et al. 1999). Yet at the same time, as Castells relates, digital technology enables communication to be multimedia and thus extremely inclusive and comprehensive. It delivers soap operas and databases and dissertations about soap operas. It also delivers fan fiction written about the soap opera characters. As he puts it,

> It is precisely because of the diversification, multimodality, and versatility of the new communication system that it is able to embrace and integrate all forms of expression, as well as the diversity of interests, values and imaginations, including the expression of social conflicts. (Castells 1996, 374)

In the same passage, he discusses the problem of the interacting and the interacted, that is to say, those who are able to create and circulate communications, and those who are only able to react to communications from others. In other words, who are the uploaders and who are only downloading what others have created? An additional dimension of

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this problem is the distinction between the 'switched-on' and the 'switched-off,' those who are not even able to download because they cannot even plug in.

Because digital communications tools are so dominant, digital inequality threatens the ability of people to become uploaders, to interact, express, and eventually resolve social conflicts. This is the connection between digital inequality and democracy. Because of their role in deliberation on and engagement with local issues, community groups in socially excluded communities are key indicators of digital inequality and democracy. These are engaged members of their communities who are using what tools they can. Such people are often weak ties that are linking several strong-tie subnetworks (Kavanaugh 1999). Already organized to address a particular issue, they are looking to do so via democratic channels, and these channels require communications. When such groups use ICT, to what extent are they uploaders or downloaders, interacting or interacted with? What digital tools do they use? On whom or what do they rely for help? Answers to these questions shed light on the real-world problems of digital inequality and democracy in the information age.

1.4 Summary: the real world and the research questions

This section first summarizes the real-world questions that the study examines, organizing presumptions and unknowns into a rational argument. This is also known as the policy rationale. Then this section summarizes the formally constructed research question.

In brief, the policy rationale is this: If ICT, as the newest infrastructure of society, is necessary for improving one's lot and participating fully in society and in the economy,

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and if ICT use is always supported—as evidenced by the sizeable computer services units that have sprung up over the past 40 years to serve organizations and individuals—then it is of great interest to find out how people without visible means of tech support are in fact using ICT.

This study presumes that structural poverty and social exclusion is a burden on all of society, not just for those in poverty or excluded. It also presumes that ICT has a role in combating poverty and exclusion, in improving the welfare of individuals and communities within a society. Not only has bridging the digital divide, or offering digital opportunity for all, been a policy objective, it has engendered a good deal of research in the U.S. as well as elsewhere, in the form of social surveys as well as case studies of social experiments with ICT. The reasoning is that in a digital society and a knowledge economy, facility with and use of ICT contributes to inclusion, educational achievement, job skills and job hunting advantages, and so on. In a society that is networked via ICT, individuals and groups derive value from being a part of the network. This is the underpinning to the reasoning in section 1.3 above.

The study further presumes—and this presumption is also backed up by empirical research–that almost universally, successful ICT users rely on tech support. The Homebrew Computer Club itself was a self-help tech support group that helped launch the personal computer. Over the past 40 years, sizeable computer services units have sprung up to serve organizations and individuals. New ICT-related job classifications are now entrenched in the global economy, even if the technology these workers support is still shifting. The new jobs have even altered the human flow through society's educational institutions to the workforce, enlarging computer science programs, turning

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library schools into information schools, and launching countless training institutes to help people earn new types of certification.

Impoverished and excluded communities generally cannot afford and are not granted formal tech support organizations. Yet (another presumption, also backed up by research) people in these communities are indeed using ICT. How are they doing it? Where does their help come from? Seen in this context, the study picks up social network theory as a sort of conceptual flashlight to answer these questions.

The answers, it is hoped, will allow scarce funds for ICT in communities to be spent more effectively, because the local help sources can be taken into account, and perhaps even augmented. They may also shed more light on how such communities seek and get help, enabling us to strengthen help networks for education, employment, health, and other challenges.

The research problem is to identify and analyze how community groups in a set of less-wired, socially excluded communities use information and communications technology (ICT). In the communities under study, (1) how and to what purpose do these groups use ICT? and (2) who or what helps them use it? The methods section below elaborates further on these questions. Overall, the study examines the process of ICT use by these community groups, with a particular eye to the social networks that support such use. What are the characteristics or the patterns of ICT use by these groups, and what are the characteristics or patterns of support for this use? Does variation in the support influence or affect ICT use? More specifically, what role do ties, particularly weak ties and strong ties, bridging and bonding social capital, play in supporting ICT use?

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This research problem can be seen as emerging from the intersection of two phenomena and can be expressed as a two by two matrix as in figure 2. One dimension is digital inequality, and the other is ICT use. As mentioned above, geographic communities evidence digital inequality. At the same time, in any community, some use ICT and some do not. Those who do are the "early adopters" (Rogers 1962) in their communities (quadrant C). In the wired communities, more than the early adopters are using ICT; we can call these people 'connected' (quadrant D). Servon (2002), concerned with community development and community-building, uses the term "organizational divide" in considering the gaps between community groups that use ICT (quadrants C and D) and those that do not (A and B).

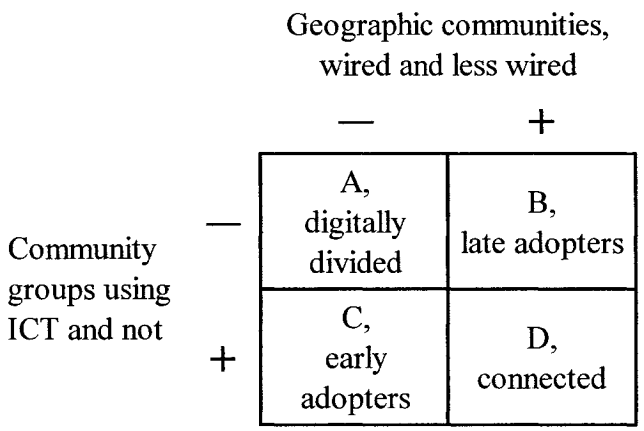

Figure 2. Connectivity of communities and community groups.

The study aims to focus on the early adopters, quadrant C in figure 2 above: groups in communities with less access to and use of ICT who are nonetheless using ICT. This is a form of sampling at the extreme, in the sense that *only* less-wired communities, *only* ICT-using groups in those communities will be studied. The study does not set out

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to measure the frequency of the phenomenon of community groups using ICT, but only to identify and analyze the phenomenon. Further research can look at groups in all four quadrants of figure 2, and can explore the frequency of this phenomenon.

The analysis of these groups includes the use of social network theory and methods. The second question above, who or what helps them use ICT, emerged from the following conceptual model:

social networks, social capital → ICT use

This model, which will be explored in detail in chapter 2, proposes that the social network or the social capital of a community group influences the ICT use by that group. This model emerges from the literature review described below and will be the lens for analyzing the data and testing the relationship between these concepts, as measured in the study. It arises from the intersection of several research discourses. The results of the study, it is hoped, make a contribution to each, but especially to community informatics.

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Chapter 2

Review of the literature

The study relies on and contributes to three threads of scholarship. Each thread is a contested space where different theoretical and/or research issues are debated. Chapter 2 summarizes these three literatures and a question in each literature that the study addresses. In this way a path will be traced to chapter 3, the research plan, or methods, chapter. This research aims to contribute to these threads by targeting key contradictions in current theory and generating a new theoretical synthesis based on empirical investigation.

2.1 Social network theory

Social network theory contrasts with sociological theory, which sees society as built up of individuals. The former starts instead from the relations between individuals (or larger social units, see figure 3), and models society as constituted of networks made up of sets of the relations, or ties between nodes. Wasserman and Faust (1999, 4) identify four additional fundamental principles of models built using social network theory: independence of actors; relations or ties consisting in the flow or transfer of resources; the constraining and/or enabling of individual actors by networks; and the generation of long-lasting ties and networks by social structures.

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The perspective of social network analysis—which comprises both method and theory—mitigates against studying any single relationship in isolation from the network of which it is part. This is because the 'dyad,' or relationship between two actors, is the building block of a network, but is itself conditioned by the network.

Across social network studies, the actor has been variously defined as individual people, groups, companies, or even countries. The relationship or tie is a flow of resources that can be material or non-material (Wasserman and Faust 1999, 4). The resources might include social support, emotional support, companionship, time, information, expertise, money, business transactions, shared activity, and so on.

Wellman at al. (1988) characterized social network theory not so much as competing directly with other approaches to identifying causality as

> reformulating basic questions. Thus, social network theorists have proposed, for example, substituting world systems theory for single state modernization theory, network communities for neighborhood communities, political networks for psychologistic interpretations of collective behavior, and vacancy chain analysis for individualistic analyses of social mobility (Wellman et al. 1988, 48).

(As an aside, the dissertation research reported in this document can be understood as reformulating the question of differences in individuals' rates of access and use of ICT, also known as the digital divide, into a question of social ties in less-wired, socially excluded communities.)

In a social network, every node is not tied to every other node. This results in any given network having particular features. Clusters of densely knit areas are where many actors are tied to each other, as, for example, a family. These clusters are connected to

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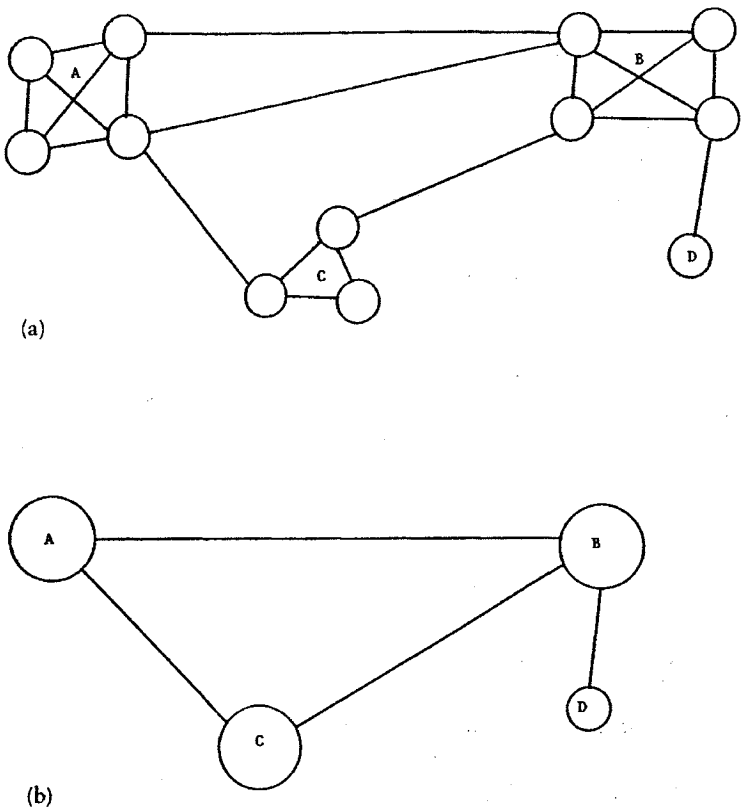

Figure 3. Networks as ties between people, illustrated in (a) below, or as ties between clusters of people, as in organizations, illustrated in (b) below. From figure 2.4, Wellman and Berkowitz 1988, 45.

other clusters via sparsely connected areas that form what are called bridges. The clusters themselves may be more or less visibly bounded, or fuzzy, as in an extended family where you might (or you might not) include ex-spouses and fiancés.

Resources shared across ties are generally finite, and therefore scarce. As a result, the property of hierarchy enters an otherwise neutral network structure. In this context hierarchy describes the fact that some nodes are at the center of a network and others are less connected and peripheral. Because resource flow generally attenuates as it travels

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from node to node, an actor's position—as a bridge, or near a bridge, at the edge of a cluster or at the center of a cluster, influences his or her access to resources.

There are three characteristics of social networks that will inform the analysis in this study: hierarchy, transitivity, and homophily. Transitivity states that if A is tied to B, and A is tied to C, it's likely that B is tied to C. Granovetter's work (1973, 1983, 1974/1995) on weak ties, to be discussed below, follows from this principle.

Another principle is homophily. A person's ties tend to be with people like them. So our personal networks tend to be homogeneous and defined by the following characteristics, in ascending order: gender, occupation, education, religion, age, and most of all race and ethnicity (McPherson et al. 2001).

Finally, there are two overarching approaches to social network analysis. The first looks at the network from the outside, with all the data that one chooses to collect on each tie and each node. Although one's data are never 100% whole and complete, this approach is called whole network analysis. The second looks at the network from the inside, with all the data that one chooses to collect on one node (also called "ego") and its ties ("alters"). This is called personal or egocentric network analysis, and is the approach to be taken in the present study.

2.1.1 Personal networks

Wellman's studies of personal networks in East York, Canada, exemplify this approach and contribute both theory and method to this study (reported in Wellman 1979, Wellman and Leighton 1979, Wellman et al. 1988, Wellman and Wortley 1990). His research team collected data on the personal ties of residents of a working-to-middle class

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Toronto locale. In 1968 they surveyed 845 people about their six closest relationships and analyzed these partial personal networks. In 1978 they interviewed and surveyed 33 people about their current ties, focusing in their analysis on the reported 403 "significant" ties. The research started from a network concept of community, defining community as a set of relationships between people.

Wellman's question was: what is community in a "large scale division of labor"—an industrialized metropolis, a so-called mass society? Is community lost, saved, or liberated? Lost would mean that individuals are not connected to each other and depend on bureaucratic resources for help. Saved would mean that people still live in solidarities—the densely knit and geographically bounded networks seen as typical of small settlements and preindustrial societies. Liberated would mean that people are neither embedded in solidarities nor alienated, but instead choose their own communities.

In the analysis, East Yorkers' communities were either lost, saved, or liberated, generally according to their position in the division of labor. Unemployed men and skilled tradesmen lived in "community lost" (they were self-sufficient or fended for themselves); people near kin or in workplaces that encouraged collegiality lived in "community saved"; and people climbing an occupational ladder lived in "community liberated."

It is important to note that even those living in "community lost," without social ties, are likely to get their needs met. Unless they meet their own needs, like the skilled carpenter who repairs his own home, they likely use what community studies (e.g. Gans 1962/1982) calls "formal bureaucracies." Bureaucracy is a form of organization that is, for the purpose of most community studies, tie-free. An individual with no personal ties

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can still get resources from any number of institutions: banks, supermarkets, psychiatric clinics, real estate agencies, welfare departments, schools, libraries, public transit systems, and so on—although often money is required.

Altogether, East Yorkers' ties were to kin, family, neighbors, co-workers, and (in the case of a very few) to those in voluntary or civic organizations. Graphic depictions of personal networks, as in figure 4 below, were a part of Wellman's analysis. The majority

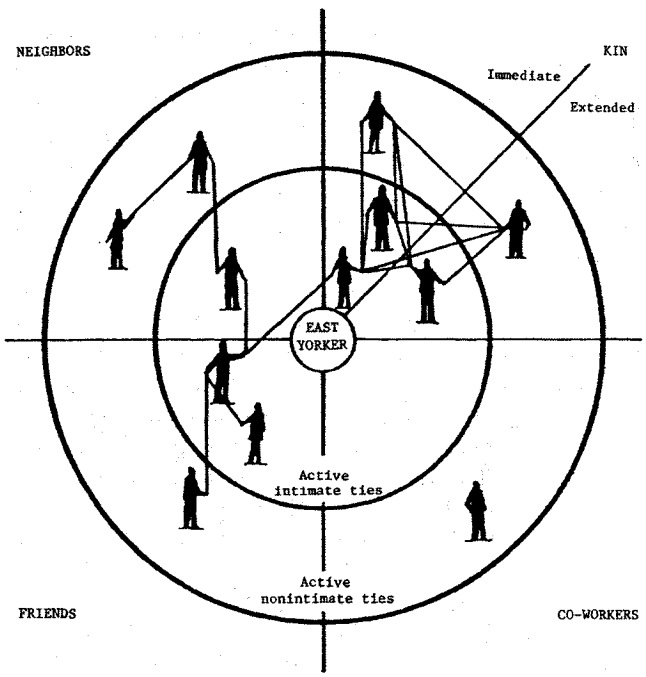

Figure 4. Typical personal network of an East Yorker. From figure 2.3, Wellman and Berkowitz 1988, 27.

of the ties were within metropolitan Toronto but outside of a one-mile radius of home; transportation and communications technology had loosened (but not separated) people from their immediate neighborhoods. (Homemakers were most likely to have

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neighborhood ties.) Face-to-face and phone were the most typical modes of contact, and different contexts served for different ties, rather than a collective setting bringing many ties together. The ties were long-lived, with only one-quarter less than 10 years in duration. Four-fifths of the ties were transitive and embedded—in other words, a vast majority of East Yorkers' ties were also tied to each other. The content of the ties—the resources shared—were sometimes multidimensional and sometimes focused, but generally consisted of companionship, emotional support, and small-scale services. Specialized information emerged (but infrequently) as tie content: for example, two people were involved in community organizations, an animal rights activist and the mother of a child with a health condition.

Summing up, Wellman writes, "We have not found communities in the traditional sense. But we have found networks, and they seem to have satisfied most East Yorkers," (1988, 176). In this particular metropolis, the significant ties of people did not conform to a small, geographically bounded community. As we shall see, this finding, generally thought to be true across most metropolitan areas, will complicate attempts to identify strong and weak ties.

2.1.2 The strength of weak ties

Rather than interrogating the concept of community, as did Wellman, social network theorist Granovetter (1973, 1974/1995) interrogated the process of getting a job. He asked how people find out about the jobs they take. He examined the tie between the jobseeker and the person who supplied the information that led to the job. (The jobseekers were all professional, technical, or managerial workers residing in a particular

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suburb of Boston.) This is a study of personal networks rather than whole networks, and focused solely on personal ties that provide information leading to a job that is actually taken. As such, it is an example of activity-specific network analysis, the activity being jobseeking.

Some respondents used bureaucratic structures to answer their needs: job agencies and classified ads. But most of the 54 interviewed relied on their informal networks. One of Granovetter's findings was that the informal social contacts that led to a job were skewed towards being weak ties rather than strong (1973, 1371):

- 16.7% of the contacts the jobseeker sees twice a week or more often,
- 55.6% of the contacts he sees less than twice a week but more than once a year,
- 27.8% of the contacts he sees once a year or less often.

Granovetter proposed a model that built on the principle of transitivity described above: if A-B and A-C, then likely B-C. Furthermore, he noted that if the two ties A-B and A-C were strong, then B had to be tied to C, either strongly or weakly. As a result, in his model all local bridges were necessarily weak ties. Figure 5 below illustrates this rule and makes the point that some bridges are more important or critical than others. In figure 5, (b) shows a bridge, a weak tie between A and B, that is more important or critical than the A-B bridge in (a). Consider how much further C and D are from B without the bridge. The data showed that study subjects tended to hear of the jobs they took via weak ties. "Of those finding a job through contacts, 16.7% reported that they saw their contact often [at least twice a week] at the time, 55.6% said occasionally [more than once a year but less than twice a week], and 27.8% rarely [once a year or less]

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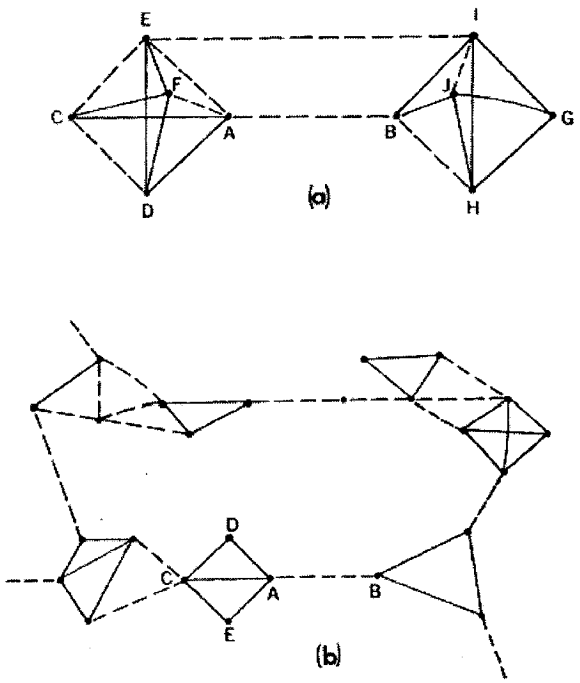

Figure 5. Examples of bridges between A and B. Strong ties are solid lines; weak ties are dotted lines. In both (a) and (b), A to B is a weak tie and a bridge, but in (b), A to B is of greater importance, as the alternative paths from A to B are much longer. From figure 2, Granovetter 1973, 1365.

(N=54)," (Granovetter 1973, 1371). Information about a job is new information, so Granovetter hypothesized that new information comes via weak ties, those which are local bridges in particular, and titled his 1973 paper, "The Strength of Weak Ties." In other words, weak ties are strong (that is, effective) when it comes to job lead information.

In addition, the information paths between the jobseeker and the hiring person were found to be short (Granovetter 1973, 1372):

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- 39.1% were just one tie long: the jobseeker heard about the job from the person hiring,
- 45.3% were two ties long: the jobseeker heard about the job from someone who was tied to the person hiring, and
- 3.1% were more than two ties long.

As we discussed above regarding the attenuation of resource flow along ties, information leading to a job appears not to travel very far. This suggests that if a person depended only on a densely knit strong-tie network, that person would be insulated from information that would lead to a job.

Granovetter reasoned that job lead information from a person's strong ties might be the same as his or her own job lead information, since a person communicates with strong ties more often, and thus a person might not use them. (As he defined them beyond his original Massachusetts study, ties are weak or strong based on time together, emotional intensity, intimacy and reciprocal services.) Or, he reasoned, people might avoid querying their strong ties about a job unless they had to, so as not to strain the relationship.

Referring to prior theory as did Wellman, Granovetter (1983) examined strong ties between people, believed to result in local cohesion, and weak ties, believed to result in alienation. He theorized that strong ties by themselves generate fragmentation, as subgroups in a community become isolated from each other, and weak ties allow for community integration, connecting these subgroups. The event he studied, the sharing of information regarding job openings, is an example of the integration process.

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2.1.3 Where weak ties aren't strong

Many studies have cited Granovetter's Strength of Weak Ties study; among them several that Granovetter later discussed as part of an ongoing dialogue within the field (Langlois 1977, Ericksen and Yancey 1980, Lin et al. 1981, Murray et al. 1981, Boomran 1975, cited in Granovetter 1983). A search on ISI Web of Science turned up 1,668 such articles, and a search of Proquest's Digital Dissertations database turned up 111 abstracts mentioning Granovetter or weak ties.

But the evidence did not completely support Granovetter's theory. To cite just a few studies, various groups were found to tend to rely on strong rather than weak ties for job leads (Murray et al. 1981, Erickson and Yancey 1980, and Langlois 1977, all cited in Granovetter 1983; Brenes 1983; Watanabe 1987; Triegaardt 1992; and Longjohn 2001):

- newly minted PhDs,
- less well-educated Philadelphians,
- non-managerial Quebec government workers,
- clerical finance/insurance/real estate workers,
- Japanese workers,
- laid-off South African workers, and
- mentally retarded workers.

These results were not explained away by the fact that studies defined a weak tie in different ways, for example, as someone with whom an actor is in less frequent contact, or as a non-kin, non-friend relationship.

Results testing the Strength of Weak Ties theory in domains other than that of job lead information are also mixed. Of the 60 dissertation abstracts that described their

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findings in testing the theory, 45% confirmed Granovetter, 37% found that both strong and weak ties play a role, and 17% found that strong ties were preferred or preferable in achieving goals. (See table 1.)

	%	N
Confirm theory; weak ties are more effective than strong ties	45%	27
Reject theory; both strong and weak ties play a role	37%	22
Reject theory; strong ties are more effective than weak	17%	10
No clear results as to Strength of Weak Ties theory	2%	1
Total	100%	60

Table 1. Findings of 60 dissertation abstracts which test Granovetter's Strength of Weak Ties theory.

Certain findings are generally accepted. When it comes to personal contacts for job leads, higher-status or higher-skilled jobs tend to use weak ties while lower-status or lower-skilled jobs use strong ties. This could be out of urgency—when a person is out of work his or her kin and friends help resolve the crisis. Or it could be because in lower-status jobs employers prefer to hire through an ethnic or other solidary group, because a current worker can vouch for, train, and even discipline a new hire. Generally, people use strong ties for emergencies, for emotional support, or when they do not have weak ties (Wasserman and Faust 1994/1999).

Disadvantaged people are often found to be "encapsulated" without weak ties outside their community, ties that could provide new information or new resources. The focus of such people, the reasoning goes, is on basic needs and emergencies, which require maintenance of strong ties (Lin 2001). Another explanation for the focus on

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strong ties is that society has a pyramidal structure, and towards the bottom it is not as easy to access people not like you—weak ties (Lin 2001). As we have seen with Wellman, however, the personal nature of community makes it unclear whether we can characterize a geographic community by the personal networks of a sampling of its residents.

Context is a particular lesson here. Granovetter studied dyads without looking at the personal networks of the jobseekers. What might he have missed? An exchange between social network theorist Granovetter and ethnographer Herbert Gans (Gans 1974a, 1974b, Granovetter 1974) is instructive here. Granovetter (1973) had generalized from his jobseeker study and commented on Gans' (1962/1982) study of residents of Boston's West End, which was demolished in the late 50s without significant local mobilization. Granovetter argued that the lack of successful protest was the result of the absence of weak ties across the community. Gans replied that weak ties were necessary but not sufficient. He enumerated six contextual issues that he felt needed to be considered along with social network analysis:

1. At the time there was no precedent for fighting urban renewal;
2. Residents did not get information in time;
3. There was a lack of trust or informal contacts with politicians, and no single politician for area;
4. There was no cultural tradition of protesting, and leader of protests was an oddball;
5. Settlement houses and Catholic church were pro-renewal; and
6. The West End was not one single community, but several neighborhoods.

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While many of these factors can be restated in social network terms, it is important to see that even the "whole network" approach of Granovetter, looking at cliques and the absence of ties between them, could be incomplete, let alone the dyad approach that he took in his own study.

At the same time, the discussion between the two scholars helped to replace an old paradigm (strong ties as key and weak ties as a drift into individual alienation) with a new paradigm: weak ties make a society whole. Furthermore, later work rooted in social network theory found that weak ties strengthen a community *over time*, by their very persistence.

(As an aside: Gans' work is an interesting parallel to the study proposed here. He lived in a community for two years and began to understand and bring out important concepts about how that community and culture was organized and how early generations of immigrants adjusted to urban industrial life. This study is taking a snapshot of how a community is organized with respect to ICT use and how generations of non-computer users are adjusting to ICT.)

The social networks literature examines social phenomena as activity across a network of actors with various ties between them. Granovetter (1973) asserted that weak ties were strong; in other words, as his data indicated, they were the dominant source of new information—information that led to a new job. Scholars have since explored the particular roles of both strong and weak ties. (As we will see in section 2.3, they have used a variety of definitions of strong/weak ties in their efforts.) These roles are not completely understood, particularly in disadvantaged settings. By looking at the ties that help people in socially excluded communities to use ICT and defining weak and strong in

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particular ways drawn from the literature, this study aims to shed more light on the question (as Granovetter would put it), Under what conditions are weak ties strong?

2.2 Social capital

The concept of social capital dovetails with and even rests on social network theory. This section will review the work of James Coleman, Robert Putnam, and Nan Lin to demonstrate how this is so, and will point up a question in the social capital literature concerning bonding and bridging social capital. This is a question that the study sets out to help address.

2.2.1 Social capital to explain group behavior

Coleman (1988) advanced social capital as a conceptual tool for resolving two conflicting theories on how microstructures in society generate macrostructures. One theory, typically sociological, held that the actions of people are governed by norms, rules and obligations; the other, usually from the point of view of economics, held that people are independent and self-interested and act to maximize their own utility. One theory erased agency; the other didn't allow for social or collective organization. Social capital, Coleman felt, would put economic rationality into a social context.

Echoing social network theory, Coleman identified social capital as something inherent in the structure of relations between actors. His examples were of the trust that is possible within a stable set of people: among diamond merchants based on family and religious ties; among members of secret cells in the Korean student movement based on common hometown or school or church; and among merchants in an Egyptian market

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based on family ties and business longevity. He pointed up two features of social capital. The first was multiplexity, where two actors have multiple dimensions to their relationship, as in the case of two friends who attend the same church and whose children attend the same school. Closure was the second, where everyone in a set of people knows at least two other people in that set and therefore has recourse to sanctions against any other person in the group.

Looking for empirical evidence of family social capital, he analyzed data on school dropouts. The data revealed that smaller, "intact" (two-parent) families where the mother expects children to attend college experience a lower dropout rate, which he explained as the children getting having a larger share of social capital from their parents, social capital that expressed itself as attention and support. With the same data as above Coleman measured lower dropout rates among children at religious schools, and ascribed this to the stronger social capital represented in the ties of children to parents, classmates, and teachers. The actors in this setting would be expected to have both multiplex ties and closure.

Coleman's descriptions are generally of social capital via strong ties, and the two features he describes map to strong ties: multiplexing has its analogy in the social network literature where Wellman discusses multistranded ties, and the concept of closure is an echo of densely knit social networks. In conclusion, Coleman warns that family and community ties seem to be weakening, so that in the future we will rely more on formal organizations than on informal networks, echoing the "community lost" sentiments, and presaging Putnam.

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2.2.2 Social capital to maintain the fabric of civil society

Putnam (1995, 2000) enters the social capital debate via a focus on the relationship between democracy and civil society—both of which social network theory suggests rely on both strong and weak ties. As did Coleman, Putnam formulates a definition of social capital that relies on social networks: "connections among individuals—social networks and the norms of reciprocity and trustworthiness that arise from them," (2000, 19). He argues that that social capital is declining in the U.S., on the basis of three indicators for which he reports a great deal of survey data: fewer people are members or active in civic associations and organizations; families spend less time together; and neighborliness and socializing with neighbors is down. He covers both bonding and bridging social capital and makes an important point:

> In short, bonding and bridging are not 'either-or' categories into which social networks can be neatly divided, but 'more or less' dimensions along which we can compare different forms of social capital. (2000, 23)

This helps us understand Gans' *Urban Villagers*: relatively-strong-tie networks based in microneighborhoods composed of a few blocks, and very little holding the entire West End together. It also helps us reconcile the varying definitions of weak ties and strong ties. The two types of ties are relative, not absolute, and depend on scale. For Wellman and many others, strong ties were kin and friends, weak ties were acquaintances and co-workers. The community he looked for and did not find was East York; what he found were personal networks ranging for the most part across metropolitan Toronto, on

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the basis of the phone, transportation, and work and home mobility. For Granovetter, strong ties were "see twice a week or more" and weak were "see once a year or less."

2.2.3 Social capital to obtain resources

Putnam's book (2000) was very much taken up by the media, policymakers, and scholars, some of whom took issue with it. Lin (2001) catalogues those who have refuted Putnam for his method. He himself takes a different approach, both theoretical and empirical: first laying out a theory of social capital which is more precise than Putnam's usage, and then concluding with a look at ICT, more specifically, cybernetworks, as an explosion of social capital.

Lin discusses social capital against a background: capital (Marx 1887/n.d.), human capital (Schultz 1961, Becker 1964), and cultural capital (Bourdieu 1970/1990). He defines social capital so as to be measurable, not confounded with its effects, and based on social network theory as "resources embedded in social networks that can be mobilized when an actor wishes to increase the likelihood of success in a purposive action," (2001, 24). He identifies four controversies and gives his answers. First, is social capital a collective or an individual asset? It can be seen as both, he says, but you can't mix it up with trust or norms, which are collective assets only. Here he makes a criticism:

> Divorced from its roots in individual interaction and networking, social capital becomes just another trendy term to employ or deploy in the broad context of improving or building social integration and solidarity. (2001, 26)

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Second, does social capital arise from closure or from open networks? Lin credits Granovetter (1973) with establishing that weak ties bring resources too, and summarizes what is generally accepted, though not always proven: dense networks, or bonding ties, help preserve or maintain resources and are activated by expressive action, while bridging ties help with searching for and obtaining resources and are activated by instrumental ties. Third, does social capital include all social structural resources that generate returns? No, he says, or you risk definitional fuzziness where the cause and the effect are the same. Fourth, is social capital measurable? Yes, and he briefly discusses two classes of measuring instruments.

Lin lays out a seven-part theory of social capital with three assumptions upon which this theory is based. First, the assumptions (2001, 56-58):

1. Society is hierarchical and pyramidal with respect to resources: there is a top and a bottom, and the top is smaller than the bottom. Different resources show identical or similar pyramids.
2. Interactions are more likely at a similar or identical level in the pyramid.
3. Two driving forces are the maintaining of resources and the gaining of better resources. For the former, expressive action is the means and the end, it is stabilizing, and it tends to take place between homophilous ties (between two people who are alike in some way). For the latter, instrumental action is the means (and not the end), and rather than stabilizing it aims at change, and tends to take place between heterophilous ties.

His seven propositions are (2001, 59-73):

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1. Social capital pays a return—improves an actor's outcomes—and is therefore worth investing. Accessing social capital is a function of one's position in the hierarchy, the nature of the tie, and the location in a network.
2. Strength of position: higher in the hierarchy means better social capital.
3. Strength of strong tie: strong ties serve better for expressive action.
4. Strength of weak tie: weak ties serve better for instrumental action.
5. Strength of location: closer to a bridge is better for instrumental action.
6. Position, tie and location all interact; thus the resource differential across a bridge influences the strength of the location near a bridge.
7. Structural contingency: at the top of a pyramid, there is not much further to go, so instrumental action is not as worthwhile. At the bottom of a pyramid, there are so many people and so many homophilous ties, instrumental action is not as possible. The middle of the pyramid is where social capital can best serve for instrumental action.

With this as his operating framework, Lin then uses the data on growing Internet use worldwide, together with a case study of the Falung Gong movement, to argue, "There is clear evidence that social capital has been on the ascent in the past decade: in the form of networks in cyberspace," (2001, 211). He further points out that those not online are at an ever-greater disadvantage, cut off from this explosion in social networks and social capital.

The concepts of bonding and bridging social capital refer to a community's capacity for accessing resources within itself (bonding) or outside itself (bridging). Underresourced communities are said to depend on bridging social capital (Putnam 2000,

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similarly but discussing strong and weak ties in Wellman and Berkowitz 1988); yet it has also been asserted that social networks entirely within these communities muster valuable resources and demonstrate a level of self-sufficiency. This is particularly true for social change, as studies of the U.S. civil rights movement have demonstrated (Morris 1984). Others have theorized that such communities mobilize both bonding and bridging social capital (Orr 1999).

Looking at the question of how less-wired communities get wired, the study sheds more light on the question: Where does such a community rely on bonding social capital and where does it rely on bridging social capital?

2.3 Community informatics

The purpose of this section is to elucidate what scholars of community informatics have suggested about the relationship between social capital/social networks and community ICT, and to point up an opportunity for further inquiry, an opportunity that the study seizes upon. The section will first define community informatics, then discuss the roots of community informatics, the main ideas, and those studies in community informatics that use the concepts of social capital and social networks.

2.3.1 What is community informatics?

Community informatics is a field both of study and of practice, although the concern here is primarily with the former. As a new field, it is variously defined, but Loader has described it as navigating the interaction between 'transformation' as expressed in ICT and 'continuity' as expressed in a local, historical community (Loader

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et al. 2000, cited in Keeble and Loader 2001, 4). This is a specification of Kling's definition of the field of social informatics: "the interdisciplinary study of the design, uses and consequences of information technologies that takes into account their interaction with institutional and cultural contexts," (Kling 1999). The case study is perhaps the predominant research method to date, with scholars often engaged alongside practitioners as designers of community ICT.

Where social informatics historically has most often concerned itself with organizational settings, particularly business and government, community informatics looks at that third terrain of social activity, the community. The concept of community, and the tensions within that concept, set in the context of the nascent information society, form the core ideas of community informatics.

The challenge of defining and explaining community is not a new one. With the last major wave of U.S. migration from country to city, the fate of community within the metropolis occupied a generation of scholars, who themselves referenced the scholarship of those who had earlier grappled with the migration to European cities during industrialization there (e.g. Tönnies 1887/1957). Community is variously defined in the social sciences and has been examined in many of its guises in community informatics literature. It may refer to a population living within certain geographic boundaries (geographic community). This definition is bolstered by the fact that planning and the flow of funds are channeled according to those boundaries and political battles are often fought within these jurisdictions. Especially early on, various cities implemented community ICT projects (for a comparison of four cities, see Guthrie and Dutton 1992).

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But there are communities within these geographic communities, as for instance the communities of interest that contended—the homeless and their allies, and local business and real estate interests—within Santa Monica's Public Electronic Network (Rogers et al. 1994). Furthermore, there are communities that do not share a geographic locale, most dramatically the diasporic communities that have taken to the Internet to maintain close ties with people far away, for example Trinidadians (Miller and Slater 2000). From these examples it is evident that community may refer to people with a shared identity. It may refer to people with a shared interest or activity (communities of interest), as for instance the work of Bishop et al. (2001) on a community ICT tool for African American women working on health issues. It may also refer to a gathering of people in cyberspace according to shared geography, identity, or interest; Rheingold's two books on computer networks (1993) and on cell phone networks (2002), respectively, come to mind. Wellman (personal communication) has recently advanced the notion that every individual and his or her ties represents a distinct personal community, more or less place based.

Benjamin (2001) used a recursive definition of community—"people living in a geospatial area who define themselves as part of a community"—in order to analyze why some telecenters succeeded and others failed to attract local involvement. This definition has a history in ethnography and acknowledges that communities are quite often self-identified or socially identified. This is one of the definitions that the proposed study will rely on.

There are tensions and overlaps between these various communities. The field of community informatics, by looking at the interaction between transformation and

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continuity, between ICT and community, is building up a picture of what community looks like and how it is evolving as we move from the industrial to the information age. Section 2.3.3 below, by taking up only those community informatics studies that make use of the concepts of social capital and social network, presents one way to synthesize the apparently disparate case studies that are all grappling with the same interaction.

It is worth mentioning that, for scholars in community informatics, the scaffolding of the field features two particular processes that have contributed to the drawing together of English-speaking scholars via conferences, proceedings volumes and at least one journal. The first of these two processes is the series of seven Dimensions in Advanced Computing (DIAC) conferences sponsored by Computer Programmers (later Professionals) for Social Responsibility since 1987; this has generated both proceedings volumes and edited books (most recently, Schuler and Day 2004). The organizer, Douglas Schuler, is a co-founder of Seattle Community Network, has launched and operates an undergraduate program in community informatics, and authored *New Community Networks: Wired for Change* (1996). The second process is anchored in Teesside, England, where Brian Loader and others have generated a flow of edited volumes (Loader 1998, Loader and Hague 1999, Loader and Thomas 2000, Keeble and Loader 2001, Loader and Dutton 2002, Loader et al. 2003, Loader and Keeble 2004), at least one conference, and the quarterly journal *Information, Communication and Society* (since 1998), all while guiding several community ICT projects.

Other integrative processes are (1) the work of Gurstein (2000) defining community informatics and bringing particular attention to work in Australia and Canada, (2) conferences organized by him and others from England, Australia, and the U.S. via

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the Community Informatics Research Network, and (3) the somewhat more broad but still highly useful conferences of the Association for Internet Research (annual since 2000) and the journals *First Monday* (launched 1996), *The Information Society* (1981), and *New Media and Society* (1999).

2.3.2 The roots of community informatics

It is possible to identify four important social trends that gave rise to community informatics, and these have their reflection in the field's still-coalescing literature. These four trends are listed below, and they each have generated scholarly work that forms a foundation for community informatics, as we shall see:

1. a network society changing, and even threatening, local communities,
2. the hacker ethic,
3. libraries' community information systems, and
4. the digital divide.

1. Network society is changing and even threatening local communities. Today we have a society characterized by networks rather than organizations, flexible production with a flexible workforce, with an economy that is globally coordinated in real (or chosen, as with e-mail) time. A new space has been identified that contrasts with the space of place (geographic communities): the space of flows, that is, the sum total of all the communications and transportations flows that link the global, mobile network of human networks (Castells 1996). The world's economies (east and west) took up digital technologies even as they experienced the economic crises of the 1960s and 70s; what has resulted is spaces of place that are threatened, because they are mostly bypassed, by

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the space of flows. In the industrialized countries, one can think of the U.S. Rust Belt or vast stretches of the North of England as thus threatened. Other spaces of place, such as the Silicon Valley, have certainly been transformed, and yet even there the space of flows has left toxic dumps with which the space of place has to cope. As has been mentioned, local governments have responded with digital initiatives of their own. An example is Santa Monica, California, which made available to its residents free online discussion lists, accessible in public libraries or from home, and access to city officials (Rogers et al. 1994). Another is Lagrange, Georgia, which offered its entire population free cable Internet (Youtie et al. 2002).

An interesting reflection in academia of this space of place-space of flows or network-communities conflict was the 1996 colloquium that became the edited volume *High Technology and Low-Income Communities* (Schön et al. 1999). This arose from a dialogue between two mutually exclusive groups in urban planning at MIT, one focused on opportunities for ICT and the other on low-income communities. They recruited Manuel Castells to the event and produced a proceedings volume that discussed, but did not name, community informatics.

2. The hacker ethic—defined by Himanen (2001) as the practice of building computers and writing code for the fun of it, for the creativity of it, and for the community-building—is what he calls "the spirit of the information age."[2] The hacker

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[2] The open-source community model is now widely discussed and has been compared or applied to other social phenomena: cultural creativity (Lessig 2004), curriculum sharing (Ishii and Lutterbeck 2001), scientific journal publishing (Public Library of Science 2003), the practice of science itself, and even the rise of Protestantism (Willinsky 2005), to name just a few.

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ethic expressed itself in the origins of the personal computer in the milieu of the Homebrew Computer Club and in the production of Linux and other such software. It also expressed itself in projects where hackers joined up with others to produce such tools as:

- the volunteer projects that built on PLATO, where by 1972 hackers and teachers were writing online courses for all levels of students (Woolley 1994);
- Berkeley Community Memory, the public terminals established in 1973 that provided an online bulletin board for all passersby (Felsenstein and Aboba 1994);
- community technology centers (CTCs) such as Playing to Win, opened in 1983 by a math teacher in a Harlem housing project (Stone 1996); and
- freenets or CNs such as the Cleveland Free-net, which began life in 1984 as St. Silicon's Hospital and Information Dispensary, an online communications tool for doctors and patients (Bluming, n.d.).

CNs and CTCs each developed into international movements, with associations, publications, and annual conferences for practitioners. Community ICT projects emerged out of the grassroots—as in inner-city Toledo, Ohio (Alkalimat and Williams 2001) and inner-city Wilmington, North Carolina (Mele 1999)—and blossomed in both virtual and actual space.

3. Community information systems in public libraries came into being in the 1970s, when urban communities in crisis needed places for local information concerning where to find food, health care, housing, civil rights, legal aid assistance, and other local services that were available. In response, librarians began to build community

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information files as an appropriate extension of their local holdings. These files were collections of flyers, booklets, and directories to help people in need. When card catalogues were converted into online databases, in many cases the community information was as well. When these online databases became Web-accessible, in many cases these community information files followed suit, especially where links had been built between CNs and local libraries. In some cases libraries took over the operations of CNs, extending their activity from collecting information for the everyday needs of individuals and communities to facilitating the creation of such information (Durrance 1984, Durrance and Pettigrew 2002). It was a library school professor at the University of Michigan who helped shepherd the Association for Community Networking into existence and organized her students into newsletter editors and eventually archivists for the movement, establishing the Community Connector (Durrance 1994), an online resource for this movement and now for the field of community informatics.

4. The fourth and final social trend that created a foundation for community informatics was the discourse and the activity around the concept of the digital divide. As has been said, this concept emerged as a gap between people who access and use ICT and those who do not. In the United States, it was the Department of Commerce who was an early implementer of both research and policy on this issue, launching a series of survey reports on the access and use by individuals of computers and later the Internet, and annual rounds of grantmaking (TIAAP, later the Technology Opportunities Program, or TOP) to communities and local organizations to support community ICT projects. Their initiative was rooted in the economic imperative to develop a market for computers and for e-business and to develop a skilled workforce via education and public provision

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of ICT. Experiments such as TOP were echoed by private and other public funders, including technology companies and even the National Science Foundation, which helped Playing to Win launch the now-nationwide Community Technology Centers Network. One could certainly say that the dot-com technology bubble fueled the digital divide discourse in the U.S., with corporations taking on local and national projects. All these influences created a big tent for study and practice regarding the phenomenon of stratification in ICT access and use.

These four trends continue to influence and interweave with each other, and are reflected in a literature that emanates from many disciplines. They themselves express the shifting definitions of community in community informatics and are examples of how transformation and continuity express themselves in these variously defined communities.

2.3.3 Community informatics and social capital/social network theory

Social capital and social networks are the two theories that the current study uses to address the question of community as it intersects with technology. A recent review of 30-plus studies of community ICT pointed to social capital as one of the top three conceptual frameworks for evaluating such projects (O'Neil 2002). A search of the literature on community ICT turned up more than a dozen scholarly studies that make use the concepts of either social networks or social capital. A number of them also use the Strength of Weak Ties theory. This section will summarize these studies and what they suggest about the relationship between social networks (or social capital) and community ICT and how they inform the dissertation research. Each of the studies looks at the

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relationship between technology and community, conceptualizing community either in terms of social networks or social capital. The analysis is strong on description and narrative but has not been thoroughly synthesized by equally strong work on general concepts and theory. The objective in this section is to construct a framework that will help explain theoretically this diverse empirical literature.

Each study defines community ICT practically, empirically, as the particular community ICT project under study. In one case it's a telecenter. In another case it's a virtual community, which essentially means a CN. It's a cybercafé. It's a high-speed connection in the home and a local community listserv to go with it. The most elaborate instantiation of community ICT in the studies examined here is Blacksburg Electronic Village, which supported electronic discussion lists, gave grants for people to develop Web sites, provided server space, tech support, and high-speed public Internet access points. It will be recalled that this was termed a community ICT package in section 1.1, Definitions. All these studies are either of CNs, CTCs, or packages of community ICT delivered to the community.

As we have seen, technology and society shape and influence each other. The cases in these studies either focus on (1) community ICT shaping social networks/social capital; (2) social networks/social capital shaping community ICT; or (3) both processes. After reviewing the finding in these three areas, this section will recap the studies' findings with regard to strong and weak ties and draw a framework from the findings reviewed. For clarity, the three types of studies are listed at the start of each subsection in which they are discussed. A table detailing all the studies is in appendix A.

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Does community ICT shape social networks/social capital?

The following studies examine the effect of community ICT on social networks or social capital:

- Kavanaugh 1999,
- Kavanaugh and Patterson 2001,
- Blanchard and Horan 2000,
- Hampton and Wellman 2000,
- Hampton 2003,
- Hampton and Wellman 2003,
- Tonn et al. 2001,
- Ferlander and Timms 2001,
- Ferlander 2002,
- Ferlander 2003,
- Kvasny 2002,
- Meredyth et al. 2002,
- Clark 2003,
- Pinkett 2003, and
- Pinkett and O'Bryant 2003.

All but two of the studies find that community ICT does indeed contribute to social capital/social networks. Of those that explore weak ties and strong ties,

- strong ties only are augmented in an Australian housing estate (public housing project) (one instance),

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- weak ties only are augmented in a Denver youth-serving CTC and at the end of the Netville project in a Toronto suburb (two instances),
- both kinds of ties are augmented in Blacksburg, Virginia (weak augmented more than strong there), in a Stockholm cybercafé, and earlier in the Netville project (three instances).

An additional complexity is that each study defines strong and weak ties somewhat differently. This is also true for the studies that ask the question, Does community ICT shape social networks/social capital? These definitions are detailed in appendix A and in further discussion below, accompanied by table 2.

Although it is possible just to sum these studies up as saying that community ICT augments a community's weak ties as much or more than strong ties, it is important to see how these studies arrived at their conclusions. In large part they are case studies. They represent a tiny fraction of the total community ICT projects in the world. What exactly did they find?

Kavanaugh (1999, similarly in Kavanaugh and Patterson 1998) asked, What is the relationship between computer networks, social networks, and civic engagement? Working in an affluent small U.S. city, they interviewed 10 members of social networks that had an online presence by means of the Blacksburg Electronic Village (BEV), and found that the ICT, especially e-mail and listservs, reinforced and extended social networks. Using the Internet to garner resources suggested that it was weak ties social networks, but data from seniors demonstrated that social support, within-group strong ties, were also reinforced and extended by community ICT. A related study (Kavanaugh and Patterson 2001) asked if a community computer network was a way to build social

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capital. Considering again the effect of the BEV in the form of listservs, grants for Web development, server space, tech support, and high-speed public Internet access points, they carried out two resident surveys (N=156 and N=320). They were not able to measure an increase in community involvement and attachment over the period that BEV had grown, but they did see an increase in community communication. They found that length of use of the Internet was directly related to (1) use of the Internet for social capital and (2) a sense of increased community involvement.

Blanchard and Horan (2000) surveyed 342 people in a mid-sized California city that was about to get a "virtual community" (i.e., a CN). Following the Putnam thesis, they wanted to know if virtual communities could "compensate for a decrease in social capital due to a decreased participation in face-to-face communities." They also asked what topics would attract people's virtual participation. Their conclusions were that people would indeed make use of a new virtual space and interact with their neighbors, building social capital by using child education resources, community bulletin boards, communicating with family and friends, and participating in government or politics.

Hampton and Wellman (2000) asked how living in a wired neighborhood affects interpersonal relations. They carried out a two-year case study of a middle-income suburban development in Toronto ("Netville") where close to half the residents were provided with a high-speed Internet connection and a residents' listserv. They found that wired households evidenced more social ties of every type: strong, weak, instrumental, emotional, social, and affiliative. Their operationalization of strong and weak included three categories: host someone at your home or vice versa (strong); talk with regularly (weak); or the "knowing tie," recognize someone by name. Additional data analyzed by

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Hampton (2003) concerning the end stage of the Netville project when the community had begun to fight the development project over house repairs and over withdrawing the high-speed Internet, suggested that ICT only contributed to weak ties, defined as above. This is from surveys done with 65 wired and unwired households. Analysis of participant observation and interview data (Hampton and Wellman 2003) says again that a household's being wired was associated with and a causal factor in more weak ties. It may have been that the local ties most augmented at the later stage were the weak ties, due to a chronological factor (all the households moved in roughly the same time and were becoming settled in the community) and due to the fact that weak ties took on importance in the struggles with the landlord and high-speed access provider.

Tonn et al. (2001) examined 40 CN Web sites based in a variety of communities and countries to see what are typical and cutting-edge features of CNs and how might they foster an increase in social capital. They looked for nine features they identified as fostering social capital in the sense of Putnam, which were: helping people be better citizens; fostering direct democracy; helping students interact with the larger community; letting citizens comment on proposed new developments; fostering barter and other alternative economics; building an "organic online community history"; bringing citizens together for mentoring; and paying special attention to seniors and low-income communities. Of the 40 CNs, eight appeared to have one or more of the social-capital-building features.

Ferlander (2002, 1) asked, "To what extent can the use of an Internet café increase social capital in a local community?" She found that community ICT, namely a cybercafé in a disadvantaged and multiethnic Stockholm suburb, strengthens both weak

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ties (defined as ties to people emotionally distant) and strong ties (to people who are emotionally close). Her studies investigated the effect of use of two distinct community ICT projects (an Internet café and a CN) on social capital in a local community. In another small survey, residents expected the CN to generate social capital (Ferlander and Timms 2001), but it did not attract enough users to carry on, perhaps due to a requirement that all posts be in Swedish, and what might have followed from that, a sense of surveillance by system operators.

Kvasny (2002) carried out a case study of a CTC run by the city of Atlanta. She asked what the relationship was between participating in a technology-rich environment and one's life changes and examined the process by which ICT reproduced social stratification. She defined social capital, after Bourdieu, as social networks that improve one's social standing, and found that community ICT reproduced social stratification rather than fostering people's social development. Inner-city Atlantans were given what she called "light training" (200) which wouldn't help them move forward in career or in life. The CTC in fact acculturated them to a new setting for relative powerlessness and exclusion. She does allow that a different approach to community ICT could actually boost participants' social capital.

A study by Meredyth et al. (2002) asks, "What is community?" in a heavily immigrant, impoverished, multilingual housing estate in Australia. Along the way they find that community ICT strengthens strong, that is, bonding ties rather than weak ties. Their community ICT project is a package, a networked community comprised of recycled home computers, subsidized Internet access, classes, a computer lab, and online community information. They define bonding social capital, or strong ties, as the links

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within distinct language or country-of-origin networks connecting residents to family and friends in a home country, and bridging capital, or weak ties, as local communication and exchange between residents. They find that the estate consists of multiple bonding social capital networks with almost no bridging social capital or weak ties, and they find that community ICT, specifically the computer lab and the training (the rest had not yet been fully rolled out), is used only for e-mail and exchange with the diasporic communities—and hence augments only the bonding social capital.

Not only does this echo Gans' urban villagers, who were also recent immigrants, the study begins to bridge the two models we are discussing. It examines the social capital that preceded the community ICT as well as that resulting from it. So in a community where bonding ties predominate, community ICT augments and extends those but not bridging ties. The obverse is true for Kavanaugh and colleagues (Kavanaugh 1999, Kavanaugh and Patterson 2001, Blanchard and Horan 2000, Hampton and Wellman 2000, 2003, Hampton 2003, Tonn et al. 2001, Ferlander and Timms 2001, Ferlander 2002, 2003, Kvasny 2002, Meredyth et al. 2002, Clark 2003, Pinkett 2003, Pinkett and O'Bryant 2003): when they examine people whose ties are mostly weak, community ICT augments and extends those ties, but not the strong ties. Haythornthwaite and Wellman's finding (2002) may hold here: ICT augments and extends what already is, rather than making any dramatic change. Yet augmenting and extending what ties exist is often dramatic in and of itself.

In an ethnography of a youth-oriented CTC in Denver, Clark (2003) asks how digital divide policy is actually practiced. Her main finding, apart from the gaps in meaning between parties and between policy and practice, makes use of Granovetter and

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of Oldenberg's concept of third places (1997) to say that young people's gaming and other typical teen online activities builds their weak tie networks, ties to a "wider circle of resources and opportunities than ... through their family or peer contacts," (Clark 2003, 109). Using Bourdieu, she concludes that these networks enable them to "do such things as find employment, locate housing, and otherwise function in society," (109).

Pinkett (2003) and Pinkett and O'Bryant (2003) ask, "How can community social capital be increased and community cultural capital be activated through community technology?" They themselves install new home computers and high-speed Internet, and implement computer classes and community-building software. They also survey 58 heads of households in the development. The residents were seen to expand their local ties and their access to information. Social networks were seen to become more dense, and ties stronger, for those engaged in the community ICT project. This was measured as visiting other residents at home, as well as phoning, e-mailing, and recognizing them by name.

Do social networks/social capital shape community ICT?

The following studies examined the effect of social networks or social capital on community ICT:

- Liff and Steward 2001b,
- Borgida et al. 2002, and
- Kvasny and Keil 2002.

The previous section treated studies that considered community as having a deficit in social capital, following Putnam, and asked whether community ICT might reverse this deficit or improve the situation. This section examines the smaller set of three studies

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that consider preexisting social networks and social capital in the community, before the arrival of ICT. The studies take a point of view close to the asset-based community development model elaborated by Kretzmann and McKnight (1993), in which all communities have assets that can be mobilized to improve conditions.

What are the findings of these three studies with respect to social networks/social capital as an influence on community ICT? Taken together, they report that social capital is a powerful influence on community ICT. They provide more evidence of projects suffering from a lack of attention to the positive influence of social capital than of community ICT projects that mobilize social capital and see the benefits.

Liff and Steward (2001a, similarly in 2001b) ask how the policy prescriptions guiding the establishment of telecenters stack up against practice. Analyzing a rural UK youth-serving telecenter, they find that rather than the prescribed strong-tie reliance, it is weak ties in a community that support the community ICT and help it serve the community. Social capital contributes, but weak ties contribute more. The authors construct a network diagram of the telecenter and its board, staff, partners, and clients in order to illustrate this. Since weak ties are deemphasized in policy directives, they are often overlooked, to the detriment of the community ICT project. By strong ties the authors mean more intimate, multistranded, mutual ties based in kinship and the traditional community, and by weak ties they mean "boundary spanners," people who are in two or more organizations (Liff and Steward 2001b, 322).

Borgida et al. (2002) ask what role social capital plays in addressing the digital divide. In a comparative case study of two rural Minnesota towns, each of which develop community electronic networks, they find that the town with more social capital

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evidences a more positive attitude towards the Internet and eliminates income-based disparities in computer and Internet use. This town develops a community electronic network collaboratively with support from a local foundation and the Department of Commerce. The town with less social capital, which pursues networking via an entrepreneurial, competitive approach, evidences a more negative attitude towards the Internet and income-based disparities in computer and Internet use persist, and are even justified by locals. The community electronic network in this town, or rather the two networks, are set up by the municipal utility and a competing businessman.

Kvasny and Keil (2002) investigate responses by two municipalities to local digital divide initiatives and ask why they were less successful than expected. One is the city of Atlanta, with its string of city-operated telecenters, and the other is LaGrange, Georgia, which offered free cable Internet access, set-top boxes for Web access via television, and e-mail accounts to all residents. In both cases, disregard for existing social networks and social capital kept the projects from greater success. In Atlanta, existing social networks brought people into the centers, but their social capital was disregarded. In LaGrange, the absence of positive word-of-mouth across poor neighborhoods left people who were not familiar with the Internet uninterested and suspicious.

Do social networks/social capital and community ICT shape each other?

One study in the set looks at both processes, social networks/social capital shaping community ICT and community ICT shaping social networks/social capital. Concerning the latter process, Kavanaugh et al. (2003) find that community ICT does indeed build social capital in the local community. Looking at both processes, they find

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that the people with more weak ties to start with increase their social capital the most. In other words, the social networks/social capital that can take the most advantage of community ICT is the weak tie, bridging type of social capital. The authors reexamine the Blacksburg Electronic Village and ask how strength of ties and Internet use influence what they call "community involvement and collective efficacy" (Kaufmann et al. 2003, 265)—a concept close to local social capital. The Internet use which the study examines is specifically group use of ICT: organizational e-mail, listservs, online bulletin boards and Web sites. People with weak ties (members of more than one organization) boost their local community involvement and connections more than people without weak ties (members of just one organization), and they also use the Internet more for political purposes.

They define strong ties as thick trust, bonding social capital, and intensive daily contact for support and mutuality within homogeneous and exclusive communities. They define weak ties as thin trust, bridging social capital, less personal, for instrumental purposes, information sharing, and linking homogeneous groups to integrate them into one social environment.

Weak ties and strong ties

Ferlander and Meredyth's definitions exemplify a challenge in synthesizing the work on community ICT and social capital. For Ferlander, bridging ties are what she calls "global," (2003, 83) to people outside the local community, while bonding ties are to people within the local community. For Meredyth et al. it is the opposite: bridging ties are to people inside the local community but not of one's own language group or nationality, and bonding ties are to one's own language group or nationality, either local

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or global. The two studies develop their diametrically opposed formulations despite the fact that both look at multiethnic or multinational urban communities: just outside Stockholm with "28% foreign citizens born abroad or in Sweden or foreign-born Swedish citizens," (Ferlander 2003, 8) and Atherton Gardens housing estate with 64% of tenants "born in Asia, predominantly Vietnam ... [and] only 14% of residents born in Australia," (Meredyth et al. 2002).

In fact, all the studies define strong and weak ties rather differently, and table 2 below details this. Hampton and Wellman, as was noted above, operationalize the two (strong and weak ties) as a continuum, from strong to weak to "knowing" tie. Clark's study of a CTC in Denver describes weak ties as young people in a CTC meeting people they wouldn't otherwise, in the sense of a "great good place," (Oldenburg 1997). Table 2 details how strong and weak ties and bridging and bonding social capital (if mentioned) are defined in each study. This issue of varying definitions and operationalizations will be taken up in the methods section.

The community ICT studies that use the concepts of social capital or social networks can be seen as pieces of an incomplete puzzle, pieces that don't fit together quite tightly. But stepping back, the two ways of looking at the phenomenon of community ICT, with the richness of the narratives and descriptions just reviewed, contain two conceptual frameworks for social transformation. Each approach asks one of these questions: Does community ICT shape social networks/social capital? or, Do social networks/social capital shape community ICT?

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Object of analysis	Definitions of strong/weak ties	Definitions of bonding/bridging social capital
Community ICT package, Blacksburg (Va.) Electronic Village (Kavanaugh 1999, Kavanaugh et al. 2003)	Strong ties = bonding social capital = thick trust = intensive daily contact, in homogeneous exclusive communities capable of exercising sanctions ... support, mutuality Weak ties = bridging social capital = thin trust = less personal, links groups to integrate them in one social environment ... instrumental, information resources, increased reach. People who are bridges are members of 2 or more community groups.	
Listserv and high-speed internet in suburban Toronto development (Hampton 2003, Hampton and Wellman 2000, 2003)	Operationalized three kinds of ties: strong ties = invited over, or invited over, weak ties = talk to regularly, knowing ties = recognize by name	(concepts not used)
Telecenter in rural England (Liff and Steward 2001b)	Strong ties = more intimate, multiple bases for interaction, mutuality; kinship, traditional community ties; provide a rance of resources in times of need Weak ties = boundary spanning. People who are boundary spanners are members of 2+ groups.	(concepts not used)
Computer classes as beginning of community ICT package delivered to Australian housing estate (Meredyth et al. 2002)	Bonding social capital = strong ties in small groups = e-mail and exchange with diasporic community. Bridging social capital = weak ties between many people = local communication and exchange between residents.	
Youth telecenter in Denver (Clark 2003)	Strong ties not used or defined Weak ties = those fostered in informal meeting places	(concepts not used)
Cybercafé in Sweden (Ferlander 2003)	Strong ties = emotionally close Weak ties = to people emotionally distant	Bonding = to similar people = local Bridging = to different people = global

Table 2. Strong and weak ties and bonding and bridging social capital, as defined in the community informatics literature.

In the first question, the community ICT that shapes the social networks/social capital can be said to represent the social engineering of that community. In the second question, the social networks and social capital that exist in a community can be said to represent the historical community, the continuity. Continuity and change are in fact both necessary for community ICT. Change refers to the launching of a community ICT project and continuity to the sustaining of that project. Along the way that project may morph, as in Clark's telecenter, from a CTC that offers training into a CTC that offers online games and entertainment for teens; or from a single computer lab to a wireless facility supporting a set of independent computer labs and home users, as in the case of PrairieNet's latest project in East St. Louis, Illinois (P. Adams, personal communication); or from grassroots CNs to public library community information services. The CN that failed in Skarpnäck, Sweden, created the change, but after about 50-odd users, it couldn't generate the sustainability. The historical community, the locals, did not make sufficient use of it.

For a community to move into the information society and the knowledge economy—to surmount digital inequality—it appears to take both the establishment and sustenance of ICT. Examining social networks and social capital appears to lead to insights about the policy challenges surrounding the launching and sustaining of ICT in communities. The role of strong and weak ties in those interrelated processes is not yet well understood. However, Kavanaugh's work (1999, Kavanaugh and Patterson 1998, 2001, Kavanaugh et al. 2003) suggests that people who are members of community organizations constitute social-capital-rich nodes in a local social network that can use community ICT and make it produce more social capital.

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To examine community groups, each of them arising from some collectively identified sense of community and representing a leadership network in that community, and their use of ICT is to look across a set of cases to see how continuity intersects with transformation. How and to what purpose do they use ICT, and where do they turn for help using it? Those are the questions addressed in the current study.

Put another way, the core ideas in the study can be stated as follows: across a set of grassroots community groups, ICT use varies, and social networks supporting that ICT use also vary. ICT use is a function of the networks. What kind of networks are supporting what kind of ICT use? The questions laid out here are asked within a particular theoretical framework that arises from the three literatures that have just been reviewed. The next chapter begins by laying out this framework.

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Chapter 3

Research design

This chapter first explains the theoretical framework that emerges from the literature review and forms the scaffolding for the research design. This study is designed to obtain new knowledge to confirm, reject, revise, or extend this theoretical framework. The chapter then describes the scope of the study and the unit of analysis. Following this it relates how the methodology, as well as the theory-building, relies on and extends the work of Granovetter and others. The subsequent section summarizes the study's empirical framework: what data will be collected and how it maps to the theory. A fourth section explains the methods of analysis that were used. Finally the choice of Manchester as a study locale is explained.

3.1 Theoretical framework

How and to what purpose do community groups use ICT, and who or what helps them use it? This study asks these questions from within a particular theoretical framework, in which social networks, including strong and weak ties, bridging and bonding social capital, influence the ICT use of community groups in socially excluded communities. The objectives of this study are to:

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1. describe and analyze the phenomenon of ICT use (as seen in a set of activities falling into the areas of uploading, creating content, downloading, and other use of technologies) by a set of such community groups;
2. describe and analyze the group's sources of help with ICT; and
3. look for patterns that relate the two.

As we saw in chapter 2, Granovetter, Lin, and other social network theorists found that weak ties bring new information, strong ties provide social support. DiMaggio and Hargittai have hypothesized that social support is required for ICT use. An extension of the two questions posed at the start of this section, then, is: what are the roles of strong and weak ties in the networks that provide help with ICT?

The expectation that emerges from the literature (Granovetter, Lin, DiMaggio and Hargittai, among others) is that groups who report both strong and weak ties helping them with ICT will evidence the earliest and most extensive ICT use, and groups with only weak ties will evidence the latest and most limited ICT use, with groups with only strong ties falling in the middle. This is based on the idea that social support (associated with strong ties and bonding social capital) is more important than new information (associated with weak ties and bridging social capital) when it comes to ICT use.

3.2 Study scope and unit of analysis

The focus of the study is the use of ICT in socially excluded areas located in certain wards of the city of Manchester, England. The unit of analysis is the grassroots community group. Each community group is thus (1) located in a less-wired geographic community, and (2) using ICT.

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Community groups are among the most important institutions, or as Kretzmann and McKnight (1993) would call them, assets, of any community. Putnam (2000) also recognized the role of people in groups in his study of social capital and social cohesion. Their activities are of particular importance when it comes to social change, which is the overarching topic of the proposed study. Since studies of ICT adoption or use tend to focus solely on individuals, ICT use by community groups constitutes a gap in the literature. As mentioned above, Kavanaugh and Patterson (1998) found that ICT use by community groups accounted for the entire increase in social capital resulting from a community ICT package implemented in Blacksburg, Virginia. Along the way, the current study also tells us something about individual ICT use, since groups are naturally made up of individuals.

The community groups in the study are located in less-wired geographic communities, according to national surveys, and yet their members are using ICT to accomplish the work of their group. Figure 2 in chapter 1 described such people as the "early adopters" in their community, since all communities are measured as moving towards higher levels of ICT use (UK Office of National Statistics 2004). The study does not include community groups which are not using ICT, and does not include community groups in community that are, relatively speaking, more wired.

In other words, in localities where people's rate of ICT use is inferred from surveys to be lower, the community groups in the study do nevertheless use ICT. The study is not trying to measure the likelihood of being wired in such an environment, or who is wired versus who is not. It is not focused on the differences between being wired (or not wired) in a socially excluded community versus in a relatively well-resourced,

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wired community. All those studies would be valid, but they are different studies. Rather, this study looks at the dynamics of early-adopter community groups with respect to ICT. (Early adopters here, as defined in section 1.4 with reference to Rogers 1962, identifies those community groups which are ahead of the rest of their local community with respect to takeup of ICT.) What conditions, what influences are associated with thus beating the odds calculated from national ICT usage statistics? More specifically, what social ties do we see providing help with ICT to these groups?

3.3 Methodology: building on Granovetter

Chapter 2 reviewed useful theory building from three different literatures, but this study also builds *methodologically* on the work of Granovetter and others mentioned in chapter 2. Following the lead of Pettigrew (1997), it makes use of an adaptation of Granovetter's Getting a Job study (1973, 1974) which resulted in the Strength of Weak Ties theory. It incorporates the method used by Granovetter along with the approaches of Gans (1982), Wellman et al. (1988), Putnam (1995, 2000), Lin (2001), and Wasserman and Faust (1994/1999). In addition to methods from social network analysis and these other scholars, it relies on data collection and analysis methods as outlined in Denzin and Lincoln (2000, 2001).

This study builds on Granovetter in two ways. We recall that Granovetter interviewed people who had recently changed jobs and analyzed the interaction between two people: one job changer and one person who provided information that led to the former getting the new job. This study, however, examines the often *multiple* social ties that provide ICT help. Pettigrew observed not just single dyads, but interactions between

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various pairs and small groups of nurses and seniors in foot clinics in her study of information sharing between strong and weak ties.

Second, unlike Granovetter's particular study, the current study locates the social ties in a sociocultural context. Gans gathered qualitative information through interviews and observation in order to understand the structure of a community which was threatened by urban development. In his book (Gans 1962/1982) and in an exchange of letters with Granovetter (Granovetter 1974b, Gans 1974a, 1974b) he emphasized that his methods elucidated aspects of the environment of the people he studied at least as well as social network methods.

In sum, this study asks a number of community group volunteers about the multiple interactions between the community group and its sources of help with ICT, and collects additional information to contextualize those interactions. Certain groups in the study do report only one single source of help with ICT, but more commonly they identify two or more sources of help, in other words, multiple ties for each community group.

The conceptual framework of the study is based very much on social network analysis. This framework states that the behavior of people in community groups is influenced by the social network in which the groups are embedded. Stated more narrowly, the ICT use of community groups is influenced by the sources of ICT help the groups access. There are of course other influences as well, and the study collects data to identify at least some of those.

Social network analysis employs a variety of data analysis methods to understand a phenomenon and the social network around it. One aspect of this study is to bring to

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light and measure to what extent weak ties and strong ties each influence or contribute to ICT use. The analysis includes constructing personal networks as in Wellman (1979, Wellman et al. 1988). Data were collected and analyzed regarding the context in which the community group works: its identity; its issues; its locale; the city; and as a proxy for the group's membership as a whole, the demographics of the community group volunteer/study participant.

There is much yet to be understood about the phenomenon of ICT use by community groups in less-wired, socially excluded communities. An approach that builds on Granovetter's analysis of jobseeker-contact dyads, allowing for multiple ties and for sociocultural context, allows the nuances to emerge from the data.

3.4 Empirical framework

The final tasks of research design are to make certain that the data to be collected will measure the social forces under scrutiny in this study, and to plan how to collect these data. An empirical framework serves to operationalize the concepts, first as empirically observable indicators, then as specific and workable questions. The social forces of key interest here are the connections among people. Giddings (1922), introducing the first issue of the *Journal of Social Forces*, provides a helpful definition of the term 'social forces': "energies that both originate in society and produce social results." The social forces that this study focuses on are strong and weak ties and bridging and bonding social capital.

As we saw in the review of those community informatics studies using a social network and/or social capital framework (chapter 2, section 3.3), the paired concepts of

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bonding and bridging social capital are sometimes used interchangeably with the two concepts of strong and weak ties. This study operationalizes these concepts as different. It also uses multiple measures in order to develop an analysis that can be compared across numerous case studies in community informatics. This also helps to illuminate different aspects of the social network of each community group.

Strength of ties is indicated by frequency of contact, type of relationship, and geographic distance. Bridging/bonding social capital is indicated by ethnicity and geography. This emerged from Lin (2001) and from McPherson et al. (2001), who advanced the principle of homophily, or "birds of a feather flock together." According to this principle, actors in dense networks of many ties tend to be alike, while actors whose ties form the bridges between the dense networks tend to be dissimilar. Thus if two actors—in this study, one sharing ICT help with the other—are of the same ethnicity and/or place of residence, that tie is more likely to represent bonding social capital. If the two actors differ on those measures, the tie is more likely to represent bridging social capital. Income and education are two additional dimensions that would also be helpful to establish homophily, but these were not obtainable for the person who is the source of ICT help.

The operationalization of concepts is summarized in table 3 below.

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Concept	Indicators	Examples of questions
Bonding/bridging social capital	Ethnicity	What is your ancestry? What is the ancestry of the person who helps you?
	Geography	How far away does the person who helps you live?
Strong/weak ties	Frequency of contact Type of relationship Degree of intimacy	How often do you see the person who helps you? Is he or she your kin, friend, workmate, or acquaintance? Have you invited him or her over, or vice versa?
Group ICT use	Technology narratives	How does the group use technology?
	Specific ICT activities	Does the group <carry out a given ICT activity> often, sometimes, rarely, or never?
Sociocultural context	For the community group: purpose, origins	What does the group do? How did the group start?
	For the community group volunteer: education, work	How far did you go in school? What is or what your occupation?

Table 3. Operationalization of concepts as empirically observable indicators and as workable questions.

3.5 Data collection and analysis

Data were collected by means of interviews with experts who were either cosmopolitan or local (Tönnies 1887/1957, Merton 1949/1957) in relation to the socially excluded areas of Manchester. The locals included 31 knowledgeable volunteers from community groups in Manchester's socially excluded areas. Cosmopolitans included various professionals and others in Manchester: those who have supported community projects and/or community ICT projects over the last twenty-odd years.

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The semistructured interviews with 31 community group volunteers form the core of the data collection. The other interviews make up the background or supplemental data, particularly interviews and joint discussions with MCIN staff, a city economic development director focusing on "digital development," and a sociologist and local community activist. Documents and Web sites were also collected and consulted, and four community meetings were attended.

3.5.1 Sampling and recruitment

The 31 community group volunteers were identified and recruited as follows. First, there were informal visits with three individuals who were later themselves part of the supplemental interviews. During these visits, an agency was identified that has worked on ICT projects in socially excluded areas of Manchester for close to a decade. Then the agency, the Manchester Community Information Network, agreed to collaborate on recruiting study participants. (Appendix B contains consent forms.) The researcher and MCIN staff together reached out to likely participants according to criteria.

There were four basic criteria for identifying community group volunteers:

1. The group had been active in the last 12 months;
2. The group was using technology in some way to support its activities;
3. The group relied more on volunteers than staff, i.e. few or no staff, small or no budget; and
4. A volunteer knowledgeable about the group's activities and its technology use was available and willing to be interviewed.

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Recommendations for possible study participants were also gathered from an individual who provides training services to area community groups. Finally, snowball sampling was also carried out. This involved asking a final question at each interview: Can you suggest someone else for me to interview? Altogether, MCIN staff identified 13 participants, the expert 2, and snowball sampling 16.

3.5.2 Interviews

Interviews were arranged by telephone, e-mail, and texting on a cell phone. They were scheduled at a time and place convenient to the respondent. This included daytime, weekend and evening. An interview protocol was followed and is described in section 3.5.3 below. Before the interview began, a consent form following the University of Michigan Institutional Review Board guidelines was reviewed and signed by both respondent and researcher, and an honorarium of ten pounds sterling was given. Study participants were also invited to review the draft findings and participate in a post-dissertation-defense meeting to be scheduled and sponsored by the Manchester funder of the research. The interviews were conducted during two periods: three weeks in July/August 2004 and one week in October of that year. Interviews took place during 19 of those days. Between one and six interviews were carried out each day. Interviews were done at workplaces (N = 2), in public settings (3), in the group's space (9), and at participants' homes (17). Each interview lasted up to 75 minutes. The average duration was one hour. With everyone's permission in advance, and as the data processing and analysis was underway, occasional questions to community group volunteers were posed and answered via e-mail.

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3.5.3 Interview questions

The protocol used in interviews with community group volunteers included a total of 95 questions, a mix of open- and closed-end questions. The complete protocol can be found in appendix C. Questions covered three areas—the group and its ICT use; who helps the group with technology; and the community group volunteer—and then a final question continued the snowball sampling.

Regarding the group and its ICT use, a set of questions covered the group's name, address, origins, size, and activities. Additional questions were asked concerning how the group used technology to further its activities and when the group started its own Web page, if any. A set of 25 questions asked for scaled answers (often/sometimes/rarely/never) to ascertain group engagement in specific ICT activities including, for example, taking digital photos, using e-mail, and looking for information on the Web. These questions were developed from national surveys of ICT use in the U.S. (NTIA 1995, 1998, 1999, 2000, and 2002) as well as the analyses of DiMaggio and Hargittai (2001) and Alkalimat and Williams (2001). A set of yes/no questions asked if members of the group ever used ICT at a variety of locations: home, work, school, cybercafé, and so on. These questions emerged from the literature on public computing sites (a good range of which is available in Mancebo 2003).

Questions were asked regarding who helps the group with technology. These questions probed in a variety of ways to identify a short list ($N < 6$) of people whom the group relied upon for help with technology or help when stuck on a technology problem. As names were mentioned, a handwritten list was created by the researcher, and that list was used in the interview to ask questions about each individual reported as a source of

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help, and about the tie between each of them and the community group volunteer. These questions were based on the work by Wellman, Hampton, Wasserman and Faust, and Lin discussed in chapter 2.

Regarding the community group volunteer, questions covered his or her role in the group, his or her own access to, use of, and attitudes towards ICT, whether he or she ever served as a source of ICT help for the group or anyone else, and his or her own demographics. The question on household income was based on work done in the UK by Williamson (2004). One additional question suggested by Kavanaugh's work on "local bridges"—members of multiple community organizations—asked if the community group volunteers were active in any additional organizations.

Table 3 above illustrates how the study's theoretical concepts mapped to certain indicators, and the indicators in turn mapped to the interview questions.

3.5.4 Other critical tools in the field

Several critical tools must be noted. First among these was the interview protocol itself, which was printed to allow for note taking. Second, a digital recorder, an Olympus 330 and later a Marantz PMD 670, with rechargeable batteries and a recharger, functioned to create audio files of the interviews. Third, a laptop computer with international dial-up connection was carried throughout. With all these devices traveled U.S.-UK power converters, transformers, and fuses to spare. Fourth, the fieldwork relied on a rented car and a city street guide marked each morning with a set of small sticky notes. Without all these, it would not have been possible to finish the fieldwork in three weeks, and the data collection would have been very incomplete.

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3.5.5 Post-fieldwork analysis

This dissertation analyzes data collected in socially excluded wards of Manchester, England in July/August and October 2004. The focus of the analysis is the relationship between ICT use and social ties. The goal is to ground the model, that is, to determine whether and how the data fit the theoretical model that was constructed in chapters 2 and 3. The model proposes that social ties, in the form of help with ICT, influence the ICT use of a community group, and more particularly, that strong ties would be associated with more extensive ICT use. Social ties and ICT use are the variables in this model, and chapters 4 and 5 examine the findings on each: first the dependent variable, ICT use, and then the independent variable, social ties. As the two variables are examined, empirical patterns are described that do indeed suggest the relationship proposed in the model. The model is supported, but it is also enriched by the empirical detail, gaining texture and nuance.

The unit of analysis is the community group as represented by a knowledgeable group volunteer as key respondent. This follows the approach of the typical household surveys which rely on one adult respondent to speak for the group of people living in that household, or of, for instance, Bertot and others (Bertot and McClure 1997, Bertot et al. 1997) who examined library ICT provision by surveying one staff member per library. Thus the study assumes that a knowledgeable volunteer best represents the group.

The analysis has proceeded in four stages: (1) recording, (2) transcribing, (3) text coding and numerical analysis (in parallel), and (4) reporting. Recording was done on a digital audio recorder as mentioned in section 3.5.4 above. The same day of the interview, the audio file was moved to a laptop hard disk and a set of debriefing notes or

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a debriefing audio file was made. Transcribing the audio files and inputting the handwritten notes took place back in the U.S. within a few weeks.

Coding and numerical analysis were two parallel tasks that began the process of triangulating, using both narratives and numbers to ascertain findings relevant to the model. Both these processes were iterative. For example, the interviews were organized into a printed book which was then hand coded. The coded sections were extracted into new text files, printed and hand coded again. Numerical analysis proceeded as follows: data from the handwritten notes and data from the transcripts were extracted into tables of numbers. Variables came directly from a question asked, or were created as they emerged from coding. Three software tools (NetDraw, Excel and SPSS) allow for the quantitative work of iterative visualization, calculation and meaning-making, focused on the descriptives (especially frequencies and crosstabulations) and correlations. Particularly in the form of NetDraw, social network analysis (Wellman and Berkowitz 1988), which contributed so much theoretically to the study, also contributed methods and tools (Borgatti 2002). The closed-end questions, which in effect are coded by the researcher before going into the field, were designed so that mathematical tendencies and statistically significant correlations could be calculated and analyzed. In sum, the method of analysis in this study is two-pronged, using both qualitative and quantitative methods (Becker 1993) to triangulate the findings. The final stage, reporting, proceeded again iteratively, with successive drafts of chapters 4 and 5 forming the basis for discussions and revisions as the analysis took shape. The discovery process was most acute during the end of the analysis stage and a good part of the reporting stage.

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Use of the qualitative or narrative method in a marginalized community, particularly within a cultural context distinct from that of the researcher, requires particular care. The data are the utterances in 'natural language' (defined here as 'conversational speech within the context of semistructured interviews') of the study participants. The goal is to explore for confirmation or rejection of the model, while seeking nuances of meaning in natural language, following the methods of Denzin and Lincoln (2000).

Many researchers miss the critical understanding of research subjects in marginalized communities because they do not speak, or comprehend, the particular restricted code speech (Bernstein 1971) of their study participants. Bernstein identified different ways of speaking, one in the working class and the other in the middle class. Restricted code speech, employed by the working class, is abbreviated and often inventive, and is spoken within a shared context. Elaborated code speech adheres more to standard usages, explains more and assumes less shared context (Bernstein 1996, Sadnovik 2001). In this study, by focusing the discussion on the specific topic of community-based ICT use, it was possible to understand the linguistic code of the community group volunteers. In some instances this was as simple as, for example, understanding profanity to be a class-based form of social criticism. In other cases, a minimalist description will convey a sophisticated understanding of how to use a piece of software.

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Code	Concept	Text to search for
T	Technology	Any text describing digital devices, software, skill or use of ICT, including but not limited to the 25 ICT activities in the closed-end questions
O	Organization	Any text describing group origin, activities, or the role of the community group volunteer or others in the group
S	Social ties	Any text describing people or relationships with people who in any way provided help or support with technology
N	Narratives	Any story of any length providing a characterization of the group, for instance, describing a person, incident, or example

Table 4. Basic coding dictionary.

The transcriptions, edited and interpreted within the context of their group, allow the community groups' voices and narratives to represent their intuitive understanding of some of the same issues that the review of scholarly literature clarified in detail and at length in chapter 2. In addition, concepts are applied to the transcripts and emerge from the transcripts in the process called coding (Coffey and Atkinson 1996). The basic coding dictionary is presented in table 4 above.

3.6 The choice of Manchester as the research locale

The choice of Manchester as the locale for the study was arrived at on account of personal connections of the researcher and scholar connections that were built on those personal ties. But the choice also depended on the particular significance of the city of Manchester. Further, the choice was framed within a view of the technological

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revolution as happening, simultaneously if differently, in all the countries of the world. The study is obliquely comparative, an American look at England. It is a component of an ongoing research program which is now comparative. Furthermore, the academic network examining the phenomenon of geographical communities using ICT includes both American and British scholars; thus the literature and the discourse itself are obliquely, although not yet explicitly, comparative.

Manchester's significance is both historical and current. Historically, because it was the headquarters of the last technological revolution—the industrial revolution—and it is a site of origin for the computer itself. As a great many biologists have focused their studies on escherichia coli, social scientists have looked at technological change in Manchester, and this study is can be conceptualized as a small contribution to that effort, examining local grassroots response to and use of new technology.

Manchester's current significance has several aspects. It is similar to many of the world's cities: deindustrialized and struggling to reinvent itself in the context of the information society. Thus, findings here may have broad applicability. According to the UK's Index of Multiple Deprivation (UK Office of the Deputy Prime Minister 2000), the city evidences a concentration of social exclusion second only to Liverpool among the 354 local authorities that make up England. It thus has an abundance of community groups in socially excluded areas. Manchester is not a case such as Palo Alto, California; Austin, Texas; or other established hubs of the information society and the knowledge economy. The knowledge generated by this study may well apply to many other places.

Manchester also has a history of experimentation with community ICT and a modest literature regarding these experiments. An early network, the Popular Telematics

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Project, or Poptel, took root in Manchester. In 1984 Poptel launched the first international trade union e-mail system (Lee 1997), and in 1990 Poptel initiated Manchester HOST, the first local government project using ICT for community development (Poptel 2004). In 1992 several early "electronic village halls" —CTCs— were established, and at least three of these continue to function today (Women's Electronic Village Hall 2004). In 1993 the Manchester Community Information Network (MCIN) was established to provide public Internet access points along with what they termed "really useful information" for the "disadvantaged [or] vulnerable," (Doyle 1997). A small literature on these projects thus provides context and comparisons for the activity that is scrutinized in the study (Bryan 1998, Cawood and Simpson 2000, Crabb 2002, Dockerty 1996, Ducatel et al.1993, Ellen 1997, Graham 1991, Herman 2001, Hill 1997, Karelis 2001, Leach 1990, 2005, Raven 2003, Shenton 1991).

A final note on the choice of Manchester is that it was conceived as a new setting for exploring a model developed by the author in another, somewhat similar, setting. A case study done in Toledo, Ohio, proposed that a telecenter's social capital—the resources accessed by that telecenter through social networks—influences the local ICT use which that telecenter then facilitates. Social capital was seen as the resources accessed by the telecenter through the social networks of its board, staff, and volunteers (Alkalimat and Williams 2001).

The model sees a telecenter as embedded in and relying on social networks and the resources available through those networks. This dissertation study conceptualizes the community groups as likewise embedded in and relying on social networks that they can use for ICT help. The general concept is that community ICT projects depend on

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social networks for their success. Toledo was the discovery case for this; with the current study, Manchester serves as the demonstration case, to help us understand just if and how social networks do influence and support community ICT use, and how this is expressed in an English as compared to an American context. The research design of the dissertation was thus informed both by prior work of the author, which engaged with social capital scholarship by Putnam (2000) and Orr (1999), and by the much fuller literature review as presented in chapter 2.

It is hoped that further work will continue to draw meaning from comparative work and from further dialogue with the literature regarding Manchester both old and new.

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Chapter 4

Findings regarding ICT use

Information and communications technology (ICT) is a broad category of tools and activities for the creation, storage, manipulation, use, and distribution of digital information. On the most abstract level, ICT is an ensemble of technologies that defines the social norms of all aspects of an information society. As we live at the early stages of a social transformation (Castells 1996, Mitchell 1996), new technologies continue to emerge, hence any empirical pattern would have to be determined via a wide diversity of specific ICT activities in order to capture universals or norms as well as new or specialized technologies.

This chapter takes the following steps in analyzing the ICT use found among the 31 community groups. First, it introduces the groups, because without a basic sense of their identity in their locales, their ICT use is an abstraction. Then, it inventories the groups' ICT use according to the 25 ICT activities queried in the interview protocol. It synthesizes this data by examining the 25 ICT activities according to 6 themes, where each theme has a particular history and dynamic.

The second half of the chapter describes the groups' ICT use according to two dimensions that emerged from the analysis: social function and social context. Social function entails the particular social role of the group's ICT activity. This activity will be

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characterized as one of three functions: downloading, uploading, or cyberorganizing. Social context entails the particular role of the group itself. This role will be characterized as one of three contexts: tenant groups, cultural groups, or social support groups. These terms—downloading, uploading, and cyberorganizing, and tenants, culture, and social support—will be defined and elaborated upon in turn. Throughout the chapter, the analysis presents patterns from interview data along with anecdotes from specific cases across the 31 groups. In order to protect the privacy of the groups, their volunteers, and their ICT helpers, groups are identified by number, personal names are changed, half the genders are switched, and identifying details are adjusted.

4.1 Introduction to the groups and their context

The groups are located in wards in the highest decile across England according to measures of social exclusion.[3] The wards and the group locations are graphed in figure 6 below. The research thus verified the existence of groups in these less-wired, socially excluded areas that are 'early adopters' (as in chapter 1, figure 2), making diverse use of ICT to further their goals.

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[3] One group is located in Manchester's most affluent ward, Didsbury. The UK Social Exclusion Unit makes clear (2004) that there are pockets of social exclusion in every ward. In this case, the group receives its mail at the home of one member but is closely associated with a center in one of the wards which is within the highest decile with respect to social exclusion.

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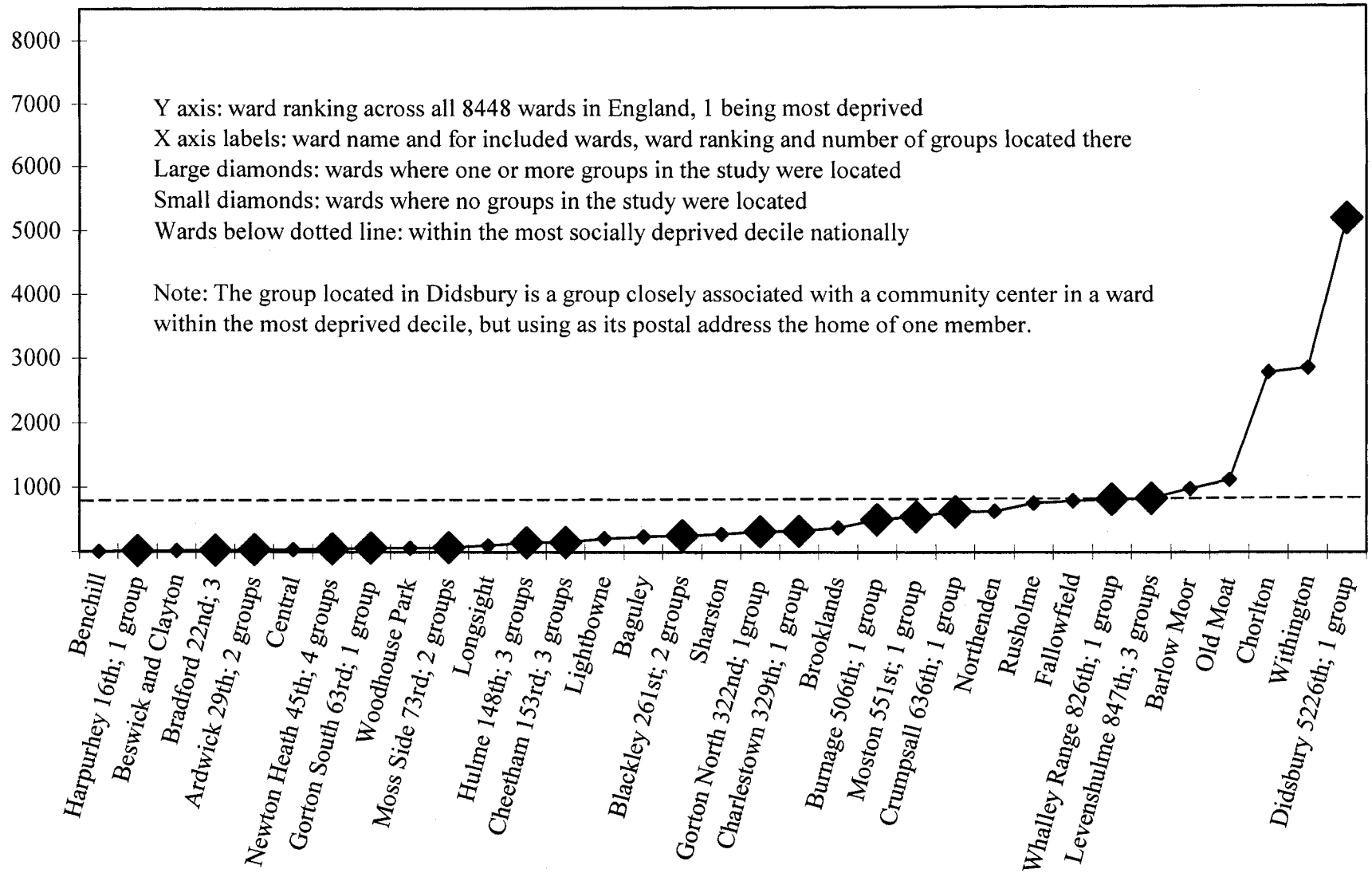

Source: Ward rankings from UK Department of Environment, Transport and Regions 2000.

Figure 6. Manchester's wards, their Multiple Deprivation rankings, and the locale of the 31 community groups.

The 31 community groups upon which the analysis is focused are all quite small. The median group size is 10 volunteers; the median annual budget £1,200 (roughly equivalent to $2,200). Two groups have paid staff, one person each, yet each group remains very much volunteer-led. Despite this, the groups are also relatively mature and stable: the oldest was founded in 1958, the newest in 2003. Median year of inception was 2000. These are very much the grassroots community groups for which the data collection plan aimed.

Each group is distinct. The analysis here and in chapter 5 will unfold their stories primarily by focusing on their ICT use and the social ties that help them with ICT, but this section will introduce the groups within their different contexts: as tenant, cultural, and social support groups. A theme across all the groups is that they are applying what resources, skills, and time they can to making their communities better; this rootedness is in contrast to Granovetter's (1973, 1974) jobseekers, who were looking to move on to a new place of employment.

4.1.1 Tenant groups

The eleven tenant and/or resident associations in the study were established between 1987 and 2003. They range in size from 4 to 35 volunteers, with most reporting 10 or fewer people. The groups work on behalf of constituencies ranging in size from 56 to 1300 households, providing advice, negotiating with authorities, and running programs and activities. With three exceptions among groups which have fundraising activities, their annual budgets vary from £600 (roughly $1,000) to zero. One group, an association

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of tenant groups, has one paid staffperson. Brief descriptions of each tenant group are provided in table 5 below.

ID	Descriptions
2	Negotiates with the adjacent university on behalf of residents regarding such issues as streets converted into campus walks, walls built on the edge of campus, and library access for community residents
4	Represents tenants in a development which is undergoing major renovation, distributes free plants each spring and encouraging local gardeners
5	Agitates with city agencies for housing maintenance and for enforcement of "antisocial behavior orders," a range of problems from residents feeling threatened on the sidewalks to car theft
6	Operates in a neglected neighborhood unclaimed by any city councilperson due to map irregularities; recently galvanized over placement and operation of a drug rehabilitation facility
7	Represents residents in high rises and attached houses which are already partly privatized, running activities for elderly residents, building a playground to replace green space lost to development
9	A group of tenants in several high tower buildings and a few row houses, tending particularly to security and maintenance issues, but also to a community space for future programs for young people and seniors
12	Works on behalf of residents of a small number of homes (54), navigating conversion to private housing via the purchase of units by former tenants and others
15	An umbrella group of tenant associations with a central office and some city support; one of two groups with a single paid staffperson
16	Represents tenants and residents in a housing development mostly privatized by "stock sales" whereby residents purchase their home at a discount; runs programs for seniors who are the poorer residents
28	Besides advocating for tenants, reclaimed and maintains several abandoned lots as a football field and a garden, and runs activities for mothers in their own community space
29	Began with a project that wired a majority of the units in the local housing development; for the Internet; formed as a tenant association several years later; has an office and its own funds

Table 5. Brief descriptions of tenant groups.

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Every tenant group in the dataset is coping with one stage or another of the national program of privatization (Ginsburg 2005) of council housing or housing estates, as public housing developments, historically owned by city councils, are known in Britain. This involves tenants or others buying the housing units or the city delegating management responsibility to other organizations. All the groups reported coping with disruptions due to lack of adequate maintenance and social ills arising from un- or underemployment and poverty, such as idle young people, isolated old people, and children needing care while their parent or parents work. Much of the groups' activity takes the form of keeping tenants' issues before city agencies, from garbage collection to housing repair to public safety. As several volunteers explained in their interviews, another activity is ongoing negotiations over establishing and enforcing anti-social behavior orders (ASBOs) placed by local police on individual residents seen as troublemakers. The ASBO mandates extra surveillance and policing of an individual, and sometimes extra services and programs, for "ASBOed" youth and their families. At the same time tenants acknowledge that social problems are community-wide. One study participant mentioned the importance of including all young people, not just those who have been ASBOed, in community programs and activities run by tenant groups and others.

The tenant and resident groups are organized into a city-supported Manchester Residents Association which is itself one of the groups in the study. The city offers a recycled computer and printer, and small annual grants (£250, or roughly $450) for operating expenses. The association, and the city support, resulted from 20-plus years of public-housing-tenant activism in Manchester and from a national policy toward

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divestiture of public housing, either by selling the housing units on the private market, with purchase incentives for residents, or by transferring management of the properties to new "social landlords," such as church-related organizations or even residents' associations themselves.

A few groups have their own funds apart from the city offering. Group 29, for example, has funds contributed by tenants working computer programming 'gigs' to benefit the association. Group 7 negotiated funds for a playground from a nearby developer who built on the community's only large green space. Several of the groups mentioned that small grants are periodically available.

Two groups have physical facilities, and a third is negotiating for such. Group 29 has an apartment-turned-office where it hosts meetings and keep computer equipment. Group 28 has gained control over a small temporary building where it carries on programming for adults and children. Group 9 is negotiating to make use of a similar unused community building.

4.1.2 Cultural groups

Fourteen groups in the study are organized in order to carry out local activities that contribute to local culture and quality of life. Their activities include publishing news, short stories, or their own memories of local life; working to protect an historical building, a park, or the local environment; networking among local historians; or organizing an annual neighborhood festival. Brief descriptions of each cultural group are provided in table 6 below.

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ID	Descriptions
3	Brought together by a one-time national TV personality, selects and then uses his fame to publicize individuals and groups providing exceptional service to the community
8	Works to disseminate information about and from Manchester's Indian community, aiming to start a newspaper and/or a radio station; created an Indian sculpture as part of a larger citiwide event
10	Conducts afterschool and Saturday educational activities to educate young Mancunians of Ghanaian descent about their home country and culture and instill them with pride
13	A group that has been editing, producing and distributing since 1977 a newsletter about local events and people; operates out of the editor's house and finances itself with advertising
14	A network of anti-globalization activists who host meetings around Manchester to raise awareness and recruit people to participate in actions
17	A network of local historians and museum staff and volunteers who host citywide and neighborhood events and keep each other informed in order to build up awareness of local history
18	Meets weekly at a local public library branch; shares and collects their local history research and their own written memories; has assembled and published eight chapbooks
19	Puts on an annual event in a local park which features sports, entertainment, stalls, and the revival of centuries-old local traditions; coordinates with many other local groups and individuals
20	Traces the history of a nearby building back to the 1500s; campaigns to preserve and repurpose it; collects their own oral histories; conducts and publishes historical research
21	A group of people interested in writing who put out a quarterly magazine (also online) about their area and its past; attracts a steady correspondence from former residents
22	Meets monthly to practice and foster recycling, cleanups, and protection of urban trees, calling attention to "grot spots," monitoring environmental changes and plans, educating people
23	A group of women who meet monthly at the local public library branch to share their writing and publish it online; launched when a local adult literacy textbook publisher sought community partners
24	Does cleanups and agitates for park preservation to the city authorities; organizes work days, usually in coordination with park staff; reclaims parts of the park that have become overgrown
26	A group of three young people who obtained equipment for producing digital music in order to carry out workshops to teach groups of local youth and adults how to make music

Table 6. Brief descriptions of cultural groups.

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One group started in 1977, another in 1990, and the rest since 2000. Size ranges from 3 to 25 volunteers. Annual budgets range from a high of £10,000 down to zero. None of the groups have paid staff.

These groups work to maintain and develop local culture, numbering among their volunteers historians, writers, editors, artists, and environmentalists. In some cases, their approach to local culture emphasizes a particular ethnicity. As culture creators, their work is part of maintaining a sense of community where they live.

Support from outside the local community for these groups is relatively limited, taking the form of regeneration funding from the government for one of the magazines and small grants such as for the digital music equipment or the parks group. Self-funding, for instance by advertising or by selling locally produced books, is apparent, and lends stability to the groups. A constructive approach based on participation by choice is in evidence, whereas many of the tenant groups operate defensively, banding together out of the necessity of facing common housing crises.

4.1.3 Social support groups

The six groups working on social support answer local needs arising from family or personal crises and the related social, economic, or health issues. The annual budgets of these groups, £25,000 or more (with one being £4,000), larger than those of most of the 31 groups, reflect the public and private priority of providing funds to address these problems. All the groups except group 11 have their own physical space in which to operate. Brief descriptions of each social support group are provided in table 7 below.

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ID	Descriptions
1	Offers advice and programs for immigrants who arrive under particular hardship, coming from a war, subject to racial attacks, and not speaking English; operates out of a small house
11	Supports people with a particular ailment and their caregivers; disseminates information about the condition; started by a local woman who suffers from the condition
25	Operates a community technology center within a large building dedicated to programs for older immigrants, dedicating several rooms to digital access and learning
27	Works with young parents, especially mothers, helping them cope with poverty, lack of education, addiction, and early parenthood, providing a setting to carry out counseling, adult learning, and child care
30	Provides advice and support to immigrant families in navigating education, employment, and social service systems; negotiating systemic reforms; running programs for children, youth, women, others
31	Provides a setting and volunteers for activities for children and youth, recruiting parents to pitch in, intervening for families in crisis with a nurturing, fun, educational space

Table 7. Brief descriptions of social support groups.

Three of the six groups address issues related to living as what is called in England "minority ethnic," that is, an immigrant or descendant of immigrants from the former British colonies. These immigrants may arrive in Manchester under particular hardship, not speaking English, fleeing wars and/or regions where education has been disrupted, so that literacy rates in their native languages may be very low (Commission on the Future of Multi-Ethnic Britain, 2000). They are often subject to racism and racial attacks (Council of Europe/European Commission Against Racism and Intolerance 2004). Several of the groups have a tradition of advocacy as well as service, and have

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helped to change community policing and other policies impacting new population groups.

Two groups serve families of various ethnicities, including British or Irish, which are more typically English speakers. They draw primarily people from nearby, rather than the ethnic-serving groups who attract people from further away based on language or ethnically oriented services. Perhaps reflecting the fact that social policy directs funds to programs supporting families in particular, they have been able to gain grant dollars and their budgets are the largest among the 31 groups.

Volunteers from all six of these groups include those who have been helped by the group and are now giving back. Brief descriptions of each cultural group are provided in table 7 above.

4.2 Twenty-five ICT activities

Twenty-five closed-end questions were asked of each community group volunteer regarding their group's ICT use. Each question asked: Does the group <do a given ICT activity> often, sometimes, rarely, or never? The 25 ICT activities were identified based on Current Population Study questions reported in the U.S. NTIA government reports (1995, 1998, 1999, 2000 and 2002) as well as the analyses of DiMaggio and Hargittai (2001) and Alkalimat and Williams (2001).

The responses to the 25 questions are summarized in table 8 below. The table and discussion here are based on yes/no data, with 'often,' 'sometimes,' and 'rarely' answers

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		%	N
1	Create documents on a computer	94%	29
2	Use e-mail	94%	29
3	Look for information online	84%	26
4	Talk on a mobile phone	77%	24
5	Take digital photos	74%	23
6	Text on a mobile phone	68%	21
7	Share photo, video, or audio files	65%	20
8	Use spreadsheet software	55%	17
9	Post to a group Web page	45%	14
10	Read a bulletin board online	39%	12
11	Belong to an electronic discussion list	35%	11
12	Record digital video	29%	9
13	Post to an electronic discussion list	29%	9
14	Record digital audio	23%	7
15	Use instant messaging	23%	7
16	Post to a bulletin board online	19%	6
17	Use online chat	19%	6
18	Use voice-over-IP online telephony	19%	6
19	Use Linux or other open source software	13%	4
20	Do bookkeeping on the computer	10%	3
21	Post to the web other than a group Web site	10%	3
22	Edit an electronic discussion list	6%	2
23	Use wireless technology to go online	6%	2
24	Use e-mail on a mobile phone	3%	1
25	Browse the Web on a mobile phone	3%	1

Note: N = 31 for all 25 ICT activities.

Table 8. Percent and number of 31 groups engaging in each of 25 ICT activities.

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coded 'yes;' 'never' and missing answers coded 'no.'[4] Taken as a whole, the group's collective use of ICT is quite broad. A majority of the groups engage in nine ICT activities. Each activity is engaged in by at least one group. Three activities present themselves as universal or nearly universal: e-mail, creating documents on a computer (typically, but not always word processing), and looking for information online. Generally, these findings affirm that there are indeed community groups which use ICT in these socially excluded communities.

These 25 ICT activities can be meaningfully examined along six thematic categories: online texts, Web use, mobile telephony, image and sound processing, data analysis, and newer technologies. These themes are familiar to people who live and work in the mainstream of the information society. A university, corporation or any other large and well-resourced institution in the U.S. or the UK engages in all of these ICT activities. In doing so, they are supported by a computer services unit and parallel units such as audiovisual and telecommunications divisions. In the grassroots community groups, supported by (as this chapter will later discuss) a small number of ICT helpers, the 25 ICT activities are not universally adopted, but are used where they are helpful and possible. Rather than examine the community groups' involvement in each of the 25 ICT

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[4] An alternative coding convention is sometimes used. This is to code 'often' and 'sometimes' as 'yes,' and 'rarely' and 'never' as no. There is only one pattern shift when the data is coded this way: 'Sharing photo, video, or audio files' drops from 65% yes to 6% yes. This is due to the fact that most groups that used these three media overwhelmingly reported sharing such files 'rarely.' Other effects which are negligible in this analysis are fewer 'yes' answers across the board and small shifts in ranking (e.g. #18 to #20 or #10 to #9).

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activities one by one, the following analysis groups them according to the six themes—online texts, Web use, mobile telephony, image and sound processing, data analysis, and newer technologies. These themes are listed and discussed in order from most commonly used to least.

4.2.1 ICT practice: online text

An examination of the community groups' practices with respect to online text unearths themes of the equalizing of power, including (among immigrant populations) the experiencing of pressure to participate, and the finding of help via public ICT facilities and services. First and foremost, however, is the theme of online text as the discovery zone, a moment of amazement at the power of the technology.

When it burst on the mass market with its alphanumeric keyboard as the dominant input device, the personal computer presented itself to non-programmers as an extension of the typewriter (Bolter 1991). Word processing was the first mass 'killer app.'[4] This was true for many early adopters, including the people in our study sample. As an example, Louise, age 68, of the tenant group 16, tells how she was introduced to computers:

> I've been doing it a long time, at work, what have you. In fact, see, I'm actually a word processor. I actually saw the first lady, at a conference, years ago, and she sat in the middle of the hall. She was doing her word processing and everyone

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[4] A 'killer app' is a software application that is adopted widely and often quite swiftly, redefining tasks, organizations, and even industries (Downes and Mui 1998).

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stood around here. Could you believe it? And [straight away][5] I'm on the first courses in Manchester to start on computers. Because I knew that was right on.

Seven items from the list of 25 consist primarily of the use and manipulation of text and digitization of written language, apart from the World Wide Web, which will be discussed separately. Two of these activities are widespread across the groups: creating documents on a computer (94%) and using e-mail (94%). The rest are engaged in by fewer than half the groups: belonging to a discussion list (35%), posting to a discussion list (29%), using instant messaging (23%), using online chat (19%), and editing an electronic discussion list (6%). These activities predominantly include writing as well as reading, sending as well as receiving, thus expressing in some way the literacy principle of "reading and writing the world" (Freire and Macedo 1987).

The written word overcomes problems of oral communication in contexts fraught with barriers of power, socioeconomic class, and nationality which express themselves in language and accents. In other words, where people cannot understand each other in conversation, a written document can sometimes ease the way for them to understand each other. With the personal computer, community groups are able to create clear and authoritative documents (because they are printed rather than handwritten) or as Latour called them, "immutable mobiles" (1986, 227). Latour's theory emerged from his study of how early scientific progress relied on data and analysis being written down and thus

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[5] Brackets in the passages quoted from interviews indicate words the researcher has added to clarify the speaker's meaning for the reader. This meaning was derived from the context of the full interview; see the discussion of interpreting what Bernstein (1971) calls "restricted code speech" in chapter 3, section 3.5.5.

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portable from one scientist to the next. A community group's progress through formal bureaucracies is no less dependent on such artifacts. Betty at tenant group 9, explains:

> We e-mail people like the housing [authority] ... because the people at the office ... you cannot understand them [on the phone] and they can't understand you, or you can't get through to them. So I just get on the e-mail.

In doing this, groups describe seeking to create an electronic 'paper trail' in dealings and negotiations with authorities. For instance, Cilla from tenant group 5 explains:

> Doing complaints by e-mail now, we have to get a response and they can't fuck me off anymore on the phone. ... We are the last to go about [getting skilled at] the computer, but with e-mail, you got to answer and there is a record.

Cilla frequently prints and passes out copies of e-mails in order to better connect non-computer users in the group to ongoing electronic dialogues.

A particular form of negotiating power with ICT is expressed among immigrant groups. Martin from support group 1 explains how the computer helps his group serve families who have immigrated from his home country, which has experienced intermittent civil war for close to 30 years:

> [For all these years] there wasn't [school], you know. So the people that grow up at that time, they haven't been studied. Some of them, they go over [miss an] opportunity, and they [have a child] who is descended this country and they don't have access to [their parent's language]. So if [I am helping] a family, I have to

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send [a letter] to them in English [and two other languages]. So everybody will understand.

ICT is by no means a perfect aid in overcoming language barriers. Martin relates a nagging problem, particularly keen for a language not written until this century and spoken today by a global diaspora of close to 13 million people (Gordon 2005):

> And if you are writing in [my language, Microsoft Word] is showing you error. Not recognizing it. I think there is a huge language in the computer, but not [mine]. If I write [a] word, it would show me there is error.

Virtual forms of community ICT also enter into the online text activity of groups. Group 1 is one of the few groups in the set of 31 that use an online discussion list, in their case relating to refugee assistance in Manchester. Martin explains that another volunteer subscribes and relays information to the group:

> I haven't much of an idea, but I know Smartgroups, they are used by professional people. They send information and they got this information in the Internet.

Refugee-serving organizations, as they are called in the UK, are known to make extensive use of ICT despite their modest size and budget (Walton 2004); this may be an echo of the global adoption of ICT by diasporic populations in order to maintain their identity and their family and home–country ties (Miller and Slater 2000).

Among the 31 community groups, all of them early adopters in digitally divided communities, there are also within-group differences with respect to online text practices. Derek of cultural group 24 is an example of a community group volunteer who is aiming to catch up with common e-mail use in his group:

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> As far as I can see, e-mails are a pain in the ass. Far sooner pick a phone up and speak to somebody. But it is having such an impact. ... It has got to be a positive thing, in the long run. There is far more information that is going to the public that wasn't actually hidden before, but it wasn't readily available. ... I have got to get into the e-mails and learn how to do them.

Mike with tenant group 7 explains the class differences within his community group:

> [The year 2000] was about the same time the local residents started having their own computers, so when we started communicating with each other via e-mail. Unfortunately, ... because a lot of our group is council tenants, quite a few of our group are not as well off as people in private housing. ... So even now a lot of people who live in the area don't have computers, or don't have access to the Internet. Or don't even know how to use a computer.

Socioeconomic pressures also limit time to explore computers: Cilla from tenant group 5 reports:

> As soon as I am finished [with computer tasks] I walk away. It isn't like I'm thinking, Oh, can't wait to get to the computer! We don't take it much further than what we have to do, because we haven't got time for exploring.

This pressure was also reflected in Cilla's mention of several others in the group who would like to be taught by her to use the computer, but no one can find the time.

Public computing places help to alleviate the pressures and the inequality experienced by the groups, sometimes playing a critical role, as we will see throughout

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the analysis. For instance, cultural group 22, an environmental group, never experienced the conversion from physical documents and typewriters to the online world. To borrow a term from recent archival theory, the group was 'born digital,' (Hedstrom 1997). The chair, Ray, doesn't even own a computer, but makes a monthly trip to the public library. This is the only practical, nearly cost-free way to maintain the group. He explains:

> I chair the meetings, and I also send out all the information about the meeting and the next meeting. That goes out by e-mails. Mainly because a couple of people are not on e-mail, we have to send that out by telephone [also]. ... We actually send out at least 30 e-mails to people who use the group or need the information or know of the group ... and get information from those [in return].

Similarly, cultural group 21, which puts out a local magazine, began its activity in a community technology center, eventually taking advantage of a local business incubator that built a community group equipped with QuarkExpress and other publication layout tools. In another case, Gail, with support group 27, reports about the parents they help in their small computer lab:

> You have some they are in school; we are supporting them to a point where they are not in school. Or they can not afford a computer. They come in here to do their work.

In general, these 31 community groups have adopted a new form of literacy. Computer literacy is a form of literacy in many ways, including as a technical skill, as a set of concepts, as evolving, as having social meaning, and, of particular interest here, as having social power, having access to a community that relies on ICT (Williams 2003). The work of these community groups as described above defies predictions that the non-

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elite "may be able to enter data—as cashiers now do for cash registers—but they will not be able to write with the machine across the spectrum of semiotic communication," (Bolter 1991, 224). They have thus wrested a measure of power (Scribner 1984/1994) as well as inclusion (Lave 1991, Barton 1994) in the information society.

4.2.2 ICT practice: use of the Web

The second most common ICT practice among the groups is using the World Wide Web. The groups' narratives concerning use of the Web are dominated by online research and secondarily with issues of barriers to overcome, sometimes attitudinal, and public computing as a tool for overcoming these barriers. Embedded in the group's embrace of the Web is a sense that the World Wide Web, with its system of global identifiers and a graphical user interface, helps to make cyberspace democratic in that a small group's URL is, generally speaking, as sturdy an address as that of a Fortune 500 corporation—and they are each only a click away (Berners-Lee 1997). Without even as much training as a new McDonalds employee would receive—twenty minutes, according to Ritzer (2000)—anyone who can read can sit at a networked computer and use a search engine to locate and peruse a Web site. The World Wide Web Consortium process, contested though it is, has also helped to keep Web production "backwards compatible" and within the reach of basic coders.

The ICT activities that fall under the category of Web use include 5 items on the list of 25: looking for information online (84%), posting to a group Web page (45%), reading a bulletin board online (39%), posting to a bulletin board online (19%), and posting to the Web elsewhere than to a group Web site (10%).

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Looking for information online comprises outreach to other groups, going to the marketplace, and connecting with resources which have already completely migrated online. Three examples illustrate each of these in turn:

> When we first started, we did a fair bit of research, to find out about other TAs [tenant associations] based in this country and abroad. (Norris, tenant group 2)

> We can get onto the Internet, you get information on what is available for the club, whether it is a bus service, whether it is an area we need to visit. And trips. It is all on the Internet, how to get there. (Kevin, support group 31)

> A lot of the new funding applications, they all want an e-mail, or 'Download it off the Web site.' And they don't usually have a number where you ring anymore. ... But you have to make sure you have the right technology. I haven't got that Adobe thing [pdf reader] at home. (Rita, support group 30)

Such uses were mentioned along with more personal uses such as chat rooms and more commonly, shopping.

Groups are familiar with and depend on public places to access computers and the Internet ('public computing') as well as virtual community ICT such as Manchester Community Information Network (MCIN), which supports community groups using technology. Some groups use these places, the cyberorganizing groups are happy to make their own facilities available to other groups, and MCIN's support is also welcome. A sample of comments expresses this:

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We meet in the local library. So a local library has Internet access, which we can use, on a public basis. So some of the people use the Internet to look at sites. (Ken, cultural group 18)

[Our kids] are saying all the time, can we get on the Internet? We would like to [enable online chat] because some other youth centers within the area have got their own Internet café, where you can chat, this is what we are hoping to eventually do. But we need to make sure all the safety precautions have been put in, from the amount of pornography there is online, and pedophilia. (Kevin, support group 31)

Local bodies had funding set up for these Web sites. We were asked, would we get involved in it? A few of us did. We didn't know how to do it. We were told how to do it. Some of them, like, the girls [in the group], don't want to know. They are not interested in it. Some of them haven't even got a computer. [I do and I took it on.] We used to go along to the IT places to do the work. (Elsie, cultural group 23)

Uneven development of Web-awareness within a group is similar to attitudes about e-mail discussed above, but again, there is a strong urge to use the Web to connect with constituents. Louise from tenant group 16 relates:

My chair wasn't very happy when I said we were going to have a Web site. ... I said we should really have one. Because this is what the younger people look at. They don't read papers and that, so the look of the future will [be to] check out Web sites. So I said, you got to be in it, whether you like it or not really.

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Language issues are a challenge for inclusion that groups have overcome. One Web site used both text and recorded voice, as Pat from cultural group 8 recalls, "Yes, I did the language. My instructions were in my own language." The bilingual site, accessible to the non-reader with voice audio in a familiar accent, helped to overcome problems for visitors who only read their first language, or who did not read, particularly visitors new to the Web and its powers.

4.2.3 ICT practice: mobile telephony

The third most common ICT practice among the groups involves mobile telephones. In the U.S., a moment cited when telephones became a basic necessity was their inclusion in the 1960s in the official budget for a family on welfare benefits (Pool 1977, Fischer 1992, Schement and Forbes 2000). Just forty years later, the basic telephone is often a cellular one, which is called in the UK a 'mobile.' By 2001, UK mobile phone ownership had reached 66% of individuals in the top income quintile, on down to 23% in the bottom quintile (UK Office of National Statistics 2004). The ICT activities that consist of mobile telephony include 4 items on the list of 25: using a mobile phone to talk (77%), to text (68%), to send or receive e-mail (3%), and to browse the Web (3%).

Mobile pricing is low relative to land lines, and land-line telephone installation and billing is burdensome, so that many people only have mobiles. This impedes home Internet access. Fiz from cultural group 26 says, "We rarely be on the Internet, because we haven't got a phone line in." E-mail and Web use from a mobile is rare; 'too expensive' was the reason most offered. Others are caught with large unexpected mobile

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bills; just talking on the phones can create a financial nightmare. In the UK, for example, calling a mobile number costs more than calling a land-line telephone number. Maria from tenant group 4 relates,

> I have to put a hold on the house phone to stop the mobile numbers going through because my bill is ... just! Everyone has got a mobile phone. But they always tend to use the house phone. And I am the one paying for it. So BT gave me a hold to put on. Cannot phone a mobile off the house phone. ... I don't know if it is the same in America as here, but the phone bill can be shocking.
>
> To ring [a mobile] can be very costly. So I had to put a stop to do that. Because all my friends have mobiles, everyone they know has a mobile.

Cilla from tenant group 5 explains their group's phone use:

> It's the networking which we find really important. ... I make phone calls to anybody and everybody and e-mailing and things like that. ... If there is anything going on around the corner that we can't see, A will phone B and B will phone C. And if C is close by, C will go out and see what is to see. C will go out and investigate. Then we put back to the base. [laughing]

Mobile phones were among the rare sources of dissatisfaction with ICT. This applies to more than cost. Norris from tenant group 2 explains,

> We bought a cheap phone. And I am not very good at sort of remembering, switch these things off! And we just got fed up with it ringing when you were [busy]. I stopped using it, because of the noise, really.

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Nonetheless, texting was so widespread across the groups that setting up interviews with community groups involved more than one text message exchange. Convenience and price (text messages cost less than talking) helped drive this practice.

4.2.4 ICT practice: digital image and sound processing

Just as activities with online text mirror and extend predigital literacy practices, digital image and sound practices, the fourth most common ICT practice among the 31 groups takes off from use of the comparable analog media (Merriden 2001, Barlow 2005). Moreover, the consumer electronics industry has brought many devices within reach of the community groups in this study. The ICT activities that fall under the category of digital image and sound processing include 4 on the list of 25: taking digital photos (74%), sharing photos, video, or audio files (65%), recording digital video (29%), and recording digital audio (23%).

Digital cameras, scanners, and other image and sound tools owned by the community groups or their volunteers are used to advance collective goals. Cultural group 22 has taken digital photos of their "litter picks" or cleanup projects "to highlight them in the local freebie newspapers." Cultural group 13, which puts out a neighborhood newsletter with an audience of many former residents as well as locals, tells of an instance where they ran a story by a former player about a long-ago football match. The group soon received and scanned in a photo of the match from a Florida reader who had been at the game. "He actually called round and said, 'I have a photo of you,'" Ena remembered.

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Some groups are just catching on, but enthusiastically. Maria of tenant group 4 replies to a question about frequency of use of digital cameras: "Oh, yes! ... It is a new camera so [my answer is] all the time. I have just got to the stage now where we have put them on the PC. And I have actually printed out the pictures. I am very proud of that."

A smaller number of groups are experimenting beyond digital still cameras. Cultural group 18, which has published a number of chapbooks about their community's history, has branched into digital video and sound recording. Ken explains:

> There is a chap called Alfie [in the group] who has done courses in the past on doing videos, and he has done his own videos of local history subjects for the group. And he has a digital camera. Stills [from the video] go on the Web site. [And] we sometimes sample sound where people just talk about subjects, and produce cassette tapes. There is one put out of various people talking about their thoughts.

According to Ken, some of the technical contributions come from younger people, but Alfie is an example of a volunteer who contributed memories as well as videography.

Graphic design is another area where digital tools empower grassroots groups. Mike from tenant group 7 tells, "I was designing a logo on computer, myself. We didn't have a logo. Previously to that, if someone wanted to design a logo, they would have to go to a design company, and it would cost them, whereas with technology, it was easier for me to design a logo for the group."

Tenant group 6 also makes its case with images. Kirk relates, "Even though they wouldn't stand in court, they are used to show council, the counselors, and the police, the evidence. To give the police and the people we are talking to an idea of what we are

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saying. Because I believe, coming from another tenant association which I ran for years, that images are far, far stronger than words."

Some are moving faster than others. Cultural group 26 is a group that uses a portable digital music studio to teach others how to record and produce music. Explains Fiz: "It is stark really. Some of my friends spend a lot of money on music equipment, and got DJ equipment and decks and vinyl, but they have not got PCs yet." These groups are well aware of the leaps that they are making by going digital. Group 26 books workshops for groups of children or adults to learn and work with their tools to create and produce music. By taking the studio to different locations and networking through other organizations, they are reaching deep into their community.

4.2.5 ICT practice: data analysis

Beniger (1986) points out that scholars since 1962 have heralded and examined managing information in a digital format as the dominant modus operandi for organizations and groups in the 21st century. This involves the manipulation of spreadsheets, databases, and the analysis of data, which are the fifth most common ICT practice among the groups. In particular, the first personal computer 'killer app' for the business world was the spreadsheet (Power 2004). Small community groups such as those in the study can use the computer to bring bookkeeping and data and records management within their reach.

The ICT activities that consist primarily of analysis include 2 on the list of 25: using spreadsheet software (55%) and doing computerized bookkeeping (10%). Spreadsheets are a common entry point into the concepts and practice of data analysis.

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Mike of tenant group 7 explains what his group does: "The accounts are on the computer, and we are also using Internet banking now." He learned spreadsheets in a large-institution setting, the company he works for. Other groups mentioned the classes in local CTCs which teach students how to use spreadsheets as part of their earning the ECDL (European Computer Driving License) or CLAIT (Computer Literacy and Information Technology) certifications promoted in the UK.

Two study participants also mentioned databases. They each learned to use them in the large-institution setting of a leading research university. Pat from cultural group 8 first used computers in the 1960s, refocusing her university research work from chemistry to computers: "We wrote the city council and had a grant, and that was the first time that we managed to have some system here, and we put our members' database there." Another respondent, Martin from support group 1, reports that of all the things on the computer, "Not everything we use, just little to work for us. Spreadsheet and database we use."

4.2.6 ICT practice: emergent technologies

The least common ICT practice across the 31 groups is the use of three emergent technologies included on the list of 25: voice-over IP online telephony (19%), Linux or other open-source software (13%) and wireless technology (6%). 'Emergent' is used here to categorize technologies which may have existed for some time but are just now developing a mass user base. These technologies were unfamiliar to most of the community group representatives, but where they had penetrated, in the case of open

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source, narratives emerged that reflect how the discourse in these socially excluded communities was not terribly different from elsewhere.

A few groups use donated machines loaded with the free software office applications Open Office or Star Office. Support group 30 received funding for Microsoft, but was prepared to use Linux. As Rita tells it,

> [Group volunteer] Uncle worked out in his office how to use Linux and all. That was quite interesting, because that would have been a new wave. ... And my brother suggested that as well.

For one group, the involvement of volunteers who are also software engineers put them ahead of other groups with respect to newer technologies. The public housing development where the group operates is in a socially excluded ward and is home to many older people, but it has also attracted young and often skilled people—who may be employed or may rely on social benefits and the informal economy. This has created an unusual dynamic towards successful below-the-radar experiments with alternative solutions. Jack from tenant group 29 explains.

> We have more and more people interested in Linux. Because we are taking a more active involvement in promotion of open source, which is what we use. Everybody has a computer with Microsoft in it, apart from those people who do understand Linux. Probably say about, 10 or 15 people who are into networks.
>
> We have a project to rewire the entire estate. ... We want to put in one that is pretty much state of the art. We want it to last at least 10, 15 years. ... We want a gigabyte backbone through the estate, and 100 [megabytes] down to each flat. That takes organization, negotiating, and raising people's awareness. ... The

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> whole estate will benefit, because we can increase the bandwidth that is available to the estate. We want to maintain the integrity of the wide network, but we are also adhering to the open-source view of the group, that [supports] bringing wireless to us and then [we'll] connect our estate to the network of the estate down the road. ... We recently established [an association] of like-minded people who like wireless and free access. Following up what has been done in other cities.

This group, having wired their housing development some years back by running cables through attics and stringing them across alleys, now maintains three Web servers. Jack continues, "We have got a mail server, a Web server, and [a file] server in the office here."

Likewise incorporating the tools that fit the constituency, Charlie from support group 25 explains their adoption of a particular new technology that was not included in the list of 25:

> The whole purpose was to get our women really into computers, because embroideries, sewing, teaching it, is what they naturally do. ... You sew on the machine through a computer so they have to learn [the computer] first, and once they are initiated to using computer, they get a lot of other things, when they are learning, but this group will do that. So in a sense it is like a camp, we are holding it to the ladies. ... We use computers as an extension of their personality. It is happening, when people, learners, come here, they come to computers and the computer responds as if it is an extension of their capability. Because the computer is become for everybody.

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Thus from the most common uses of ICT such as e-mail and word processing, to the relatively unique, to the positively grassroots application of introducing older women to computerized embroidery in a community setting, the groups in this study are actively using, innovating, and reflecting on their adoption of these new tools.

4.3 Downloading, uploading, and cyberorganizing

Across the 31 groups, this study identifies three social functions with respect to ICT. These three social functions are downloading, uploading, and cyberorganizing. This section describes these functions and relates them to the previous examination of the 25 ICT activities. The general finding is of three distinct types of ICT use, and the groups are sorted into these categories visually in table 9 below.

1. Downloaders are the community groups (N = 13) that make use of ICT, but without posting to any group Web site or having facilities for ICT use beyond personal workstations, for instance, in their home or their group workspace. The downloaders are participating in the information age, but perhaps not as fully (or, as section 4.2 demonstrated, as broadly) as the uploaders or the cyberorganizers.
2. Uploaders are the groups (N = 11) whose use of ICT includes a group Web site, but not maintaining facilities for others to use ICT. This activity is in addition to the same ICT activities as the downloaders.
3. Cyberorganizers are the community groups (N = 7) whose use of ICT includes maintaining facilities that enable them to engage in provision of technology. Two of these seven also maintain group Web sites; this study includes them as

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cyberorganizers, rather than as uploaders, because in the interview and in their group's allocation of time and other resources, the facilities and support they provide take priority over their group websites.

		Group has ICT facility?	
		No	Yes
Group has Web site?	No	13	5
	Yes	11	2

Table 9. ICT facilities and Web sites across the 31 community groups.

These three types of ICT use can be characterized as downloading, uploading, and cyberorganizing. These three social functions can be understood in their relation to information society by making an analogy to industrial society. Downloading is a form of consumption; uploading is a form of production; and cyberorganizing is a form of reproduction, generating more consumption and production.

Following Harris (1979, especially chapter 3), production and consumption are the primary social activities of human economy and culture, on which exchange depends. Social reproduction, based in the family and other social institutions, is how a society replenishes itself by preparing others to be members of society, especially the next generation. For the information society, the three types of ICT use are defined in relation to both cyberspace and physical space.

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One key here is the flow of information between actual space and cyberspace. Generally speaking, the uploader (producer) transfers information from physical space to cyberspace; the downloader (consumer) accesses information from cyberspace. Groups that provide facilities for access to the Internet provide access for both downloaders and uploaders. Cyberorganizers are required for the other two activities to proceed.

For individuals, the most common presence in cyberspace is an e-mail address; even homeless people get and use e-mail addresses to maintain their lives and social networks (Rogers et al. 1994). But for organizations, a very common presence is a group Web site, an asynchronous information-sharing zone. Both an e-mail address and a Web site require, and in turn afford, a permanent presence in cyberspace.

As for the physical access points to cyberspace so that this presence can be felt and expressed, it may be any number or combination of places, either public, private, or personal (Williams and Alkalimat 2004). Wherever public computing facilities exist, they serve as a social space for learning and using the new tools (Mark et al.1997), either along with private spaces such as home or work, or, where computing devices are scarce, in place of them. In this study, participants report that members of their groups use computers in their homes (100%), other people's homes (81%), workplaces (80%), public libraries (71%), educational institutions (70%), UK Online Centers (50%), cybercafés (35%), and electronic village halls (20%).

Across the 31 groups in the study, 7 have ICT facilities of some kind. These are the cyberorganizing groups. They have developed actual community ICT, as defined in chapter 1, section 1.1. They host physical facilities for their community to access, learn, and use ICT. Five of the seven have computer labs; one provides Web servers, services,

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and home Internet access to area residents; and one has a portable digital music studio for individuals and groups to use. Each of these groups is active in its community and has expanded its programs, participation, and social network on the basis of the ICT it offers. As an example, Emily, a volunteer with tenant group 28 tells how the computer lab the group operates lost its teacher for the summer. The young mothers in the class convinced Emily to run the class, despite her own sense of inadequate skills. These seven groups are fully engaged in providing access and support for other people, allocating time and resources to do so. These groups are cyberorganizing their communities, helping other people take up and use ICT (Alkalimat and Williams 2001).

Of the 31 groups in the study, 11 of them have Web sites and no ICT facilities. These groups have developed virtual community ICT, as defined in chapter 1, section 1.1. Their virtual community ICT is a Web site hosting content that is of, by, and for their own and perhaps other communities. These groups are doing what the definitions section (1.1) describes as uploading, creating a presence for their group in cyberspace, posting their information and ideas. As an example, Ken of cultural group 18 explains how the group began its Web site, putting excerpts of its publications online:

> [So I said at the meeting,] Wouldn't it be nice if we put some of the stories on the Internet? They quite liked the idea of that. People around the world can see them. So I got volunteered for services, put together a Web site with the materials. And showed it to [the others].

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The ICT offerings, both Web sites[6] and ICT facilities, are an expression of a group's determination to use an ICT artifact, virtual or actual, as a resource for outreach (Day and Harris 1997, Liff and Steward 2001a).

There is a relationship between the 25 ICT activities measured and the three types of activity: downloading, uploading, and cyberorganizing. This difference is both quantitative and qualitative and will be demonstrated below. A count of how many of the 25 activities each group engages in uncovers differences between the groups that are downloading, uploading, and cyberorganizing. This difference is shown in table 10 below. Downloading groups on average engage in 8.2 of the 25 ICT activities. Uploading groups engage in somewhat more, an average of 9.8 ICT activities per group. Cyberorganizing groups engage in the most, an average of 11.7 out of 25. In sum, downloading groups on average are the narrowest ICT users, measured across the 25 ICT activities, cyberorganizing groups are the broadest, and uploading groups fall in the

	Downloaders	Uploaders	Cyberorganizers	All
Average number of ICT activities	8.2**	9.8	11.7	9.6
N	13	11	7	31

** A statistically significant negative correlation was found between the number of ICT activities and being a downloader group, with Pearson's correlation coefficient of -.317, p = .041, N = 31.

Table 10. Downloading, uploading, and cyberorganizing, and average number of ICT activities per group.

[6] Group URLs are not provided here in order to maintain their anonymity in the study. Web sites of a number of Manchester voluntary and/or community organizations can be found via the portals established by the Manchester Community Information Network. These portals can be found (as of September 4, 2005) at http://www.mcin.net/home/pages/75 .

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middle. The lower number of ICT activities for downloading groups was found to be more than a tendency, a statistically significant difference.

As appendix D details, statistically significant correlations also support the following differences between engagement in particular ICT activities across downloading, uploading, and cyberorganizing groups:

- With respect to online text, downloader groups are less likely to use e-mail than the uploader groups or the cyberorganizing groups. Measuring low on this core ICT application supports the picture of downloaders as less integrated into the information age. At the other end, more fully integrated, enactors rather than the enacted, cyberorganizers are more likely to use online chat. This may be because they spend more time near the computer, since it is a service the group provides.
- With respect to using the Web, correlations confirm the definition: uploaders are more likely to post to a group Web page and downloaders less likely. But they also suggest that uploaders are more likely to post to Web bulletin boards. Being an uploader is thus associated with this other way of representing oneself on the Web.
- With regard to mobile telephone use, uploading groups are less likely to talk or to text on a mobile than downloading or cyberorganizing groups. It may be that downloading groups are the most subsumed into this corner of the mobile phone market, perhaps due to cost imperatives, while cyberorganizing groups, being the most "techie," make extensive use of their mobile's texting ability. Texting may also be a popular substitute for e-mail.

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- With regard to digital images and sound, being engaged in downloading is negatively associated with taking digital photos or sharing image or sound files. Confirming the definition, uploaders are more likely than either downloaders or cyberorganizers to share image and sound files.
- With respect to analysis, cyberorganizers are more likely to use bookkeeping software. This suggests that the organizational capacity that allows them to acquire and maintain computers and other digital tools requires recordkeeping, especially with respect to finances.
- Finally, with respect to emergent technologies: correlations suggest that cyberorganizers are more likely to use Linux or other open-source software. Narrative data suggest that this is related to their being engaged in the provision of ICT facilities.

Across all these statistically significant differences, cyberorganizing groups are engaged in more of the 25 ICT activities than other groups. Uploading groups are engaged in fewer of the ICT activities than other groups when one excludes their posting to group Web pages.

4.4 A relationship between context and ICT use

The practical day-to-day life of each social group has as its context the everyday life constituting civil society around it. Putnam (2000) theorizes the decline of civil society, but does not go so far as to predict absolute anomie in the sense of Durkheim (1893/1947). A socially excluded community does in fact have a social life. People

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organize and participate in social groups in their own interest, even in opposition to the general trend of demobilization for which Putnam amassed evidence.

As was detailed in section 4.1, the groups in this study work on different issues that fit them into three common categories, each defining a social context for the group and its activities:

1. tenants' issues relating to integrity and security of housing;
2. cultural issues relating to local quality of life; and
3. social support issues relating to assisting families or age cohorts (e.g. youth or seniors) in need.

The tenant groups are in a geographically defined space. Each has a clear practical interest in having a beneficial relationship with the management of its housing development. Practical incentive pulls on every volunteer. Cultural groups are the opposite of this. They are self-selected activists pulling themselves together based on a common cultural interest that often extends beyond the geographic space: witness the repeated mentions of people who used to live in the area making contact with the cultural groups. The third set of groups is defined around a common need to overcome a life crisis.

These three contexts overlap with the three ICT types as shown in the cross-tabulation in table 11 below. Tenant groups tend to be found among the downloading groups. Cultural groups dominate among the uploaders. And social support groups are concentrated among the cyberorganizers.

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	Downloaders	Uploaders	Cyberorganizers	All
Tenants	**7**	2	2	11
Cultural	4	**9**	1	14
Support	2	0	**4**	6
All	13	11	7	31

Table 11. A pattern across social function and social context.

What is the logic of this pattern? Social support groups, whether supporting children, seniors, or adults, see computers and the Internet as among the tools for helping their population participate fully in the information society. Their social mission adopts ICT as one of the services to be provided. Cultural groups are telling their stories or rallying others to promote a cause. They have experience, news, and opinions to put out and take up the most developed and the most cost-effective tools to do so. Tenants are organizing according to geography and according to local patterns of housing ownership in order to strengthen their negotiating power with a landlord or other local authority. The tools of e-mail, document creation, and gathering information online serve them well; other tools do not enter into the work these groups do in response to outside pressure.

These findings suggest that different activities associated with tenant groups, cultural groups, or social support groups are associated with different approaches to ICT use. This affirms and extends the idea mentioned in chapter 1, section 1.1 of the social in the technological. ICT use is not general, not an end in itself, but is tailored to achieving some particular purpose. This argues for a reformulation of ICT use by groups as 'social

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ICT use,' SICT, linked necessarily to the social role the group plays and the social ties it utilizes in terms of strength and social capital.

4.5 Summary

The above analysis of ICT use across the 31 groups enables the patterns of rich and complex data to open up the dependent variable part of the theoretical model. ICT activity is broad and varied, combining online text, data analysis, multimedia (Castells 1998), use of the Web (O'Donnell 1998), mobile telephony (Katz and Aakhus 2002), and newer technologies, particularly open source (DiBona et al. 1999). Furthermore, there are three overarching types of ICT use among the community groups: downloading, uploading, and cyberorganizing.

The theoretical model projected that the study would find ICT that ranged along a single continuum from less to more extensive. The findings suggest that cyberorganizing groups are the most extensive users of ICT, followed by uploaders, and then downloaders, as in figure 7 below. Cyberorganizers make the most extensive use, except in the important area of creating and maintaining Web pages. Cyberorganizing groups and uploading groups are each more extensive ICT users than downloading groups, although in different ways.

The hierarchical relationship between downloaders and uploaders echoes Castells' elaboration of the paired concepts of the enactor and the enacted in the information age (1996). Castells highlights the difference between being able to create and circulate communications and only being able to react to communications from others. In the extreme case the enacted (analogous to the downloader) can read, look, listen and click

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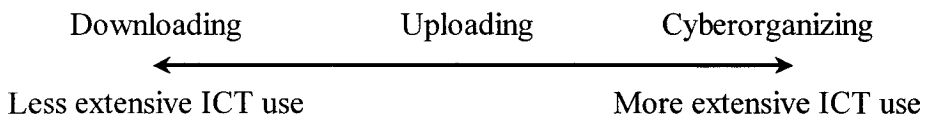

Figure 7. Locating downloading, uploading, and cyberorganizing along a continuum from less to more extensive ICT use.

The hierarchical relationship between downloaders and uploaders echoes Castells' elaboration of the paired concepts of the enactor and the enacted in the information age (1996). Castells highlights the difference between being able to create and circulate communications and only being able to react to communications from others. In the extreme case the enacted (analogous to the downloader) can read, look, listen, and click only where and how the uploader has designed for him or her to do so. Also, in this study, the downloaders are creating communications, e-mail for instance, but their creating is not at the level of the uploaders.

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Chapter 5

Findings regarding social ties

Just as the last chapter presented this study's findings regarding ICT use, this chapter takes up the other variable in the model, that of presenting the findings regarding social ties. In addition, with both variables presented, the chapter connects the findings back to the theoretical model, which advances that social ties, operationalized as help with ICT, influence the ICT use of community groups in socially excluded communities. In so doing, the chapter is able to fill in the sketch (that any model necessarily is) with the actual color and texture of the community groups and their social ties. What results is a model augmented and made more real.

Social network theory was the starting point for the study. Its foundational idea is that social phenomena such as that which this study examines can be better understood by examining them as relationships between actors. This does not remove the context, as the Gans-Granovetter 1974 exchange emphasized; rather, it locates the context as an important condition for the interactions between the actors.

Methodologically, relying on social network theory also involves adopting social network methods. This involves identifying each community group as a node in a distinct egocentric network, connected to other nodes which are their sources of ICT help. It involves considering the groups as a dataset, with their features measured by

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analyzing the data from interviews with community-group volunteers. It involves considering the ties as a related but distinct dataset, with their features measured by analysis of the interview data. Social network analysis is most often quantitative; it is particularly well supported, often dramatically so, with graphics. The analysis in this chapter is supported by egocentric network diagrams describing the community group as a central node linked to its sources of ICT help.

The basic findings that this chapter will explain are as follows. In turning to others for help with ICT, the community groups reach across various digital divides of age, ethnicity, and employment. Those interviewed reported that their groups rely on between zero and five ties each, with more ties associated with representatives of groups that make more extensive use of ICT, uploaders and especially cyberorganizers. By most measures in the study, the community-group volunteers report mostly strong ties, mostly bonding social capital as their sources of ICT help. As with number of ties, a greater preponderance of strong ties and bonding social capital is associated with groups making more extensive use of ICT, uploaders and especially cyberorganizers. This implies resourcefulness and self-reliance with respect to ICT among these groups in socially excluded communities. While an explanation of the implications will be reserved for chapter 6, this chapter will unpack these basic findings.

The interview ascertained who was a social tie with respect to ICT help by asking the following questions of each study participant:

- Has the group ever gotten stuck on a technology problem or needed help? Please, tell me about that.
- Who did the group go to when it was stuck [or needed help]?

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- Are there other sources of help with technology that the group uses?
- Who or what are they?

Subsequent inquiry in the interview aimed at triangulating three empirical sets of measures:

1. The demographics of tie and group. Examining the demographics of tie and group locates the ICT help process in the context of the broader society and allows for comparative data.
2. The size of each group's social network of ICT help. Examining the size of the network providing ICT help to a group gives one estimation of how supported or how isolated a group may be.
3. Tie quality: weak or strong, bonding or bridging social capital. Examining tie quality also shows how supported or isolated a group, represented by the study participant, may be.

This chapter addresses the question of what type of social networks and social capital community groups access for ICT help, in a community where ICT knowledge is expected to be scarce given the effect of the digital divide.

Paralleling the last chapter, this chapter combines methods to elucidate findings from the data. Viewed one way, this study is a case study of Manchester; viewed another way, a small-N study of community groups. The mix of quantitative and qualitative methods used in the study bridges this contradiction, connecting the closed-end questions which call for numerical analysis with the open-ended questions which lend themselves to narrative analysis. Most of the numerical analysis brings to light tendencies rather than statistical significance, and this is partly attributable to the small N. But these

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tendencies, and the statistical significance, echo the narratives that emerge from the qualitative analysis, so taken together, the two methods produce meaningful findings, which of course bear further testing and exploration.

5.1 Demographics of the volunteers and their social ties

The place to start in analyzing the social networks providing ICT help to groups is the demographic data. Social network theorists all rely on demographic data providing a necessary context for the study of social networks (Granovetter, Lin, Wellman, among others) and that is the case with the community groups and their ICT helpers.

To begin with, the community group volunteers do reflect the socially excluded communities where their groups operate. Their median per capita income is £6,700, roughly equivalent to $12,000 per year, and their educational attainment is below that of the UK population as a whole, with 35% having no educational qualification, 42% having some qualification, and 23% having a university degree. (Qualifications may include passing the GSCE or General Certificate of Secondary Education or the A-level, Advanced examinations, or earning a vocational certification.)[7]

Second, the particular demographic context for this study is the digital divide. Over time, in the UK as elsewhere, the digital divide has shifted (Dutton et al. 2005), but ICT use is still associated with certain demographics. Table 12 below provides recent data for the UK, showing that differentials in Internet use exist across age, ethnicity,

---

[7] Haezewindt (2004, table 2.19) reports UK population educational attainment as follows: 15% having no qualification, 68% having some qualification, and 16% having a university degree.

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education, income, and to a small degree gender. As a result, one can use demographics to project ICT use, as was done in a study of library provision of Internet access by Williams (2001).

A recent Oxford Internet Institute survey shows that age cohorts range from a high of 94% of 14-17 year olds using the Internet to a low of 20% of 75-and-older individuals using the Internet. A slight gender edge exists, with 63% of men using the Internet versus 57% of women. Education shows as dramatic a digital divide as age, with just 29% of "school leavers" without qualifications using the Internet up to 83% of individuals with university degrees. The lowest income bracket includes 29% Internet

Age	
14-17	94%
18-24	78%
25-34	69%
35-44	69%
45-54	65%
55-64	53%
65-74	31%
75+	20%

Ethnicity	
White British	59%
Asian	67%
Black African	74%
Black Caribbean	52%
Other	61%

Education	
No qualifications	29%
GSCEs, A levels, vocational	66%
Degree or higher education	83%

Gender	
Men	63%
Women	57%

Income	
<£12,500	29%
£12,500-25,000	58%
£25,000-37,500	70%
£37,500-50,000	84%
£50,000 and over	84%
All	60%

Source: Dutton/Oxford Internet Institute 2005 and di Gennaro and Dutton, personal communication

Table 12. Internet users in the UK, as percent of various demographic strata.

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users; the highest 84%. Across ethnicity, the range is from a low of 52% of Black Caribbean people to a high of 74% of Black African people reporting that they are using the Internet.

Table 13 below provides demographic information on the community-group volunteers and their ties, or sources of help with ICT. (The community-group volunteers are a proxy for their groups.) The table shows that community-group volunteers are a decade or more older than the ties that help them, with a median age of 52 as compared to 40, and an age range of 25-77 as compared to 20-68. The group volunteers are almost evenly mixed men and women (55% and 45%) as compared to the ties providing ICT help who are predominantly (80%) men. The ties are more White British, slightly more Asian and less Black African and Caribbean than the community-group volunteers. Finally, as a proxy for income, which was not available for the ties, the community-group volunteers are typically not in the workforce (39% in workforce) while their sources of ICT help are typically in the workforce (85%).

	Median age	% men/women	Ethnicity	Employment
Community group volunteers N = 31	52	55/45	68% White British 10% Asian 13% Black African 3% Black Caribbean 6% Other	39% in workforce
Ties (sources of ICT help) N = 62	40	80/20	82% White British 11% Asian 5% Black African 2% Black Caribbean 0% Other	85% in workforce

Table 13. Demographics of community group volunteers and their social ties (help with ICT).

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Taking tables 12 and 13 together, the general finding is that the community groups are reaching across existing digital divides reflected in age, ethnicity, and income. Statistically speaking, they are turning to younger, white, working men for help. Apart from the gender gap in terms of help provision, this is logical, and it is also heartening. It is logical in that people are turning to those that are more likely have the know-how to help them.

This study finds that groups in marginalized communities are not necessarily isolated. These ICT users are connected across various digital divides. This indicates that the community groups are not, as Wilson (1987) described people in socially excluded communities in the United States, unable to connect with people who have skills they need to tap. By and large, for these community group members, social exclusion and multiple deprivation do not entail being isolated from people who can help with computer skills.

5.2 Narrative analysis regarding social ties and ICT use

To conduct this analysis of social ties and ICT use, it is necessary to continue the process begun in chapter 4 of triangulating between the numerical analysis and the narrative analysis. This is particularly important in examining tie strength and bonding or bridging social capital, because the five measures—family or friend, volunteering the help, invited home, see often, and live nearby—are not all of equal weight. A complete analysis considers these measures in their full texture and variety. Conceptually, they may be thought of as multiple dimensions of the social network. As a bridge between the numbers and the narratives, graphic representations of the networks reported by each

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group are presented here and in appendix E. The appendix contains all 31 network diagrams; 5 are reproduced below, accompanying narratives from the community-group volunteers. In the graphics, strong ties and bonding social capital, according to the six measures, are indicated by letter codes and by size of the node representing the course of ICT help for the group.

The narratives below are from six groups. Two are downloading groups: one with no ties and another with one weak tie. Two are uploading groups: one with one strong tie, and another with five ties, a mixture of strong and weak. Finally, two are cyberorganizing groups: one with four strong ties, and another with four strong ties and one weak. These six groups are chosen for the completeness of the narratives and the vividness of the pictures they draw.

In social network research as elsewhere, strong and weak are relative terms, and are measured here in six quite different ways. Moreover, as can be seen in each figure, the measurements are often, but not always, in accord with each other.

5.2.1 ICT help networks of two downloading groups

Two downloading groups are presented in this section. The first is a social support group, and the second is a tenant group. The first downloading group to be considered is known as support group 1. This group reports no social tie to rely on for ICT help. When some computer breakdown happens, Martin says:

> To be honest, I learn. And I try to [make it] work. And I change a computer component. But still we have problems which we couldn't solve. So normally we contact an agency who can probably [fix it].

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The group has found service people in the phone book, but never anyone helpful enough that the group would go back to. This is a group without a social network with respect to ICT help. Martin is resourceful, and facile with office applications on the computer, but, as he says, the group has computer problems it cannot solve.

Square = community group
Circle = source of ICT help
Larger circle size suggests stronger tie
F = Family or friend
V = Volunteering his or her help
H = Invited to home
O = Seen at least once in two weeks
L = Live one mile away or closer

Figure 8. Network diagram for tenant group 5 and its source of help with ICT, indicating tie strength and bonding social capital.

Tenant group 5, whose network diagram is presented in figure 8 above, is a downloading group that turns for ICT help to a consultant who is made available to tenants' associations. Cilla, who identifies herself as the group's 'techie,' describes her interaction with this contract worker for the city council:

> There was a problem with the BT [dial up] setup. I didn't know what he was doing. He was going, I will have to come back. He came back. So I was starting to look over his shoulder. [Since then] it has mostly been about printer fonts, and the computer dysfunctioning or the printer. I will phone him to get advice.

Cilla learned troubleshooting by close observation of this tech-support person. This person, whose name she could not recall, lives within a mile of her, and is considered by

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her to be a friend; but he is paid to help and she sees him once in six months. By and large, this is a weaker tie, although he represents bonding social capital as indicated by place of residence.

These two groups illustrate the smaller and generally weaker social networks providing ICT to downloader groups.

5.2.2 ICT help networks of two uploading groups

The ICT help networks of two uploading groups are presented in this section. Both groups are cultural groups. The first, cultural group 18, relies on one tie for ICT help. Ken, the volunteer who was interviewed and who described himself as one of the group's 'techies,' is close to Wellman's (1979) skilled tradesman, self-reliant rather than seeking help from social networks, except that there is one person with whom he consults. He knows this person through another community project where he also volunteers. Gary is the person who does most of the ICT work for this other project:

> I usually pop into his office once a week, and we have a couple hours of talking. I have been sort of shadowing him about what he has been doing there. Because if there was any problems I could just stand in.
>
> But I tend to be the sort of person that people turn to. Friends, basically, when they are buying computers. The tutor who used to work with our group, but she retired, she rings me up half the time, Ken it is not working, can you tell me what to do with the computer? I have helped install hard disks, and sort out problems with modems. And connecting new hardware. And stay on, and sort it out, install software, put games on for the children.

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Cultural group 18, shown in figure 9 below, has just one tie, but this tie is strong—a friend, volunteering his help, seen weekly, although not invited over—and represents bonding social capital with respect to geography (lives nearby).

Square = community group
Circle = source of ICT help
Larger circle size suggests stronger tie
F = Family or friend
V = Volunteering his or her help
H = Invited to home
O = Seen at least once in two weeks
L = Live one mile away or closer

Figure 9. Network diagram for cultural group 18 and its source of help with ICT, indicating tie strength and bonding social capital.

The second uploading group to profile here is cultural group 23, shown in figure 10 below. Elsie reports that the group turns to five people for ICT help. One is the woman from the area who works for the adult literacy publishers and helped start the group.

> Throughout the years with Loni, she has learned the technology. I don't know how she has done it. ... We can call her for help. She has been here [at the house], because we had meetings here. ... She is like a friend.

The other three ties work for the library and for the Manchester Community Information Network (MCIN). As Elsie puts it, "These are people who are funded, they're waged, they're not volunteers, obviously." The cultural group met them in the course of MCIN's

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initiative to create a local portal for the area, when they were recruiting local organizations to participate.

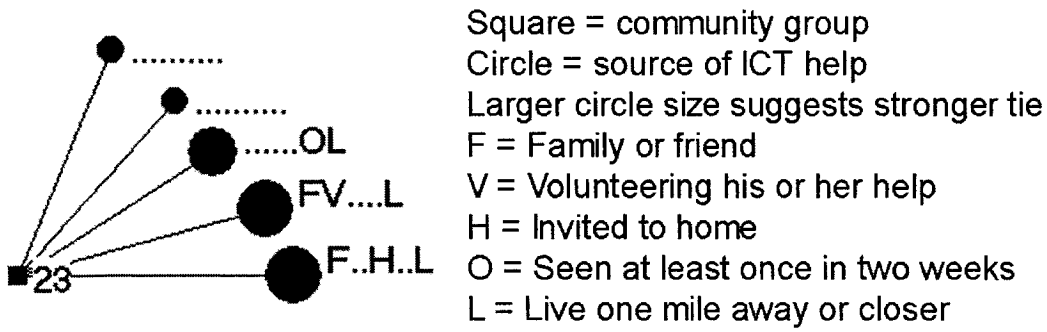

Figure 10. Network diagram for cultural group 23 and its sources of help with ICT, indicating tie strength and bonding social capital.

At the same time, the relationships of the professionals to the group are strengthened by physical proximity. As another example, Elsie sees one of the ICT helpers, Darrell, almost nightly, when they each walk their dogs. Of him she said,

> He is one of the best workers on the field. So I see a lot of Darrell. And he lives across the field. … He is part of us all. It just happens. I didn't see that until now. … I can ring Darrell any time, just privately about my own work. If I can't get him now, I can get [him later on].

Loni and Darrell are professionals who are also locals.

The staff person hired to provide user support in the library's computer lab is a weak tie to the group. Elsie remembers a time when the group was hung up on a PC problem in the lab and relied on him:

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> William, that was there the other day, he was quite knowledgeable, he helped us. But by the time he had come over a few times, I told him, I am getting better at it. ... I see him each month now. I needed some help with a birthday card once. I went to him and he helped me. That was the first time that we booked him for the group. We book him a month ahead now.

The fifth person who helps with ICT is a neighbor who is also in a class Elsie is taking towards a computing certification (CLAIT, similar to the European Computer Driving License). Besides bonding with this neighbor, the classes have put Elsie in the position of helping others as well. Elsie explains:

> We are doing PowerPoint at the moment. So we are sort of getting to the end. We have gone thru it all together. We have gone thru the various things. Graphs. But if anyone wants to know how to do it, they come here. And I will show them.

This group has five ties for ICT help, but as a set they are not overwhelmingly strong ties, although three represent bonding social capital. Two are measured as weak ties and bridging social capital on all the measures. The third person is someone she sees often and he lives nearby. A fourth she considers a friend, she has been invited home, and lives nearby. But all these four, as Elsie is aware, are paid to help. The sole volunteer source of help is a friend living down the street, who is taking classes with her, so her skills are very similar to Elsie's. This social network has supported the group in their uploading for several years, but is fragile in that it depends on weaker, paid ties.

Comparing groups 18 and 23 (uploaders) with groups 1 and 5 (downloaders), the networks of the two uploading groups are larger and include more strong-tie, bonding social capital than the ICT help networks of the two downloading groups. This is true

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generally between the downloading and uploading groups. The comparison can be made visually using Appendix E, which diagrams all 31 ICT help networks. As the analysis turns now to the cyberorganizing groups, this trend will continue.

5.2.3 ICT help networks of two cyberorganizing groups

The ICT help networks of two cyberorganizing groups are presented in this section. Both groups are social support groups. The first, support group 30, relies on

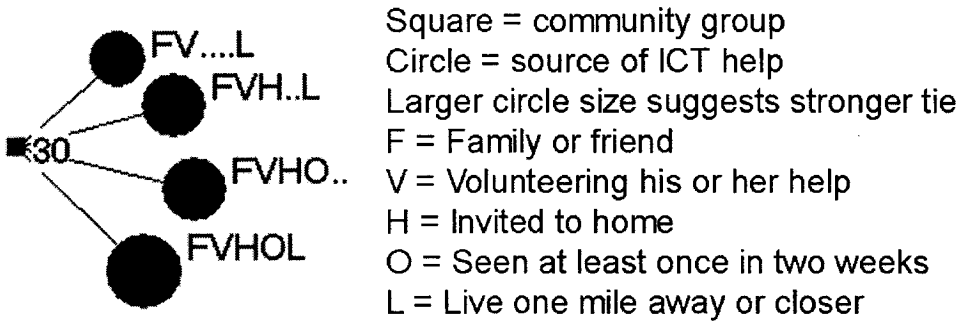

Figure 11. Network diagram for support group 30 and its sources of help with ICT, indicating tie strength and bonding social capital.

four ties for help with ICT, as shown in figure 11 above. Rita's explanation of who the group turns to for ICT help reveals an awareness of the value of social networks:

> [We can turn to] a lot of people in the community, through different people, locally. ... We know people in the community are involved in the [house of worship] or we know them as friends, or family of friends. So we are looking in that way. Because it can be quite expensive [if] they are a private company.

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Rita identifies four people who provide ICT help to the group. First of these is Uncle, whose title confers both familiarity and respect. In his 50s and involved with the group since its founding, he has helped close to a dozen younger people get training and jobs in IT. At least two of them now have jobs working with him, and they also help the group, for instance installing and networking their computer lab. One is related to Rita:

> He came from his home country, and when he married into my family, he was already in the [computer] business.

Speaking of the other source of help, she explains,

> I don't really know him. He knows who I am, I know who he is. The thing is that I know his wife very well, she is my friend. But I do know his family and my family go back a very long time.

A final source of help is another woman, who is the daughter-in-law of the one paid staffperson:

> Because her husband is involved in the group, she started coming to do women's groups and stuff. And we got together, because at the time I was pregnant and her daughter was eight months. ... She does the accounts, then she does the publicity as well.

Group 30's network of four sources of ICT help very much represents strong ties and bonding social capital. Their ties are all friends or family and all volunteering. Three have been invited over to Rita's or vice versa, three live nearby, and two she sees more than once a fortnight.

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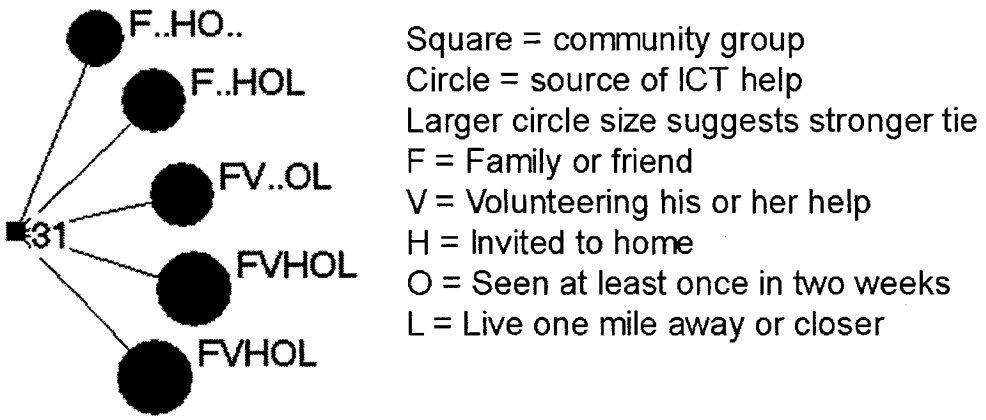

Figure 12. Network diagram for support group 31 and its sources of help with ICT, indicating tie strength and bonding social capital.

The second cyberorganizing group to examine here, support group 31, reports five ties to whom it can turn for ICT help, as shown in figure 12 above. Kevin, the lead volunteer for the group, is somewhat unfamiliar with ICT, yet he manages, with social network support, to direct a group that makes use of ICT for office work, a computer-based multisensory room, and now a computer lab. Kevin reports,

> [Besides Jason,] we have one or two specialists on the management committee that is a bit high up on the technology of computers, but there isn't anyone coming in on a regular basis. One [age 68] has just retired from full-time employment, but he has a lot of computer skills.

Support group 31's five ICT helpers predominantly measure as strong ties and bonding social capital. They are all considered friends or family, and all see Kevin at least once a fortnight. Four of them live a mile away or closer to Kevin, three have been invited to Kevin's home or vice versa, and three are volunteers.

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The networks of these two cyberorganizing groups, as is true across the set of 31, are larger and more predominantly strong-tie, bonding social capital than the ICT help networks of the four downloading and uploading groups reviewed above.

5.2.4 Making the connection to ICT help

How do the groups find their way to the people that help them with ICT? Narrative answers provide some detail. The study group participants provided clear explanations for how they made contact with 50 of the 62 ties. Of these 50, 37 were someone the community-group volunteer reported as having known for at least several years in some other capacity than as ICT helper. This multiplexity—multiple dimensions to the connections between the group and the ICT helper—is associated with strong ties and bonding social capital (Wellman and Berkowitz 1988, Lin 2001) and reinforces the basic findings already reported in this chapter regarding social networks and social capital.

For instance, five of the ties were relatives: two sons, two son-in-laws, and one wife. Several more were close friends or once removed from close friends, as in these explanations:

> How often do I see him? I live with him!
>
> He goes to my church, and his wife is my best friend.
>
> He's my boyfriend, and he has a computer too. He works as a computer support manager.
>
> He's my lifelong friend, and the other guy? The son of my lifelong friend!

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My mum's best friend's husband. And [the other] I first met him in college in 1999.

He's a friend of my flatmate's brother, we make sure we keep him visiting. He says we are his two daffy old aunts. [laughing]

Still more of the ties were already associated with the community group in some non-ICT way:

He's a member of our church. Everyone in our church goes to him.

Oh, she's been around for years, as a teacher, helped the group get started, and she lives in the old part of the neighborhood.

She used to be treasurer of my tenants group and then went to work at [the local CTC]. He's got a health problem, he's the vice chair of our committee [similar to board of directors]. And the other one, he's been a staunch volunteer since 1967.

She been helping the residents association in other ways, I met her that way.

He has gotten a lot done for [another local preservation project], knows that business inside out, and all about pockets of money. We used to phone each other every week, what's happening with your group, with my group. Then he got me using e-mail and pointed out that we could include more people that way, get more people to join.

She used to be a user [of our services]. And from there she became a volunteer and then joined the management committee.

While ties through community activities were rare in Wellman's (1979) study of East Yorker's "most significant" personal ties, in this dataset such ties are quite common.

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This most likely reflects the facts that this study focuses exclusively on people who are active in community groups, on their community activity and not other aspects of their lives, and on the ties that are helping the group with ICT. Only two people mentioned ties that they knew through their jobs; these community groups do not appear to be using workplace connections for ICT help.

5.3 Quantity of ties providing ICT help

One's position in a social network matters a great deal with regard to resource mobilization. In this study of egocentric networks, the community group, through each volunteer who participated in the study, is by definition at the center of a network, connected to each of its sources of ICT help. But the number of ties the group has matters in terms of resources, operationalized in this study as help with ICT. A node that has more ties has on average more access to resources. More ties are better for at least three reasons: (1) the chances of accessing the particular needed resource are higher; (2) the chances of accessing the resource when it is needed are higher; and (3) there is a greater possibility for combining resources from more than one tie to assemble the help needed. In ICT help, one person may provide part of the answer, and a community group may then finish solving the problem solving in consultation with another tie.

In this study, 31 nodes reported a total of 62 ties as providing them with ICT help. But these 62 ties were not evenly distributed. Community groups reported as few as 0 and as many as 5 ties, with an average of 2.0 ties per group. (Appendix E provides a visual diagram of these 31 networks, which will be discussed in greater detail in section 5.3 below.) The striking fact about the distribution of the ties across the 31 groups is that

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cyberorganizing groups have the most ties (averaging 3.0 per group), followed by uploaders (2.1) and then downloaders (1.4). These differences, presented in table 14 below, are statistically significant.

The narratives extracted from interviews with several groups and reviewed in section 5.2 above help to illustrate the differences in network size. These same narratives also underscore the role of strong ties and bonding social capital. These aspects of the social networks, expressed in quantifiable measures, will be further analyzed in section 5.4 below.

	Downloaders	Uploaders	Cyberorganizers	All
Groups' average number of ties	1.4**	2.1	3.0***	2.0
N	13	11	7	31

** A statistically significant negative correlation was found between the number of ties and being a downloading group, with Pearson's correlation coefficient of -.370, $\rho = .020$ (one-tailed).
*** A statistically significant positive correlation was found between the number of ties and being a cyberorganizing group, with Pearson's correlation coefficient of .382, $\rho = .017$ (one-tailed).

Table 14. Downloading, uploading, cyberorganizing, and average number of ties per group.

Before proceeding, it is necessary to relate the size-of-network finding to the theoretical model. The model proposed an association between social ties and ICT use. In other words, more support would suggest broader and/or deeper ICT use. The finding that having more people to rely on for ICT help is in fact associated with more extensive ICT use, combined with a new understanding of downloading, uploading, and

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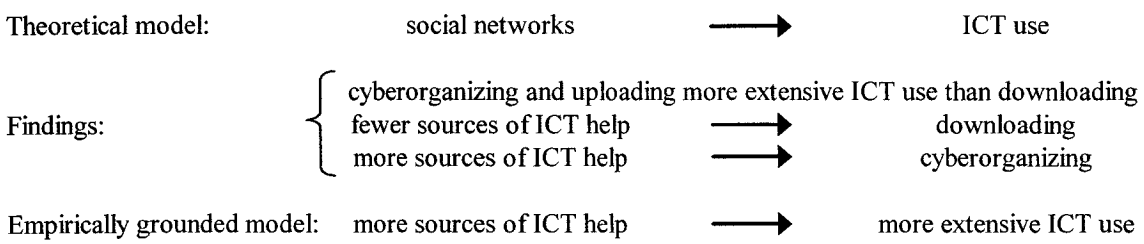
cyberorganizing, enriches and grounds the model in empirical data, as the diagram in figure 13 below indicates. As measured in this study, having more sources of help with ICT is associated with cyberorganizing activity among groups; having fewer sources of help with ICT are associated with downloading.



Note: Arrows signify correlation and influence.

Figure 13. Empirically grounded model relating number of ties to ICT help.

In the figure above, the theoretical model is presented at the top: social networks contribute to and influence ICT use. The findings are that: (1) there are three increasingly extensive levels of ICT use: downloading, uploading, and cyberorganizing; (2) having fewer sources of ICT help is associated with being a downloading group; and (3) having more sources of ICT help is associated with being an uploading group. Thus, grounding the model in the empirical findings, it is possible to theorize that more sources of ICT help are correlated with more extensive ICT use.[8]

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[8] A question was posed to the researcher: What if these levels fully satisfy the needs or mission of the community group? There is no presumption in the study either way; the levels of ICT help and ICT use that were found may or may not satisfy the groups. In other words, 'fewer sources' of help is not necessarily a disadvantage, it is just different. The study focuses on the *existing* patterns in the relationship between ICT help and ICT use. It does provide grounded theory to suggest that additional sources of help

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5.4 Quality of ties providing ICT help

This section turns to a discussion of the strength of the ties and of the bonding or bridging social capital they represent. Strong ties are considered the means for maintaining resources, social and emotional support, and help where weak ties are absent (Lin 2001, Wasserman and Faust 1994/1999). Weak ties are considered the means for obtaining new information, and for developing resources (Lin 2001, Granovetter 1973, 1974). ICT use is considered to require, among other things, social support (DiMaggio and Hargittai 2001). Bonding social capital is likewise considered for maintenance of resources and bridging for obtaining new resources (Lin 2001). Both strong ties and bonding social capital are considered within-group phenomena in society, while weak ties and bridging social capital operate across groups (Coleman 1988, Putnam 2000, Lin 2001).

How do the findings from the 31 community groups speak to these concepts? As laid out in the research plan and summarized in table 3 in chapter 3, data regarding strong and weak ties and bonding and bridging social capital were collected to measure four indicators: geographic distance, frequency of contact, type of relationship, and degree of intimacy.[9] Data analysis revealed patterns across five measures of social capital or social ties: all of the five above and one additional measure that emerged from the narratives

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would be identified via the group's social networks, particularly their strong ties, particularly in tinthe demographics of male, white, younger, in the workforce.

[9] A fifth indicator, ethnicity, did not provide useful, sufficiently specific data on both ties and community groups. Possible future research to explore this indicator of social capital is discussed further in chapter 6.

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and will be explained below, volunteering to help. These measures are described below in descending order of frequency across the 62 ties in the dataset and are also detailed in table 15 below.

The most common expression of bonding social capital in this dataset was common ethnicity of the tie and the community group volunteer (82% of ties). Shared ethnicity indicates bonding social capital, following from McPherson et al. (2001) who found that dense networks tended to be populated by actors more identical to each other and network bridges tended to be populated by actors more dissimilar to each other. Orr (1999) and Morris (1984) also conceptualized bonding social capital as within-ethnic group.

The most frequently seen strong-tie measure across the 62 ties is shared kinship or friendship (73%). Wellman and colleagues (Wellman 1979, Wellman and Leighton 1979, Wellman et al. 1988, Wellman and Wortley 1990) associated kinship and friendship with stronger ties as opposed to work colleagues or acquaintances. Ties to cyberorganizing groups are the most likely to be kin or friends (81%).

The next most common expression of strong ties is that the source of help was volunteering their help (60%). This signifies someone who helps without receiving any salary or other payment to do so. These individuals are available when asked, or soon after, but are not in any ICT-helping role as a paid professional. A tie volunteering his or her ICT assistance suggests a stronger tie than one paid to help. This follows Pettigrew (1997) which looked at how seniors use social service information they get from their social ties. She conceptualizes health professionals, or more specifically nurses

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providing foot care, as weak ties to the seniors whom they help. In the current study, ties to cyberorganizing groups are the most likely to be volunteering (76%).

Following that, the next most common expression of strong ties is frequency of contact between the tie and the community group volunteer (54% of ties seen every two weeks or more often). More frequent contact indicates strength of tie. This follows from Granovetter (1973, 1974), who found that less-frequently-seen ties provided new information. Ties to cyberorganizing groups are the most likely to be seen often (68%).

The next highest measure of strong ties is a history of the source of ICT help or the community-group volunteer inviting the other person to his or her home (52%). This indicates strength of tie. The specific question posed to community group volunteers was: "Have you invited this tie to your home, or have they invited you to theirs?" Hampton and Wellman 2003 used this question to ascertain strength of tie. Ties to cyberorganizing groups are the most likely to be invited (67%).

The last measure, indicating bonding social capital, is a shorter distance between the homes of the tie and the community group volunteer (42% of ties one mile away or closer). Closer residence suggests bonding social capital, following from McPherson, Orr, and Morris, among others. People living nearer to each other are expected to be more similar, in more ways, and this represents bonding, within-group social capital. Ties to cyberorganizing groups are the most likely to live one mile or closer to the community-group volunteer (60%). Ties to downloading groups are the least likely to live this close (24%).

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	Downloaders		Uploaders		Cyberorganizers		All	
	%	N	%	N	%	N	%	N
F: Percent of ties family or friend to community group volunteer. ***Tie strength.***	72%	18	65%	23	81%	21	73%	62
V: Percent of ties volunteering their help. ***Tie strength.***	50%	18	52%	23	76%**	21	60%	62
O: Percent of ties seen at least once in two weeks by community group volunteer. ***Tie strength.***	50%	16	42%	19	68%	19	54%	54
H: Percent of ties invited to home of community group volunteer, or vice versa. ***Tie strength.***	50%	18	39%	23	67%***	21	52%	62
L: Percent of ties living not more than one mile from community group volunteer. ***Bonding social capital.***	24%††	17	41%	22	60%†††	20	42%	59

** A statistically significant positive correlation was found between a tie volunteering his or her help and helping a cyberorganizing group, with Pearson's correlation coefficient of .241, $\rho = .030$ (one-tailed).
*** A statistically significant positive correlation was found between a tie being invited over or vice versa and helping a cyberorganizing group, with Pearson's correlation coefficient of .216, $\rho = .046$ (one-tailed).
†† A statistically significant negative correlation was found between a tie living one mile or closer and helping a downloading group, with Pearson's correlation coefficient of -.243, $\rho = .032$ (one-tailed).
††† A statistically significant positive correlation was found between a tie living one mile or closer and helping a cyberorganizing group, with Pearson's correlation coefficient of .255, $\rho = .025$ (one-tailed).

Table 15. Downloading, uploading, and cyberorganizing, and five measures of tie strength and social capital.

As table 15 indicates, certain of these differences are statistically significant; others are tendencies. Taken as a whole, a pattern is visible whereby ties to cyberorganizing groups are generally more likely to be strong ties and bonding social capital, and ties to downloading groups are generally less likely, comparing across the

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three types of ICT use. Figure 14 below summarizes the process from theoretical model to findings to empirically grounded model. The theoretical model, derived from the literature review and summarized in chapter 3, section 3.1 above, proposed that varying combinations of strong and weak ties, bonding and bridging social capital, accessed for ICT help, would influence the ICT use of the community groups.

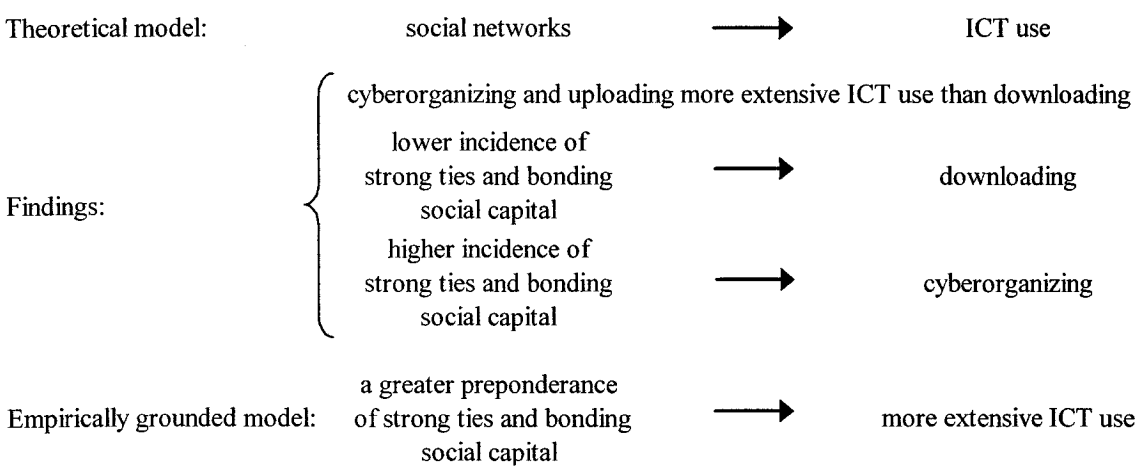

Figure 14. Theoretical model relating ICT use and social ties providing ICT help.

The findings show that: (1) there are three increasingly extensive levels of ICT use: downloading, uploading, and cyberorganizing; (2) having a lower incidence of strong ties and bonding social capital is associated with being a downloading group; and (3) having a higher incidence of strong ties and bonding social capital is associated with being a cyberorganizing group. Thus, grounding the model in the empirical findings, it is possible to theorize that a greater preponderance of strong ties and bonding social capital to draw on for ICT help is correlated with more extensive ICT use.

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5.5 The role of the Manchester Community Information Network (MCIN)

Because the sampling relied on MCIN staff who themselves work with community groups to provide ICT help, a question remains: How does MCIN enter into or impact the findings? Table 16 below reports MCIN-affiliated ties by three sampling methods. Seven of the 13 groups recruited with MCIN's help reported one or more MCIN staff as a source of help with ICT. Two of the 13 groups recruited by snowball sampling[10] reported MCIN staff as a source of ICT help. Looking at the groups, then, 9 of the 31 reported relying on MCIN. MCIN's help in recruiting subjects was necessary,

	Group reports MCIN staff as source of ICT help?		All
	No	Yes	
Group recruited via MCIN	6	7	13
Group recruited via snowballing from an MCIN recruit	13	2	15
Group not recruited via MCIN	3	0	3
All	22	9	31

Table 16. Community groups' reliance on MCIN for help with ICT.

[10] These 13 groups were recruited by the researcher soon after a group that MCIN helped recruit mentioned them in response to the last interview question, "Can you recommend any other community group volunteers that I could contact about interviewing?"

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even critical, because the groups are not in local directories, being quite small, close to the grassroots and relatively invisible to outsiders.

Of the 62 ties, 11 work for MCIN, 51 do not. (9 groups reported a total of 11 ties who work for MCIN; 2 groups reported 2 ties each.) These ties were evaluated according to the strong tie and bonding social capital indicators as in appendix E. They appear more as weak ties than strong, more bridging than bonding. So it is likely that in the absence of MCIN, groups would have reported less help overall, and more reliance on strong ties and bonding social capital. MCIN may have moderated the extremes in the data—providing help where needed and providing weak ties where strong ties already exist.

MCIN's approach in communities, detailed in Raven (2002), may strengthen local networks. When MCIN decides to extend work into a new area of Manchester, MCIN staff members find local groups and network their way from those groups to others. Networking involves some quid pro quo. MCIN staff make themselves conveniently available for a wide range of ICT help, invite groups to participate as information providers in community portals, and if needed, teach groups MCIN's free, open-source, content management tool, forming temporary committees which then participate in a 'release date' celebrating the community portal. The day-to-day work and the community portal building comprise both face-to-face and virtual networking activity.

5.6 Summary

Three main findings are reported in this chapter. First, the demographic profile of the ties suggests that community groups are reaching across the digital divide in turning

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to them for help with ICT. Second, cyberorganizing groups tend to have a larger number of ties for ICT help than uploading groups, and uploading groups more than downloading groups. Third, cyberorganizing groups tend to have a greater predominance of strong ties and bonding social capital for ICT help than uploading groups, and uploading groups more than downloading groups.

The findings affirm the theoretical model proposed at the start. Social ties providing help with ICT are associated with and influence ICT use among community groups.

A particular lesson of the findings is that the notion of social exclusion may be oversimplified, not taking into account individuals who experience one level of the digital divide and reach to another, yet stay within their strong-tie, bonding-social-capital networks. The next chapter will discuss the implications of finding these individuals who reach across ethnicity, class, gender, and generation, but rely largely on people in their own communities.

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Chapter 6

Implications and suggestions for further research

This dissertation has investigated how groups in socially excluded communities in an advanced industrialized country use social ties to assist with their ICT activities. The focus is a reversal of conventional thinking about crossing the digital divide. Most assumptions in policy and the research literature place the main responsibility on society to help the less fortunate. This research is about how people are helping themselves. The agency of the socially excluded, often discounted, emerges as central in this research.

Another frequent bias is seeing the solution to the digital divide as a bridge across which people can escape into the mainstream of society. This research is focused on how ICT activities have been appropriated by socially excluded groups to advance their own agendas more than to conform to mainstream community norms. In the case of these community groups, the past and present social world of the socially excluded is not abandoned, but carried forward into cyberspace. Not only is the digital divide a two-way bridge (Eglash 2002), but organized community groups are extending their own identities and lives into cyberspace (Schuler 1996).

These findings emerged from finding 31 community groups and asking the following questions: How does your group use ICT and who helps you use it? But both empirical research and theory building are ongoing activities requiring critique,

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replication, and reformulation. The findings of a specific research project never stand alone, but have value only when properly contextualized and critiqued within and alongside other scientific literature. After doing this, this final chapter will consider future lines of research as well as related foci for policy, both public and private.

In previous chapters we have identified key ideas in three sets of scholarly literature (chapter 2), designed the research project (chapter 3), and analyzed empirical data (chapters 4 and 5). In this final chapter a summary analysis will be presented consisting of five parts:

1. a recapitulation of the empirical findings presented in chapters 4 and 5;
2. a summary of the findings in relation to the three questions that emerged from the literature review and model-building. What contribution does this research make toward answering those questions?
3. a reconceptualization of the theoretical model based on the empirical findings. What theoretical clarity does this revised model contribute?
4. a review of the anomalies and questions that emerged in the analysis. What does a close-up view of the analysis bring out as far as ideas for research needed to reconfirm and extend the research results?
5. a longer-lens view of the study aimed towards a research program. What additional research logically follows from this investigation?
6. policy implications of the research. What is its practical value for government, the private sector, or institutions of civil society?

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6.1 Recapitulation of the empirical findings

The study findings that were presented in chapters 4 and 5 can be summarized in the following six points:

1. In less-wired, socially excluded communities, there are active community groups at the grassroots level making varied use of ICT (section 4.2). The literature examining ICT use in such communities has looked for, and found, individuals, but not groups. The study theorized, after Rogers (1962), that there would be "early adopter" community groups in these settings, and after Castells (1996), as ICT diffuses across society generally. This confirms Walton's (2004) survey of refugee-serving organizations in the UK. Other studies have found early adopter individuals in socially excluded communities, or early adopter groups in affluent communities.
2. Three distinct types of ICT use emerge across the groups: downloading, uploading, or cyberorganizing, from less to more extensive ICT use. All groups are carrying on downloading activities, which most typically include browsing the Web, creating documents on a PC, and using e-mail. Uploaders are groups which are also representing themselves on the Web with a group Web site. Cyberorganizers are those groups which facilitate and support the use of ICT by others. Cyberorganizing groups in particular, but also uploading groups, evidence more extensive use of ICT (section 4.3).
3. For these 31 groups, context and ICT use are closely aligned. Tenant groups tend to be downloaders; cultural groups tend to be uploaders; and social support groups tend to be cyberorganizers. This close association between

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context and ICT use suggest that their ICT use be reconceptualized as social ICT or SICT (section 4.4).

4. All but four of the community groups rely on social networks for help with ICT. In so doing, these groups are reaching across various digital divides, demographically speaking, to access ICT-skilled helpers. They are accessing help from people who are younger than they are, and more likely to be white, male, and working. In the case of groups turning more to males, this is not echoed in usage statistics for men and women in the UK; this may be a perceived digital divide or due to some other factor (section 5.1).
5. Groups with more ties are making more extensive use of ICT, from downloaders with the fewest ties, to uploaders with more ties, to cyberorganizers with the most ties (section 5.2.).
6. Groups with more strong ties and more bonding social capital among their ICT helpers are making more extensive use of ICT, from downloaders, to uploaders, to cyberorganizers with the greatest preponderance of strong ties (section 5.3.).

The study finds that in finding and accessing help with ICT, grassroots groups in socially excluded communities rely on themselves, more than on others, to survive and prosper in the information society, finding strong ties which are often younger, more male, and more in the workforce to lend their ICT skills, advice, and support.

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6.2 Implications of the empirical findings

The empirical findings reported in this study, while specifically grounded, have general implications relative to other research. The specifics of this study include place (Manchester, England), time (2005), social situation (socially excluded neighborhoods), unit of analysis (grassroots community group), social activity (ICT use), and research method (lone researcher conducting interviews based on snowball sampling of key respondents representing each group).

Other studies are grounded in these same specifics. For example, there is an emerging literature studying Manchester's approach to community ICT. Bryan (1998) traces the themes of economic development and impulses towards democratization that launched Manchester's community informatics work. Ducatel (1993) draws lessons for policy at the UK and EU level, arguing for closer coordination between the needs of grassroots organizations and agencies developing projects. Ellen (1997) argues for a networking rather than an information model in her comparisons of early efforts. Herman (2001), a former CTC director and now a scholar, analyzes the provision of community ICT to women in Manchester. There is also work specifically focusing on community groups (Bishop et al. 2001 and Bishop 2003, Mele 1999). Other research has specifically examined ICT use in socially excluded communities, for example, Merkel (2002) in the U.S. and Keeble (2003) in the north of England. All four of these studies bring to light how the will of the end-user—individual or group—tends to hold sway, sometimes advancing and sometimes at odds with technology project plans.

Beyond the studies that overlap with this dissertation in their specifics, however, the general relevance of the research can be best understood in its contribution to answers

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to the three basic questions that emerged from the literature review and launched this dissertation research. These questions steered the model building, the research plan, and the data analysis. They are the starting point for the process of drawing conclusions, projecting future research, and elaborating the policy implications.

1. If weak ties bring information and strong ties bring social support, how does this play out when community groups in socially excluded communities adopt and use ICT?
2. If bonding social capital maintains resources, and bridging brings new resources in, how does this play out when community groups in socially excluded communities adopt and use ICT?
3. What do social networks and social capital *as an influence or an input into* community ICT teach us about community ICT?

The findings do indeed shed light on each of these questions, and this is best understood by considering the findings not alone, but in tandem with other findings. The next three subsections will address these questions.

6.2.1 Social networks

With respect to social networks: the community groups in this study are accessing both weak and strong ties for help with ICT. By most measures taken in this study, strong ties predominate, and this becomes more pronounced as the group's ICT use becomes more extensive (chapter 5, sections 5.1, 5.2, 5.3).

Granovetter (1973) found that job seekers in Massachusetts obtained jobs via informal contacts more often than via formal channels. In a different cultural and

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socioeconomic setting, these groups too are accessing ICT help much more through informal contacts than formal channels. The majority of Granovetter's job seekers, however, found jobs through weak ties. The majority of sources of ICT help for the Manchester groups are strong ties. This matches the data on jobseekers at lower status and income levels, who tend to find jobs through strong ties, as detailed in Lin (2001). Summarizing across many studies of job seeking and status attainment, Lin further describes disadvantaged people as encapsulated in strong-tie networks, without weak ties that are unlike them, and Wilson reported similar findings from Chicago's South Side in his *When Work Disappears*, although he made the point that even when a majority are jobless, "the ghetto still includes working people," (1996, xix). Individuals who participate in, and even lead community groups may be among the minority in their socially excluded communities, in having strong and weak ties.

This work suggests many interesting parallels to other instances where people in marginalized populations rely on each other rather than outsiders. Liebow (1967) found that men on Talley's Corner were not isolated unemployed men, but used the corner as their no-cost hangout after and before work, whether they lived in the ghetto or had moved out. Stack (1979) found welfare mothers in a public housing project had organized task-sharing among themselves to sustain their families; Casanova (1996) recounts similar experiences among homeless people in New York City. It may be that in general, for the vast majority of people, being human means having and relying on strong ties.

A particular benefit to social network theory is that it helps us avoid the ecological fallacy (Robinson 1950). This is the fallacy that just because something is true

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on average or in general for a population, it is true for every individual in that population. Rather than relying completely on statistical measures, looking for and finding the social networks in a population can bring to light the structures by which a population functions. In the case of Manchester's most socially excluded communities, of course many groups with no helping ties may have dissolved. But the findings affirm that some have survived, and most of them have their own helping ties.

6.2.2 Social capital

These community groups are accessing both bridging and bonding social capital for help with ICT. By most measures taken in this study, bonding social capital predominates, and this becomes more pronounced as the group's ICT use becomes more extensive. Networking for ICT help is in the direction of people who are younger, male, and more likely to be in the workforce than those seeking help; so the ties are across various real and perceived digital divides that exist in the population (chapter 5, sections 5.2, 5.3).

So, while Coleman (1988) estimated that with the breakdown in community ties, and diminished social capital, people would rely more on formal organizations, this is not the case with these community groups. It may be that very few formal organizations exist to help these community groups with ICT. Or it may be that those that do are in conflict with the community groups themselves, as in the case of tenant groups not interested in working with the city council, which is also their landlord.

Nor does the trend discerned by Putnam (2000)—decline of social and civic organizations, thus a decline of social capital—seem to apply to these community groups,

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although more research would be needed to observe such groups over time. While the general decline he describes in the U.S. seems undeniable, and there is concern over social capital in the UK (see, for instance, Field 2003), it seems that some bonding social capital continues to exist. Much like forest life after a fire has ravaged it, life goes on. In the case of the 31 community groups studied here, social capital not only exists, but transforms ICT into SICT.

The data here suggest that help with ICT tends to travel via networks of bonding social capital, even in communities which are underresourced with respect to ICT. This might happen in two ways: first, via the early adopters, for instance, the techie or his fellow volunteer who brings digital video to the cultural group; and second, via a certain porousness to local communities. This echoes Wellman's concept of "community liberated," where rather than being isolated villages, urban areas consist of individuals forming social ties where they can, be it work, home, or elsewhere. Wellman's modern formulation of this is "networked individualism" (Wellman 1979, Wellman and Berkowitz 1988).

6.2.3 Community ICT

The third question that drove this study arose from the community informatics literature. What do social networks and social capital *as an influence or an input into* community ICT teach us about community ICT?

With respect to community ICT, the main finding, of several, is that the definition of community ICT as applied *to communities*, either via actual ICT (facilities) or virtual ICT (online resources) has to be expanded to include ICT as applied *by communities.* A

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great deal of interesting research has examined externally funded experiments carried out in communities, in partnership with or serving local residents. But looking at communities as having internal structure—stable, organized groups and their social networks and social capital—helps bring to light a type of ICT that has been relatively hidden. Its obscurity is due very much to its grassroots, modest nature, and the class and cultural divides between research activity and daily life in these locales, as discussed in chapter 3, section 3 5.5.

This study is not the first report of this sort of community ICT. Bishop et al. (2001) report the case of an African American women's health organization taking up a Web tool and another case (Bishop 2003) of a Puerto Rican community organization reinventing its information systems and services using technology. Mele (1999) examines the case of public housing tenants, also African American women, gaining access to a locked-up community computer and using it to access weak ties (lawyers and architects volunteering their assistance in response to listserv appeals). In all these cases community organizations are the agents of ICT adoption and use, with university partners in the case of Bishop and without in the case of Mele.

A shorthand for this finding is the concept of agency; the communities where funders or policymakers can look to implement technology projects (in order to include socially excluded people in the information age) are in fact populated by *organized networks of actors* who are using ICT. This concept is the other side of the coin from the concept of sustainability, which has absorbed a great deal of attention because of the expense, and the experimental rather than institutionalized nature of a great deal of

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community ICT. Sustainability depends on actors, on people and a plan, or put more popularly, 'Where there's a will, there's a way.'

The particularity of these community groups' ICT use also helped identify three different approaches to ICT: downloading, uploading, and cyberorganizing. When the groups are carrying out tenant, cultural, or family support work, they are also carrying out downloading, uploading, or cyberorganizing. This expresses a concept put forward by Merton (1963) and taken up by Campbell (1982) and others: manifest and latent function. The idea is that social phenomena may be accomplishing one thing on the surface and another at a deeper, perhaps hidden, level. As an example: the 'safety elevator,' invented in the 1850s, was intended to hoist factory equipment, but it served to move people up and down as well, and thus allowed for taller buildings to be built and opened the way for far more dense central cities (Goodwin 2001). The manifest work of pursuing tenants' issues, maintaining cultural interests, or protecting children and families, is also the latent work of 'wiring,' or as Castells (1996, 1998) would put it, informatizing, the socially excluded community. To accomplish this, an interconnected division of labor appears to have developed between downloading, uploading, and cyberorganizing.

The data here confirm that social networks and social capital are indeed an input into community ICT. Variation in social ties providing help is echoed by variation in SICT use. Thus, community ICT appears to depend on social networks and social capital.

While e-mail and listservs are strong leveling forces in cyberspace, and popular among the 31 groups, Castells' concepts of the interactors and the interacted, reviewed in chapter 1 section 1.3, find some affirmation in the distinction between uploading groups

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and downloading groups. The tenant groups' ability to exchange e-mail in order to resolve conflicts around local disturbances or maintenance issues, and over the longer term, the local magazines and history groups online could be part of the community's recovery from the blows absorbed by the many factory closings that Manchester has experienced beginning in the 1960s, such as that of the Beyer Peacock locomotive factory, which was an anchor of several now-socially-excluded wards, once supplying locomotives to as far as away as the Peruvian Andes.

6.3 Model and revised model

Theory is a conceptual summation of research, and in turn provides a model of interpretation. It is in this sense that a model represents a conceptual framework for research activities. This study began with the simple and straightforward model that social ties, social capital, would influence ICT use. The study also clarifies apparent contradictions in the literature. Granovetter argues one relationship, weak ties, while others argue what appears to be the opposite. In the social capital literature, a parallel difference emerges between Coleman and Putnam.

This analysis on the surface might seem to be an argument in support of Coleman and Lin. However, upon reflection, rather than contrasting one set of findings against another, it seemed more fruitful to consider the findings as equally true, but perhaps functioning in a different way under different circumstances.

It seems from this analysis that there are at least two major ways in which the dynamic process might work. In the case of Granovetter, people were seeking information not only about another community but as a method or tactic to leave where

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they were, to go to where the job would take them. They were seeking information outside their community in order to leave it and go somewhere else. His finding is that people were successful to the extent that they knew someone who was already in that other place.

This analysis points to a very different process by which people are seeking information (to help them use ICT) from another place, from other people, but to use where they are. The people examined are in groups, bringing information back to make their communities better, rather than being examined as individuals, seeking information in order to go somewhere else. And in this way, we have at least one explanation of how both findings operate in the same dynamic model. Therefore, it seems that the most abstract representation of our model has been affirmed. Ties and social capital do influence SICT use, and the model is shown in figure below.

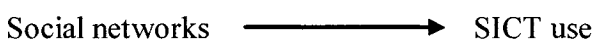

Figure 15. Empirically grounded model, positing a relationship between social networks and a new concept called social information and communications technology, SICT.

Of course, as was mentioned at the start of this dissertation (chapter 1, section 1.1), technologies are necessarily social. There has been a great deal of work (for instance, Orlikowski 1992, Suchman et al. 1999) identifying the social determinants of technology use. Within community informatics, when a consensus emerged saying "It's not about access," (Clement and Shade 2000), the idea was that technology use would

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follow the needs and interests of the user. Community use wasn't mirroring workplace use; Excel wasn't the killer app. And community use was suffering from an absence of socially meaningful applications, such as Web resources of interest to low-income people, or to Spanish-speakers. (Lazarus and Mora 2000)

One particular formulation of this combination of social and technology has already emerged from Michigan's School of Information: sociotechnical capital, defined by its originator as "productive combinations of social relations and information and communication technology," (Resnick 2002, 650). Resnick's focus is on how sociotechnical capital, the independent variable, contributes to new social activities. In the empirically grounded model emerging from this study, the focus is on social ICT as a dependent variable, an outcome itself, influenced by social networks, and the ICT use takes into account the social outcomes sought by the users. The current study is complementary to Resnick's looking at the same dynamic, but the other way around.

6.4 Anomalies and new questions brought to light

The study itself brings to light anomalies and questions that are of interest. This section will enumerate and discuss eight such questions.

1. First of these is the question of whether community groups are satisfied with their ICT use and their ICT help. Would they do differently with more? What more help would they like to have? It would be productive to examine the data for any indications of whether groups are satisfied or not with either their ICT help or their ICT use, and to collect new data answering questions regarding the groups' satisfaction levels, because

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ICT is still a moving target, and indeed groups will be making decisions regarding catching up (or not) with new forms and applications of ICT.

2. By and large groups turned for ICT to strata that were statistically speaking more likely to be Internet users and by extrapolation, good sources of help. But groups were not turning to women, and they were not turning to Black Africans, two groups with average or higher rates of Internet use. One woman gave evidence of undervaluing her skills and related how a group of mothers convinced her to teach their computer class. Are the ICT skills of women or Black Africans underrated, either by themselves or others? Are they not seen as helpful? What are the barriers to relying on these strata?

3. Shared ethnicity as an indicator of bonding social capital is difficult to measure with enough specificity to be conclusive. Ethnicity itself is a shifting phenomenon – especially with today's migration patterns, your parents ethnicity is not necessarily your own. More detailed question could pinpoint this more effectively.

4. This points to a feature of the study which brought forward intriguing results which suggest follow-on research: personal network analysis brought the social ties to light and suggest that whole network analysis could identify the interconnections among the helpers themselves. Data collected from the ties as well as the community groups could teach us more about how a digitally-divided community bridges the digital divide by relying on its own capacities.

5. Strong and weak ties and bonding and bridging capital are concepts that some research equates and other research does not. These concepts need further clarification.

6. Cyberorganizing groups were clearly identified, but what are their clients doing with ICT, what is their purpose in using ICT? The study focused on groups seeking help,

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not on groups providing help to others. A more complete picture of communities bridging the divide would include this.

7. In table 11 (in chapter 4) there are some groups which do not fit the pattern tenants/downloaders, cultural groups/uploaders, support groups/cyberorganizers. A larger N would make it possible to turn up the microscope and examine the other six cells in the table. What are the dynamics there?

8. MCIN's social network model of help provision could be usefully compared to other models, such as those at work in Durrance and Pettigrew (2002). Linkages between bonding and bridging social capital such as MCIN generates are hard to build, but very productive in community ICT efforts (Alkalimat and Williams 2001, Virnoche 1998).

9. In general, institutional support was backgrounded in this study: not just MCIN, but also the city and national governments, colleges and universities, and other civil society organizations. Foregrounding these players to see their roles (if any) in ICT help would present a more complete picture of these communities within the metropolis.

6.5 Future research

Stepping back and taking a longer view, the research that this analysis has reported and contextualized in the literature provides valuable guidelines for future research. In one general sense, this research is part of community informatics, a subarea of social informatics. As such it is only emerging as a major research area and has just begun to appear in the graduate curriculum (Resnick, personal communication). Because of the relationship between research and curriculum, there is added importance to what

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may emerge out of existing and planned studies. The guidelines and principles for future research can be summarized as follows.

(1) Go beyond the case study. The first and most important result of this research is to encourage going beyond the single case study. Community informatics research to date is predominantly case studies (Gurstein 2001, Keeble and Loader 2001, Day and Schuler 2003, Schuler and Day 2004). In the U.S., community technology centers have been surveyed, but the unit of analysis in the surveys was the user, not the center itself. Meaningful work beyond the case study includes Benjamin's (1999) survey of South African telecentres, and the CRACIN research project in Canada now collecting multiple-site data (Clement et al. 2005). The niche that the present study occupies, and calls for more of, is the creation of *samples* of social units being studied. While standing on the strengths of existing case studies, this allows for comparisons and generalizations beyond the case study.

(2) Standardize the indicators. Looking back on the variation of how theoretical concepts such as social capital have been operationalized, specifically in the wording of questionnaires and instruments, what is needed is the standardization of empirical indicators. Sociologists have worked on this for some time and their approach can be adopted (Flap n.d. and van der Gaag 2004).

(3) Combine qualitative and quantitative methods. One of the strengths of this analysis has been the close relationship between quantitative and qualitative data and methods. Future research can usefully combine survey data and case study data, quantifiable aggregated information as well as storytelling captured in the language of the respondents.

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(4) Maintain multidisciplinarity. As community informatics is an emerging field based on the broader societal transformation taking place, it can usefully be studied in a multidisciplinary or transdisciplinary way. The research that forms the basis of the present analysis is a good example, being work drawing from the disciplines of sociology, geography, development studies, library and information science, and informatics.

(5) Design longitudinal studies. One of the limitations of this current analysis is that the data was collected at one point in time. Future research might usefully create trend data that can be examined over time, so that in addition to the memory of the respondents, one would be able to collect objective evidence of historical change as well.

(6) Do comparative research. One of the strengths of the study is that the researcher came from a different country than where the study was conducted. While this study did not collect data in more than one country, at the very least the researcher brought a different perspective to the data analysis. To take this further, future research might benefit from a comparative framework both at the level of cities—in this case it would have been to add other UK cities to compare with Manchester—or countries. An explicit comparison between the U.S. and the UK, or other European countries or third world countries would be valuable as well, especially given the regional and development studies research in this area.

(7) Obtain and construct datasets. In general, future research could result in datasets that could be archived to provide the basis for future secondary analysis, either for the purpose of replication or synthesis, along with other research projects so archived

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by social science researchers, for instance, at the Interuniversity Consortium for Political and Social Research (ICPSR) in Ann Arbor, Michigan.

There are many limitations to this single study which call for replication, translation, and testing. The present study suggests that, in this particular instance, socially excluded communities rely on themselves, more than on others, to survive and prosper in the information society. Of course this finding is not conclusive. It is drawn from one city, one small set of groups, at one particular moment, and asked a number of questions of a small number of people. Manchester might be a unique experience and a more atomistic, social-tie-poor society exists at the bottom of other societies. But if this finding goes on our collective intellectual map, and more researchers begin to consider the possibility, then we might find it elsewhere. It requires reaching across class gaps between scholar and study participant, and accessing informal structures which are generally invisible to outsiders.

6.6 Policy

As Paul Edwards indicates (1996), policy involves choices about the allocation of legitimacy and material resources. It is in this sense that all research, in revealing some truths about society or nature, might well have policy implications for government, business, and civil society. In the U.S., the federal E-rate policy that afforded schools and libraries discounts on hardware and software was informed by the research carried on by NTIA and the U.S. Bureau of the Census (Wilhelm, personal communication). The Gates Foundation has steered its funding to libraries and others, guided by academic research on the digital divide (Gates Foundation 2004). The World Council on the

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Information Society, the multiyear, multiconference policymaking process, has been informed and petitioned by scholars (Gurstein 2000 and Carpentier and Servaes forthcoming, for example).

Community informatics is a research area that has very clear policy implications. Starting from the social reality of a digital divide, a constantly moving polarity of adoption and use of SICT, sets the stage for a serious crisis of democracy in the information society being built. If at the level of the new technologies, there is an information-rich and information-poor polarity, then community informatics, in dealing with all communities, has a major role to play to make sure the fundamental requirements of a democratic society can be met even under the conditions of that polarization. One of the major findings of this analysis has been that even in communities that are socially excluded, there are groups that represent a heartbeat of possibility.

This research has been carried out in the environment of three immediate policy centers: the city, the university, and the non-profit sector. The policy implications of this research can be briefly stated at each of these levels. Extrapolation to national, European Union, and United Nation policy levels is also possible.

At the citywide level, a city has to maintain open lines of communications across all sectors. City Council staff have played a leading role in branding Manchester as a knowledge city and in implementing that by working with business, community, and university forces. They can only play a positive role in the survival of the UKOnline Centers recently defunded by the UK government. The experience of Seattle as a Technology-Friendly city is very similar, fostering "digital divide" data collection, computer recycling, fundraising and networking for local community ICT players

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(Keyes, personal communication). Altogether, a city administration is a key advocate for community ICT in terms of legitimacy, money, and networking.

At the university level, community informatics curricula and research trains and sensitizes people who will work in all the information sectors. It can also empower community groups. One of the study participants brought out publications and presentations made jointly with a scholar from Manchester Metropolitan University,[11] and the origins of community informatics practice can be found at that university, where local economic development work led to proposals for community ICT (Leach et al. 1991). In Manchester and Toledo, Ohio, student theses have helped to clarify issues for policy makers as well as for other scholars (Crabb 2001, Karelis 2001, Haslan 2000, Zelip 2002, McGreevy 2002, Hamilton 2002). In Toledo, University of Toledo sociologists helped to found and provided office space for the local association of community technology practitioners (McGuire, personal communication), as well as training students in the process of community organizing and locating the work in their own scholarly research (Stoecker 1997, Alkalimat 2003). They have opened up support from their own information technology divisions to provide services and support for community ICT (Gibson, personal communication). The University of Michigan School of Information offers a course and arranges accompanying community projects that orient students toward community informatics careers and volunteership. At a cross-divisional, cross-institutional level, the Oxford Internet Institute is an example of how universities can effect this work. In each case, care was taken to make sure the community partners were advanced by their relationship with the university.

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[11] This scholar and her published works are not identified to preserve anonymity of the community group.

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At the community level, this study traveled out from its starting point in the field to return to the Manchester Community Information Network with strong affirmation of the approach they take to 'wiring' communities. Technologically advanced staff are assigned to network into communities and team up with existing community groups in order to produce local portals rich in content from the community groups. In the process of Web training and encouragement, the staff finds itself solving many other ICT problems, learning their way around the community, and strengthening its social networks. MCIN operates with full awareness and appreciation for the strong-tie networks and the bonding social capital that this study identifies as a key influence on ICT use, as well as the community's weak ties to other professionals at work in the community. This study validates MCIN's approach and encourages cities, universities, and other community institutions to support and emulate this model of bridging digital (and other) divides in socially excluded communities in the UK and elsewhere. The success of the research method, which emerged from initial and exciting conversations with MCIN staff, affirms the value of community informatics scholarship linked with the actual practice of experienced community workers.

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Appendices

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Appendix A. Community informatics studies using social capital/social networks concepts.

Papers by Date/ Setting	Research Question	Unit of Analysis/N	ICT	Social Capital	Weak Ties/ Strong Ties	Bridging/Bonding	Findings
Kavanaugh 1999 Affluent small city, U.S.	What is the relation between computer networks, social neworks, and civic engagement?	Interviews with 10 members of social networks with online presence	A community network utilizing the Internet, especially e-mail and discussion lists	Putnam. Accumulates through social networks and trust and norms of mutual reciprocity that these relationships foster.	Thick trust: intensive daily contact, in homogeneous exclusive communities capable of exercising sanctions Thin trust: product of weak ties, less personal, links groups to integrate them in one social environment	No	1999: Computer networks reinforce and expand social networks within a geographic community. The Internet is important for garnering resources. (KW: weak ties) ...The Internet facilitates links between groups, via people who belong to more than one. The Internet facilitates within-group ties too, BEV seniors.
Blanchard and Horan 2000 Mid-sized city, U.S.	Can virtual communities compensate for decrease in social capital caused by decreased participation in face-to-face communities? ... What forums (virtual communities of interest) of place-based virtual communities will attract participation?	342 people surveyed in a town just getting a virtual community	A virtual community (electronic resources for a place-based community OR same for a dispersed community of interest	Putnam: "features of social organization such as networks, norms, and social trust that facilitate coordination and cooperation for mutual benefit"	No	No	People interested in education-related information for their kids and themselves ... in exchange of community information, bulletin boards ... communicating with friends/relatives ... participating in government or politics. A new virtual space where people can interact with their neighbors can build social capital.
Hampton and Wellman 2000 Middle-income suburban community, Canada	How does living in a wired neighborhood affect interpersonal relations?	Case study, some houses in development wired, some not.	High speed connection in the home and local community listservs	No -- social networks	Operationalized, with "knowing ties" as recognize by name, talk to regularly, invite over, or invited over.	No	There are more ties of every type if house is wired. Internet supports a variety of social ties: strong, weak, instrumental, emotional, social, affiliative.
Alkalimat and Williams 2001 Low-income urban community, US	How does social capital structure power in a CTC and influence its programs and effectiveness for local residents?	Case study	A telecenter and its programs	Uses Putnam. In contrast with physical capital and human capital, focuses on social relationships, expectations, obligations and norms that facilitate productive human activity. measured as members attending board meetings, coded by social sector.	No	Bridging social capital, relationships that link one group with another. Bonding social capital: relationships within a group. It is measured as a church member who lives locally and is a participant in CTC.	As social capital invested in center shifted from all bonding to a mix of bridging and bonding, programs and cyberpower grew.

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Papers by date / Setting	Research Question	Unit of Analysis/N	ICT	Social Capital	Weak Ties / Strong Ties	Bridging/Bonding	Findings
Kavanaugh and Patterson 2001 Affluent small city, U.S.	Is a community computer network a way to build social capital? Hypotheses: 1. As BEV usage grows, community involvement and attachment grows 2. As users increase, within-community communication increases	Two surveys of residents (N=156, N=320)	BEV = listservs, grants for Web site development, server space and tech support, high-speed access at community access points	Social-capital-building activities = communications via Internet with non-family members	No	No	Hypotheses 1 not proven. The Internet, especially e-mail and discussion lists, reinforces and expands social networks. Longer users of Internet ("early adopters") are more likely to use for social capital and report more sense of community involvement. The duration of Internet use in years is directly related to sense of increased community involvement since using Internet. Putnam saw in their work that social capital may be a prerequisite for CMC, not a result.
Liff et al. 2001 Rural UK	How do policy prescriptions stack up against actual practice?	CTC geared towards youth	CTC geared towards youth	Not defined	Strong ties = more intimate, multiple bases for interaction, mutuality; kinship, traditional community ties; provide a range of resources in times of need. Weak ties = boundary spanning. People who are boundary spanners are members of 2+ groups		Prescription is for strong ties yet in this case, weak ties seemed to be decisive on advisory board (and shopfront CTC uses weak ties to attract people); boundary spanners were in evidence. CTCs need more opportunity for social networking in their programming, where community of practice should be the model, not highly structured lockstep courses; CTCs must find room for nonusers, newbies and experts.
Tonn et al. 2001 Various	1. What are typical features of a community network, what's cutting edge? 2. How can community networks help foster an increase in social capital?	40 community network Web sites	A Web site of a community network	Used Putnam. Operationalized as the following Web site features: 1. help people be better citizens 2. foster direct democracy 3. help students interact with larger community 4. let citizens comment on proposed new developments 5. foster bartering and other alternative economic activities 6. build an organic online community history 7. bring citizens together in mentoring relationships 8. pay special attention to seniors 9. pay special attention to low-income communities	No	No	Community networks generally do not contribute to social capital building in communities. Only from 1 to 8 of the Web sites appeared to do any of the 9 activities.

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Papers by date / Setting	Research Question	Unit of Analysis/N	ICT	Social Capital	Weak Ties / Strong Ties	Bridging/Bonding	Findings
Borgida et al. 2002 Rural communities, U.S.	What role does social capital play in addressing the digital divide?	Comparative case study, N=2	Community electronic network, which may include such features as access to government, community discussions, e-mail, community information computer/Internet access, education, training	Norms and relations that enable communities to achieve desired goals	No	No	The town with more social capital has more positive attitudes towards the Internet and no income-based disparities in computer/Internet use. The other town pursued an entrepreneurial/competitive approach to information technology and disparities and negative views of the Internet persist.
Ferlander 2002 Low-income suburban community, Sweden	"To what extent can the use of an Internet Café create social capital in a local community?"	62 responses to questionnaires by café users, plus observation data	A local cybercafé	Putnam: "features of social organization such as networks, norms, and social trust that facilitate coordination and cooperation for mutual benefit"	The entire study concerns itself with in-community (i.e. geographic) ties		IT café users show higher social capital than non users -- higher sense of local identity, see less tension in community, higher trust, more local friends and social support. Q: Is café use effecting this or does the café attract people who are more this way?
Kvasny 2002 Low-income urban community, US	1. What is the relation between increased citizen participation in a technology-rich environment and increased life chances? 2. Will IT access improve the life chances of people? 3. How does IT reproduce social stratification?	Case study, observation, document review	Community technology center with classes	Used Bourdieu. Social capital = social networks to improve social standing.	No	No	Author saw ICT reproducing social stratification rather than fostering social development. People didn't learn things that could get them a high-tech job.
Kvasny and Keil 2002 Two communities in U.S.	1. How have target populations and service providers reacted to two digital divide initiatives? 2. Why are they less successful than expected?	Two case studies: in one, 20 interviews of 40 minutes each were transcribed and coded.	CTC and high-speed Internet via set top boxes, each provided for free by the city.	Bourdieu: "the benefits that one can potentially receive from participating in communities and networks; information, support, guidance, and additional social contacts"	No	No	With respect to social capital, it was noted that existing social networks brought people to CTC. The lack of use of existing social networks kept set top boxes from being adopted in low-income areas. "Elitist assumptions built into the provision of ICT" held back initiatives.

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Papers by date / Setting	Research Question	Unit of Analysis/N	ICT	Social Capital	Weak Ties / Strong Ties	Bridging/Bonding	Findings
Meredyth et al. 2002 low-income urban community, Australia	What is community? How can one identify and measure social/cultural effect of a computer network?	A to-be-built resident maintained 'networked community' in a housing estate; 100 people in focus groups of 500 in estate, 200 surveyed of 800 in estate)	Recycled computers, subsidized Internet access, computer classes, computer lab, online community information	Putnam: "trust, communication, participation and sociability." The study used social capital indicators from other Australian studies. The questions asked are outlined in paper.	Bridging social capital = weak ties between many people = local communication and exchange between residents Bonding social capital = strong ties in small groups = e-mail and exchange with diasporic community		The estate consists of multiple bonding-social-capital networks, bridging social capital is almost nonexistent; language is the fault line. Residents went for bonding social capital activities with computers, not bridging.
Clark 2003 Low-income urban community, U.S.	How does ICT policy play out in the lives of those targeted for access to new media?	Case study; issues ethnography	CTC with computers running games	Bourdieu: "the networks of friends and acquaintances that enable young people to do such things as eventually find employment, locate housing, and otherwise function in society"	Uses Granovetter: "Weak ties such as those fostered in informal meeting places are what enable individuals to gain acess to a potentially wider circle of resources and opportunities than … through their family or peer contacts. … [P]eople in disadvantaged communities tend to have fewer weak ties than those from more affluent locations."	No	Kids used CTC for gaming and typical teen online activities, as a safe space. The CTC appears to be a place that builds a young person's social capital and weak ties.
Ferlander 2003 Low-income suburban community, Sweden	To what extent can ICT (re) create social capital and community in an urban area?	Case study or studies involving observations, interviews, N<100 surveys	LocalNet, a community network and IT café	Putnam, Bourdieu, Coleman, Fukuyama: "social networks, social support and trust, which creates a sense of community"	Strong ties = emotionally close Weak ties = to people emotionally distant	Bonding = to similar people = local Bridging = to different people = global	The IT café increased social capital in community, weak ties and strong ties
Hampton 2003 Middle-income suburban community, Canada	What is the impact of ICT on social networks of people?	End stage of a community network: 56 wired and unwired households surveyed.	High-speed connection in the home and local community listservs	No -- social networks	Same -- continuum	No	ICT contibutes to weak ties, not strong ties. It facilitates community participation and collective action via large dense network of weak ties and as an organizing tool.

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Papers by date / Setting	Research Question	Unit of Analysis/N	ICT	Social Capital	Weak Ties / Strong Ties	Bridging/Bonding	Findings
Hampton and Wellman 2003 middle-income suburban community, Canada	What is the Internet's effect on the local community?	56 wired and unwired households surveyed, participant observer, interviews.	High-speed connection in the home and local community listservs. Also: e-mail, Web, networked computing technologies = Internet. Technologies do not cause social change but technology generates social affordances that offer possibilities.	Critiques Putnam for "conflating interpersonal community and civic involvement into one term, social capital."	Same -- continuum	No	Being wired was associated with having more weak ties, but had no effect on strong ties.
Kavanaugh et al. 2003 Affluent small city, U.S.	What are the differences in community and collective efficacy and how might they be associated with strength of ties and Internet use?	158 respondents	Group use of ICT=organizational e-mail, listserv, online bulletin board, Web site	Refers to Putnam	Thick trust == strong ties == bonding social capital: intensive daily contact, in homogeneous exclusive communities capable of exercising sanctions ... support, mutuality Thin trust == weak ties == bridging social capital: product of weak ties, less personal, links groups to integrate them in one social environment ... instrumental, information resources, increased reach		People with weak ties boost their local community involvement and their local connections to people after getting on the Internet MORE than people without weak ties. Also they use the Internet for political purposes. ICT helps build bonding and bridging social capital in communities.
Pinkett 2003 Low-income urban community, U.S.	How can community social capital be increased and community cultural capital be activated through community technology?	Surveyed 26 heads of household in 2000, 32 in 2001	New PCs in households, high-speed Internet, classes, community-building software	Putnam: community social capital is the extent to which community members can work and learn together effectively	No	No	The residents expanded their local ties, their social netowrks, and access to information channels, and increased their cultural capital in that they had more local information flow.
Pinkett and O'Bryant 2003 same as above	same as above	same as above	same as above	same as above	same as above	same as above	Social networks became more dense and tie strength increased for indviduals engaged in the ICT project: visiting others at home, recognizing others, e-mailing, phoning others living in development.

Appendix B. Consent forms.

Note: Two consent forms follow. The first was used with the 31 community-group volunteers, the second was for background interviews.

Using ICTs in Manchester—Consent form for community group volunteers

Thank you for volunteering to participate in the Using information and communications technologies (ICTs) in Manchester study. I am looking at how community groups use digital tools and who or what helps them. We are hoping to inform policy in this area and answer theoretical questions of how social networks work. I am a student at the University of Michigan and the study is my PhD thesis. The study is sponsored by my university and by the City of Manchester's Digital Development Agency.

There are two ways that you benefit by participating in the study. First, you receive a small honorarium of 10 pounds, even if you withdraw from the study at some point. Second, it is hoped that the findings will help to improve support to community groups, including yours.

The study poses minimal risk and discomfort to participants. You will be interviewed once for 60 to 90 minutes. Your participation in this project is voluntary. You may skip or refuse to answer any question that makes you feel uncomfortable without affecting your study compensation. Even after you sign this consent document, you may decide to leave the study at any time without penalty or loss of benefits to which you may otherwise be entitled, including the honorarium.

Your privacy, confidentiality, and anonymity and that of your community group will be respected at all times in the study. Notes, transcriptions, audiotapes, will either be destroyed or stripped of identifying information before being archived and kept for future studies. You and your community group will not be identified in reports produced from this study. Records will be kept confidential to the extent provided by law. However, either the sponsors of the study, or the University of Michigan Institutional Review Board, or university and government officials responsible for monitoring this study may inspect these records.

If significant new knowledge is obtained during the course of the research that may relate to your willingness to continue participation, you will be informed of this knowledge.

One copy of this document will be part of the research records and one copy is yours to keep.

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I have read the information given above. Kate Williams has offered to answer any questions I may have concerning the study. I hereby consent to participate in the study.

Signature of Volunteer	Date	Signature of Researcher	Date

I am willing to have this interview recorded on audio. (You may still participate in this study if you are not willing to have the interview recorded.)

Signature of Volunteer	Date

If you have questions regarding your rights as a research participant, please contact Kate Williams (0161 275-2920 or katewill@umich.edu) or the University of Michigan Institutional Review Board, 540 E. Liberty Street, Suite 202, Ann Arbor, Michigan 48104-2210, USA, (734) 936-0933, irbhsbs@umich.edu.

Using ICTs in Manchester—Consent form for background interviews

Thank you for volunteering to participate in the Using information and communications technologies (ICTs) in Manchester study. I am looking at how community groups use digital tools and who or what helps them. We are hoping to inform policy in this area and answer theoretical questions of how social networks work. I am a student at the University of Michigan and the study is my PhD thesis. The study is sponsored by my university and by the City of Manchester's Digital Development Agency.

It is hoped you will benefit by participating in the study in that it will inform theory, policy and practice regarding community provision of ICT and ICT support.

The study poses minimal risk and discomfort to participants. Your participation in this project is voluntary. You may decline to answer any question that makes you feel uncomfortable with no penalty whatsoever. Even after you sign this consent document, you may decide to leave the study at any time without penalty or loss of benefits to which you may otherwise be entitled.

Your privacy, confidentiality, and anonymity will be respected at all times in the study. Notes, transcriptions, audiotapes, will either be destroyed or stripped of identifying information before being archived and kept for future studies. You will not be identified in reports produced from this study. Records will be kept confidential to the extent provided by law. However, either the sponsors of the study, or the University of Michigan Institutional Review Board, or university and government officials responsible for monitoring this study may inspect these records.

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If significant new knowledge is obtained during the course of the research that may relate to your willingness to continue participation, you will be informed of this knowledge.

One copy of this document will be part of the research records and one copy is yours to keep.

I have read the information given above. Kate Williams has offered to answer any questions I may have concerning the study. I hereby consent to participate in the study.

Signature of Volunteer	Date	Signature of Researcher	Date

I am willing to have this interview recorded on audio. (You may still participate in this study if you are not willing to have the interview recorded.)

Signature of Volunteer	Date

If you have questions regarding your rights as a research participant, please contact Kate Williams (0161 275-2920 or katewill@umich.edu) or the University of Michigan Institutional Review Board, 540 E. Liberty Street, Suite 202, Ann Arbor, Michigan 48104-2210, USA, (734) 936-0933, irbhsbs@umich.edu.

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Appendix C. Interview protocol for community group volunteers.

Note: When used in the field, the protocol below provided additional space between the questions for taking notes.

Thank you for taking the time to do this interview. It should last from 60 to 90 minutes.

Before we start, there is a consent form which I'll give you some time to read and consider before signing. This is a tool that protects the rights of study participants and enables them to make an informed decision to participate in research.

[Each of us sign one form, give them extra form to keep. Give them the 10 pound payment for participating and collect their signed receipt.]

1. Would you just tell me the full name and address of your group?

    1a. What is your role in the group?

2. If you would, please tell me the purpose of <the group>?

3. Who does the group serve?

4. How did the group get started?

5. What year did the group start?

6. How many members or participants?

7. In the group, what are some of the things that volunteers do?

8. How many paid staff does the group have?

    8a. What do you estimate to be your group's annual budget?

    8b. What activities has the group carried out in the past year?

9. How has the group used technology to help in <same activities>?

10. Is there someone the group considers to be its tech person? Who?

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11. Tell me a little more about the group using technology as you mentioned.

12. Has the group ever gotten stuck on a technology problem or needed help? Please, tell me about that.

13. Who did the group go to when it was stuck [or needed help]?

[If the answer is "me," ask:]

14. Anyone else besides you?

15. Are there other sources of help with technology that the group uses?

16. Who or what are they?

[Ask questions 17-28 for each person mentioned:]

17. Tell me how <person> helped.

18. How did the group happen to go to <person>?

19. How did <person> happen to know how to do this?

20. Does this person work for MCIN, or where do they work?

21. What is their job there?

22. About how old do you think they are?

23. Are they male or female?

24. Do they live within a half-mile of you?

25. How often do you see them?

26. Have you invited them to your home, or have they invited you to theirs?

27. Would you say they are kinfolk, friend, workmate, or an acquaintance?

28. What's their ethnicity?

[At this point, depending on the answer to question 12, the interviewer may need to mention or ask about another instance of being stuck with technology and loop back to question 13 to find out who helped then.]

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[Then ask:]

29. Turning it around now, does anyone come to you when they're stuck on a technology problem or question?

[If yes, then ask:]

30. Can you give me an example of when that happened?

The next few questions are about how <the group> uses technology for group activities and purposes.

I'm going to go down a list of technology uses and I'd like to know from you if the group does this, for group purposes, either often, sometimes, rarely, or never:

[Lay on the table a sheet with the following words on it: often, sometimes, rarely, never.]

[uploading-related uses]

31. create or maintain web pages? OFTEN SOMETIMES RARELY NEVER

32. host or edit an electronic discussion list? OFTEN SOMETIMES RARELY NEVER

33. post to an electronic discussion list? OFTEN SOMETIMES RARELY NEVER

34. post to an online bulletin board? OFTEN SOMETIMES RARELY NEVER

35. post information on the Web in some other way, blogging for instance? OFTEN SOMETIMES RARELY NEVER

if so, how?

36. take digital photos? OFTEN SOMETIMES RARELY NEVER

37. record digital audio? OFTEN SOMETIMES RARELY NEVER

38. record digital video? OFTEN SOMETIMES RARELY NEVER

39. [if yes to any of above three:] share photos, audio or video or that you have made? OFTEN SOMETIMES RARELY NEVER

if so, which? how do you share them?

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40. send or receive e-mail as part of group activities? OFTEN SOMETIMES RARELY NEVER

41. belong to an electronic discussion list? OFTEN SOMETIMES RARELY NEVER

42. create documents on a computer? OFTEN SOMETIMES RARELY NEVER

if so, what documents?

43. use spreadsheet software? OFTEN SOMETIMES RARELY NEVER

44. use bookkeeping software? OFTEN SOMETIMES RARELY NEVER

45. look for information on the Web? OFTEN SOMETIMES RARELY NEVER

46. read an online bulletin board? OFTEN SOMETIMES RARELY NEVER

47. talk over the Internet as you would on a telephone? OFTEN SOMETIMES RARELY NEVER

48. use Linux or any open-source software? OFTEN SOMETIMES RARELY NEVER

49. use online chat? OFTEN SOMETIMES RARELY NEVER

50. use instant messaging? OFTEN SOMETIMES RARELY NEVER

51. use a mobile to talk? OFTEN SOMETIMES RARELY NEVER

52. use a mobile to text? OFTEN SOMETIMES RARELY NEVER

53. use a mobile to send e-mail? OFTEN SOMETIMES RARELY NEVER

54. use a mobile to browse the Web? OFTEN SOMETIMES RARELY NEVER

55. use wireless technology to connect to the Internet? OFTEN SOMETIMES RARELY NEVER

[place of use]

56. Do the members of your group use digital technology at:

home?

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work?

school?

college?

university?

someone else's home?

electronic village hall?

cybercafé?

UK online centre?

a library?

elsewhere?

if so, where?

57. Does your group, for its activities, do anything else with digital technology or use any other technology that I haven't asked about? If so, what?

[If uploading activities are mentioned:]

58. This is a question on timeline. Did <the group> began <posting to the Web/running the listserv/whatever uploading activities mentioned> in the last twelve months or earlier? If earlier, about what year?

OK, thanks. Just a few more questions.

59. Are you active in any other organizations besides <the group>? If so, which?

60. What do you personally use a computer for?

61. What excites you about technology?

62. What do you find challenging about technology?

63. What is your occupation?

64. Can you tell me your home postcode?

65. Would you mind telling me your age?

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66. When you were growing up, what was your father's occupation?

67. What was your mother's occupation?

68. How far did you go in school?

69. In what town did you spend most of your time growing up?

70. How many years have you lived in your present home?

71. How many years have you lived in Manchester?

72. Where did you move to Manchester from?

73. What country would you say most of your ancestors are from?

[Lay on the table a sheet with the chart below on it.]

74. What code below best describes your household's income per year before taxes?

Code	Per week	Per year
T	nil	nil
U	less than 60£	less than £3,000
V	£60 to £119	£3,000 to £5,999
W	£120 to £199	£6,000 to £9,999
X	£200 to £299	£10,000 to £14,999
Y	£300 to £479	£15,000 to £24,999
Z	£480 or more	£25,000 or more

75. How many people are there in your household?

76. Do you have a computer in your house? Is it connected to the Internet?

77. Can you recommend any other community group volunteers that I could contact about interviewing?

[Turn off tape.]

OK! That's all. Thank you very much for your time and your thoughtful answers!

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Appendix D. Statistically significant correlations between downloading, uploading, cyberorganizing, and particular ICT activities.

Pearson's Correlation Coefficient, Significance (one-tailed)		Downloading	Uploading	Cyberorganizing
Online text	Use e-mail	-.309, ρ = .045		
	Use online chat			.321, ρ = .039
Use of the Web	Post to a group Web page	-.640, ρ = .000	.817, ρ = .000	
	Post to a bulletin board online		.319, ρ = .040	
Mobile telephony	Text on a mobile phone		-.354, ρ = .026	
Digital image and sound	Take digital photos	-.395, ρ = .014		
	Share photo, video, or audio files	-.326, ρ = .037	.409, ρ = .011	
Data analysis	Do bookkeeping on the computer			.345, ρ = .029
New technologies	Use Linux or other open-source software			.483, ρ = .003

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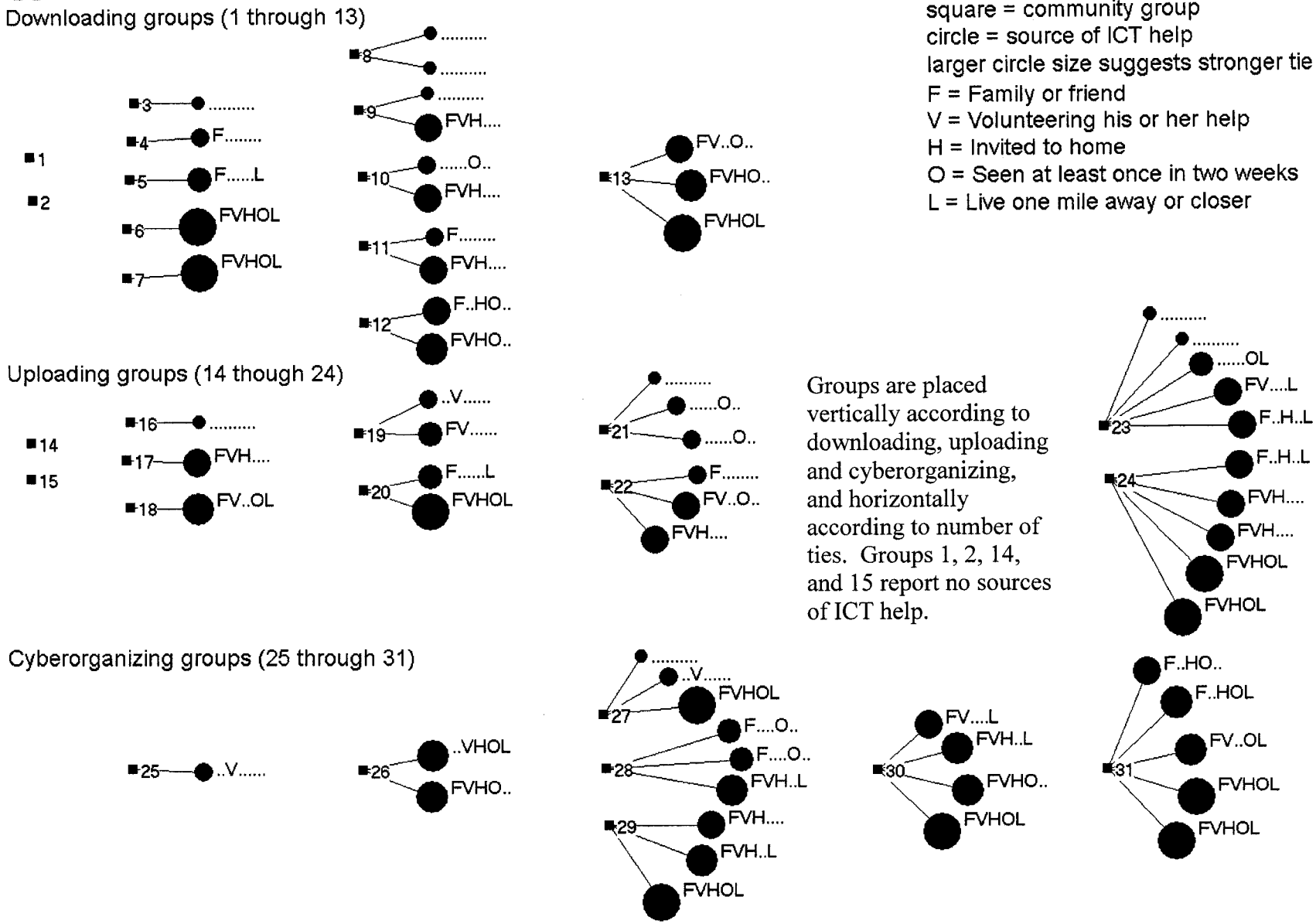
Appendix E. Network diagrams of groups and their sources of ICT help.



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