

8-1-2009

Social Capital in Information and Communications Technology Research: Past, Present, and Future

Song Yang

University of Melbourne, yanssy1@pgrad.unimelb.edu.au

Heejin Lee

Yonsei University

Sherah Kurnia

The University of Melbourne

Follow this and additional works at: <https://aisel.aisnet.org/cais>

Recommended Citation

Yang, Song; Lee, Heejin; and Kurnia, Sherah (2009) "Social Capital in Information and Communications Technology Research: Past, Present, and Future," *Communications of the Association for Information Systems*: Vol. 25 , Article 23.

DOI: 10.17705/1CAIS.02523

Available at: <https://aisel.aisnet.org/cais/vol25/iss1/23>

This material is brought to you by the AIS Journals at AIS Electronic Library (AISeL). It has been accepted for inclusion in Communications of the Association for Information Systems by an authorized administrator of AIS Electronic Library (AISeL). For more information, please contact elibrary@aisnet.org.

Communications of the Association for Information Systems

CAIS 

Social Capital in Information and Communications Technology Research: Past, Present, and Future

Song Yang

Department of Information Systems, The University of Melbourne

yanssy1@pgrad.unimelb.edu.au

Heejin Lee

Graduate School of International Studies, Yonsei University

Sherah Kurnia

Department of Information Systems, The University of Melbourne

Abstract:

Social capital is a very influential concept in social science in understanding contemporary societies. It is found to directly and indirectly influence many aspects of social life, such as quality of life. It is also increasingly explored in relation to Information and Communications Technology (ICT). However, little is known about the relationship between ICT and social capital. The study of the relationship is still in its early stages and has not produced consistent results. This paper sets out to provide an analytical review of the literature focusing on the relationship between the two in order to understand how ICT affects social capital and vice versa. It begins by presenting a review of social capital and then builds a framework to classify and organize ICT related social capital studies. Using this framework, we provide an analysis of existing studies in the area. On the basis of this analysis, we identify three gaps in the ICT related social capital research: an imbalance in the levels of analysis between the collective and the individual levels, a lack of theoretical explanation of why and how social capital changes due to ICT, and the limited ability of the research findings to be generalized. We then make suggestions for future research.

Keywords: social capital, ICT

Volume 25, Article 23, pp. 183-220, August 2009

Editor's Note: The corresponding author is Heejin Lee at heejinmelb@yonsei.ac.kr

I. INTRODUCTION

Social capital has become increasingly important in a variety of research fields. Despite such importance, it has no commonly agreed upon definition. Although it has various definitions in different contexts in different disciplines, it is widely understood to be the resources embedded in social networks for the mutual benefit of parties within the networks. The central proposition of social capital theory is that social networks have value because they constitute valuable resources that facilitate certain actions of participants within the networks [Bourdieu 1986; Burt 2001; Coleman 1990; Portes 1998; Putnam 1995a; b; 2000].

Initially, the term was used mostly in sociological and political discourse. It has lately been applied to other fields and has become an influential concept in understanding the contemporary world. Since people's relationships matter greatly to themselves as individuals and as members of communities, social capital has been investigated in – and is found to influence – many aspects of life including: the development of human capital [Coleman 1988; Fiorgas 2000], quality of life [Dekker and Uslaner 2001; Kennelly et al., 2003; Spence and Schmidpeter 2003], health [Liukkonen et al., 2004; Rose 2000], economic performance [Baron et al., 2000; Grootaert et al., 2004], and innovation diffusion [Fountain 1997].

Society and social changes have always been associated with the development of technology [Buchanan 1995; Castells 2000; Westrum 1991]. With the development of Information and Communications Technology (ICT)¹, the interactions between ICT and social capital in organizations and society at large have drawn both researchers' and policymakers' attention. However, studies in this area are still in their early stages and have not produced consistent results. At this stage, there is little consensus on the role of ICT in building social capital. Based on an analysis of the impact of television [e.g., Putnam 2000], some researchers believe that electronic technology contributes to a decline in social capital, whereas others argue that ICT – such as the Internet and its latest applications, such as social networking sites (SNS) – facilitates social capital building [e.g., Hampton and Wellman 2003]. This indicates that the findings about the relationship between one particular technology and social capital cannot be directly applied to other technologies. It also shows that there is inadequate knowledge about the relationship between ICT and social capital, that is, about how ICT affects social capital and *vice versa*.

To enhance our understanding in this area, this paper reviews studies about social capital and ICT. This can help researchers identify the present level of knowledge in this area and thus decide what questions researchers should seek to answer in the future. As part of this review, we develop a framework to organize and evaluate existing studies concerning the relationship between social capital and ICT.

The contribution of this paper is its synthesis of prior literature, its selection of criteria in assessing social capital related ICT studies, and its insights into the gaps in current studies with implications for further research. The extensiveness of ICT research related to social capital proves the importance of the social capital concept in the realm of information systems. The proposed framework is a significant contribution to the literature because no prior study has presented an integrative, interdisciplinary review of this topic.

The paper is organized as follows: the following section, Section II, introduces the background literature on social capital theories and then classifies the concept of social capital into two categories: "individual" social capital and "collective" social capital. Section III describes the method we used for reviewing the literature, and Section IV examines ICT related social capital studies. For each article reviewed, the role of social capital in relation to ICT – whether social capital is a dependent variable or an independent variable – is identified. Through the use of two criteria (the level of analysis and the role of social capital), we present a framework by which we can map studies of social capital and ICT. The issues emerging from the analysis of the related studies based on the proposed framework are discussed in Section V. Finally, the paper concludes with an assessment of this study's limitations and suggestions for further work.

¹ IT is defined by the Information Technology Association of America (ITAA) as "the study, design, development, implementation, support or management of computer-based information systems, particularly software applications and computer hardware." It is extended to include an increasingly important aspect of computing, that is, communication. When computing and communication are combined, it is often referred to as Information and Communications Technology (ICT). "IT" and "ICT" are often used interchangeably. In this paper, we use "ICT" because what is discussed with regard to social capital is essentially related to the communication aspect of ICT.

II. THE CONCEPT OF SOCIAL CAPITAL: A REVIEW OF PAST AND PRESENT LITERATURE

Increasing efforts have been made to develop social capital theories in recent years, as evidenced by the considerable number of publications focusing on the concept and its application to numerous subject areas in various disciplines. Studies have suggested that social capital is positively related to a range of economic and sociological outcomes, but have also expressed concern with its detriments to social practices [Adler and Kwon 1999]. Although the use of the term “social capital” has a relatively short history and research into it is still in its early stages, the notions underlying it are not new, but rooted in early sociological studies [Grootaert and Van Bastelaer 2002]. Contemporary authors who have refined the social capital theory into its current state of popularity include Pierre Bourdieu, James Coleman, and Robert Putnam [Bourdieu 1986; Coleman 1988; 1990; Putnam 1995a; b; 2000]. To date, many authors have contributed to the conceptualization and operationalization of this complex concept.

Social Capital: Its Origins and Contemporary Development

The concept behind social capital is nothing new in sociological research [Field 2003; Portes 1998]. It can be traced back to the eighteenth and nineteenth centuries and is connected with scholars such as Tocqueville, Durkheim, Marx, Weber, and Locke, among others. Bankston and Zhou [2002] made specific reference to the connections between Durkheimian normative sociology and Coleman's thinking on social capital. This is supported by Portes [1998], who also argues that classical social theories, such as the research of Durkheim and Marx, already suggest that involvement and participation in groups can have positive consequences for individuals and communities. The term “social capital” is believed to have first been used by Hanifan [1920], who mentioned it in his book *The Communitary Center* [as cited in Putnam 2000; 2002]. Hanifan defined social capital as “good will, fellowship, sympathy, and social intercourse among the individuals and families who make up a social unit,” and outlined the benefits of social capital [Hanifan 1920 in Putnam 2002, p. 4]. A few other scholars, such as Jacobs [1961] and Loury [1977], also used the term [as cited in Woolcock and Narayan 2000]. However, their research on this concept did not seem to attract wide attention at the time.

The idea of social capital was revived in the 1980s. The research of Bourdieu, Coleman and Putnam is most commonly cited as the basis for contemporary discussions of social capital. The first systematic analysis of social capital was made by Bourdieu [1986], and a clear theoretical framework was developed by Coleman [1988; 1990], who first conducted an empirical investigation into the concept. It is Putnam who correlates the levels of social capital with traditional public policy concerns and successfully exports the concept from academia into the wider media. Many authors have since advanced the concept of social capital, particularly its operationalization. In recent years, research on social capital has grown rapidly across many disciplines including, among others, sociology, politics, public health, and economics. One study found that the number of journal articles listing “social capital” as a keyword was 20 before 1981. This number rose to 109 between 1991 and 1995, and to 1003 between 1996 and March 1999 [Baum 2000]. Bourdieu's, Coleman's, and Putnam's studies on social capital, along with those of some other contemporary authors², are discussed further in the next subsection.

As Grootaert and Van Bastelaer [2002] suggest, current studies of social capital may be at the same early stage as that of human capital studies 30 or 40 years ago. Social capital is complex, especially because researchers and practitioners approach it from various disciplines and backgrounds for various applications. There are significant variations, controversies, and disagreements with respect to the definition, measurement, sources, and outcomes of the concept. Doubtless, debate and progress on the theorization and operationalization of the concept will continue. Of particular importance at the moment, there is no clear, commonly agreed upon definition of social capital in the current literature. The definition adopted by a particular study depends on the discipline and level of investigation [Robinson et al., 2002]. Researchers from various disciplines, such as sociology (where the social capital concept originated) and economics (where the concept is applied) are still working on a definition to suit their needs. In addition, popular measurements of social capital have been heavily criticized [Lin 2001b]. Consequently, research for integrating various research strategies, both qualitative and quantitative, into the design of instruments to measure social capital more accurately is still required [Woolcock 2001]. Moreover, with the increasing popularity of the concept of social capital, it will continue to be considered important in various subject areas. Its application to ICT, for instance, is expected to further flourish as new technologies continue to develop. Therefore, we believe that a comprehensive and integrative review of the literature is necessary to extend knowledge in the area. To build a framework that can effectively map studies on social capital and ICT, we first need to categorize studies on social capital.

² Some of the most frequently cited publications on social capital, based on our keyword search on Google Scholar (with “social capital” used as the keyword), include Coleman [1988: 7501 citations], Putnam [1995a: 3589 citations], Portes [1998: 2324 citations], Nahapiet and Ghoshal [1998: 2323 citations], Knack and Keefer [1997: 1766 citations] and Woolcock [1998: 1523 citations].

Categorizing Studies of Social Capital

Although researchers in different disciplines agree on the significance of relationships as a resource for social action, they lack agreement on the precise definition of social capital. This leads to further disagreements in the measurement and interpretation of social capital. Table 1 lists some definitions of social capital. They are broadly similar, with some slight differences. To a certain extent, the definitions vary depending on the level of analysis that corresponding theories involve [Portes 1998; 2000]. This is demonstrated by the contemporary development of social capital and is supported in the social capital literature [Lin 1999; 2001b; Newton 1997; Slangen et al., 2004]. Bourdieu started the modern social capital research tradition by studying the phenomenon from the perspective of individuals. Coleman independently developed social capital, mostly at the individual level, but with an implied shift to social capital at the collective level. Putnam, based on Coleman's research, conceives of social capital as a community wide concept. Later studies on this concept are usually enlightened by these original scholars' research. They can, therefore, be roughly separated into two camps: one for individual social capital, and the other for collective social capital. Some theories, such as those by Bourdieu [1986], Coleman [1990], and those who follow them, regard social capital mainly as the resources generated by an individual's social network for his or her mutual benefit as a member of the network. Social capital defined from this point of view is called "individual social capital" [Portes 2000]. Others, such as Putnam [1993; 1995a; b; 2000] and Woolcock and Naryyan [2000], consider social capital as both individuals' social networks and their moral attitudes, or social norms, which contribute to the common good of a community or even a nation. Social capital defined from this approach is referred to as "collective social capital" [Portes 2000].

Table 1. Example of Social Capital Definitions

Level of Analysis	Authors	Definitions of Social Capital
Individual	Bourdieu	(Social capital is) "the aggregate of the actual or potential resources which are linked to possession of a durable network of more or less institutionalized relationships of mutual acquaintance or recognition" [1986 p. 248]. (Social capital is) "made up of social obligations ("connections"), which is convertible, in certain conditions, into economic capital and may be institutionalized in the form of a title of nobility" [1986 p. 243].
	Coleman	"Social capital is defined by its function. It is not a single entity, but a variety of different entities having two characteristics in common: They all consist of some aspect of social structure, and they facilitate certain actions of individuals who are within the structure." [1990 p. 302].
	Burt	(Social capital refers to) "friends, colleagues, and more general contacts through whom you receive opportunities to use your financial and human capital" [2001 p. 9].
Collective	Putnam	(Social capital refers to) "features of social organization such as networks, norms, and social trust that facilitate coordination and cooperation for mutual benefit" [1995 p. 67].
	World bank	"Social capital refers to the institutions, relationships, and norms that shape the quality and quantity of a society's social interactions."
	Woolcock	(Social capital refers to) "the information, trust, and norms of reciprocity inhering in one's social networks" [1998 p. 153].

Social Capital as an Attribute of Individuals

As mentioned, the contemporary theoretical development of the social capital concept independently started from the research of a French sociologist, Bourdieu [1986], and that of an American sociologist, Coleman [1988; 1990]. Other important theories of social capital at the individual level include Lin's network theory of social capital [Lin 2001a; 2001b], Burt's theory of structural holes and network closure as social capital [Burt 2001], and Portes's theory arguing that social capital is "the ability of actors to secure benefits by virtue of membership in social networks or other social structures" [Portes 1998 p. 6]. They focus on individuals or small groups as the unit of analysis and examine the benefits accruing to individuals from their relationships with others. For example, Bourdieu [1986] emphasizes that capital is accumulated labor, and he divides capital into three fundamental classes: economic, cultural, and social capital. Economic capital "is immediately and directly convertible into money and may be institutionalized in the form of property rights" [p. 243]; cultural capital "may be institutionalized in the form of educational qualifications" [p. 243]; and social capital is an individual feature, which is "the aggregate of the actual or

potential resources which are linked to possession of a durable network of more or less institutionalized relationships of mutual acquaintance or recognition” [p. 248].

Coleman [1990], on the other hand, takes rational action as the starting point and suggests, “Social capital is defined by its functions. It is not a single entity, but a variety of different entities having characteristics in common: they all consist of some aspect of a social structure, and they facilitate certain actions of individuals who are within the structure” [p. 302]. According to Coleman, social capital can take on forms such as obligations and expectations, information potential, and norms and effective sanctions. His definition is important because it implies a shift of understanding social capital from the individual level to the collective level [Adam and Roncevic 2003].

The measurement of individual social capital often focuses on variables indicating the position of an individual inside a social network [Adam and Roncevic 2003]. Some of the measurement instruments include, among others, the Name Generator/Interpreter, the Position Generator, and the Resource Generator [Van der Gaag and Snijders 2003; 2004; Van der Gaag et al., 2004]. The Name Generator/Interpreter requires the respondent to identify the names of people with whom he or she can talk about personal matters. The Position Generator measures access through network members to certain occupations that represent social resource collection based on job prestige. The Resource Generator asks about access to a fixed list of specific social resources in several different domains of life.

Social Capital as a Feature of Communities

The conceptual extension of social capital from an individual asset to a community or national feature, initiated by Robert Putnam [1993; 1995a; 1995b; 2000], makes it possible to discuss the social capital possessed by communities and even nations, and the consequent effects on their development.

The core idea of social capital theory, as argued by Putman [2000] – who emphasizes the character of social capital as a community level resource – is that social networks have value. He defines social capital as “...connections among individuals – social networks and the norms of reciprocity and trustworthiness that arise from them” [p. 21]. Putnam’s arguments are that: (1) social networks and social norms are important to societal cooperation, coordination and collaboration; (2) social capital has important consequences for democracy; and (3) social capital has declined in post-war America. One of the most pressing questions for the future, in Putnam’s view, is how to reverse America’s declining social capital and to restore civic engagement and trust.

The results of subsequent studies on social capital and civic engagement mainly support Putnam’s assertion that social capital is significantly related to indicators of socioeconomic development and democratization [Cox 2002; Fukuyama 2000; Norris 2000; Quan-Haase and Wellman 2004]. Researchers, such as Fukuyama, point out that social capital promotes a kind of associational life that is necessary for the success of government and democracy, and is critical for understanding societal development [Fukuyama 2000].

As a set of resources rooted in relationships, collective social capital has many different attributes and thus requires multidimensional measurement [Grootaert et al. 2003; O’Brien et al. 2004]. The most stable and widely agreed dimensions of social capital in the literature, regardless of the disciplines, are social networks, trust, and norms of reciprocity. A social network concerns the extent of an individual’s participation in various types of social organizations and informal networks. It also concerns the social support that one can obtain [Grootaert et al., 2003]. Trust is defined as “the level of confidence that people have that others will act as they say or are expected to act or that what they say is reliable” [Productivity Commission 2003 p. x]. It is the “bedrock” of most personal relationships, and facilitates various day to day interactions [Productivity Commission 2003]. Norms of reciprocity refers to shared understandings, informal rules, and conventions on continuing relationships of exchange that are at any given time, unrequited or imbalanced. It involves mutual expectations that a benefit granted now should be repaid in the future [Putnam 1993]. The notion that the norm of reciprocity is related to social capital is well documented as an important element that facilitates the way in which interactions are structured among group members [Productivity Commission 2003; Putnam 2000; van Schaik 2002].

III. METHODOLOGY

Our literature review required: (1) the development of criteria for the types of studies to be included in our analysis; (2) a literature search strategy; and (3) a scheme for analysis that outlines the documentation and coding of the studies examined. Given the vastness of the social capital literature, we chose to limit our initial sample of studies to those where both ICT and social capital were significant themes of the manuscript. Because of the current popularity of both terms (social capital and ICT), this strategy was adopted in order to avoid having an unmanageable number of articles with limited value.

To locate publications on social capital and ICT related topics, we first employed keyword searches across a large range of databases on information systems, sociology, and political science. The key resources include the *Web of Science*, *International Bibliography of the Social Sciences*, *ISI Current Contents Connect*, *JSTOR*, *ScienceDirect*, and *Sociological Abstracts*. The *Web of Science* citation index was a particularly powerful tool in this process. To trace sources not yet indexed by the conventional tools, the Web search engine *Google Scholar* was also used. Two sets of keywords were used to address research into social capital and related theories (set A), and research into various aspects/elements of ICT (set B), respectively. Keywords in set A are: “social capital,” “social network,” “social tie,” “social relationship,” “mutual benefit,” and “social resources.” Keywords in set B are: “technology,” “information and communications technology/ICT,” “information technology/IT,” “information systems,” “TV,” “computer,” “Internet,” “community network,” “network computing,” “ubiquitous computing,” “mobile technology,” “mobile phone,” “mobile service.” The primary keywords adopted in the searches are combinations of words (e.g., “social capital and Internet”) selected from each set. The time span of each search was from 1996 to 2007. Publications from only this period are included for analysis because research into social capital and ICT has expanded since the extension of social capital theory to ICT by Robert Putman in 1995³ [Baum 2000]. This search results in 75 articles from 39 different journals, two dissertations, nine conferences, and other resources.

Since more than half of the reviewed articles from the first round of searching are not published in the top information systems journals, we ran the search again, targeting only level A and B IS journals identified by Fishers, Shanks, and Lamp [2007] (see Appendix D for the journal list). Eight A level, 19 B level IS journals, and seven professional journals were searched using “social capital” as the single keyword. This resulted in 28 papers, which are all included in the initial review list. Because the study of social capital and ICT is expanding into many disciplines, we do not claim that our review did not miss some research papers published in some journals in various disciplines during the searched time period. However, we believe that our review is comprehensive and up to date, at least in regard to IS research and related areas (see Appendix C for the exact distribution of studies across resources).

Our method for the analysis of ICT – social capital studies was to first classify each study according to its focus on either individual or collective social capital. Then each article was reviewed to determine: the type of ICT under investigation; the methodology used; the way social capital was measured; the use of social capital in the research design (whether it is an independent, a dependent, or a control variable); and its relevant findings. The outcomes of the analysis are summarized in Appendices A (collective social capital – ICT) and B (individual social capital – ICT). The data contained in these appendices provide the basis for subsequent analysis to identify issues in ICT – social capital research, gaps in the current research, and directions for future research. The next section discusses in detail existing research into social capital and ICT.

IV. RESEARCH INTO SOCIAL CAPITAL AND ICT: THE CURRENT SITUATION

Currently, great efforts are being made to explore the influence of ICT on society. At the same time, some IS researchers have increasingly become aware of the important role of social capital in technology development and knowledge sharing processes [Fountain 1997; Riemer 2004; Syrjanen and Kuutti 2004]. To analyze the existing studies of social capital and ICT, we first develop a two dimensional framework to map those studies. The two dimensions are: (a) the unit of analysis and (b) the role of social capital in research design.

In Section II, we discuss the unit of analysis as an important criterion for classifying the studies of social capital. The unit of social capital analysis is concerned with whether the social capital concept is defined as an asset of an individual or a feature of a community. In this section, we propose that those studies can be further classified according to the role of social capital or ICT in the research design.

The study of Markus and Robey [1988], in addressing IT and organizational change, presents several ways of understanding the causal structure in theory and research. According to them, technology plays different roles in relation to organizational change as: an independent variable that causes organizational change (named the technological imperative); a dependent variable caused by the organization’s information processing needs and managers’ choices about how to satisfy the needs (the organizational imperative); or as one of many factors in an emergent process of change resulting from the unpredictable interaction between technology and its users (the emergent perspective). Guided by the analysis of Markus and Robey, we assess the reviewed studies by examining the relationships between social capital and ICT according to the role of social capital in the research design. The

³ Currently, social capital theory is widely applied to interdisciplinary research. The application of social capital theory to ICT related issues can be traced back to the inaugural Pool Lecture, Tuning In, Tuning Out: The Strange Disappearance of Social Capital in America, by Putnam in 1995 [Putnam 1995b]. Putnam named television as the main culprit in the decline of social capital in America. He therefore calls for investigation of the social consequences of technology, especially in terms of social capital.

role of social capital depends on whether social capital is a dependent variable or an independent variable. For example, some studies focus on the impacts of ICT on building social capital and maintaining it (dependent variable), whereas others focus on the effects of social capital (independent variable) on the development and use of ICT. Although we highlight the role of social capital instead of that of ICT in this study, we actually have considered both roles since there is a converse relationship between the two; that is, when social capital is the dependent variable, ICT becomes the independent variable and vice versa.

Through the use of two dimensions (the unit of analysis and the role of social capital in research design), we obtain four categories of social capital and ICT research. We now place exemplary or representative studies into each category and map the current state of the research in the area, as shown in Table 2⁴.

In the upper left cell, social capital is treated as a dependent variable and measured at the individual level. We call the concept of social capital in this category “Connecting Social Capital” because social capital measurement here is closely related to connecting people. Studies in this category endeavor to examine the impacts of ICT on individuals’ social networks and the possible benefits generated by such networks, such as higher social satisfaction and greater ease in finding a job.

In the lower left cell, social capital is treated as a dependent variable but measured at the collective level. We call the concept of social capital in this category “Changing Social Capital,” not only because research in this category is initiated by an interest in finding out the reasons for the decline in social capital, but also because most studies in this category aim to identify the role of ICT in social capital building in communities. The effects of ICT – typically television, Internet, and community networks – are widely discussed in relation to the dimensions of social capital such as social networks and social norms, and outcomes of social capital such as civic engagement and processes of democracy.

Not only have the impacts of ICT on social capital at different levels attracted researchers’ attention, but also the effects of social capital on ICT development. Since it has been suggested that social capital brings positive outcomes to many realms of society – such as public health, economic development, and civic engagement – we can infer that social capital can play a role in advancing technology adoption, diffusion, and use. Research shown in the upper right cell focuses on the effects of individual social capital. Relatively fewer studies target individual social capital explicitly. However, terms such as “social influence” and “social norms” are often mentioned as related to the concept of individual social capital and are discussed in some technology acceptance studies. We consider those studies implicitly connected to social capital and ICT development in this review. Because many reviewed studies include the social factor as influential in technology acceptance in certain circumstances, we call the concept of social capital in this category “influencing social capital.”

In the lower right cell, the effects of social capital are examined at the collective level. Social capital in this category is called “enabling social capital” because research in this category considers social capital as an enabler of technology diffusion. In this category, social capital is considered a feature that already exists in communities before the introduction of ICT and, thus, could have a powerful influence on an ICT project and its outcomes.

⁴The analysis and classification were conducted mainly by the first author. Only when there were unclear cases (e.g., when a paper could be assigned to two cells) were the other two authors consulted.

Table 2. Four Categories of Social Capital and ICT Studies

Role of Social Capital Level of Analysis	Dependent Variable	Independent Variable
<p style="text-align: center;">Individual</p>	<p>Connecting Social Capital</p> <p>Bianchi and Robinson [1997] Haythornthwaite [2001] Papakyriazis and Boudourides [2001] <i>Haythornthwaite [2002]</i> Reich and Kaarst-Brown [2003] <i>Hiller and Franz [2004]</i> Matzat [2004] <i>Schultze and Orlikowski [2004]</i> <i>Selwyn [2004]</i> Steinfeld [2004] <i>Drentea and Moren-Cross [2005]</i> <i>Alessandrini [2006]</i> <i>Ellison et al. [2007]</i></p>	<p>Influencing Social Capital</p> <p>Gargiulo and Benassi [2000] Täube and Joye [2001] Anderson [2004] Frank et al. [2004] Hall and Graham [2004] <i>Newell et al. [2004]</i> Hatzakis et al. [2005] <i>Yang [2005]</i> <i>Chou et al. [2006]</i> <i>Honig et al. [2006]</i> <i>Lin et al. [2006]</i></p>
<p style="text-align: center;">Collective</p>	<p>Changing Social Capital</p> <p>Norris [1996] London [1997] Blanchard and Horan [1998] McBride [1998] <i>Uslaner [1998]</i> <i>Wellman [1998]</i> Franzen [2000] <i>Uslaner [2000]</i> <i>DiMaggio et al. [2001]</i> <i>Hampton [2001]</i> <i>Kavanaugh and Patterson [2001]</i> <i>Nie [2001]</i> <i>Shah et al. [2001]</i> <i>Wellman et al. [2001]</i> <i>Hopkins and Tomas [2002]</i> <i>Wellman [2002]</i> <i>Foth [2003]</i> <i>Goodman [2003]</i> <i>Hampton [2003]</i> <i>Hampton and Wellman [2003]</i> <i>Ling et al. [2003]</i> <i>Millen and Patterson [2003]</i> Norris [2003] Pierce and Lovrich JR. [2003] Hardin [2004] <i>Hüsing [2004]</i> <i>Lengnick-Halla et.al [2004]</i> <i>Pigg and Crank [2004]</i> Quan-Haase and Wellman [2004] Resnick [2004] <i>Uslaner [2004]</i> Williamson [2004] Information Economy Division [2005] <i>Kavanaugh and al. [2005]</i> <i>Liff [2005]</i> Shah et al. [2005] <i>Beaudoin and Thorson [2006]</i> Huysman and Wulf [2006]</p>	<p>Enabling Social Capital</p> <p>Fountain [1997] Bebbington and Perreault [1999] Isham [2000a, b] Robalino [2000] <i>Borgida et al. [2002]</i> Han [2002] Sullivan et al. [2002a, b] <i>Riemer and Klein [2004]</i> Simpson [2005] <i>Wang et al. [2006]</i> Hsieh and Tsai [2007]</p>

Table Notes: To indicate the focus of each paper, we use different fonts as follows:

- Normal Font: Social capital focused research considering ICT as one of the factors relating to social capital
- Font in *italics*: ICT focused research considering social capital as one of the factors relating to ICT
- Font in **bold**: The same focus on both

Social Capital as a Dependent Variable

Research using social capital as a dependent variable explores the role of ICT in social capital building, recreation, and maintenance. Impacts of ICT on social capital at both the individual and collective levels are discussed here. However, the difference between individual and collective social capital is not always clear. Shah, Kwak, and Holbert [2001], for example, claim that they explore the relationship between Internet use and the individual level production of social capital. Nevertheless, their study is based mainly on Putman's social capital theory, which in turn is focused on social capital at the collective level. Moreover, the authors employ Internet use to predict civic engagement, interpersonal trust, and life contentment, which are more related to the welfare of a community than to an individual's personal benefits. In this paper, we group reviewed studies based on (a) the theoretical foundation of an article – that is, whether it is based on the theory of individual social capital or that of collective social capital, and (b) the immediate beneficiary – who would benefit immediately, the community or individuals. For that reason, Shah et al., [2001] is placed into the changing social capital category.

Connecting Social Capital

Research that examines the role of ICT in building individual social capital is included in this category. Some studies illustrate that the spread of ICT creates networking infrastructure, which encourages the formation of social capital [Clark 2003; Pierce and Lovrich Jr. 2003]. Pierce and Lovrich Jr. [2003] examine the relationship between Internet use and social capital in forming social and personal trust. Surveys among citizens of Minneapolis and Atlanta show that Internet use is associated with higher levels of trust, even when controlling for the personal characteristics of individuals; i.e. race, income, and education. In a study of a community technology centre (CTC) in one of Denver's disadvantaged communities, Clark [2003] seeks to find out how CTC practices address the digital divide and to examine the policy implications of those practices. Its main findings – apart from discrepancies between the goals of the center's supporters and policymakers on the one hand and its actual use on the other – suggest a potential for CTC to enhance users' social capital. By using Oldenburg's concept of third places, the author emphasizes the positive role of CTC for drawing young people together and thereby helping them build social networks. These networks, which comprise social capital, facilitate not only activities such as "finding employment" and "locating housing," but also individual "political involvement" and "civic engagement." Notably, the Internet's potential for increasing social capital, according to Clark [2003], may lie less in the technology itself than in the public locations that enable its use among disadvantaged communities.

In recent years, the rapid development of social network services (SNSs) has increasingly attracted researchers' attention. The relationship between the use of SNSs and social capital has also been investigated [Ellison et al., 2007]. SNSs focus on building online communities of people who share or are interested in exploring the same interests and/or activities. Sites that deliver such services, such as MySpace, Facebook, LinkedIn, and CyWorld, allow individuals to present themselves, articulate their social networks, and establish or maintain connections with others. In analyzing the relationship between the use of Facebook and the formation and maintenance of social capital, Ellison et al., [2007] discovers that there is a strong association between the two. Furthermore, Facebook use may also provide benefits for users with low self-esteem and low life satisfaction. Technology-mediated interactions, such as the use of social network sites, may provide users with an opportunity for the creation of new forms of social capital, called "virtual" social capital that opposes but also complements "real" social capital developed offline [Alessandrini 2006].

Some studies, however, argue that ICT may also erode social capital [Loch and Conger 1996]. Loch and Conger [1996], for example, argue that ICT can cause de-individuation. They describe de-individuation as "a feeling of being estranged or separated from others that can lead to behavior violating established norms of appropriateness" [p.76] and claim that people experience de-individuation when interacting with people via a computer. At the same time, some researchers find that the differences in ICT use may lead to different results. ICT use for information and/or communication usually enhances cooperation and collective action, which may be beneficial to social capital building, while using such services for entertainment may lead people to increased disconnection from the real world [Rheingold 2002; Srivastava 2005].

Changing Social Capital

Most studies that use both ICT and social capital as keywords focus on the impacts of ICT use on collective social capital. Early studies in this category concentrate on the effects of ICT – mainly TV and the Internet – on social



capital, in response to Putnam's argument. Findings from these studies only partly support Putnam's view that television in America has contributed toward the erosion of social capital and civic engagement [London 1997; Norris 1996; 2003; Shah et al., 2001]. Norris [1996], for example, by analyzing data from the American Citizen Participation Study in 1990 [Verba et al., 1995 in Norris 1996], shows that while the amount of time spent in front of the television does seem to be negatively related to political participation, other evidence about what American viewers watch suggests that watching news and, in particular, current affairs programs does not seem to be damaging to the democratic health of society and may even prove beneficial. Recent studies are motivated mostly by three considerations: the importance of social capital for economic development, social development, and the democratic process. Studies in the former areas are concerned with the effects of ICT – typically the Internet and community networks – on social capital in building strong and cohesive communities, while those in the latter consider the role of ICT in building social capital for the development of democracy.

Some government agencies and international organizations emphasize that it is necessary to investigate the role of ICT in the building of social capital because of its benefits, such as the reduced need for personal security and improved workplace efficiency [Information Economy Division 2005]. Studies for economic and social development examine the dynamic role of ICT and its uncertain consequences for both individuals and communities. It is expected that ICT can enhance people's connectivity, which potentially acts as a catalyst for greater social interaction and community participation [Department of Communication Information Technology and the Arts 2005; Field 2003].

Some positive outcomes have been reported about the role of ICT in the building of social capital for community development. Hampton and Wellman's study conducted in Netville, Toronto, Canada is among the most frequently quoted. It reveals the positive social impacts of Internet use on relationships within neighborhoods [Hampton 2001; Hampton and Wellman 2003]. Contrary to predictions that Internet use would encourage social isolation, the Netville experiment showed that Internet use resulted in greater civic involvement and neighborly contact. In fact, wired residents were two to three times more likely to recognize and talk with their neighbors than were non-wired residents. Moreover, the residents of a networked neighborhood were able to organize and mobilize collectively, despite the weak ties among them. These findings indicate that communication networks in Netville promoted the building of social capital.

Social researchers have also attempted to identify the impact of the information technology revolution on democratic governance [Han 2002; Putnam 2002]. Han [2002], for instance, demonstrates that Netizen activities in cyberspace have contributed to the substantial development of Korea's democracy. This theory is supported by a series of social and political movements from 2000 to 2002. He argues that Korea's experience of Internet based social capital mobilization confirms the power of newly created cyberspace as a public sphere in the Information Age. He also recognizes that social capital evolution, ICT diffusion, and democratic development are all bound by a country's historical and cultural specifics.

Social Capital as an Independent Variable

Studies treating social capital as an independent variable in ICT related research usually examine the effects of social capital on the development and use of ICT. Such studies are grouped into two categories: (a) influencing social capital and (b) enabling social capital. These two categories analyze, respectively, the effects of individual social capital and collective social capital on ICT.

Influencing Social Capital

Studies in this group regard social capital as the resources or attributes of an individual that can affect his/her acceptance, involvement in diffusion, and usage of ICT. Kvasny and Keil [2002], for example, in their evaluation of the different approaches taken to address the digital divide by two cities – Atlanta and LaGrange – define social capital as social networks that improve an individual's social standing. To address the digital divide, Atlanta established community technology centers, while LaGrange offered its residents free broadband Internet access at home. Both initiatives were less successful than expected. In explaining this failure, the authors adopted Bourdieu's theory of practice, which mainly concerns the dialectical relationships between social actors and social structure. Their findings indicate that although individual social capital can contribute to greater success in both cases, it is not properly addressed in these two situations. In Atlanta, existing social networks brought people into the centers, but they failed to use those networks to facilitate the diffusion of IT skills within the community. In LaGrange, by offering free broadband at home, the recipients were isolated from community champions and positive social influences, which might be important to making the Freenet initiative workable among people across poor neighborhoods where the Internet was not familiar.

Although only a few studies explicitly use the term “social capital” and define it at the individual level, some have noticed the influence of social factors – often defined as subjective or social norms – on ICT [Loch and Conger 1996; Straub et al. 1997; Venkatesh and Davis 2000; Venkatesh et al. 2003]. The influence of social factors is defined, in the study of technology acceptance, as the degree to which an individual perceives that others expect him or her to adopt or continue to use information technology [Venkatesh et al. 2003]. This concept is closely related to the communication channel aspects of Innovation Diffusion Theory [Rogers 2003] and is found to be an important factor for potential users in adopting a technology, especially in regard to mandatory usage settings [Venkatesh et al. 2003].

These studies indicate that individual social capital, which mainly involves an individual’s social networks and the resources generated by those networks, may have positive effects for ICT acceptance and diffusion. It may also provide a context for the use of some technologies, such as the Internet or mobile phones, for communication. However, because of the vagueness in the measurement of individual social capital itself, it is hard to distinguish the effects of social capital from those of purely social relationships or social networks in ICT use. The purpose of this paper is to review related previous studies on the interaction of social capital and ICT, and therefore no further effort is made at this stage to discuss research involving other social phenomena, including social networks.

Enabling Social Capital

In this category, studies define social capital as a feature of communities and examine the effect of social capital on ICT adoption, acceptance, and use in communities. Two types of studies are identified. In one group, the effects of collective social capital on ICT are discussed directly, and the term “social capital” is used explicitly. In the other, the influence of social capital is implicit, and some or all elements of collective social capital are investigated. These elements include social networks and social norms, such as trust and reciprocity, in a community as defined in Section II. Although the second group can partly elucidate the interaction between social capital and ICT, they involve many other social concepts that are outside the scope of this paper. Therefore, only the studies that explicitly examine the role of social capital are presented below.

Some studies demonstrate that a high level of already established social capital, such as pre-existing, strong, non electronic networks and community commitment, is a factor for success in establishing electronic based networks [Borgida et al., 2002; Fukuyama 1995]. Borgida et al., [2002] examine the role of social capital in addressing the digital divide by conducting a comparative case study of two rural Minnesota communities, each with its own community electronic network. They find that the community with a higher level of social capital had a more positive attitude towards the technological change. Moreover, the cooperative community-based approach to electronic networking adopted in this community is also helpful in narrowing the digital divide.

Fountain [1997] argues that social capital is a necessary, although not sufficient, enabler of effective partnerships for technology innovation and suggests that it is necessary to draw a distinction between social capital and so called “informational capital.” The latter emphasizes the value of shared information. Although access to information, notably through the Internet, provides a variety of opportunities, informational capital is not a replacement for social capital. Social capital increases the ability to build and use informational capital because trustful relationships facilitate information flows and make information more meaningful. Fountain claims that the ability to collaborate both within and among firms and other organizations appears to be a necessary condition for firms to take advantage of new technologies.

Some studies explore the role of social capital in relation to various forms of virtual organizations enabled by ICT and e-commerce in an organizational context [Arenius 2002; Nahapist and Ghoshal 1998; Spence and Schmidpeter 2003; Steinfeld 2004]. Typically, these studies are based on Nahapist and Goshal’s research [Nahapist and Ghoshal 1998], which categorizes social capital into three dimensions; structural, relational, and cognitive. The structural dimension comprises the actual relationships that provide the opportunity for accessing resources or acting together. The relational dimension includes the motivation of individuals to act collaboratively toward others. The cognitive dimension refers to the ability of people to act together. Nahapist and Goshal’s approach can be used to analyze social capital at both the individual and collective levels, but it is more commonly used at the collective level to analyze the interaction between social capital and ICT in organizational contexts. Researchers confirm that social capital has a positive role in technological innovation, but they call for further investigation into this dynamic process [Spence and Schmidpeter 2003; Steinfeld 2004]. Riemer and Klein [2004] identify the contradictions and challenges of ICT enabled virtual organizations and argue that, without social capital which is a necessary complement, collaboration in virtual organizations is unlikely to succeed. Steinfeld [2004] analyzes the under utilization of business to business e-commerce and points out that the under utilization is attributed to the assumption that location is irrelevant because cyberspace allows people to interact over great distances. The author stresses, however, that local business clusters and the exploitation of social capital are important elements even for the success of e-commerce.

V. DISCUSSIONS: GAPS IN THE CURRENT RESEARCH

The previous section presents in detail the current status of social capital and ICT studies. By examining some studies in each cell through a perspective suggested by the framework, we provide an overall view of the studies and elucidate the relationship between social capital and ICT. In addition, the framework, with each cell filled with relevant studies gives us an opportunity to identify some gaps in the current study. Among them, the following three are noteworthy for their implications for future study: (a) an imbalance in the analysis levels; (b) a lack of theoretical explanation of why and how social capital changes because of ICT; and (c) issues regarding the generalization of the findings to date. These issues are not isolated. Rather, they are intertwining and rooted deeply in the controversies surrounding the social capital concept. In the following three subsections, we further discuss each discrepancy and suggest what needs to be done to resolve them.

An Imbalance in Levels of Analysis

The majority of the reviewed social capital – ICT studies measure social capital at the collective level, frequently as the dependent variable (“changing social capital,” our framework). Fewer studies focus on the technological impacts on individual social capital or explicitly identify the effects of individual social capital on technology development, acceptance, diffusion, and use. This is partly because social capital theory flourished only after the introduction of collective social capital by Putnam.

The issue of the level of analysis is addressed by Markus and Robey [1988] in examining theories of IT and organizational change. They identify two problems: problems of inference and ideological biases. The former arise when the levels at which concepts are defined and data are collected are inconsistent with the goals of studies, while the latter are derived from differences in research questions, acceptable methodologies, and conventions for reporting results in different disciplinary groups favoring macro or micro level theories. After considering the pros and cons of both macro level (collective) and micro level (individual) analysis, Markus and Robey point out that mixing the levels of analysis may also be useful in studying IT and organizational change, since some technologies are neither strictly micro nor macro in character [Markus and Robey 1998].

We believe that Markus and Robey’s [1988] argument is also valid in examining the role of ICT in social capital. Although previous studies of social capital usually focus on either the individual (micro) level or the collective (macro) level, social capital is concerned with both individuals and collectives [Coleman 1990; Nahapist and Ghoshal 1998]. It may exist both at the micro level, i.e., among individuals, and at the macro level, i.e., within communities and even nations [Baron et al., 2000]. That is, institutionalized social relations with embedded resources are expected to be beneficial to both the collective and the individuals in the collective [Lin 2001b]. As such, interactions between social capital and ICT take place at both levels. ICT could change individual social capital as well as collective social capital. However, these changes are not synchronal. ICT, such as the Internet and mobile phones, is first adopted by some individuals and progressively diffuses to a larger population [Rogers 2003]. Its impacts on social behaviors and other phenomena, including social capital, are progressive as well. If ICT is linked only with collective social capital, we believe that our understanding of the mechanism underlying the connection between these two components of society is incomplete. It is also true for studies exclusively focusing on social capital and ICT at the individual level. A mixed-level approach to studying the ICT-social capital interaction would be most helpful in solving the problems of inference created by results from research at either level.

However, as discussed in Section II, different research questions and measurement instruments are favored by studies targeting social capital at different levels. It may be overly ambitious to conduct a mixed-level study on all the issues including the relationship between ICT and social capital; ideological biases may arise. A practical mixed level strategy proposed by Coleman [1986] is to move down to the level of individual actions and back to the macro level, instead of staying at the macro social level. Therefore, we believe research into how individuals react to and use ICT can provide information necessary to clarifying how such technology will or should develop and what impact it is likely to have upon our society. Until certain questions about the use of new ICT by individuals or small groups are answered, it seems unlikely that gross predictions relating to society as a whole will be valid. By saying this, we do not suggest that research into ICT-social capital should not be undertaken at the collective level. Rather, we only seek to emphasize that we should pay attention to the impacts of ICT on individual social capital, especially when a particular technology is in its early stage of development.

A Lack of Theoretical Explanation about Why and How Social Capital Changes Due to ICT

Much information systems research is devoted to “what,” as opposed to “why” or “when,” relationships exist [Lee et al., 1997]. Likewise, there is no theoretical framework in existing studies that sufficiently explains why ICT consumption leads to changes in social capital. The explanation of the causation between frequent television watching and declining social capital given by Putnam [2000] is that “watching things (especially electronic screens) occupies more and more of our time, while doing things (especially with other people) occupies less and less” [p. 9].

However, this explanation cannot be generalized to explain and predict the relationships between technologies and social capital. The majority of other studies of ICT use and social capital report only the association or relationship between those two variables; they make no effort to explain the association.

To clarify this issue, we first present our understanding about theory; specifically, the causal connection theory. A theory is a set of propositions or theoretical statements [Hage 1972]. It is also a strategy for handling data in research, providing modes of conceptualization for describing and explaining phenomena in sociology [Glaser and Strauss 1973]. There are no right or wrong theories, but theories close to or far from knowledge [Glaser and Strauss 1973; Hage 1972].

To study causal relationships, Cook [1993] distinguishes two types of theoretical constructions: causal connections and causal explanations. Causal connections are implicit in statements such as "A causes B" or "A increases/decreases B." These statements describe the nature of the link between the two variables: "if one is made to vary, the other varies with it and would not have varied had the cause not been present" [p. 40]. On the other hand, causal explanations identify how or why a causal connection occurs. They answer questions, such as, "why does A cause/increase/decrease B?" Causal explanations involve specifying the full set of conditions that suffice to produce cause-effect connections. The assumption underlying this belief is that an understanding of how or why a phenomenon occurs allows one to recreate that phenomenon wherever and however its essential causal ingredients can be brought together. This is why, as argued by Cook [1993], a causal explanation is often considered the "Holy Grail" of science.

We previously indicated, in reviewing the research on the causal relationship between ICT and social capital, that a large number of studies describe the causal connections between the two. However, causal explanations regarding their connections are insufficient. The most frequently used methods in these studies are first hand surveys, but sometimes second hand data that were not specifically collected for measuring ICT-social capital relationships are also used. Surveys, although they can be used to identify causal relationships, hardly provide sufficient, rich data to explain complicated phenomena, such as the ICT-social capital interaction. In particular, research into both subjects [ICT and social capital] is at an early stage and mired in controversies. We suggest that, besides quantitative methods, qualitative methods such as action research, in-depth case studies, and some anthropological approaches, may be valuable in understanding the full set of conditions related to ICT-social capital issues. Moreover, we should not isolate the interaction of ICT and social capital from social contexts, which are closely related to the next issue we discuss.

Issues Regarding Generalization

Studies of social capital and ICT usually choose to investigate one particular technology, such as television or the Internet. It seems that many recent findings, in contrast to previous ones [e.g., the study of Putnam, 1995a], tend to support the argument that ICT has positive impacts on social capital building by creating online social connections and belongings and/or enhancing physical (offline) interactions [Hampton and Wellman 2003; Kavanaugh et al., 2005b; Norris 1996; 2003; Rheingold 2002; Shah et al., 2001; Srivastava 2005; Wellman 2001]. It is notable that most recent studies examine the role of the Internet or community networks in building social capital, while previous studies, apparently following Putnam, focus mainly on television. These findings seem to suggest that the effects of ICT on social capital may be different depending on the type of technology under investigation, and results based on investigations of one particular technology cannot be generalized to other technologies without certain qualifications.

These findings, in our view, are low in generalizability. Generalizability refers to the usefulness of a theory in a setting different from the one in which it was empirically tested and confirmed [Baskerville 1996; Lee and Baskerville 2003]. As Babbie [1990] argues, "Science aims at general understanding rather than at the explanation of individual events. . . . The utility of a social theory or social correlation is enhanced by its generalizability. The larger the scope of phenomena it explains, the more useful it is" [p. 13, 25, quoted by Baskerville 1996]. Because the field of IS research involves so much practical application, this generalizability is particularly important to IS research and has been considered a crucial aspect in assessing the impact of most IS research findings [Baskerville 1996]. Generalizable findings or theories are expected to cause practitioners to adjust their conclusions and direct fellow researchers to areas for further study.

Moreover, new information and communication technologies, such as mobile technologies, are developing faster than ever. Technology convergence, which is the process whereby information and/or communications technologies blend to facilitate wider and more integrated methods for the distribution of information, has been thriving [Allen Consulting Group 2005]. One example of convergence is mobile phones; they are capable not only of making phone calls, but also of taking photos, connecting to the Internet, watching television, and accessing reading material, among many more things. Unless we can determine the commonalities across different information and communications technologies, we will not fully understand the role of new technologies in social capital, let alone

provide guidance to practitioners and other researchers. Therefore, it is a challenging task for future research in this area to construct theories that can explain the mechanism of interaction between social capital and ICT in general.

VI. CONCLUSION AND FUTURE RESEARCH

This paper set out to review the literature on ICT and social capital to identify the current knowledge and gaps in this area as well as to propose future research directions. Social capital is one of social sciences' most influential concepts in understanding contemporary societies. It is also increasingly explored in relation to ICT. We first built a framework to classify and organize existing ICT-social capital studies. We used two criteria to construct this framework: the level of social capital analysis and the role of social capital in research design. In the former, two different, but related, concepts are identified: individual social capital and collective social capital. In the latter, research is divided into two streams: studies using social capital as a dependent variable and those using social capital as an independent variable. The intersection of the two criteria produces a matrix of four categories of research into the interaction between social capital and ICT. After discussing representative studies in each category, we identified three gaps in social capital research in relation to ICT. First, there has been an imbalance in the levels of the analysis because the existing research is more likely to measure ICT and social capital at the collective level than at the individual level. Second, it has not been explained in theory why and how social capital changes because of ICT. Finally, the generalizability of the research findings to date has been problematic since the effects of a particular technology on social capital discovered in a study can hardly be generalized to other technologies without proper evaluations.

On the basis of observations from this study, we highlight some topics for future research into ICT and social capital that can complement the current research in this area:

- *New technologies and social capital:* As discussed in the previous sections, ICT-related social capital research focuses mainly on a few technologies, such as television, the Internet, and some community networks. With the appearance of new technologies and applications, e.g., mobile technologies and Web 2.0, more empirical research on these technologies in relation to social capital is required.
- *Virtual social capital:* Some researchers argue that social capital can be created in new forms that have emerged from online interactions and relationships [Alessandrini 2006; Liff 2005]. These new forms of social capital are often called 'virtual' social capital, in contrast with 'real' social capital that is normally developed offline. Research addressing virtual social capital is still limited. Further research on this topic would be very useful to better understand the effects of ICT use (particularly online activities) on social capital.
- *ICT and social capital in rural areas:* Both social capital and ICT affect people living in rural settings capacity for development. Not much attention has been paid to this topic. Studies addressing ICT and social capital may contribute to rural development. It is also interesting to see the comparison between ICT-social capital interactions in urban areas and those in rural areas.
- *ICT and social capital in developing countries:* This is another topic that seems under researched compared to the relatively large number of studies conducted in developed countries. On one hand, social capital in developing countries may be significantly different in form and substance from that in developed countries. On the other hand, developing countries may take advantage of late adoption of ICT. Therefore, the pattern of interactions between ICT and social capital can differ in developing countries, and this difference is worth investigating.
- *New methods for studying the social capital-ICT interaction:* For the reviewed articles in this paper, the most frequently used research method is the quantitative survey. Surveys, though helpful in identifying causal relationships, may not be sufficient to deliver rich data that are necessary to build theories explaining complicated phenomena, such as the ICT-social capital interaction. Therefore, more efforts need to be made to develop new research methods in this area.

This list is by no means exhaustive. It is intended to help researchers and practitioners interested in this area to form an initial question for their enquiry, and thereby to further knowledge in this area. We also believe that no matter what topic a researcher chooses to study, he or she should keep in mind the three gaps identified above.

In summary, this paper contributes to information systems research, as well as to related disciplines, by offering an integrative literature review of social capital and ICT. Although research into this topic has increased in a variety of fields, there has been no study that examines the topic from an interdisciplinary perspective. Despite its pioneering value and comprehensive coverage, however, this study has some limitations. First, we may have overlooked some studies that are relevant to this study. However, since we employ a systematic method of searching through the literature, we believe that we have included the most significant studies (at least those published in the most important IS journals). Second, this study is conceptual, and it is difficult to offer practical contributions at this stage. However, our suggestions for further research have the potential to guide important practical contributions by showing why and how ICT use affects the development of social capital. We expect that future research will address these limitations.

REFERENCES

Editor's Note: The following reference list contains hyperlinks to World Wide Web pages. Readers who have the ability to access the Web directly from their word processor or are reading the paper on the Web can gain direct access to these linked references. Readers are warned, however, that:

1. These links existed as of the date of publication but are not guaranteed to be working thereafter.
2. The contents of Web pages may change over time. Where version information is provided in the References, different versions may not contain the information or the conclusions referenced.
3. The author(s) of the Web pages, not AIS, is (are) responsible for the accuracy of their content.
4. The author(s) of this article, not AIS, is (are) responsible for the accuracy of the URL and version information.

- Adam, F. and B. Roncevic (2003). "Social Capital: Recent Debates and Research Trends," *Social Science Information* 42(2), pp. 155-183.
- Adler, P. S. and S.-W. Kwon (1999). *Social Capital: The Good, the Bad, and the Ugly* DOI: 10.2139/ssrn.10.2193/ssrn.186928, last revised October 25, 1999.
- Alessandrini, M. (2006). "Getting Connected: Can Social Capital be Virtual?" *Webology* 3(4) Article 33, <http://www.webology.ir/2006/v3n4/a33.html>.
- Allen Consulting Group (2005). *Australian Mobile Telecommunications Industry Research* commissioned by the Australian Mobile Telecommunication Association (AMTA).
- Anderson, B. (2004). *Information Society Technologies, Social Capital and Quality of Life* Chimera Working Paper, University of Essex, Colchester.
- Arenius, P. M. (2002). *Creation of Firm-level Social Capital, Its Exploitation, and the Process of Early Internationalization* Institute of Strategy and International Business, Helsinki University of Technology.
- Bankston, C. L. and M. Zhou (2002). "Social Capital as a Process: The Meanings and Problems of a Theoretical Metaphor," *Sociological Inquiry* (72), pp. 285-317.
- Baron, S., J. Field and T. Schuller (2000). *Social Capital: Critical Perspectives* Oxford University Press, Oxford: New York.
- Baskerville, R. (1996). "Deferring Generalizability: Four Classes of Generalization in Social Enquiry," *Scandinavian Journal of Information Systems* 8(2), pp. 5-28.
- Baum, F. (2000). "Social Capital, Economic Capital and Power: Further Issues for a Public Health Agenda," *Journal of Epidemiological Community Health* (54), pp. 409-410.
- Beaudoin, C. E. and E. Thorson (2006). "The Social Capital of Blacks and Whites: Differing Effects of the Mass Media in the United States," *Human Communication Research* 32(2), pp. 157-177.
- Bebbington, A. and T. Perreault (1999)., "Social Capital, Development, and Access to Resources in Highland Ecuador," *Economic Geography* 75(4), pp. 395-418.
- Bianchi, S. M. and J. Robinson (1997). "What did You do Today? Children's Use of Time, Family Composition, and the Acquisition of Social Capital," *Journal of Marriage and the Family* 59(2), pp. 332-344.
- Blanchard, A. and T. Horan (1998). "Virtual Communities and Social Capital," *Social Science Computer Review* 16(3), pp. 293-307.
- Borgida, E., J. L. Sullivan, A. Oxendine, M. S. Jackson, E. Riedel and A. Gangl (2002). "Civic Culture Meets the Digital Divide: the Role of Community Electronic Networks," *Journal of Social Issues* 58(1), pp. 125-141.
- Bourdieu, P. (1986). "The Forms of Capital," *Handbook of Theory and Research for the Sociology of Education* Greenwald Press, Richardson, J. G.(Ed), New York, pp. 241-255.



- Buchanan, R. A. (1995). *The Power of the Machine: the Impact of Technology from 1700 to the Present* Viking, London.
- Burt, R. S. (2001). "Structural Holes versus Network Closure as Social Capital," *Social Capital: Theory and Research* Lin, N., K. Cook and R. S. Burt (Eds), Aldine de Gruyter, New York.
- Castells, M. (2000). "Toward a Sociology of the Network Society," *Contemporary Sociology* 29(5), pp. 693-699.
- Chou, T. C., J. R. Chen, and S. L. Pan (2006). "The Impacts of Social Capital on Information Technology Outsourcing Decisions: a Case Study of a Taiwanese High-Tech Firm," *International Journal of Information Management* 26(3), pp. 249-256.
- Clark, L. S. (2003). "Challenges of Social Good in the World of Grand Theft Auto and Barbie: a Case Study of a Community Computer Center for Youth," *New Media & Society* 5(1), pp. 95-116.
- Coleman, J. S. (1986). "Social Theory and Social Research and a Theory of Action," *American Journal of Sociology* (91), pp. 1309-1335.
- Coleman, J. S. (1988). "Social Capital in the Creation of Human Capital," *The American Journal of Sociology* (94), pp. S95-S120.
- Coleman, J. S. (1990). *Foundations of Social Theory* Belknap Press of Harvard University Press, Cambridge, Mass.
- Cook, T. (1993). "A Quasi-Sampling Theory of the Generalization of Causal Relationships," *New Directions in Program Evaluation* (57), pp. 39-82.
- Cox, E. (2002). "Australia: Making the Lucy Country," *Democracies in Flux: the Evolution of Social Capital in Contemporary Society* Putnam, R. D.(Ed), Oxford University Press, pp. 333-358.
- Dekker, P. and E. M. Uslaner (Eds.) (2001). *Social Capital and Participation in Everyday Life* Routledge, New York, NY.
- Department of Communication Information Technology and the Arts (2005). *The Role of ICT in Building Communities and Social Capital*.
- DiMaggio, P., E. Hargittai, W. R. Neuman, and J. P. Robinson (2001). "Social Implications of the Internet," *Annual Review of Sociology* (27), pp. 307-336.
- Drentea, P. and J. L. Moren-Cross (2005). "Social Capital and Social Support on the Web: The Case of an Internet Mother Site," *Sociology of Health & Illness* 27(7), pp. 920-943.
- Ellison, N. B., C. Steinfield, and C. Lampe (2007). "The Benefits of Facebook 'Friends': Social Capital and College Students' Use of Online Social Network Sites," *Journal of Computer-Mediated Communication* (12), pp. 1143-1168.
- Field, J. (2003). *Social capital* Routledge, New York.
- Fiorgas, D. (2000). "Community Formation and Social Capital in Australia," Paper delivered to the *7th Australian Institute of Family Studies Conference*, Darling Harbour, Sydney.
- Fisher, J., G. Shanks, and J. Lamp (2007). "A Ranking List for Information Systems Journals," *Australasian Journal of Information Systems* 4(2), pp. 5-18.
- Foth, M. (2003). "Connectivity does not Ensure Community: On Social Capital, Networks and Communities of Place," *ITiRA 2003 Conference Track: Community Informatics*.
- Fountain, J. E. (1997). "Social Capital: A Key Enabler of Innovation in Science and Technology," *Investing in Innovation: Toward A Consensus Strategy for Federal Technology Policy* L.M.Branscomb and J.Keller (Eds.), The MIT Press, Cambridge.

- Frank, K. A., Y. Zhao, and K. Borman (2004). "Social Capital and the Diffusion of Innovations within Organizations: The Case of Computer Technology in Schools," *Sociology of Education* 77(2), pp. 148-171.
- Franzen, A. (2000). "Does the Internet Make Us Lonely?" *European Sociological Review* 16(4), pp. 427-438.
- Fukuyama, F. (1995). *Trust: The Social Virtues and the Creation of Prosperity* Free Press, New York.
- Fukuyama, F. (2000). *Social Capital and Civil Society* IMF Institute.
- Gargiulo, M. and M. Benassi (2000). "Trapped in Your Own Net? Network Cohesion Structural Holes, and the Adaptation of Social Capital," *Organization Science* 11(2), pp. 183-196.
- Glaser, B. G. and A. L. Strauss (1973). *The Discovery of Ground Theory: Strategies for Qualitative Research*, Aldine Chicago.
- Goodman, J. (2003). *Mobile Telephones and Social Capital in Poland: Summary of a Case Study with Vodafone Forum for the Future*.
- Grootaert, C., D. Narayan, V. N. Jones, and M. Woolcock (2004). *Measuring Social Capital: an Integrated Questionnaire*, The World Bank, New York.
- Grootaert, C., D. Narayan, V. Nyhan Jones, and M. Woolcock (2003). *Integrated Questionnaire for the Measurement of Social Capital* The World Bank Social Capital Thematic Group.
- Grootaert, C. and T. Van Bastelaer (2002). *Understanding and Measuring Social Capital: A Multidisciplinary Tool for Practitioners* The World Bank.
- Hage, J. (1972). *Techniques and Problems of Theory Construction in Sociology* J. Wiley, New York.
- Hall, H. and D. Graham (2004). "Creation and Recreation: Motivating Collaboration to Generate Knowledge Capital in Online Communities," *International Journal of Information Management* 24(3), pp. 235-246.
- Hampton, K. (2001). "Broadband Neighborhoods-Connected Communities," *Julie Jacko and Andrew Sears, CHI2001 Extended Abstracts*. New York, NY: The Association for Computer Machinery, pp. 301-302.
- Hampton, K. and B. Wellman (2003). "Neighboring in Netville: How the Internet Supports Community and Social Capital in a Wired Suburb," *City and Community* 2(4), pp. 227-311.
- Hampton, K. N. (2003). "Grieving for a Lost Network: Collective Action in a Wired Suburb," *The Information Society* (19), pp. 417-428.
- Han, J. (2002). "Internet, Social Capital, and Democracy in the Information Age: Korea's Defeat Movement, the Red Devils, Candle Light Anti-U.S. Demonstration, and Presidential Election during 2000-2002".
- Hardin, R. (2004). "Internet Capital," *Analyse und Kritik* 26(1), pp. 122-138.
- Hatzakis, T., M. Lycett, R. D. Macredie, and V. A. Martin (2005). "Towards the Development of a Social Capital Approach to Evaluating Change Management Interventions," *European Journal of Information Systems* 14(1), pp. 60-74.
- Haythornthwaite, C. (2001). "Tie Strength and the Impact of New Media," *The Hawaii International Conference On System Sciences* Maui, Hawaii.
- Haythornthwaite, C. (2002). "Strong, Weak, and Latent Ties and the Impact of New Media," *The Information Society* (18), pp. 385-401.
- Hiller, H. H. and T. M. Franz (2004). "New ties, Old Ties and Lost Ties: The Use of the Internet in Diaspora," *New Media & Society* 6(6), pp. 731-752.

- Honig, B., M. Lerner, and Y. Raban (2006). "Social Capital and the Linkages of High-Tech Companies to the Military Defense System: Is There a Signaling Mechanism?" *Small Business Economics* 27(4-5), pp. 419-437.
- Hopkins, L. and J. Tomas (2004). "E-Social Capital: Building Community through Electronic Networks," *The Institute for Social Research at Swinburne University*.
- Hsieh, M.-H. and K.-H. Tsai (2006). "Technological Capability, Social Capital and the Launch Strategy for Innovative Products," *Industrial Marketing Management* 36(4), pp. 493-502.
- Hüsing, T. (2004). "The Impact of ICT on Social Cohesion: Beyond the Digital Divide," *The Proceedings of the 14th Economic Forum Krynica Zdrój, Poland*.
- Huysman, M. and V. Wulf (2006). "IT to Support Knowledge Sharing in Communities, Towards a Social Capital Analysis," *Journal of Information Technology* 21(1), pp. 40-51.
- Information Economy Division (2005). *The Role of ICT in Building communities and Social Capital* Department of Communications, I. T. at. A.
- Information Technology Association of America. "Information Technology Definition Aggregation," Wikipedia Definition provided by ITAA, Last Modified - Unknown. <http://www.itaa.org/es/docs/Information%20Technology%20Definitions.pdf> (accessed December 7, 2008).
- Isham, J. (2000a). "The Effect of Social Capital on Technology Adoption: Evidence from Rural Tanzania," *Conference on Opportunities in Africa: Micro-evidence on Firms and Households* The Centre for the Study of African Economies.
- Isham, J. (2000b). *A Model of Technology Adoption with Social Capital* PhD thesis, Faculty of the Graduate School University of Maryland.
- Kavanaugh, A. et al., (2005). "Weak Ties in Networked Communities," *The information Society* 21(2), pp. 119-131.
- Kavanaugh, A. and S. Patterson (2001). "The Impact of Community Computer Networks on Social Capital and Community Involvement," *American Behavioral Scientist* 45(3), pp. 496-509.
- Kennelly, B., E. O'Shea, and E. Garvey (2003). "Social Capital, Life Expectancy and Mortality: A Cross-National Examination," *Social Science & Medicine* 56(12), pp. 2367-2377.
- Knack, S. and P. Keefer (1997). "Does Social Capital Have an Economic Payoff? A Cross-Country Investigation," *Quarterly Journal of Economics* 112(4), pp. 1251-1288.
- Kvasny, L. and M. Keil (2002). "The Challenges in Redressing the Digital Divide: A Tale of Two Cities," *Proceedings of the International Conference on Information Systems (ICIS)* Barcelona, Spain, December 15-18, 2002.
- Lee, A. S. and R. L. Baskerville (2003). "Generalizing Generalizability in Information Systems Research," *Information Systems Research* 14(3), pp. 221-243.
- Lee, B., A. Barua, and A. B. Whinston (1997). "Discovery and Representation of Causal Relationships in MIS research: A Methodological Framework," *MIS Quarterly* 21(1), pp. 109-136.
- Lengnick-Halla, C. A. and M. L. Lengnick-Halla (2004). "The Role of Social and Intellectual Capital in Achieving Competitive Advantage through Enterprise Resource Planning (ERP) Systems," *Journal of Engineering and Technology Management* 21(4), pp. 307-330.
- Liff, S. T. (2005). "Local Communities: Relationships between 'Real' and 'Social' Virtual Capital," *Communities and Technologies* van den Besselaar, P. et al., (Eds.) Kluwer Academic Publishers http://www.iisi.de/fileadmin/IISI/upload/C_T/2005/Paper3C_T2005.pdf.
- Lin, B. W., P., C. Li, and J. S. Chen (2006). "Social Capital, Capabilities, and Entrepreneurial Strategies: A Study of Taiwanese High-Tech New Ventures," *Technological Forecasting and Social Change* 73(2), pp. 168-181.

- Lin, N. (1999). "Social Networks and Status Attainment," *Annual Review of Sociology* (25), pp. 467-487.
- Lin, N. (2001a). "Building a Network Theory of Social Capital," *Social Capital: Theory and Research* Lin, N., K. Cook, and R. S. Burt (Eds.) Aldine de Gruyter, New York.
- Lin, N. (2001b). *Social Capital: A Theory of Social Structure and Action* Cambridge University Press, Cambridge, UK : New York.
- Ling, R., B. Yttri, B. Andersen, and D. Diduca (2003). "Mobile Communication and Social Capital in Europe," *Mobile Democracy: Essays on Society, Self and Politics* Nyri, K. (Ed.), Passagen Verlag, Vienna.
- Liukkonen, V., P. Virtanen, M. Kivimaki, J. Pentti, and J. Vahtera (2004). "Social Capital in Working Life and the Health of Employees," *Social Science & Medicine* 59(12), pp. 2447-2458.
- Loch, K. D. and S. Conger (1996). "Evaluating Ethical Decision Making and Computer Use," *Communication of the ACM* 39(7), pp. 74-83.
- London, S. (1997). "Civic Networks: Building Community on the Net," Paper prepared for the Kettering Foundation [http:// www.scottlondon.com/reports/networks.html](http://www.scottlondon.com/reports/networks.html).
- Markus, M. L. and D. Robey (1998). "Information Technology and Organizational Change: Causal Structure in Theory and Research," *Management Science* 34(5), pp. 583-598.
- Matzat, U. (2004). "Academic Communication and Internet Discussion Groups: Transfer of Information or Creation of Social Contacts?" *Social Networks* 26(3), pp. 221-255.
- McBride, A. (1998). "TV, Individualism, and Social Capital," *Political Science and Politics* 31(3), pp. 542-552.
- Millen, D. R. and J. F. Patterson (2003). "Identity Disclosure and the Creation of Social Capital," *CHI 2003* Ft. Lauderdale, Florida, USA.
- Nahapiet, J. and S. Ghoshal (1998). "Social Capital, Intellectual Capital, and the Organizational Advantage," *Academy of Management Review* 23(2), pp. 242-266.
- Newell, S., C. Tansley, and J. Huang (2004). "Social Capital and Knowledge Integration in an ERP Project Team: The Importance of Bridging and Bonding," *British Journal of Management* (15), pp. S43-S57.
- Newton, K. (1997). "Social Capital and Democracy," *American Behavioral Scientist* (40), pp. 575-586.
- Nie, N. H. (2001), "Sociability, Interpersonal Relations, and the Internet - Reconciling Conflicting Findings," *American Behavioral Scientist* 45(3), pp. 420-435.
- Norris, P. (1996). "Does Television Erode Social Capital? A Reply to Putnam," *Political Science and Politics* 29(3), pp. 474-480.
- Norris, P. (2000). "Making Democracies Work: Social Capital and Civic Engagement in 47 Societies," *European Science Foundation EURESCO Conference on Social Capital: Interdisciplinary Perspectives* University of Exeter.
- Norris, P. (2003) "Social Capital and ICTs: Widening or Reinforcing Social Networks?" *Information Forum on Social Capital for Economic Revival* Tokyo, Japan.
- O'Brien, M. S., C. A. Burdsal, and C. A. Molgaard (2004). "Further Development of an Australian-Based Measure of Social Capital in a U.S. Sample," *Social Science & Medicine* 59(6), pp. 1207-1217.
- Papakyriazis, N. V. and M. A. Boudourides (2001). "Electronic Weak Ties in Network Organisations," *Proceeding of the 4th GOR Conference* May 17-18, Goettingen, Germany.

- Pierce, J. C. and N. P. Lovrich Jr. (2003). "Internet Technology Transfer and Social Capital: Aggregate and Individual Relationships in American Cities," in *Comparative Technology Transfer and Society* (1)1, pp. 49-71.
- Pigg, K. E. (2004) "Building Community Social Capital: The Potential and Promise of Information and Communications Technologies," *The Journal of Community Informatics* (1)1, pp. 58-73.
- Portes, A. (1998) "Social Capital: Its origins and Applications in Modern Sociology," *Annual Reviews* (24), pp. 1-24.
- Portes, A. (2000). "The Two Meanings of Social Capital," *Sociological Forum* (15)1, pp. 1-12.
- Productivity Commission (2003). "Social Capital: Reviewing the Concept and its Policy Implications," Australian Government Productivity Commission.
- Putnam, R. D. (1993). "The Prosperous Community," *The American Prospect* 4(13).
- Putnam, R. D. (1995a). "Bowling Alone: America's Declining Social Capital," *Journal of Democracy* 6(1), pp. 65-78.
- Putnam, R. D. (1995b). "Turning in, Tuning Out: The Strange Disappearance of Social Capital in America," *Political Science and Politics* 28(4), pp. 664-683.
- Putnam, R. D. (2000). *Bowling Alone: The Collapse and Revival of American Community*, Simon & Schuster, New York.
- Putnam, R. D. (Ed.) (2002). *Democracies in Flux: the Evolution of Social Capital in Contemporary Society* Oxford University Press.
- Quan-Haase, A. and B. Wellman (2004). "How does the Internet Affect Social Capital," Huysman, M. and V. Wulf (Eds.) *IT and Social Capital* MIT Press, Cambridge, MA.
- Reich, B. H. and M. L. Kaarst-Brown (2003). "Creating Social and Intellectual Capital through IT Career Transitions," *Journal of Strategic Information Systems* 12(2), pp. 91-109.
- Resnick, P. (2004). "Impersonal Sociotechnical Capital, ICTs, and Collective Action among Strangers," Dutton, W., B. Kahin, R. O'Callaghan, and A. Wyckoff (Eds.) *Transforming Enterprise* MIT Press.
- Rheingold, H. (2002). *Smart Mobs: the Next Social Revolution* Persons Publishing, Cambridge, MA.
- Riemer, K. (2004). "The Role of Social Capital in Managing Relationships with IT Suppliers: A Case Study in Electronic Commerce," *Managing Dynamic Networks* Klein, S. and Poulymenakou, A (Eds.) Springer-Verlag, Berlin, Heidelberg, pp. 125-166.
- Riemer, K. and S. Klein (2004). "How Can Virtual Organizations Deliver? Promises, Challenges and Potential Remedies," *Multikonferenz Wirtschaftsinformatik* Adelsberger, H. H., S. Eicker, H. Krcmar, J. M. Pawlowski, K. Pohl, D. Rombach, and V. Wulf (Eds.), pp. 275-291.
- Robalino, D. A. (1999). *Social Capital, Technology Diffusion and Sustainable Growth in the Developing World* Dissertation, RAND Graduate School of Policy Studies.
- Robinson, L. J., A. Schmid, and M. E. Siles (2002). "Is Social Capital Really Capital?" *Review of Social Economy* 60(1), pp. 1-24.
- Rogers, E. M. (2003). *Diffusion of Innovations* Free Press, New York.
- Rose, R. (2000). "How Much Does Social Capital Add to Individual Health?: A Survey Study of Russians," *Social Science & Medicine* 51(9), pp. 1421-1435.
- Schultze, U. and W. J. Orlikowski (2004). "A Practice Perspective on Technology-Mediated Network Relations: The Use of Internet-Based Self-Serve Technologies," *formation Systems Research* 15(1), pp. 87-106.

- Selwyn, N. (2004). "Reconsidering Political and Popular Understandings of the Digital Divide," *New Media & Society* 6(3), pp. 341-362.
- Shah, D. V., J. C. Cho, W. P. Eveland, and N. Kwak (2005). "Information and Expression in a Digital Age - Modeling Internet Effects on Civic Participation," *Communication Research* 32(5), pp. 531-565.
- Shah, D. V., N. Kwak, and R. L. Holbert (2001). "'Connecting' and 'Disconnecting' with Civic Life: Patterns of Internet Use and the Production of Social Capital," *Political Communication* (18), pp. 141-162.
- Simpson, L. (2005). "Community Informatics and Sustainability: Why Social Capital Matters," *The Journal of Community Informatics* 1(2), pp. 79-99.
- Slangen, L. H. G., G. C. van Kooten, and P. Suchanek (2004). "Institutions, Social Capital and Agricultural Change in Central and Eastern Europe," *Journal of Rural Studies* 20(2), pp. 245-256.
- Spence, L. J. and R. e. Schmidpeter (2003). "SMEs, Social Capital and the Common Good," *Journal of Business Ethics* 45(1-2), pp. 93-108.
- Srivastava, L. (2005). "Mobile Phones and the Evolution of Social Behaviour," *Behaviour and Information Technology* 24(2), pp. 111-129.
- Steinfeld, C. (2004). "Explaining the Underutilization of Business-to-Business E-Commerce in Geographically Defined Business Clusters: The Role of Social Capital," *Social Capital and Information Technology* Huysman, M. and V. Wulf (Eds), MIT Press, Cambridge, MA.
- Straub, D., M. Keil, and W. Brenner (1997) "Testing the Technology Acceptance Model across Cultures: A Three-Country Study," *Information and Management* (33), pp. 1-11.
- Sullivan, J. L., E. Borgida, M. S. Jackson, E. Riedel, A. Oxendine, and A. Gangl (2002a). "Social Capital and Community Electronic Networks - For-Profit versus For-Community Approaches," *American Behavioral Scientist* 45(5), pp. 868-886.
- Sullivan, J. L., E. Borgida, M. S. Jackson, E. Riedel, and A. R. Oxendine (2002b). "A Tale of Two Towns: Assessing the Role of Political Resources in a Community Electronic Network," *Political Behavior* 24(1), pp. 55-84.
- Syrjanen, A. and K. Kuutti (2004). "Trust, Acceptance and Alignment: The Role of It in Redirecting a Community," *IT and Social Capital* Huysman, M. a. W., V. (Ed) MIT Press, Cambridge, MA.
- Täube, V. and D. Joye (2001). "Social Capital and Internet Use in Switzerland: Structural Disparities and New Technologies," *ISA Publication on Social Indicators*.
- Uslaner, E. M. (1998). "Social Capital, TV and the 'Mean World': Trust, Optimism, and Civic Participation," *Political Psychology* 19(3), pp. 441-467.
- Uslaner, E. M. (2000). "Social Capital and the Net," *Communications of the ACM* 43(12), pp. 60-64.
- Uslaner, E. M. (2004). "Trust, Civic Engagement, and the Internet," *Political Communication* 21(2), pp. 223-242.
- Van der Gaag, M. P. J. and T. A. B. Snijders (2003). "A Comparison of Measures for Individual Social Capital," *Creation and Returns of Social Capital* Amsterdam, The Netherlands.
- Van der Gaag, M. P. J. and T. A. B. Snijders (2004). "The Resource Generator: Measurement of Individual Social Capital with Concrete Items," *XXII Sunbelt International Social Networks Conference* New Orleans, US.
- Van der Gaag, M. P. J., T. A. B. Snijders, and H. D. Flap (2004). "Position Generator Measures and Their Relationship to Other Social Capital Measures," *XXIII Sunbelt international Social Networks Conference* Cancún, Mexico.
- Van Schaik, T. (2002). "Social Capital in the European Values Study Surveys," *OECD-ONS International Conference on Social Capital Measurement* London.

- Venkatesh, V. and F. D. Davis (2000). "A Theoretical Extension of the Technology Acceptance Model: Four Longitudinal Field Studies," *Management Science* 46(2), pp. 186-204.
- Venkatesh, V., M. G. Morris, G. B. Davis, and F. D. Davis (2003). "User Acceptance of Information Technology: Toward a Unified View," *MIS Quarterly* 27(3), pp. 425-478.
- Wang, E. T. G., T. C. Ying, J. J. Jiang, and G. Klein (2006). "Group Cohesion in Organizational Innovation: An Empirical Examination of ERP Implementation," *Information and Software Technology* 48(4), pp. 235-244.
- Wellman, B. (1998). "A Computer Network is a Social Network," *SIGGROUP Bulletin* 19(3), pp. 41-45.
- Wellman, B. (2001). "Computer Networks as Social Networks," *Science* 293(5537), pp. 2031-2034.
- Wellman, B. (2002). "Designing the Internet for a Networked Society," *Communications of the ACM* 45(5), pp. 91-96.
- Wellman, B., A. Q. Haase, J. Witte and K. Hampton (2001). "Does the Internet Increase, Decrease, or Supplement Social Capital?: Social Networks, Participation, and Community Commitment," *American Behavioral Scientist* 45(3), pp. 436-455.
- Westrum, R. (1991). *Technologies & Society: The Shaping of People and Things* Wadsworth Pub. Co., Belmont, CA.
- Williamson, A. (2004). "Getting Ready for eDemocracy: A Five-stage Maturity Model for Community ICT" *Australian Electronic Governance Conference* Melbourne Victoria, Australia.
- Woolcock, M. (1998). "Social Capital and Economic Development: Towards a Theoretical Synthesis and Policy Framework," *Theory and Society* (27), pp. 151-208.
- Woolcock, M. (2001). "Microenterprise and Social Capital: A Framework for Theory, Research, and Policy," *The Journal of Socio-Economics* (30), pp. 193-198.
- Woolcock, M. and D. Narayan (2000). "Social Capital: Implications for Development Theory, Research, And Policy," *The World Bank Research Observer* (15), pp. 225-249.
- Yang, S. (2005). "Relationships among Mobile Data Service, Mobility and Social Capital: A Conceptual Model," *Proceedings of the Australasian Conference on Information Systems* NSW, Australia.

APPENDIX A

Collective Social Capital (CSC) – Information and Communications Technology (ICT) Literature

Citation	Source	Source Type	Methodology and Measure of SC	Main SC Theories Adopted	Type of ICT	Relevant Findings
SC as dependent variable						
Norris, 1996	Political Science and Politics	Journal Article	Secondary analysis (previous survey data used)	Putman	Television	The amount of television viewing seems to support Putnam's theory, while other evidence suggests that watching news programs does not damage the democratic health of society, and may even prove beneficial.
London, 1997	Paper prepared for the Kettering Foundation	E Resource	Theoretical analysis	Putnam	E-network in general	Electronic networks can play a role in strengthening communities if they are used to augment social networks that are already in place. Such networks can serve as public spaces for informal citizen to citizen interaction and support rational dialogue. In some cases, they can promote the social connectedness, trust, and cooperation that constitute social capital.
Blanchard and Horan, 1998	Social Science Computer Review	Journal Article	343 community members of a mid-size city were surveyed.	Putnam	Virtual community	Social capital and civic engagement will increase when virtual communities develop from actual communities and when these virtual communities foster additional communities of interest.
McBride, 1998	Political Science and Politics	Journal Article	Content analysis (coding television programs)	Putnam	Television	Individualism is the most prominent value system among different types of programs. Television individualism is a leisure-oriented, prosperous lifestyle with few expectations of its members.
Uslaner, 1998	Political Psychology	Journal Article	Secondary analysis (previous survey data used)	Putnam	Television	It is not television that makes people less trusting, but optimism for the future that makes people more trusting. There is no support for the argument that television makes people participate less in, or withdraw from, civic engagement.
Wellman, 1998	SIGGROUP Bulletin	Journal Article	Theoretical analysis	Multiple	Computer network	Issues regarding the consequences of computer networks with respect to supports, ties, reciprocity and communities are discussed. Some undertaken projects are listed.
Franzen, 2000	European Sociological Review	Journal Article	Survey	Putnam	Internet	Internet use neither decreases respondents' network size nor the time spent with friends. Electronic mail is widely used and has positive effects on people's social networks.
Uslaner, 2000	Communications of the ACM	Journal Article	Theoretical analysis	Putman	Internet	Internet neither destroys nor creates social capital. It is similar to television, which mirrors everyday life. What people do online is pretty much what they do offline.



Citation	Source	Source Type	Methodology and Measure of SC	Main SC Theories Adopted	Type of ICT	Relevant Findings
DiMaggio et al., 2001	Annual Review of Sociology	Journal Article	Theoretical analysis	Putnam	Internet	The Internet has no intrinsic effect on social interaction and civic participation. Internet use tends to intensify already existing inclinations toward sociability or community involvement rather than creating them <i>ab initio</i> . Further research is needed to relate the qualitative character of the online relationships formed in virtual communities and civic associations and social movement use of the Internet.
Hampton, 2001	CHI2001 Extended Abstracts	Book Section	Survey ethnographic observations from "Netville"	Putnam	Internet	The Internet can be used to increase neighborhood social capital and the connectivity of local social networks.
Kavanaugh and Patterson, 2001	American Behavioral Scientist	Journal Article	Telephone survey	Putnam	Internet	The results of the longitudinal study indicate frequent and increasing use of the BEV and the Internet for local social capital-building activities. However, there is no trend toward an increase in community involvement or attachment, except in a subset of the population that scores high on measures of preexisting community involvement.
Nie, 2001	American Behavioral Scientist	Journal Article	Secondary analysis (previous survey data used)	Putnam	Internet	Internet users do not become more sociable; rather, they already display a higher degree of social connectivity and participation because they are better educated, richer, and less likely to be among the elderly. Because of the inelasticity of time, Internet use may actually reduce interpersonal interaction and communication.
Shah et al., 2001	Political Communication	Journal Article	Secondary analysis (previous survey data used)	Putnam	Internet	Informational uses of the Internet are positively related to individual differences in the production of social capital whereas social-recreational uses are negatively related to these civic indicators. Analyses within subsamples defined by generational age-breaks further suggest that social capital production is related to Internet use among generation X, while it is tied to television use among Baby Boomers, and newspaper use among members of the Civic Generation.
Wellman et al., 2001	American Behavioral Scientist	Journal Article	Secondary analysis (previous survey data used)	Putnam	Online communication	People's interaction online supplements their face to face and telephone communication without increasing or decreasing it. However, heavy Internet use is associated with increased participation in voluntary organizations and politics. The Internet is becoming normalized as it is incorporated into the routine practices of everyday life.



Citation	Source	Source Type	Methodology and Measure of SC	Main SC Theories Adopted	Type of ICT	Relevant Findings
Hopkins and Tomas, 2002	Academic Study Report	E Resource	Trace uses of the network	Cox Woolcock	Internet	The lesson here for this project may be that we cannot expect the network to 'fill in the social capital gaps' in a simple way. Instead, it is likely to be used initially as an adaptation of existing channels of communication in the areas of the social capital matrix that are already well developed.
Wellman, 2002	Communications of the ACM	Journal Article	Secondary analysis (previous survey data used)	Putnam	Internet	Internet communication has benefited from, and facilitated the social transformation of work and community from groups in little boxes to globalized, ramified, or branching social networks. Rather than being an isolated technical system, the Internet is quickly being incorporated into everyday life while increasing North Americans' stock of social capital.
Foth, 2003	ITiRA 2003 Conference Track: Community Informatics	Conference paper	Theoretical analysis	Putnam	Online community	Framework and rationale for a study about how to realize the potential of online community.
Goodman, 2003	Industry Supported Report	E-Resource	27 in-depth interviews with experts and qualitative research with residential telephone users	UK government	Mobile phone	Mobile phones support strong links by allowing more contact between people. They support weak links by allowing users to circumvent traditional social barriers. They are also significant for social capital because they are accessible to unprecedented numbers of people.
Hampton, 2003	The Information Society	Journal Article	Survey and ethnographic observations from "Netville"		Community network	Weak, not strong, ties grow as a result of ICTs. ICTs facilitate community participation and collective action: (a) by creating large dense networks of relatively weak social ties and (b) through the use of ICTs as an organizing tool.
Hampton and Wellman, 2003	City and Community	Journal Article	Survey and ethnographic observations from "Netville"	Putnam	Internet	The Internet especially supports increased contact with weaker ties. It not only supports interaction among neighbors, but also facilitates discussion and mobilization around local issues.
Ling et al., 2003	Mobile Democracy: Essays on Society and Politics	Book Section	Survey (interview)	Putnam	Mobile phone	In general, ICT contributes to the organization of informal social interaction. To a lesser degree, it is related to one's participation in formal social groups. The data here show literally no interaction between ICTs and close friendships.

Citation	Source	Source Type	Methodology and Measure of SC	Main SC Theories Adopted	Type of ICT	Relevant Findings
Millen and Patterson, 2003	CHI 2003	Conference Paper	Participant observation	Putnam	Online community	Based on the analysis of online interaction where the identity policy of a group is that of a member's online identity is his or her real-world identity with no anonymity; bridged and enriched online and face to face interactions promoted accountability in support of local commerce and fostered a social norm of polite conversation.
Norris, 2003	Information Forum on Social Capital for Economic Revival	Conference paper	Secondary analysis (previous survey data used)	Putman	Online community	Online participation has the capacity to deepen linkages among those sharing similar beliefs as well as serving as a virtual community that spans generational divisions.
Pierce and Lovrich JR., 2003	Comparative Technology Transfer and Society	Journal Article	Secondary, Survey	Borgida et al.,	Internet	Internet technology use at both the aggregate and the individual level is associated with higher levels of trust, even when controlled for the demographics of the city and the personal characteristics of individuals.
Hardin, 2004	Analyse und Kritik	Journal Article	Theoretical analysis	Putnam	Internet	Relationships on the Internet are typically too thin to foster trust and cooperation among those who do not have fairly rich relationships.
Hüsing, 2004	The 14th Economic Forum	Conference Paper	Secondary analysis		Internet	ICT often creates inequalities and is usually not invented primarily to bridge social divides. In an increasingly computerized society and labor market, rather than being gadgets to help the socially disadvantaged bear a difficult situation, ICT and the skills to work with it should primarily be a political concern as an end to overcome economic disadvantages themselves.
Lengnick-Halla, et.al, 2004	Journal of Engineering and Technology Management	Journal Article	Theoretical analysis	Nahapiet and Ghoshal	ERP	ERP is an enabling technology to build and augment social and intellectual capital, rather than an information technology (IT) solution for organizational inefficiencies.
Pigg and Crank, 2004	The Journal of Community Informatics	Journal Article	Theoretical analysis		ICT in general	Much work remains to be done before it can be said with any validity that ICTs can, in fact, create community social capital.
Quan-Haase and Wellman, 2004	IT and Social Capital	Book Section	Survey	Putnam	Internet	The Internet occupies an important place in everyday life, connecting friends and kin both near and far. In the short run, it is augmenting – rather than transforming or diminishing – social capital. Those who use the Internet the most continue to communicate by phone and in person. Although it helps connect far flung communities, it also connects local community.

Citation	Source	Source Type	Methodology and Measure of SC	Main SC Theories Adopted	Type of ICT	Relevant Findings
Resnick, 2004	Transforming Enterprise	Book Section	Theoretical analysis	Coleman	ICT in general	Larger structural transformations in society are likely to arise from new forms of organized interaction among strangers that ICTs can enable. With impersonal sociotechnical capital, connecting occurs without personal connections, and organizing without organizations. Over centuries, the process of modernization has included more and more coordinated activity among strangers, aided by industrialization, urbanization and the growth of government. ICTs are ushering in the next chapter in that process.
Uslaner, 2004	Political Communication	Journal Article	Secondary analysis (previous survey data used)	Putnam	Internet	Internet users are not social isolates. They tend to have slightly wider social circles than nonusers, but their Internet communications are largely with people they know. Consequently, it is hardly surprising that Internet users are no more or less trusting of strangers than nonusers. The social connections that people make on the Internet do not promote trust—indeed, there is some evidence that chat rooms may bring together people who do not trust one another.
Williamson, 2004	The Australian Electronic Governance Conference	Conference Paper	Theory analysis	Putnam	Community network	A five stage model for community ICT engagement and maturity is discussed. This model is non-linear, temporal, and can be used as an audit of the current community technology capability for assessing maturity and establishing clear milestones within a community ICT framework.
Information Economy Division, 2005	Government Document	E-Resource	Theoretical analysis	The Productive Commission	ICT in general	ICT has a role to play in building social capital, yet the role will depend on how individuals, communities, organizations, and governments incorporate ICT into their lives and social structures. This is determined by context, impetus, and sustainability.

Citation	Source	Source Type	Methodology and Measure of SC	Main SC Theories Adopted	Type of ICT	Relevant Findings
Kavanaugh et al., 2005	The Information Society	Journal Article	Survey	Putnam	Community network	This article summarizes evidence from stratified household survey data in Blacksburg, VA showing that people with weak (bridging) ties across groups have higher levels of community involvement in civic interests and of collective efficacy than people without bridging ties among groups. Moreover, heavy Internet users with bridging ties are more socially engaged, more likely to use the Internet for social purposes, and have been attending more local meetings and events since going online than heavy Internet users with no bridging ties.
Liff, 2005	Communities and Technologies, 2005	Conference paper	Online qualitative content analysis		Websites	No strong correlation between these measures of real and virtual social capital was found. Moreover, while a ready made Web site rarely results in the creation of a developed community site, bottom-up sites are also rare.
Shah et al., 2005	Communication Research	Journal Article	Secondary analysis (previous survey data used)	Putnam	Online community	Online media complement traditional media to foster political discussion and civic messaging. These two forms of political expression, in turn, influence civic participation. Other variable orderings are tested to compare the theorized model to alternative causal specifications. The results reveal that the model produces the best fit empirically and theoretically, with the influence of the Internet rivaling the mobilizing power of traditional modes of information and expression.
Beaudoin and Thorson, 2006	Human Communication Research	Journal Article	Survey	Putnam	Television	The relationship between news use and social capital is less positive for African-Americans than for Caucasians and the relationship between watching television for entertainment and social capital is more negative for African-Americans than for Caucasians.
Huysman and Wulf, 2006	Journal of Information Technology	Journal Article	Theoretical analysis	Nahapiet and Ghoshal	ICT in general	The higher the level of social capital, the more communities are stimulated to connect and share knowledge. Distributed community members will be more inclined to connect and use electronic networks when they are motivated to share knowledge with others who are able to share knowledge and have the opportunity to share knowledge.

Citation	Source	Source Type	Methodology and Measure of SC	Main SC Theories Adopted	Type of ICT	Relevant Findings
SC as Independent Variable						
Fountain, 1997	Investing in Innovation: Toward a Consensus Strategy for Federal Technology Policy	Book Section	Theoretical analysis	Putnam	ICT in general	Social capital is a necessary, though not sufficient, condition for effective public-private partnerships for the devolution of some science and technology responsibilities to the states and for a new, more collaborative style of government policy.
Bebbington and Perreault, 1999	Economic Geography	Journal Article	Case study		Internet	A framework links social capital to discussions of sustainability resource access and livelihoods.
Robalino, 2000	RAND Graduate School of Policy Studies	Thesis	Econometric analysis		ICT in general	Social interactions are the source of externalities that, when ignored, may generate policy recommendations that are seriously biased. An agent based macroeconomic model for the developing world that facilitates the process of technology diffusion by formalizing the social interactions is proposed.
Isham, 2000	The Conference on Opportunities in Africa: Micro-evidence on Firms and Households	Conference Paper	Secondary survey data		Internet	The probability of adopting an improved fertilizer is increasing in land endowments, the cumulative proportion of adopters, the presence of tribally based social affiliations, and the village distance from a local market. When adoption patterns are omitted from the implementation of the model, it is shown that the probability of adoption continues to increase in land endowments and ethnic affiliations and is also positively associated with consultative norms, the adoption of improved seeds, the availability of credit and extension services, and the average number of years that households have resided in the village.
Isham, 2000	Faculty of the Graduate School	Thesis	Econometric analysis		Internet	This dissertation develops and tests a model of technology adoption with social capital. It predicts that the probability of adoption is increasing in household-level human capital and land endowments and village-level adoption patterns and social capital.
Borgida et al., 2002	Journal of Social Issues	Journal Article	Two rounds survey in two cities Focus groups	Coleman Putnam	Internet	The intriguing possibility that extant community structures and the levels of social capital may play an important mediating role in understanding the impact of Internet access on social relationships and psychological well being, as well as the impact of Internet access on the forms of individual and collective action in a community.

Citation	Source	Source Type	Methodology and Measure of SC	Main SC Theories Adopted	Type of ICT	Relevant Findings
Han, 2002	Study report	E-Resource	Secondary analysis		Internet	Information technology alone does not determine the successful evolution of democracy. Rather, it is social capital that produces unprecedented political revolution in Korea. The impact of information technology on the prospects for a country's democracy is highly dependent upon its social capital.
Sullivan et al., 2002a	American Behavioral Scientist	Journal Article	Survey	Putnam	Community network	In the presence of a broadly based community electronic network, political, as well as economic resources are linked to the use and knowledge of computer resources.
Sullivan et al., 2002b	Political Behavior	Journal Article	Survey	Putnam	Community network	In a town with the broadly based community electronic network, individuals' political, as well as economic, resources are linked to their knowledge and use of computer resources. Whereas, in the comparison community, economic stratification alone determines computer access.
Riemer and Klein, 2004	Multikonferenz Wirtschaftsinformatik 2004	Book Section	Theoretical analysis	Nahapiet and Ghoshal	ICT in general	Virtual organizations will either be restricted to the coordination of well structured tasks or its structural propositions will have to be adapted to allow rich social capital to emerge.
Simpson, 2005	The Journal of Community Informatics	Journal Article	Theoretical analysis		ICT in general	This paper describes a theoretical framework drawn from the diffusion of innovation community development and social capital theories. The framework emphasizes the interplay between physical infrastructure, soft technologies, social infrastructure, and social capital.
Wang et al., 2006	Information and Software Technology	Journal Article	Survey	Adler and Kwon	Group	The data support the positive relationships between group cohesion and both the willingness to participate, and people's commitment to, learning. Group cohesion is likewise positively related to meeting management goals. Resources within an organization should support the climate of learning and the encouragement of team participation.
Hsieh and Tsai, 2007	Industrial Marketing Management	Journal Article	Survey	Nahapiet and Ghoshal	Intranet	This study takes Taiwan's integrated circuit design firms as a sample to analyze. First, both technological capability and social capital are associated positively with the launch strategy for innovative products. Second, while the market growth rates increase, the positive relationship between technological capability and the launch strategy for innovative products becomes weaker.

APPENDIX B

Individual Social Capital (ISC) – Information and Communications Technology (ICT) Literature

Citation	Source	Source Type	Methodology and Measure of SC	Main SC Theories Adopted	Type of ICT	Relevant Findings
SC as Independent Variable						
Bianchi and Robinson, 1997	Journal of Marriage and the Family	Journal Article	Survey Time-diary, social capital was measured indirectly	Coleman	Television	ICT can indeed improve social capital in local neighborhoods, but its effects are closely related to interrelated factors such as: education, income, number of household members, and age.
Haythornthwaite, 2001	The Hawaii International Conference on System Sciences	Conference Paper	Theoretical analysis	Related to SC, but mainly using social network theory	ICT in general	More strongly tied pairs communicate more frequently, maintain more and different kinds of relations, and use more media to communicate. It is theorized that dependence on a common and widely used medium makes a weak tie network vulnerable to dissolution and reformulation following changes to that medium; by contrast, strong ties are more robust under conditions of change since their connection rests on multiple relations and media.
Papakyriazis and Boudourides, 2001	4th GOR Conference	Conference Paper	Theoretical analysis	Burt	E-mail	Weak ties of interpersonal and group relations are increasingly mediated electronically through the use of e-mail and other types of new information and communication technologies. The way people interact and share information through a computer-mediated communication channel depends on the social context of the used media technology.
Haythornthwaite, 2002	The Information Society	Journal Article	Theoretical analysis	Related to SC (but Social network theory)	ICT in general	It is argued that where ties are strong, communicators can influence each other to adapt and expand their use of media to support the exchanges important to their ties; however, where ties are weak communicators are dependent on common organizationally established means of communication and protocols established by others.
Reich and Kaarst-Brown, 2003	Journal of Strategic Information Systems	Journal Article	Case study	Nahapiet and Ghoshal	Internet	The findings support Nahapiet and Ghoshal's (1998) theoretical model of social capital and intellectual capital. It also suggests two extensions to the model: (1) enablers of the initial levels of social capital and (2) inhibitors of the social and intellectual capital spiral.



Citation	Source	Source Type	Methodology and Measure of SC	Main SC Theories Adopted	Type of ICT	Relevant Findings
Hiller and Franz, 2004	New Media & Society	Journal Article	In-depth interviews		Computer	Three phases in the migration cycle are identified: pre-migrant, post-migrant, and settled migrant, and four categories of computer usage are linked to each phase. Three types of online relationships can be identified among people that result in developing new ties, nourishing old ties, and rediscovering lost ties.
Matzat, 2004	Social Networks	Journal Article	Survey (mail)	Lin	Internet	Researchers build up weak contacts that make their research more visible and that make them more aware of other researchers' work. These weak contacts are useful for the reception of new research papers. As a result, International Data Groups (IDGs) provide access to social capital. However, no evidence is presented about equalizing the effects on the general structure of academic communication. IDGs do not reduce inequalities in access to informal communication channels.
Schultze and Orlikowski, 2004	Information Systems Research	Journal Article	Ethnographic field study		Internet	The use of IT altered the nature and quality of information shared by the participants, undermined the ability of sales reps to provide consulting services to customers, reduced the frequency of their interaction, and prompted sales reps to expand social capital to promote customers' technology adoption.
Selwyn, 2004	New Media & Society	Journal Article	Theoretical analysis	Bourdieu	ICT in general	Four conceptual limitations to conventional dichotomous notions of the digital divide and individuals' 'access' to information and communications technology (ICT) were identified: what is meant by ICT; what is meant by 'access'; the relationship between 'access to ICT' and 'use of ICT'; and a lack of consideration for the consequences of engagement with ICT. It proposes a model of the digital divide based around these conceptual 'stages' while recognizing the mediating role of economic cultural and social forms of capital in shaping individuals' engagements with ICT.



Citation	Source	Source Type	Methodology and Measure of SC	Main SC Theories Adopted	Type of ICT	Relevant Findings
Steinfeld, 2004	Social Capital and Information Technology	Book Section	Theoretical analysis	Ports	E-commerce	Successful collaborative e-commerce in geographical business clusters must recognize and complement the rich communications and preexisting relationships that have served to enhance trust and cooperative behavior, rather than attempt to be a substitute for such communication and relationships.
Drentea and Moren-Cross, 2005	Sociology of Health & Illness	Journal Article	Participant observation and discourse analysis	Lin	Internet	Three main types of communication emerge from the analysis: emotional support, instrumental support – both formal and informal - and community building/protection. All of them contribute to the creation and maintenance of social capital.
Alessandrini, 2006	Webology	Journal article	Survey	Putman	Internet	Internet access does not preclude social capital building activities. It appears likely that people with Internet access are more likely than those without to engage in activities normally expected to create and enhance levels of social capital.
Ellison et al., 2007	Journal of Computer-Mediated Communication	Journal article	Survey	Putman	Social network sites	Research findings show a strong association between the use of Facebook and the three types of social capital (bonding, bridging, and maintained social capital), with the strongest relationship being to bridge social capital. It was also found that Facebook usage might provide greater benefits for users experiencing low self esteem and low life satisfaction.
SC as Independent Variable						
Gargiulo and Benassi, 2000	Organization Science	Journal Article	Survey	Coleman Burt	Community network	Managers with cohesive communication networks are less likely to adapt these networks to the changes in coordination requirements promoted by their new assignments, which in turn damage their role as facilitators of horizontal cooperation within a newly created business unit structure.

Citation	Source	Source Type	Methodology and Measure of SC	Main SC Theories Adopted	Type of ICT	Relevant Findings
Täube and Joye, 2001	ISA Publication on Social Indicators	Book Section	Survey	Coleman	Community network	Smaller communities with denser relations reveal higher amounts of social capital for the individual because of the higher flow of information in a dense network. The results showed that the ability to deal with new technologies is clearly associated with persons living in more central types of communities. The social position is important for the explanation of the individual orientation towards new technologies.
Anderson, 2004	Working Paper	E Resource	Using data provided by the two surveys to analyse correlates of perceived quality of life (QoL) change in six countries.		Mobile Internet	According to the results, in no country did acquiring a mobile phone, Internet access, or broadband Internet have any positive effect on overall quality of life (QoL). Instead, changes in environmental conditions, perceptions of free time communication with friends, and work conditions for those at work played a more significant part in changing perceived QoL. There was little support for the standard macro-economic assumption that moving into employment necessarily increases QoL.
Frank et al., 2004	Sociology of Education	Journal Article	Interviews surveys		Computer systems	The effects of social pressure and access to expertise through help and dialogue are at least as important as the effects of traditional constructs. Change agents should pay attention to local social capital processes that are related to the implementation of educational innovations or reforms.
Hall and Graham, 2004	International Journal of Information Management	Journal Article	Content analysis for survey by questionnaire and in-depth interviews	Cohen and Prusak	Online community	The initial impetus for members to join the group is to discover information for personal benefit. Over time, however, individual desire to reciprocate the help received from the group developed out of online interactions. A stronger social infrastructure among the group's members might have enhanced its knowledge creation capabilities through the provision of social capital.



Citation	Source	Source Type	Methodology and Measure of SC	Main SC Theories Adopted	Type of ICT	Relevant Findings
Newell et al., 2004	British Journal of Management	Journal Article	Case study		IT project (not technology)	In understanding the relationship between social capital and knowledge integration within a project team it is necessary to distinguish between two forms of social capital – external bridging social capital and internal bonding social capital. For effective mobilization of ‘weak’ social capital bridges for collective purposes, there is first a need to create ‘strong’ social capital bonds within the project team so that it becomes a cohesive social unit that will be able to effectively integrate knowledge that is acquired through members’ bridging activity.
Hatzakis et al., 2005	European Journal of Information Systems	Journal Article	Case study	Nahapiet and Ghoshal,	ICT in general	This paper proposes a framework based on social capital theory for conceptualizing the effects of change management interventions in the poor relationship between business and IT colleagues. The research shows that there is a potential advantage to using a social capital approach to evaluate change management interventions that aim to improve the collaboration between business and IT.
Yang, 2005	Proceedings of the Australasian Conference on Information Systems	Conference Paper	Theoretical analysis	Bourdieu	Mobile phones	Theoretical model linking social capital, mobility, and ICT
Chou et al., 2006	International Journal of Information Management	Journal Article	Case study	Nahapiet and Ghoshal	IT outsourcing	Prior relationships affect ongoing IT outsourcing decisions in various dimensions. Social capital may be a double-edged sword that is both a resource in facilitating IT outsourcing and a burden that undermines the rationality of decision makers.
Honig et al., 2006	Small Business Economics	Journal Article	Survey questionnaire)	Bourdieu	IT in organization	Social capital and signaling are found to lead to greater investment as well as better performance.

Citation	Source	Source Type	Methodology and Measure of SC	Main SC Theories Adopted	Type of ICT	Relevant Findings
Lin et al., 2006	Technological Forecasting and Social Change	Journal Article	Survey	Lin	IT in organization	Entrepreneurs' management experience may not be an advantage for high-tech new ventures. The six Stevenson entrepreneurial strategies can have different effects on the performance of new ventures, whereas social capital actually moderates the effects of entrepreneurial strategies and resources on the performance. There is no single route to entrepreneurial success or failure; entrepreneurs are successful when they can adjust their entrepreneurial strategies according to their social capital and capabilities.

APPENDIX C

The Distribution of Papers across Journals and Other Sources

Resource name	Number of Articles from the Source
Journal	
American Behavioral Scientist	3
American Behavioral Scientist	1
Analyse und Kritik	1
Annual Review of Sociology	1
British Journal of Management	1
City and Community	1
Communication Research	1
Communications of the ACM	2
Comparative Technology Transfer and Society	1
Economic Geography	1
European Journal of Information Systems	1
European Sociological Review	1
Human Communication Research	1
Industrial Marketing Management	1
Information and Software Technology	1
Information Systems Research	1
International Journal of Information Management	2
Journal of Computer-Mediated Communication	1
Journal of Engineering and Technology Management	1
Journal of Information Technology	1
Journal of Marriage and the Family	1
Journal of Social Issues	1
Journal of Strategic Information Systems	1
New Media & Society	2
Organization Science	1
Political Behavior	1



Resource name	Number of Articles from the Source
Political Communication	2
Political Psychology	1
Political Science and Politics	2
SIGGROUP Bulletin	1
Small Business Economics	1
Social Networks	1
Social Science Computer Review	1
Sociology of Education	1
Sociology of Health & Illness	1
Technological Forecasting and Social Change	1
The Information Society	3
The Journal of Community Informatics	2
Webology	1
Other resources	
Book chapters	9
Conference proceedings	10
Government publications	1
Reports	2
Other e-resources	4

APPENDIX D

The Australian Information Systems Journal Ranking List [Adopted from Fisher, Shanks and Lamp (2007)]

Level A Journals

Decision Sciences	Journal of the Association for Information Systems
Decision Support Systems	Journal of Management Information Systems
European Journal of Information Systems	Management Science
Information Systems Journal	MIS Quarterly
Information Systems Research	
Information and Management	

Level B Journals

Australasian Journal of Information Systems	Information Technology and People
Behaviour and Information Technology	International Journal of Electronic Commerce
Communications of the Association for Information Systems	Journal of the Association for Information Systems
Systems	Journal of Computer Information Systems
Data and Knowledge Engineering	Journal of Database Management
Database	Journal of IS (ACCT)
Electronic Markets	Journal of Information Technology
Human computer interaction	Journal of Strategic Information Systems
Information and Organisation (formerly, Accounting, Management and IT)	Journal of the Operational Research Society
Information Systems (Elsevier)	Scandinavian Journal of IS

Premier Professional Journals

Academy of Management Executive	Interfaces
Communications of the ACM	MIS Quarterly Executive
California Management Review	Sloan Management Review
Harvard Business Review	

ABOUT THE AUTHORS

Song Yang is a PhD candidate in the Department of Information Systems, the University of Melbourne, Australia. Her current research focuses on the social consequences of mobile technology; specifically, the impacts of mobile phones on individuals' social capital.

Heejin Lee is a professor at the Graduate School of International Studies, Yonsei University, Korea. Before joining GSIS, Yonsei, he was in the Department of Information Systems at the University of Melbourne, Australia and Brunel University, UK. Professor Lee has written extensively on the impact of broadband in South Korea, and time and IT. He is currently working on IT for development and ICT standards policy in China. His work has been published in a variety of international journals including *Telecommunications Policy*, *Government Information Quarterly*, *The Information Society*, *Time & Society*, and *The Journal of Information Technology*. He is an associate editor of *Journal of Research and Practice in Information Technology*.

Dr. Sherah Kurnia is a senior lecturer and researcher at the Department of Information Systems, the University of Melbourne, Australia. She holds a bachelor of computing (information systems) with first-class honors and doctor of philosophy from Monash University, Australia. Her research interests are in the area of electronic commerce, supply chain management and adoption of technologies including interorganizational systems, mobile commerce, and mobile internet. She has published in various journals including *International Journal of Supply Chain Management*, *Journal of Strategic Information Systems* and *Asia Pacific Management Review*, book chapters, and leading IS conferences' proceedings.

Copyright © 2009 by the Association for Information Systems. Permission to make digital or hard copies of all or part of this work for personal or classroom use is granted without fee provided that copies are not made or distributed for profit or commercial advantage and that copies bear this notice and full citation on the first page. Copyright for components of this work owned by others than the Association for Information Systems must be honored. Abstracting with credit is permitted. To copy otherwise, to republish, to post on servers, or to redistribute to lists requires prior specific permission and/or fee. Request permission to publish from: AIS Administrative Office, P.O. Box 2712 Atlanta, GA, 30301-2712, Attn: Reprints; or via e-mail from ais@aisnet.org.



EDITOR-IN-CHIEF
 Ilze Zigurs
 University of Nebraska at Omaha

AIS SENIOR EDITORIAL BOARD

Guy Fitzgerald Vice President Publications Brunel University	Ilze Zigurs Editor, CAIS University of Nebraska at Omaha	Kalle Lyytinen Editor, JAIS Case Western Reserve University
Edward A. Stohr Editor-at-Large Stevens Institute of Technology	Blake Ives Editor, Electronic Publications University of Houston	Paul Gray Founding Editor, CAIS Claremont Graduate University

CAIS ADVISORY BOARD

Gordon Davis University of Minnesota	Ken Kraemer University of California at Irvine	M. Lynne Markus Bentley College	Richard Mason Southern Methodist University
Jay Nunamaker University of Arizona	Henk Sol University of Groningen	Ralph Sprague University of Hawaii	Hugh J. Watson University of Georgia

CAIS SENIOR EDITORS

Steve Alter University of San Francisco	Jane Fedorowicz Bentley College	Jerry Luftman Stevens Institute of Technology
--	------------------------------------	--

CAIS EDITORIAL BOARD

Michel Avital University of Amsterdam	Dinesh Batra Florida International University	Indranil Bose University of Hong Kong	Ashley Bush Florida State University
Fred Davis University of Arkansas, Fayetteville	Evan Duggan University of the West Indies	Ali Farhoomand University of Hong Kong	Sy Goodman Georgia Institute of Technology
Mary Granger George Washington University	Ake Gronlund University of Umea	Douglas Havelka Miami University	K.D. Joshi Washington State University
Chuck Kacmar University of Alabama	Michel Kalika University of Paris Dauphine	Julie Kendall Rutgers University	Claudia Loebbecke University of Cologne
Paul Benjamin Lowry Brigham Young University	Sal March Vanderbilt University	Don McCubbrey University of Denver	Fred Niederman St. Louis University
Shan Ling Pan National University of Singapore	Jackie Rees Purdue University	Jia-Lang Seng National Chengchi University	Paul Tallon Loyola College, Maryland
Thompson Teo National University of Singapore	Craig Tyran Western Washington University	Chelley Vician Michigan Technological University	Rolf Wigand University of Arkansas, Little Rock
Vance Wilson University of Toledo	Peter Wolcott University of Nebraska at Omaha	Yajiong Xue East Carolina University	

DEPARTMENTS

Global Diffusion of the Internet Editors: Peter Wolcott and Sy Goodman	Information Technology and Systems Editors: Sal March and Dinesh Batra
Papers in French Editor: Michel Kalika	Information Systems and Healthcare Editor: Vance Wilson

ADMINISTRATIVE PERSONNEL

James P. Tinsley AIS Executive Director	Vipin Arora CAIS Managing Editor University of Nebraska at Omaha	Copyediting by Carlisle Publishing Services
--	--	---

