THE INTERNET AND SOCIAL CAPITAL

by

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ABSTRACT

There is great disagreement within the literature regarding the effect of internet use on social capital. Some research has shown that individual internet use will enhance social capital by allowing users to gain knowledge, build linkages and coordinate action in a way which is efficient effective and inexpensive. Other research has shown that online participation is not able to foster the same feelings of trust gained through face-to-face interactions, and can even lead individuals to become socially disconnected and isolated. This paper addresses these vastly different claims and tests the influence of individual internet use on two major components of social capital; participatory and network capital. The key findings suggest that using email for social contact, and visiting beneficial web sites has a positive effect on individual levels of social capital.

INDEX WORDS: internet, online, communication, social capital, trust, confidence

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TABLE OF CONTENTS

CHAPTER 1

INTRODUCTION

Defined as the "features of a social organization such as networks, norms, and social trust that facilitate coordination and cooperation for mutual benefit," social capital is the glue that binds communities together and provides the cohesive structure necessary to overcome the collective action problems inherent in democratic societies (Putnam 1995: 66). While there are numerous conceptions of exactly what social capital is, there is little denying the important role that social capital plays in flourishing societies. The World Bank recently noted that social capital is almost as influential a factor as human capital in the development and success of emerging democracies (World Bank 2004). Other research has focused on the role of social capital in well established and strong democracies – arguing that social capital is just as crucial to their success as it is to others. Whether examining emerging or established democracies, it is quite clear that social capital is a beneficial thing for societies to posses.

Communities with high levels of social capital often experience more successful institutions (Brehm 1997). In one respect, social capital is civic participation, whether it be in voluntary activities, group membership, socializing or voting. All of these activities serve to strengthen the trust that individuals have in each other as well as the trust they have in the government and its institutions. Trust breeds confidence in the institutions trusted, making it easier for institutions to succeed in their endeavors.

A person living in a social capital rich community is given the tools to succeed, and experiences a higher quality of life compared to those without social capital (Kavanaugh 2001). Individual feelings of trustfulness are beneficial to democracies, increasing the quantity and quality of political participation, and helping citizens make decisions that are more open-minded and tolerant of others (Paxton 2002). Despite serving dual levels of analysis, is almost impossible to examine the individual and group level effects of social capital in isolation. It is often said that "what is good for the goose is good for the gander", and this is also true of social capital. What is presented as a group benefit will most certainly benefit individuals and vice versa.

Since arguments regarding the social implications of past communications technology – the television and telephone for example - are so prevalent in the literature, it was only a matter a time before eyes turned to the internet as a tool which could positively or negatively influence individual and community levels of social capital. Reaching families at a rate ten times faster than the telephone did, the internet has grown faster than any communication technology in human history and currently reaches almost two-thirds of the US population (Madden 2003). And while research agrees that social capital is a good thing for democratic communities to possess, there is disagreement regarding the effect that the rapid proliferation of the internet and other information and communication technologies will have on social capital.

Those who think that the internet will enhance or increase social capital – cyberutopians – argue that the internet promotes civic engagement by allowing users to gain knowledge, build linkages and coordinate actions in a way which is efficient,

effective and inexpensive. Email lowers the opportunity costs of communication, and serves to enhance existing social networks while making it easier to expand into new networks. By providing citizens with news and information at low opportunity costs, the internet can serve to better educate citizens, and leave them better prepared for democratic participation. Online newsgroups, weblogs and discussion boards can further serve to educate citizens and energize participation while enhancing and expanding social networks and promoting trust.

Others – cyberdystopians – are not as optimistic about the effect that the internet will have on communities and individuals. They argue that online participation is not able to foster the important feelings of trust gained through face-to-face interactions. Individuals who spend large amounts of time online can become socially disconnected and lonely, neglecting traditional social capital building activities in lieu of spending time online. In addition, advanced search techniques and other methods of information collecting can serve to decrease the diversity of viewpoints that individuals are exposed to.

If either side of the debate is correct in their assumptions, the recent growth in internet use should have some effect on the observable level of social capital. Yet recent research has argued that since 1990, the United States has experienced fairly constant levels of social capital within its communities (Paxton 1999, Putnam 2000, Neustadtl 2002).

<u>Puzzle</u>

This presents a puzzle because despite strong arguments on both sides of the debate regarding the positive or negative consequences of internet use, social capital levels have largely remained stable since the internet reached consumer culture in the mid-1990's. If we are to believe either side of the internet debate, we should see at least *some* influence on the level of social capital. If the cyberutopians are correct and internet users are utilizing their new technology to build and grow personal networks, coordinate community efforts, and gain information, then we should see a positive effect on the level of social capital in the US. If the cyberdystopians prove right, and the internet is aiding in the further detriment of social capital, then we should see a drop in social capital subsequent to internet proliferation. If the internet holds so much potential influence on social capital, positive or negative, then why haven't we seen any of its effects?

CHAPTER 2

RESEARCH QUESTION

In light of this puzzling conflict in the literature, this paper will address the following research questions: Does internet use influence individual levels of social capital? Does the internet offer opportunities to enhance social capital that are distinct from traditional activities? How does time spent online affect traditional relationships? Does the type of use matter?

In search of the answers to these questions this paper first reviews social capital theory, building upon a key distinction between the objective and subjective components of social capital. I then discuss how the internet is unique, and the reasons why internet use offers distinctive opportunities to enhance individual levels of social capital. Methodological deficiencies in previous research are discussed before social capital is operationalized by following the lead of Paxton (Paxton 1999). Once the hypotheses and theoretical models are well specified, the findings, implications, and possible limitations to the research are presented and discussed.

CHAPTER 3

LITERATURE REVIEW

Social Capital Theory

A cursory glance at the recent literature in social capital theory can easily lead one to conclude that the state of the art is one of disarray, as social capital has taken so many different meanings that it has essentially become a meaningless term. As the godfather of social capital research, Putnam is often blamed as the genesis for this trend – focusing intently on the advantages of social capital and the implicit dangers of a social capital deficient society, while glossing over exactly what social capital is (Putnam 1995). Following this intellectual hand wringing over the overly broad conceptualization of social capital in the literature, scholars often continue by suggesting that their conception of social capital is the correct and true embodiment of the phenomenon.

Upon further inspection however, it seems that despite arguing that they hit the mark where others miss, most if not all of the seminal authors in the field are saying the same thing, albeit in quite different languages and through vastly different colored lenses. So while Putnam's "bonding and bridging capital", Granovetter's "strong and weak ties", and Coleman's "dense and loose networks" are often thought of as conceptually distinct, further inquiry reveals that the differences between what the authors are describing are largely semantic (Granovetter 1985, Coleman 1988, Putnam 1995).

Truth be told, social capital is a robust concept that is impossible to measure directly. "If physical capital is wholly tangible, [and] human capital is less tangible,

social capital is less tangible still" (Coleman 1988: S100). Because it is not directly observable, scholars often latch upon a certain element of social capital as *the* embodiment of the concept. Like the blind man who sees nothing but a snake after being exposed to the trunk of the elephant, scholars often claim that social capital is defined solely by the characteristics they happen to be looking at. Despite claims of exclusivety, social capital consists of two major elements, an objective element that stresses the networks of relations between individuals, and a subjective element that stresses the positive nature of these relations.

Even authors who claim to focus entirely on one theoretic element of social capital and discard the rest as unimportant find themselves unable to cast aside the dual nature of social capital. For example, while Lin argues that "social capital, as a relational asset, must be distinguished from collective assets and goods such as culture, norms, trust, etc", she is unable to escape the importance of trustful relationships within networks. Without positive and trusting relations between members of a social network – the subjective component of social capital – there can no mobilization of resources.

The important role of social networks in America is often traced back to Tocqueville who credited a great deal of America's early success to the civic nature of early Americans who frequently interacted with each other in associations that were created to serve, economic, political, and social purposes (Tocqueville 1966). By participating in associations, early Americans not only extended their social networks, but more importantly their participation helped breed and support feelings of trust and mutuality among citizens.

Extending the idea of social networks beyond participation in civic organizations, contemporary scholars stress that individuals are embedded in a number of distinct but often overlapping networks. Individuals are members of tight-knit closed networks made up of ones family and direct cohorts (Coleman 1988). Characterized by a fairly homogeneous membership, families and close friends serve as a resource which helps in the creation of human capital and the facilitation of action within the social structure.

Concerned with the theoretical restrictions of previous models that focused solely on strong ties, subsequent research stresses the importance of both strong and weak ties for social cohesion and the leveraging of resources (Granovetter 1973). This is not to deny the importance of strong and intense relations between friends, however it is among the weak ties – the friends of friends – that vital information is often diffused. Within a dense network of strong ties, there are few sources for crucial information like available jobs, with quite a bit of that information flowing across weak networks.

Part and parcel with the idea of a social network is the understanding that an individual is located somewhere in that network. While not as intent as others in making a distinction between strong and weak ties, Lin argues that income, race and gender are determinants for an individual's location within a social network (Lin 2000). Social capital is embedded resources, and the elite's possession of greater quantities of social capital than others, affords them with an unequal proportion of resources. Inequalities derived from location in the social network serve to further economic and social inequality, and prevent the mobilization of resources for the betterment of advantaged segments of the population (Lin 1999).

Separate from the strong/weak dichotomy, research has made a theoretical distinction between formal and informal networks (Putnam 1995, Paxton 1999). Formal membership in voluntary organizations, civic groups, and clubs tie individuals together within a recognized social space. Depending on the level of participation and interaction between members of a formal network, some formal ties become strong while others remain quiet weak. The informal component measures the width of an individual's social network. Individuals with highly developed informal network structures simply know more people in their community and are exposed to more diversity than those with poorly developed informal network capital.

Along with the objective network component of social capital, the subjective quality of the associations – characterized by positive and trusting relations between individuals – is a common theme in social capital theory. Within the social network, social capital relies upon shared trust and norms of reciprocity (Coleman 1988). Within closed networks trustworthiness and reciprocity is easily enforced as individuals who act outside accepted norms are easily punished for their actions. This further perpetuates a trustful community and allows for the formation of generalized trust. The social elite are elite precisely because the relationship between members of the elite is one of trust, empowering them with economic and cultural resources (Bourdieu 1987).

A further distinction can be made between bonding and bridging forms of social capital (Putnam 1995). In the former, social capital increases trust within a fairly homogenous group, while in the latter social capital enhances relationships across social cleavages and reinforces heterogeneous trust and networks. Putting it another way, "bonding social capital constitutes a kind of sociological superglue, whereas bridging

social capital provides a sociological WD-40" (Putnam 2000: 23). These ideas differ from other authors who largely focus on the effect of social capital within close knit groups (Coleman 1998). By introducing the idea of bonding social capital, Putnam examines how trust within close knit groups spills over into society at large. Once established within the group, bonding capital is easily transferred outside the organization in the form of generalized trust through bridging capital. Put differently, trust in people you haven't met comes from the trust you have fostered with people you have met and associated with (Brown 2002).

Trust is also examined through the lens of rational choice and the collective action problem (Ostrom 2000). Those who believe that others will cooperate, i.e. those who trust others, are more likely to cooperate themselves. Continued social interaction is a necessary condition for the shared norms of reciprocity that empower self-organized collective action through conditional cooperation (Granovetter 1985).

By the end of the 20th century, scholars had firmly entrenched themselves on one side of a fierce theoretical war of words over the concept of social capital. On one side of the debate sat Lin, Burt, and Granovetter who defined social capital as resources embedded in social networks. On the other side sat Putnam, Bourdieu and Coleman who conceptualized social capital as a form of solidarity within individuals and communities that led to mutual recognition and acknowledgement. Sensing the ever growing lack of consensus among social capital theorists, Paxton makes a seminal contribution to the literature, recognizing the gain from viewing social capital as a general concept that cannot be captured by a single indicator (Paxton 1999). Via a multiple indicator assessment of social capital, Paxton's research introduces measurements of social capital

Figure 1: Social Capital Matrix

Subjective (Participatory Capital)

	HIGH	LOW
HIGH	Social Capital	Wide Net, No Depth
LOW	High Trust, Small Net	

Objective (Network Capital) is the vertical axis label (HIGH / LOW).

that embody the theoretical thrust of both the objective and subjective components of social capital.

Paxton continues by arguing that while the subjective and objective dimensions of social capital are theoretically distinct, it requires possession of both elements to possess social capital. As shown in Figure 1, wide social networks with little depth to the relationship, and highly trustful networks with a limited number of participants are insufficient in the creation of social capital.

Paxton's contribution is supported by statistical findings that support the idea of social capital as a latent and general concept. Looking at three families of social capital concepts (trust, networks and ease of cooperation), Paldam found that "all definitions and measurements are related" (Paldam 2000). Going back to an argument made above, it is quite likely that even divergent theories of social capital are viewing the same phenomenon through different colored lenses.

With less concern for the theoretical crisis in the literature, other research looks at civic engagement and trust as separate dimensions and hypothesizes that the two are in a tight reciprocal relationship – something Putnam referred to as the "vicious-virtuous cycle of civic engagement and positive predispositions toward others" (Brehm 1997: 1014). Despite high expectations regarding the findings, the research showed only slight evidence to support the reciprocal relationship hypothesis and instead found that the relationship runs largely from participation to trust. It should be noted that while the relationship between participation and trust was found to be stronger than vice-versa, both were found to have a much weaker influence than more significant indicators such as wealth, education, race and general life satisfaction. Hypothesizing in the other direction, other research supports the null hypothesis that there is no significant relationship between trust and participation (Brown 2002).

<div align="center">Internet Use and Social Capital</div>

While some philosophers and social theorists discussed the possibilities brought about by large scale computer networking well before it was actually feasible, modern empirical research on the topic did not emerge until the World Wide Web exploded into popular culture in the mid-90s (Connolly 2000). Some research straddles what seems like an ever widening chasm between cyberutopians and cyberdistopians by arguing that the internet is merely the medium through which messages flow (Uslaner 2004). More often that not however, participants in this debate are firmly planted on one side or the other.

Despite conflicting claims regarding the effects of individual internet use on social capital, empirical findings from both camps have been modest. Yet, while the

<div align="center">12</div>

direct effects of the internet might still be up for debate, there is no doubting that the internet is an unparalleled form of communication technology that offers unmatched opportunity. A "polyvalent technology which is discriminate, indiscriminate, one-way, and two-way," the internet holds the potential for dynamic communication unmatched by any previous technology (Ferrigno-Stack 2001). While newspapers are able to reach many people with the same message, they are unable to communicate with a single person like the telephone can. The internet represents the best of both worlds and can be used to reach many people or a single person - a targeted person or anyone who cares to pay attention. In addition, the internet can be used to simply broadcast or receive information, or to communicate in a reciprocal fashion.

The internet is also unique in that it is an active means of communication as opposed to traditional, passive modes of communication like television and the printing press (Morrisett 2003). Message boards and chat rooms require active participation, and encourage social interaction. While the typical television viewer is only able to access a few hundred channels at most, the typical internet user has almost every US newspaper, magazine, and specialized hobby club website right at his fingertips. What the average man doesn't know but wants to know can almost certainly be discovered through google.

The internet also represents a distinctive leap from traditional forms of communication technology in that it is able to overcome the spatial and temporal boundaries plaguing traditional forms of communication by lowering the transaction costs of obtaining information and participating in political discussion (Ferrigno-Stack 2001; Klein 1999). No longer does it cost $2.75 a week to subscribe to the newspaper. Keeping in touch with relatives no longer requires a trip to the post office and a walk to

the mailbox. Traffic concerns and a lack of downtown parking spots no longer keeps individuals from attending and participating in a discussion on local policy.

With a few exceptions, the majority of empirical evidence weakly supports the idea that internet use is good for social capital. Despite positive findings, previous research is rife with methodological limitations that prevent us from being fully convinced of the positive social impacts of internet use. For one, research often focuses on a single element of social capital and fails to look at both the objective and subjective components of social capital at the same time (Bimber 2000, Howard 2002, Neustadtl 2002). Other research uses over simplified operationalization of the internet variables, with internet use being measured dichotomously for users and non-users (Franzen 2003, Tolbert 2003). Other times, internet use is measured using an interval scale such as hours spent online per week, but no measures are taken into account that allow the researcher to differentiate from potentially beneficial internet use and potentially negative internet use (Kraut 1998, Shah 2001).

Despite methodological shortcomings, research does suggest that internet use supplements the objective network component of social capital in a number of ways. It increases the size and depth of social network and increases face-to-face and telephone contact between individuals (Wellman 1990, Danitz 1999, Kavanaugh 2001, Wellman 2001, Howard 2002, Katz 2002, Neustadtl 2002, Quan-Haase 2002). Internet use is positively related to participation in volunteer and political organizations and other forms of community involvement (Kavanaugh 2001, Wellman 2001). The internet also levels the social playing field and gives traditionally disadvantaged users access to embedded resources previously known only to elites (Lin 1999, DiMaggio 2001).

14

Using a case study method that looks at how the internet has aided networks of activists to coordinate in ways that would not have been possible before the internet era, research has found that many groups can cooperate and resolve problems solely through online contact (Danitz 1999). In fact, volunteer associations and organizations are made more efficient through the effective use of the internet as a centralized communications network (Lupia 2003). As a result it is easier for members to participate and keep informed, and organization leaders have an excellent platform from which to guide cooperative efforts from. General internet use strengthens network capital in the same way it enhances these social networks, because communication and information gathering – whether it be from an aunt, ex-roommate, or your local soccer club – is made drastically easier via the internet's revolutionary form of communication.

"When computers link people as well as machines, they become social networks" (Kavanaugh 2001: 496), and the internet increases and strengthens the already existent social ties between citizens (Gibson 2001). Internet use strengthens already existent social networks – however new or old they are – by allowing users to easily extend and maintain contact with friends and family over email and message boards (Howard 2002; Kavanaugh 2001). Increased contact via email supplements traditional forms of contact and helps individuals keep in touch, leading to increased face-to-face and telephone contact (Wellman 2001, Katz 2002, Quan-Haase 2002).

Research that suggests the contrary, finding no relation between internet use and network size/density, suffers from poor model specification that fails to account for the vastly different ways the internet can be used, and the intensity of internet use (Franzen 2003). Other research finds that greater internet use is associated with a decline in the

size of an individual's social circle and an increase in feelings of social isolation and depression (Kraut 1998). By drawing its sample from households that have only been online for one to two years, this research fails to account for varying degrees of computer skill. Once accounted for, subsequent research finds that the expected relationship between internet use and social isolation is mediated by the amount of experience held by the user (LaRose 2001).

"Information is a gateway into political engagement", enabling citizens to competently participate in political discussions and make well informed political decisions (Bimber 2003: 197). Political participation is influenced by the transaction costs associated with acquiring the information necessary to participate, and the easy acquisition of information online directly effects individual participation in political parties (Downs 1957, Bimber 2003). Highly accurate search engines and other information gathering tools also enhance the processing of information by allowing users to pinpoint the exact information they need – reducing the time needed to collect necessary information (Shah 2001).

In addition to lowering the cost of acquiring information, the internet lowers the other costs of participation by reducing the spatial and temporal constraints to democratic participation in forums (Klein 1999).   Although no empirical connection has been found between internet use and voting behavior, online voting registration lowers the transaction cost of registering and could lead to higher levels of participation (Bimber 2001).

Of course an information rich society runs the risk of information overload. For example, some predicted that the internet would revolutionize the way in which

constituents communicate with their elected officials. However, studies have shown that the rapid increase in the number of emails received by congress has led congressional staff to largely ignore constituent email (Katz 2002). This is a vivid example of how the internet has become almost too efficient and encompassing in its communications architecture resulting in congressional staff being simply overloaded with information to the point that they are unable to extract anything meaningful.

Along similar lines, more information does not always mean better information. For example, the American Medical Association is finding their membership roles decreasing as doctors are able to get their information from other sources (Lupia 2003). As a result of decreased membership, the AMA is not able to fund as much research as they have in the past and the information they provide has subsequently suffered. In turn, good research traditionally provided by the AMA is now being substituted for by dubious information from less credible sources. This is good example of an instance in which the internet had a negative impact on the level of information available, and weakened fundamental providers of information.

Following Lin's conception of social capital as embedded resources, other research finds that the internet is successful in leveling the playing field between the haves and the have-nots, with the internet offering beneficial resources previously held largely by elites (DiMaggio 2001). Here, internet use is not increasing the size of ones social network, but instead enhancing the resources available to all positions in the social network. Opportunities for gaining access to good jobs, staying healthy, and participating in human life are all improved through access to the internet (Ferrigno-Stack 2001). The egalitarian norms of the internet, with its lack of dominant actors, present great

possibility for bottom-up globalization and the mobilization of resources by traditionally disadvantaged groups (Lin 1999). Of course, unequal access to the internet and a digital divide between the have's and the have-not's will only perpetuate traditional inequalities – so equal access to online resources is a necessity (Bimber 2002).

Turning to the subjective component of social capital, internet use offers a number of possibilities for enhancing trust and norms of reciprocity. Online communities have shown the same potential for social cohesiveness and norm creation as traditional political groups (Hill 2001). The internet also increases the likelihood of interaction between similar types of individuals, leading to more trustful relationships among individuals. From a game theoretic perspective, online communication modeled as cheap talk increases the ability to coordinate by fostering trust between the various players (Rothstein 2001, Johnson 1993). The internet provides a number of opportunities for norm enforcement and punishment of those that defect from accepted norms of reciprocity (Wilson 1997).

The internet defines and establishes place through common interest, not geographic proximity, and has an inherent advantage in bringing similar people together (Giovannetti 2003). As a result of the commonalities of its users, the internet increases the possibility of achieving cooperative outcomes (Agre 2003). Other research suggests that computer mediated communications through MUDs can lead to meaningful relationships established online (Utz 2000).

The internet allows for easily enforced monitoring and sanctioning of defectors in the game, further strengthening coordination efforts and norms (Wilson 1997). For instance, while an e-bay seller could sell a product and fail to deliver it, they would most

likely receive a negative review from the buyer. This negative review would be seen by other potential bidders and would discourage others from doing business with the seller. In effect the possibility of being sanctioned prevents a seller from balking on a sale or selling shoddy merchandise. While this is merely an example, it outlines the distinct advantage that the internet offers in the monitoring and sanctioning of users and the ways in which sanctions and monitors help ensure trustworthiness (Ostrom 2000).

Detractors argue that trust is not built through life experiences, but is something passed on by parents during a child's developmental years (Uslaner 2000). Others focus on a cyberbalkanization argument, arguing that the internet's highly specialized forms of information gathering can result in the diminished exposure to outside ideas (Putnam 2000, Levin 2002). Because users actively choose the information they digest, internet users are not exposed to the same breadth of topics that traditional seekers of news are. Levin argues that a reduction in exposure to outside ideas and viewpoints can negatively affect individual feelings of generalized trust and the ability to reach cooperation with others.

It would be foolish to conclude a discussion on the influence of internet use on social capital without remaining cognizant of a few caveats related to our inquiry. To being with, social capital is not something created or depleted on a whim – it takes years, perhaps centuries, to change social capital (Paldam 2000). In this respect, even if the internet proves to be a positive force in the production of social capital, its influence will probably not cause drastic change over night.

In addition, looking at just internet use alone – hours spent online – only tells researchers some of the story. In order for social research on internet effects to be of

merit, it must include robust measurements that capture the varying aspects of internet usage. Research suggests that both the type of use, and the type of user matter, and that the effect of internet use on social capital depends primarily upon *what* the internet is being used for and *how* it is being used (Norris 1998, Bimber 2001, LaRose 2001). Someone who spends their online time surfing for pornography can hardly expect to gain as much from the internet as a person who spends his online hours discussing and debating government policy and reading local, national, and international news. In the same way, someone who is ill trained in using a computer will not come away with nearly as much as a person who is skilled and can spend their time actually collecting information and participating instead of figuring out how to make their internet connection work.

Another limitation to keep in mind is that just like the telephone, internet use benefits from some positive network externalities, as the utility of the internet increases as the number of users increases. In other words, the benefits of internet use grow exponentially as internet use goes up. The implication here is that if a large portion of the population does not use the internet and take advantage of its offerings, its social effects are greatly diminished. In line with empirical findings, this means that we are more likely to see internet effects as internet use becomes more entrenched in everyday life. Perhaps this is why research found no relation between internet use and community involvement in 1996, but positive relations in 1999 (Kavanaugh 2001).

CHAPTER 4

THEORY

Social capital is a broad concept that must be clearly defined before it can be

theoretically considered. As it is referred to in this paper, social capital involves two

components, an "objective network structure linking individuals…to each other in social

space," as well as the more subjective reciprocal, trusting, and positively emotional, "ties

between individuals" (Paxton 1993: 93). Created for an examination of social capital

levels over a 20 year period, this definition succinctly captures previous theoretical

considerations regarding social capital and is well accepted in the literature.

The objective component of social capital is what is often referred to as network

capital and captures the size and shape of an individual's social network. Network

capital is made up of both formal and informal associations. Formal membership in

voluntary organizations, civic groups, and clubs put individuals in very tight knit social

networks with other members. The more an individual participates in these voluntary

associations, the greater his ties become with individuals within his social space.

Informal association with others is a component of social capital that measures the

width of an individual's social network. Individuals with highly developed informal

network structures simply know more people in their community than those with poorly

developed informal network capital. Along with this wide net of social contacts comes

an exposure to diversity that is not seen in the formal social networks.

As the definition states, objective social networks are only one half of our conception of social capital. And while the former component ensures that individuals are tied together in a social network, it is the later part of the definition that outlines the nature of the relationship. More particularly, social capital exists when the nature of social ties are based upon relationships of reciprocal trust and obligation. Simply knowing a good number of your neighbors or participating in a local association is not sufficient for social capital, it is required that these networks be built upon relationships of trust as well. This trust is built through repeated interactions, which encourages individuals to cooperate. The cooperative efforts are manifest through participation ultimately foster feelings of trust between individuals. In addition, high levels of trust between close-knit groups of individuals makes it more likely that individuals outside one's formal network will be treated with trust and respect as well.

When individuals have both strong objective networks as well as trustful relationships within those networks, they are better suited to take advantage of their opportunities in life. Aside from providing information such as job opening or educational opportunities and assist in the development of human capital, individuals in trustful networks feel safe within their communities and are more satisfied with their lives because they know and trust those around them. They are also more likely to participate democratically as their relationships with others serve to educate them about public matters and expose them to the concerns of those outside their formal network.

Social capital is not something that is created overnight, and is something built upon over time and through repeated interactions. It is aided through the collection of common interests inherent within voluntary organizations. People are more likely to trust

those that are like themselves, and associations serve to bring together people with similar backgrounds and ideas. It is also bolstered by strongly defined and well supported social norms that discourage individuals from acting in ways that can jeopardize trust.

As an influential medium of communication, the internet helps build social capital by enhancing and expanding network capital, and decreasing participation costs. The ever-widening use of email has transformed the ability of people to stay in touch and exchange information, whether that person is down the hallway or two continents away. The ease of emailing someone creates opportunities to forge small paths of communication that simply don't exist with the envelope and stamp. Quite simply, email creates, maintains, and enhances social networks, widening the number of people that one communicates with, and deepening the communication of existing relationships.

Although it is most utilized among the younger generation, chatting or Instant Messaging holds tremendous potential in the fostering of network capital. One look at the average teenager's "buddy list" can show the value that chatting holds in extending social networks. Chatting takes away the formality associated with email use, and creates social interactions that are fluid and closer in form to conventional conversation. Chat rooms allow for users to escape spatial limitations in their interactions with other and talk freely with someone halfway around the world. Just like the effect of email, chatting not only furthers the bond between existing relationships, but eases the ability of individuals to forge new relationships.

The internet has also improved the ability of communities to build and acquire participatory capital by encouraging group participation. Voting and other less formal

forms of political participation are enhanced by the ease at which individuals can acquire

political information and participate in online political discussions and debates. The

internet has bettered the ability of groups to coordinate their activities and make decisions

at the group level. Group and association members actively participate in online

discussions and gather information about activities in ways that make the monthly

newsletter obsolete. Organizations find the dissemination of information to their

members is not only easier to do with the internet, it is economical as well. While

postage fees limit the amount of information that organizations can mail to their members,

email is unrestricted by number or weight – freeing groups from earlier restrictions.

Traditional organizations flourished largely when they were localized, but the internet

enhances the ability for groups to prosper across larger spatial domains.

People who visit information rich websites - such as online news sites, political

websites, and government sites – are better informed about the issues affecting their

communities and their country, and are more likely to be active democratic participants.

With over 3,500 newspapers available online, the great majority of which are accessible

for free, the U.S. has become an information rich society. This information capital has a

direct effect on participatory capital, as those who are better informed are more likely to

participate in online debates and discussions as well as traditional forms of political

participation such as voting. By decreasing the transaction costs associated with

acquiring political information, the internet has made it more likely that well informed

citizens are able to actively participate.

Internet use in public administration, coupled with government efforts to

proliferate public information through the Freedom of Information Act and other efforts,

has created higher levels of government transparency than were available before the rapid growth of the internet. Transparency bolsters government legitimacy which in turn breeds confidence and institutional trust amongst citizens. In this regard we should expect to see citizen confidence in government institutions increase with internet use, and over time.

In light of the theory above, the following hypotheses are to be tested (with the first four measuring the two dimensions of network capital while the final two measure dimensions of participatory capital):

H1: Greater email use among individuals leads to higher rates of participation in formal non-voluntary organizations.

H2: Greater quality web use among individuals leads higher rates of participation in formal non-voluntary organizations.

H3: Greater use of email as a form of communication by an individual leads to larger social networks.

H4: Greater web use among individuals leads to larger social networks.

H5: Greater quality web use among individuals leads to higher measures of trust.

H6: Higher levels of internet use among individuals leads to higher measures of trust.

All six of the above hypotheses are expected to have positive linear relationships between the dependent and independent variables. Strictly speaking, significant relationships are those that are statistically significant at the .05 level. With little

evidence leading us to expect that internet use is a major predictor of social capital, any

statistically significant and positive effect will be taken as hypothesis confirming.

CHAPTER 5

METHOD

The following research offers a contribution to the existing literature through its methodological strengths over previous work. For one, internet use is operationalized in ways take into account the idea that not all forms of internet activity are created equal, and some types of internet use are different than other types of use. These models also provide a fuller conceptualization of social capital, and measure the influence of the internet on both objective and subjective components of social capital. With the inclusion of data from 2004 and 2002, this research also looks at internet effects at time periods in which the positive network externalities of large-spread internet use are more likely to be felt. This research also builds upon the suggestions of previous researchers who encouraged statistical models that are able to account for change over time (Neustadtl 2002).

Because we are concerned with the micro-level effects of internet use on social capital, the individual will serve as the unit of analysis. In order to test the hypotheses presented above, a negative binomial regression model (NBRM) and two random effects (RE) regression models will be specified, with each utilizing distinct dimensions of social capital. The NBRM model estimates formal network capital, and is a cross sectional analyses that examines individuals in the United States in 2004. Regression is an appropriate technique because it wields more explanatory power than correlation

matrixes and cross-tab techniques that are unable to control for the influence of other variables in the relationship between the independent and dependent variable.

As Table 1 shows, the dependent variable for formal network capital has a low mean of 1.6, and over a third of its cases are coded zero. Because the dependent variable assumes the form of a poisson distribution, OLS is an inappropriate model specification for the dependent variable and would lead to inefficient, inconsistent and biased estimators. Taking into account the form of the dependent variable, and because there is significant evidence of overdispersion (LR test of $\alpha=O \mid \chi^2=264 \mid Prob>= \chi^2=0.00$), the NBRM is the appropriate model to fit the data.

The RE models estimate the effect of internet use on informal network capital and participatory capital, and include data from 2000, 2002 and 2004. This is an technique preferred over OLS because it takes into account the time-serial nature of the data and allows for us to look at change over time. During the research, questions were asked about the possible advantages of a 2SLS model that can capture the interactive effects between network and participatory capital. While such models do allow us to take into account the interaction between network and participatory capital, they were not utilized for a number of reasons. As noted earlier, despite claims of a reciprocal relationship between the two, it has not been empirically shown that the two have any influence over each other. A random effects model is also much more parsimonious than a 2SLS model, and doesn't require the identification of instrumental variables that affect one dependent variable but not the other.

Perhaps most importantly, despite having to make more restrictive assumptions, Tables 1 and 2 in Appendix A shows that there is no difference in the findings 2SLS

models compared to the RE models. Email use an in-person contact, the two statistically significant indicators of informal network capital are significant in both the RE and 2SLS model, with the same direction of influence. Beneficial web use, age, race, children, income and marital status are significant in both models for participatory capital. In line with previous research in the literature, the 2SLS models also fail to confirm a statistically significant effect between network capital and participatory capital – further suggesting that there is no need to control for a reciprocal relationship between our dependent variables.

Throughout all models, cumulative General Social Survey (GSS) data will be used, with survey data collected in 2000, 2002, and 2004. The General Social Survey has been conducted since 1972 with the aid of NSF funding and under the direction of a board of distinguished social scientists who monitor and select new questions. Administered annually to 1500 people until 1994 (3000 people bi-annually after that), and consisting of hundreds of questions, the GSS is free for researchers to download and has been applied to over 8,000 research topics. While questions relating to individual levels of social capital have been asked since the survey's inception, internet related questions were recently added in 2000 to capture the level of internet use, the types of websites that were being visited, and a number of other internet related variables.

The GSS dataset brings a number of distinct advantages over other available data. To begin with, their measures for such things as individual trust are well established within the literature and have been shown to be stable measurements of the phenomenon they seek to capture. Because it is such a widely encompassing survey, it offers the opportunity to control for a myriad of socioeconomic variables in ways that smaller

datasets do not offer. By drawing its samples from within the United States, the GSS

allows for a most-similar-systems design that lends explanatory value in the difference of

outcomes.

One of the disadvantages to the analysis of any secondary source data such as the

GSS, is that it does not give the researcher full control over the possible ways in which

constructs can be operationalized. Effort is made to point out instances in which the

limitations inherent within the GSS data prevent the models from being optimally

designed.

<u>Formal Network Capital Model</u>

Because survey questions regarding organizational membership were only asked

in 2004, the data does not lend itself to a time serial regression for this measure of social

capital. Limitations aside, this model shows the relationship between internet and formal

memberships in associations and provides an adequate test of both H1 and H2. The

dependent variable, formal network capital, is measured on an interval scale as the

number of memberships the respondent holds to voluntary organizations. Fraternal

groups, political groups, hobby and sports groups, labor unions, and professional groups

all count as valid organizations and are included in this measure. This measure for

network capital was chosen because it is a direct measurement of organizational

membership that fully and accurately captures the construct of formal network capital.

There are main independent variables that measure internet use in this model,

each measuring distinct aspects of internet use. While early research looked at total

minutes spent online as a good measure of internet use, this turned out to be a very poor

measure of internet use because it failed to capture the worth of each individuals online

experience (Norris 1998). Because internet use alone does little to tell us how different

uses of the internet effect our dependent variable, our models require distinct measures of

internet use that allow us to test hypothesized relationships.

Table 1: Descriptive Statistics of Dependent, Independent, and Control Variables

Variable	Mean	SD	Min	Max
Dependent Variables				
Group Membership	1.61	1.88	0.00	13.0
Social Network Size	27.89	43.28	0.00	500.0
Individual Trust Index	0.00	1.00	-1.34	1.4
Independent Variables				
Beneficial Web Use	0.69	1.35	0.00	5.00
Hours Spent on Email	1.92	5.39	0.00	70.0
Contact By Email	2.62	1.98	1.00	8.00
Hours Spent on Web	3.34	7.53	0.00	130.0
Control Variables				
In-Person Contact	4.29	1.90	1.00	8.00
Age	46.10	17.18	18.0	89.0
Female	0.55	0.50	0.00	1.00
White	0.79	0.41	0.00	1.00
Married	0.48	0.50	0.00	1.00
Children	0.72	0.45	0.00	1.00
Years of Education	13.44	2.92	0.00	20.0
Income Index	15.93	5.45	1.00	23.0
2002 Dummy	0.33	0.47	0.00	1.00
2004 Dummy	0.36	0.47	0.00	1.00

In order to test the relationship between email use and formal network capital that

is hypothesized in H1, an independent variable for email use is included in the model.

This variable is simply measured by the number of hours the respondent spends using

email per week. It is expected that this variable will have a positive influence on an

individuals score for formal network capital.

Another independent variable for internet use that is included in the model

measures quality of web use by the individual. This measurement is a composite index

created by increasing the quality web use score by 1 for each of the following types of

websites that the respondent visited in the last 30 days: online news sites, government webpages, political websites, and educational and school based sites. If the respondent visited all five types of websites in the last month, his quality web use score would be 5. If he visited four of the types of sites, his score would be 4 – and so on. This measure of internet use allows us to differentiate between web use that we expect to have an effect on network capital, and web use that is not expected to have an effect. Because of this, the quality web use score is a much stronger measure for the type of web use we are interested in when compared to a time-use measure of the number of hours spend on the web. In line with the hypothesized relationship outlined in H2, it is expected that the quality web use score will have a significant and positive influence on the dependent variable measuring formal network capital.

A number of standard socio-economic control variables are included in the model in order to eliminate the possibility of spurious relationships between the main independent variable and the dependent variable. Age is measured on an interval scale according to age in years. It is expected that social capital will increase with age. A dummy variable for sex is included, with a score of 1 for females, and a score of 0 for males. While sex is being included in the model, it is expected to have little direct influence on social capital due to the relative sexual equality of the United States. Education is measured on an interval scale, operationalized as the number of years of school the respondent had. It is expected that education level will have a direct positive effect on social capital.

For many of the same reasons, income is also expected to have a direct positive effect on social capital. Yearly income is included as an ordinal index that increases in

32

score proportionately to the household income of the respondent. The ordinal scale

utilized was developed for the GSS in 1998, and naturally creates normal income

distributions that are not found in the interval level measurement of income in dollars.

While standardizing a measurement of income dollars would achieve the same effect,

such a measure is not included in the dataset.

A variable capturing race is included in the model, and is scored as a 1 if the

respondent is white, and 0 if the respondent is non-white. While race is being included in

the model it is expected to have little influence due to diversity within races and relative

racial equality in the US. The marital status of the respondent is also included in the

model, with a score of 1 if married and 0 if otherwise. In addition to martial status,

whether the respondent is a parent is captured in a variable which is coded 1 if the

respondent has children and 0 if the respondent has no children. It is expected that both

married individuals and parents are more likely to experience high levels of social capital

because families tend to be more outwardly active in their communities than single

people do.

<center>Informal Network Capital Model</center>

Survey questions capturing the measure of informal network capital were

collected in 2000, 2002, and 2004. Because of this, a time-series model is utilized to test

the effect of internet use on informal network capital. A random effects model is

specified by pooling the data for the three data points and including dummy variables for

year in the model. Specification of a random effects model was supported by a Hausman

test which showed that the random effects model had better fit and was more efficient

than the fixed effects model.

<center>33</center>

The dependent variable, informal network capital, is measured on an interval scale that captures the number of friends and family members the respondent keeps in contact with at least once a year. By adequately measuring the size of an individual's informal social network the dependent variable is a properly operationalized measure for the concept of informal network capital.

The main independent variables are captured though two distinct measures of internet use. The first variable measures how much the individual uses email to the number of people the respondent stays in contact with via email. This variable utilizes an ordinal index scale designed to provide a more normally distributed variable than we would have if we simply measured email contact in the same interval manner as the dependent variable measuring informal network capital. By including this variable in the model, we are able to test the positive linear relationship between email use and the size of social networks posited in H3.

The second measure for internet use is a variable capturing how much time the respondent spends using the web. Web use is measured via an interval level scale that directly measures the number of hours the respondent spends using the web on a weekly basis. Inclusion of this main independent variable allows for the model to test the hypothesized positive relationship between individual web use and informal social network size.

A number of control variables are included in the model because of their expected influence on the size of an individual's informal social network. The first is a variable measuring the number of people the respondent interacts with on a face-to-face basis within a given year. This variable utilizes the same ordinal index scale used for the main

independent variable capturing email contact. It is expected that the relationship between the number face-to-face interactions and the size of informal social networks will be positive.

All of the socioeconomic control variables that were included in the formal network capital model are also included in the model testing the effects on informal network capital It should be noted that the expected direction of the relationships between these control variables and the dependent variable are the same as they were in the first model.

<center>Participatory Capital Model</center>

A third model is included to test the relationship between internet use and participatory capital. Following in the footsteps of the model explaining informal network capital, the model for participatory capital is a time-series random effects model that examines change over time. As with the previous model, a Hausman test suggests that the random effects model was a better fit for the data and a produced more efficient estimators when compared to a fixed effects model utilizing the same dependent and independent variables.

In order to accurately capture the construct of participatory capital, the dependent variable is operationalized by creating a composite index measuring three distinct aspects of participatory capital. In creating the composite index, three distinct variables are individually standardized before they are added together and standardized again into the final composite index. Despite being somewhat crude, this method allows for the examination of participatory capital as a general concept through the aggregation of its individual indicators. This approach builds upon the relative strengths of the three

individual measures while keeping in mind that participatory capital is a multidimensional concept that requires measurement from a variety of vantage points. In addition to the theoretical reasons justifying the creation of a composite index for participatory capital, research has shown that such an approach leads to reliable measures of participatory capital (Paxton 1999). The only draw-back to this approach is that it hinders the explanatory value of the model because it does not allow for direct interpretation of the model to explain how the independent variables influence unit change in the dependent variable.

The first indicator is a measure of individual trust, capturing if the respondent feels that people are generally helpful or generally looking out for themselves. The variable is scored 2 if the respondent answered that people were generally helpful, 1 if they feel like it depends, and scored 0 if the respondent felt that people were generally looking out for themselves.

The second indicator to be included in the index is fairness. This indicator is measured by how much the respondent feels that others are fair. Responses are coded as a 2 if the responder felt that generally people are fair, coded a 1 if they felt it depended on the situation, and coded a 0 if the individual felt that people are not fair. The third and final measure of individual trust depends on the respondents answer to a survey question that literally asks, in general, how much the respondent feels that others can be trusted. This variable is also an ordinal measure, with a score of 2 if the respondent feels that people can be generally trusted, 1 if it depends, and a score of 0 if they felt that you can't be too careful.

There are three main independent variables used in this model to capture internet use. The first is a measure of weekly number of hours spent surfing the web. The specifics regarding the measurement of this variable were discussed above, and the relationship between web use and participatory capital is expected to be positive. The second variable capturing internet use is a measure of the number of weekly hours the respondent spends using email. This variable is also measured in the same way that it was in previous models, and is expected to positively affect participatory capital. The third and final independent variable measuring internet use is the web use quality measure that was also included in the model predicting change in formal network capital. As with this first model, quality web use is expected to have a positive linear relationship with the dependent variable.

In addition to these measures of the main independent variables, the standard set of socio-economic control variables are included in this model as well. It is expected that these control variables will influence the dependent variable in the same direction outlined in the previous models.

CHAPTER 6

FINDINGS

Formal Network Capital Model

Beginning with interpretation of the model for formal network capital, all of the

statistically significant variables are moving in the expected direction. As Table 2 shows,

the two variables for internet use have a positive effect on network capital. The

statistically significant control variables also move in the expected direction, with age,

marital status, income, and education having an influence on the dependent variable that

is statistically significant at the .05 level. Turning to the test of the model's goodness of

fit, the Pseudo R^2 of .0421 indicates that this model explains only .0421 percent of the

variance in the formal network capital index. Despite having a relatively low R^2, a model

can still hold explanatory merit if its independent variables hold statistical or substantive

significance, which this model does.

A survey of the literature was done to ensure that all of the relevant variables

were included in the model and to see if other research had encountered such low R^2

values in examination of these relationships. After finding empirical support for

inclusion, control variables for race and children were included in all of the subsequent

models. While the Pseudo R^2 is somewhat low, it is important to remember that the

Pseudo R^2 is somewhat nonsensical in regard to NBRM. In addition, published

researchers have typically encountered low R^2 when examining internet use as an

organizational membership predictor. Katz and Rice built a number of models to explain

organizational membership with R² ranging from .04 to .07 (Katz 2002). It is difficult to

compare the outcomes of other research on this topic because the study either utilized

simple correlation techniques, or they did not directly address organizational membership.

Table 2: Coefficients and t-scores for Formal Network Capital Model.

Variable	β	z	P>|z|	e^β	$e^{\beta S x}$	SDofX
Hours Spent on Email	0.004	0.84	0.40	1.004	1.027	6.818
Beneficial Web Use	0.076	3.87	0.00	1.079	1.137	1.695
Age	0.005	2.37	0.02	1.005	1.085	16.30
Female	0.018	0.28	0.78	1.018	1.009	0.497
White	−.035	−.43	0.66	0.966	0.986	0.407
Married	0.202	2.88	0.00	1.224	1.106	0.499
Children	−.005	−.06	0.96	0.996	0.998	0.438
Years of Education	0.114	9.72	0.00	1.120	1.387	2.877
Income Index	0.043	2.85	0.00	1.044	1.111	2.456

Note: Pseudo R² = 0.0421, N=1292.

The statistical significance is fairly strong in this model with five out of nine

variable significant at the .05 level. The main independent variable measuring whether

the respondent visits websites that are thought to be beneficial to building social capital is

significant with z-score of 3.87. It is clear that beneficial web use does have a positive

influence on an individual's level of formal social capital. The e^β of 1.079 for beneficial

web use suggests that a one unit increase in the beneficial web use index increases the

expected number of memberships by a factor of 1.079, or 7.9%. Look at the standardized

factor change coefficients, it can be said that beneficial web use is the second most

influential independent variable, with a fully standardized coefficient of 1.14. This

means that a standard deviation, or 1.79 unit increase in the beneficial webuse score

increases the number formal memberships by a factor of 1.14, holding all other variables

constant. Because the t-score for email hours shows that the variable is not statistically

significant, we are unable to interpret its coefficient because we are unable to ensure that

the impact of email use on formal network capital is not really zero.

As expected, age has a positive effect on the number of organizations that a person is a member of, with each additional year in age causing a .005 percent increase in the number of memberships, holding all other variables constant. Education also moves in the expected direction, with each additional year of education increasing the number of organizations one is a member of by a factor of 1.12. Being married increases the number of formal memberships by 22%, holding all other variables constant. Finally, a standard deviation increase in the income index increases formal membership numbers by a factor of 1.11.

<div align="center">Informal Network Capital Model</div>

Turning our attention toward Table 3 and the second model with informal network capital as the dependent variable, it is clear to see that this model holds much more explanatory merit than the first model. With an R^2 of .3807, the model is able to explain 38% of the variance in the dependent variable capturing the size of one's social network. All of the independent variables move in the expected direction, another indication of model fit. Because of uncertainty regarding the direction of influence, all independent variables are subject to a two-tailed test for statistical significance.

Looking at the scatter plot of the residuals found in Graph 1 of Appendix B suggests that there is some uneven variance in this model which might need to be addressed. A VIF test for this model shown in Table 1 of Appendix B illustrates that there are no serious collinearity problems. Because the VIF score for each variable falls below the standard threshold of 3 it is assumed that the model does not suffer from any fatal collinearity flaws. Even in the instance of high multicollinearity the parameters are

not biased and the only risk is an artificial inflation of standard errors which could cause a loss of statistical significance – a problem we don't have with this model.

While we are unable to say that the effect of web use by hour is not really zero, the other independent variables, contact by email moves in a positive direction as indicated by their coefficients. Contact by email is a significant predictor of the dependent measure for informal social networks with a t-score of 10.6. Its effect is positive with a coefficient of 3.62 indicating that an increase of one on the contact by email index leads to a 3.62 person increase in the overall number of social contacts. Looking at its fully standardized coefficient in comparison to the other significant independent variables shows that it is quite influential relative to the other independent variables with a fully standardized coefficient of .168. Interpretation of the coefficient for web hours is useless because as the t-score indicates, we are unable to be certain that the influence of web use on the number of overall social contacts is not really zero.

Table 3: Coefficients and t-scores for Informal Network Capital Model.

Variable	β	t	P>|t|	β^{Sx}	β^{Sy}	β^{Sxy}
Contact by Email	3.622	10.601	0.000	7.187	0.085	0.168
Hours Spent on Web	-0.090	-1.126	0.260	-0.665	-0.002	-0.016
In-Person Contact	12.158	38.008	0.000	22.914	0.284	0.536
Age	0.149	4.195	0.000	2.509	0.004	0.059
Female	-0.035	-0.031	0.975	-0.017	-0.001	0.000
White	0.539	0.380	0.704	0.218	0.013	0.005
Married	0.669	0.520	0.603	0.334	0.016	0.008
Children	0.905	0.651	0.515	0.407	0.021	0.010
Years of Education	-0.129	-0.597	0.551	-0.377	-0.003	-0.009
Income Index	-0.152	-1.231	0.218	-0.830	-0.004	-0.019
2002 Dummy	2.652	1.862	0.063	1.293	0.062	0.030
2004 Dummy	2.301	1.303	0.193	0.909	0.054	0.021

Note: R^2 = 0.3807, Adjusted R^2 = 0.3788, N=3844.

The variable measuring the number of people one has face-to-face contact with has the largest influence. The coefficient of 12.16 indicates that an increase of one on the

face-to face-contact index leads to a 12..16 person increase in the overall number of social contacts. A fully standardized coefficient of .536 shows that the number of people one comes in face-to-face contact with is the most influential indicator of the size of his informal social network. Age is also another significant indicator of network size with a t-score of 4.195. Each additional year in age leads to a .149 person increase in network size, and a standard deviation increase in age leads to a .059 standard deviation increase in the dependent variable.

<div align="center">Participatory Capital Model</div>

Turning to the participatory capital model shown in Table 4, the model is able to explain 18.5% of the variance in the participatory capital index. As with the first model, the literature has shown low R^2 to be typical in these types of models, however very few models have focused on individual levels of trust. Because the R^2 is so low, this model must ensure significance, have normally distributed errors, and include all relevant variables in order to hold explanatory merit. The majority of independent variables are statistically significant, with 7 out of 12 variables holding significance. As with the previous models, a two-tailed test of significance is utilized in estimation of statistical significance.

Turning to the scatterplot presenting in Appendix B, Graph 2, it can be seen that the residuals are normally distributed around 0. The stripes that are seen in the graph are formed because the dependent variable is only able to take a limited number of values. Looking at the VIF scores shows that there are not problems or collinearity associated with this model.

Table 4: Coefficients and t-scores for Participatory Capital Model.

Variable	β	t	P>|t|	β^Sx	β^Sy	β^Sxy
Beneficial Web Use	0.060	3.353	0.001	0.068	0.060	0.068
Hours Spent on Email	0.000	-0.054	0.957	-0.001	0.000	-0.001
Hours Spent on Web	-0.004	-1.460	0.144	-0.028	-0.004	-0.028
Age	0.013	12.197	0.000	0.221	0.013	0.220
Female	0.088	2.568	0.010	0.044	0.088	0.044
White	0.347	8.004	0.000	0.138	0.345	0.137
Married	0.061	1.569	0.117	0.030	0.061	0.030
Children	-0.140	-3.357	0.001	-0.064	-0.139	-0.063
Years of Education	0.063	9.602	0.000	0.181	0.062	0.181
Income Index	0.024	6.340	0.000	0.129	0.024	0.128
2002 Dummy	-0.003	-0.073	0.942	-0.001	-0.003	-0.001
2004 Dummy	0.056	1.278	0.201	0.024	0.056	0.024
Note: R^2 = 0.1542, Adjusted R^2 = 0.1509, N=3076.						

In interpreting the effects of the independent variables in this model, the coefficient for beneficial web use implies that a one unit increase in the beneficial web use score leads to a .06 unit increase in the standardized index score for participatory capital. A person who visits all types of websites that are hypothesized to be beneficial will experience a participatory capital index score that is .30 units higher than those who visit no beneficial websites. The coefficients for hours spent using email and hours spent using the web can not be interpreted because their t-scores indicate that we are unable to be statistically sure that the true effect between the independent and dependent variables is not zero.

Moving to the interpretation of the statistically significant control variables, each additional year in age causes a .013 unit increase in the participatory capital index, and a standard deviation increase in age causes a .22 standard deviation increase in the dependent variable. The female variable also holds a positive effect, with being female leading to a .088 unit increase in the participatory capital index. Suprisingly, being white

has a very influential effect on participatory trust, with white respondents expected to score .347 units higher on their participatory network index compared to non-whites

Educational level is also a significant predictor of participatory capital, with each additional year of education resulting in a .063 unit increase in the participatory capital index. While we are unable to confidently show that being married has a significant effect on participatory capital, having children has an unanticipated negative effect on participatory capital, as respondents with children experiencing experience a level of participatory capital .140 units lower than those without children.

CHAPTER 7

CONCLUSIONS AND IMPLICATIONS

Overall, the models do suggest a causal relationship between internet use and various measures of social capital. In all three models, the variables capturing specific types of internet use were significant and influential. As previous research has indicated, merely looking at internet use alone is insufficient to provide an explanation of how this use will affect things like social capital. In all three models, independent variables that captured bulk use of the internet such as web use or email use per week failed to have a significant effect on any measures of social capital. On the other hand, internet variables that measured more specific types of use such as beneficial web use or using email to keep in contact with friends and family did show to be both significant and beneficial to individual levels of social capital. This implies that future studies should delve even further into internet activities and attempt to parse out exactly what individuals are doing when they visit the web and send emails.

The models measuring formal network capital and participatory capital both suffered from low R^2, indicating that there might be some problems with the model specification. Despite meeting the criteria outlined for holding explanatory value despite low R^2, this is a cause for concern and should be addressed in future research. One of the possibilities for why the R^2 is so low in these types of models is that it is simply more difficult to get high R^2 in individual level models that do not operate at the aggregate

level. It could also be because the influence of variables such as internet use is slow to develop.

With this being said, the models tested in this paper do show that internet use is a powerful influence on various measurements of social capital, confirming H1, H3 and H5. Visiting beneficial websites causes an increase in both organizational membership and participatory capital, while using email to stay in contact with others leads to individuals having larger social networks. This indicates that in addition to using the internet to contact people, internet communication can lead to face-to-face interaction. In addition, the findings suggest that the internet is also used to communicate with people who one does not have frequent in-person contact with.

While the findings found no significant year effects, time-series models should continue to be developed in order to show researchers change over time. While not within the scope of this study, future researchers should also look at a conceptualization of social capital that simultaneously takes into account both subjective and objective elements of social capital. This could require the building of complex interactive models of the type previously discarded in the name of parsimony. With so many theoretical reasons for why network and participatory capital have an effect on each other, further empirical inquiries in the matter should be pursued before the topic can be put to rest.

Because the social implications of the internet are so broad, it is important that social scientists and policy makers pay attention and help shape the internet as it is being institutionalized. If information rich community websites are beneficial to the individual success of those in the community, provision of these websites is something that local communities should pursue. If communicating via email helps develop wide and deep

46

social networks, then efforts to decrease the digital divide should continue – not just to make sure that everyone is able to get online, but so that people are equipped with the human capital needed to utilize online services.

While most of the international studies on this subject have measured relationships at the aggregate level, it would be interesting to address this topic with an international scope. If the findings above are correct, we should also expect the internet to have a greater influence on social capital in nations in which the internet is used for social capital building purposes. This approach would also allow the control of cultural differences that may account for changing social capital levels – introducing a number of external influences that were left of the models discussed here.

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APPENDIX A. COMPARISONS BETWEEN RE AND 2SLS MODELS

Table 1: Models with informal network capital as the dependent variable

	RE Model	2SLS Model
	β	β
Contact by Email	3.622	3.537
	(10.60)**	(5.27)**
Hours Spent on the Web	-0.090	0.035
	(1.13)	(0.22)
In-Person Contact	12.158	11.854
	(38.01)**	(19.57)**
Age	0.149	0.081
	(4.19)**	(0.59)
Female	-0.035	3.353
	(0.03)	(1.60)
White	0.539	
	(0.38)	
Children	0.905	-1.031
	(0.65)	(0.39)
Education	-0.129	0.047
	(0.60)	(0.09)
Income	-0.152	-0.189
	(1.23)	(0.61)
Married	0.669	
	(0.52)	
2002 Dummy	2.652	3.291
	(1.86)	(1.52)
2004 Dummy	2.301	0.000
	(1.30)	(.)
Participatory Capital (Interactive)		2.178
		(0.28)
Constant	-39.473	-36.615
	(10.97)**	(2.31)*
Observations	3844	1117
R-squared	0.38	0.40

Absolute value of t statistics in parentheses
* significant at 5%; ** significant at 1%

Table 2: Models with participatory capital as the dependent variable

	RE Model β	2SLS Model β
Hours Spent on Email	-0.000	-0.004
	(0.05)	(0.63)
Hours Spent on the Web	-0.004	-0.003
	(1.46)	(0.54)
Beneficial Web Use	0.060	0.073
	(3.35)**	(2.69)**
Age	0.013	0.014
	(12.20)**	(7.85)**
Female	0.088	0.091
	(2.57)*	(1.59)
White	0.347	0.271
	(8.00)**	(3.68)**
Children	-0.140	-0.147
	(3.36)**	(2.10)*
Education	0.063	0.041
	(9.60)**	(3.79)**
Income	0.024	0.026
	(6.34)**	(3.94)**
Married	0.061	0.062
	(1.57)	(0.94)
2002 Dummy	-0.003	-0.029
	(0.07)	(0.47)
2004 Dummy	0.056	0.000
	(1.28)	(.)
Network Capital (Interactive)		0.003
		(2.52)*
Constant	-2.087	-1.882
	(19.91)**	(10.76)**
Observations	3076	1117
R-squared	0.15	0.15

Absolute value of t statistics in parentheses
* significant at 5%; ** significant at 1%
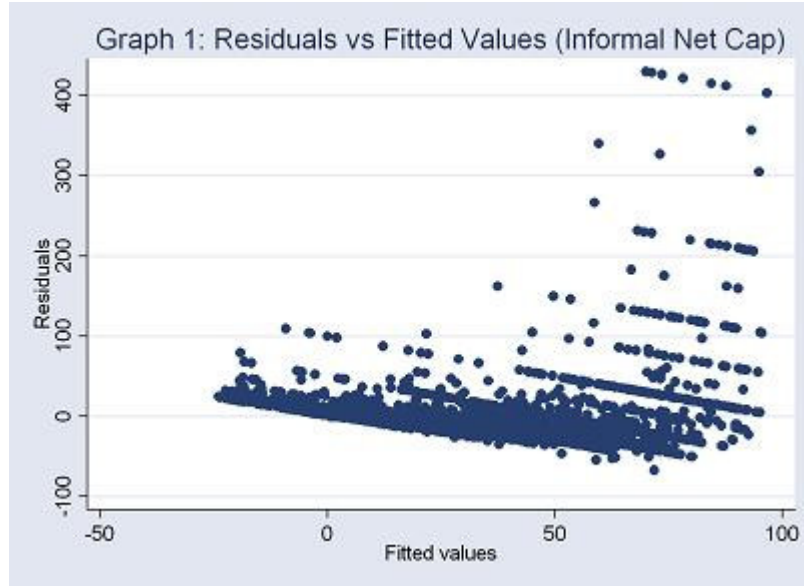
APPENDIX B. SCATTERPLOTS AND VIF SCORES FOR RE MODELS

Graph 1: Residuals vs Fitted Values (Informal Net Cap)

Table 1: VIF statistics for RE model on informal network capital		
Variable	**VIF**	**1/VIF**
2004 Dummy	1.65	0.607772
2002 Dummy	1.63	0.612864
Contact by Email	1.55	0.643253
Income	1.54	0.649903
Married	1.40	0.715858
Education	1.35	0.742152
Children	1.32	0.755237
In-Person Contact	1.23	0.813389
Age	1.21	0.826491
Hours Spent on Web	1.18	0.847226
White	1.11	0.897039
Female	1.04	0.960126
Mean VIF	1.35	

Graph 2: Residuals vs Fitted Values (Part Cap)
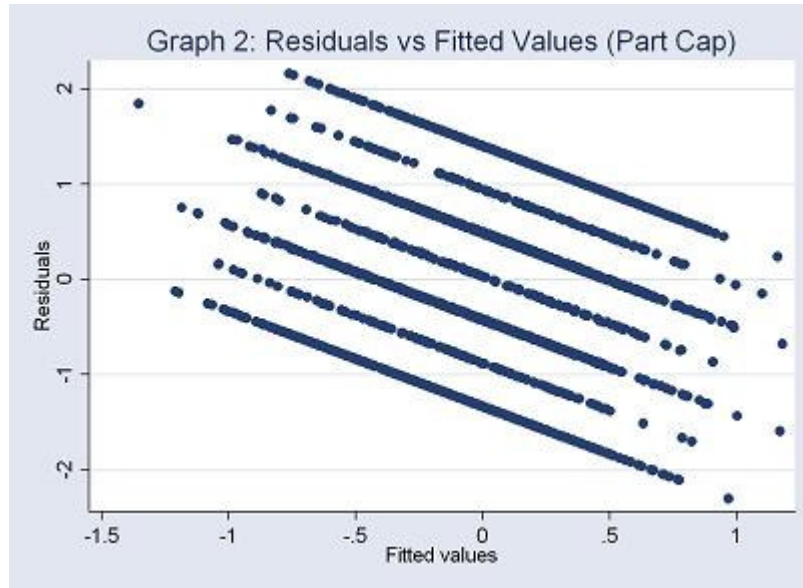
Table 2: VIF statistics for RE model on participatory capital		
Variable	**VIF**	**1/VIF**
income98	1.49	0.673348
goodnet	1.48	0.677689
married	1.35	0.742553
emailhr	1.33	0.752069
wwwhr	1.30	0.766916
year04	1.29	0.772583
kids	1.29	0.777539
educ	1.28	0.781800
age	1.17	0.851633
year02	1.15	0.866877
white	1.06	0.939824
female	1.05	0.954943
Mean VIF	1.27	