Leveraging Public Nonprofit Partnerships for IT innovation:
Building Effective Neighborhood Information Systems

by

Sungsoo Hwang

BA, Hanyang University, Seoul, Korea, 1997

MPA, Syracuse University, 1998

Submitted to the Graduate Faculty of

the Graduate School of Public and International Affairs in partial fulfillment

of the requirements for the degree of

Doctor of Philosophy

University of Pittsburgh

2008

UNIVERSITY OF PITTSBURGH

GRADUATE SCHOOL OF PUBLIC AND INTERNATIONAL AFFAIRS

This dissertation was presented

by

Sungsoo Hwang

It was defended on

August 7, 2008

and approved by

David Y. Miller, Ph.D, Associate Professor, GSPIA

Angela W. Foster, Ph.D, Assistant Professor, GSPIA

Mark C. Hoffman, Ph.D, Associate Professor, Grand Valley State University

Dissertation Committee Chair: Sabina E. Deitrick, Ph.D, Associate Professor, GSPIA

LEVERAGING PUBLIC NONPROFIT PARTNERSHIP FOR IT INNOVATION: BUILDING EFFECTIVE NEIGHBORHOOD INFORMATION SYSTEMS

Sungsoo Hwang, PhD

University of Pittsburgh, 2008

This is a study of Neighborhood Information System (NIS) across the U.S. This dissertation investigates the public-nonprofit partnerships of building NIS and evaluates their effectiveness in being a tool for local governance. I employed an extensive study, including a nationwide survey, and an intensive study, including qualitative case analyses.

Neighborhood indicators play a critical role for local governance as they provide necessary information about neighborhoods. Recently, Neighborhood Information Systems (NIS) have been developed in the cities across the U.S. to provide better access to local data and information to community development stakeholders. National Neighborhood Indicators Partnership (NNIP), at the Urban Institute brings many local NIS together, acting as a headquarter unit.

Government agencies, non profit organizations, and community organizations engage in decision making process for community development and NISs are designed to help information sharing, and effective and participatory decision makings for community development stakeholders. The use of partnerships has emerged as a dominant strategy to develop an NIS. This research investigated what contributes to a working partnership to develop a successful and effective NIS as an information-sharing network to help local economic development and community revitalization. This study suggests data is more important than other resources such as funding and technology in terms of building an Information System for the communities. It also indicates executive level connections with local governments are important as development of an NIS needs a project champion in government for data sharing. The implication for building NISs is that government is an indispensable part of the partnership network, even when the initiation of NIS development comes from the nonprofit sector.

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PREFACE

This took too long. More precisely speaking, not this dissertation itself but my entire doctoral program study. It made me humble and I appreciate the support from my family, friends, and mentors more. My dissertation chair and advisor, Dr. Sabina Deitrick helped me tremendously over the years of my dissertation writing and working for the Pittsburgh Neighborhood and Community Information System project. Dr. David Miller was a strong supporter for my entire duration at the GSPIA. I learned much of my quantitative research from Dr. Angela Foster; more importantly learned her caring for students' learning and achievements. Dr. Mark Hoffman's expertise in Information Technology was extremely helpful for this dissertation as well as his tireless consultation. Without them, this dissertation would not have been completed. I am heavily influenced by former advisors: Dr. Bill Dunn, and Dr. Louise Comfort. I thank for their teaching and mentoring. I also thank Dr. Carolyn Ban for her support. I appreciate Dr. Yong-Jin Cha's support while he was taking his sabbatical year at the Carnegie Mellon University. I also thank Dr. Stuart Shulman for sharing his qualitative research expertise and recommending me to the International Working Group on e-Consultation.

My classmates and friends in Pittsburgh were big supporters on this rather lonely journey. Andrew Aurand and I shared much together. I thank Jane Hansberry, Kai-Hung Fang, Phil Murphy, Eric Sevigny, and others. I thank Sung-Jun Myung, Chi-Sung Park, Hyun-Joo Chang, Joo-Hun Lee and many other Korean friends for their support. My Zen Group of Pittsburgh Dharma brothers and their families were my family members at home away from home. And of course, I cannot forget all the Dharma teachers I met through KUSZ for their spiritual guidance.

My wife, Jamie put up with my cranky writing days. I thank for her support and love. Most importantly, I would not be writing this now without my parents' endless love and support for long years. 아버지, 어머니, 은혜에 감사드립니다. 사랑합니다. My son was too young to speak but he kept me motivated and focused.

DISCLAIMER

This material is based upon work supported by the National Science Foundation under Grant 05-574 (Doctoral Dissertation Research Improvement Grant, 2006–2007, chaired by Professor Sabina Deitrick). Any opinions, findings and conclusions or recommendations expressed in this material are those of the author(s) and do not necessarily reflect the views of the National Science Foundation (NSF).

1.0 INTRODUCTION

This is a study of Neighborhood Information System (NIS) across the U.S. This dissertation investigates the public-nonprofit partnerships of building NIS and evaluates their effectiveness in being a tool for local governance. I employed an extensive study, including a nationwide survey, and an intensive study, including qualitative case analyses. This introduction chapter will begin by defining what the problem is to study and discuss the background and context. Then, the third section of this chapter will discuss the significance and contribution this study aims to achieve.

This dissertation contains nine chapters. Chapter 2 describes the problem statement of this study, 'What makes partnerships work to build effective NIS?' and provides contextual information as a research question chapter. Chapter 3 reviews three streams of literature to demonstrate academic research pertinent to NIS study. Then Chapter 4 provides the analytical framework, which is collaborative governance. This framework is rooted in theories of collaboration, collaborative public management, collaborative networks, and public participation and civic engagement. This chapter also presents a plan for the research of this study, including research questions and a conceptual model. Chapter 5 lays out the research design and methodology, particularly discussing the mixed method, and explains the data collection and data analysis methods. Chapter 6, 7, & 8 report the results of the analyses. Chapter 6 presents an exploratory case study which builds up to Chapter 7, a quantitative analysis derived from the survey as an

extensive study. Chapter 8 is a comparative case study as an intensive study to complement the extensive study.

Chapter 9 summarizes analysis results from Chapter 5 to 7 and discusses policy and managerial implications as well as identifies the limitations of the study and a future research agenda, following a conclusion of the study.

2.0 NEIGHBORHOOD INFORMATION SYSTEM: BACKGROUND, STAKEHOLDERS, AND RESEARCH QEUSTIONS

This chapter will provide the context of the phenomenon, the Neighborhood Information System (NIS), which this dissertation research investigates. The first section will describe what the NIS is, what it does, and who the stakeholders of an NIS are. Then, the next sections will discuss the central research questions, and the significance and contribution that this study aims to achieve.

2.1 WHAT IS A NEIGHBORHOOD INFORMATION SYSTEM?

What is an NIS? NIS is a Geographical Information System (GIS)[1]-enabled technology system that provides interactive mapping tools combined with a conventional database system. GIS is usually referred as desktop software which displays spatial data. In an over-simplified version, I call it a 'visual display of a database on the map.' Technologies used for NIS include the 'Web' and an online mapping system for spatial information. The information system takes conventional and spatial databases and makes data retrieval and mapping easy on the web. In short, NIS is a tool powered by modern technology such as the Web, GIS, and database systems that can assist economic development and community revitalization. NIS contains wide range of

[1] GIS is a collection of computer hardware, software, and geographic data for capturing, managing, analyzing, and displaying all forms of geographically referenced information. A definition by Environmental Systems Research Institute, Inc. (ESRI, 2006) ESRI's website: *http://www.gis.com/whatisgis/index.html*

data gauging on neighborhood conditions, including housing and crime data (see table 2.2 and 2.3).

The main objective of an NIS is to help local organizations develop electronically-compiled, technically sound, and content-rich indicators of a neighborhood's condition so that community development corporations (CDCs), community-based organizations (CBOs), residents, and other neighborhood stakeholders can better plan for the revitalization of the neighborhood. Officials, government agencies, intermediary non-profits and research institutions can help community development by performing their own functions at any or all stages from planning to research (Sawicki & Flynn, 1996, p. 5).

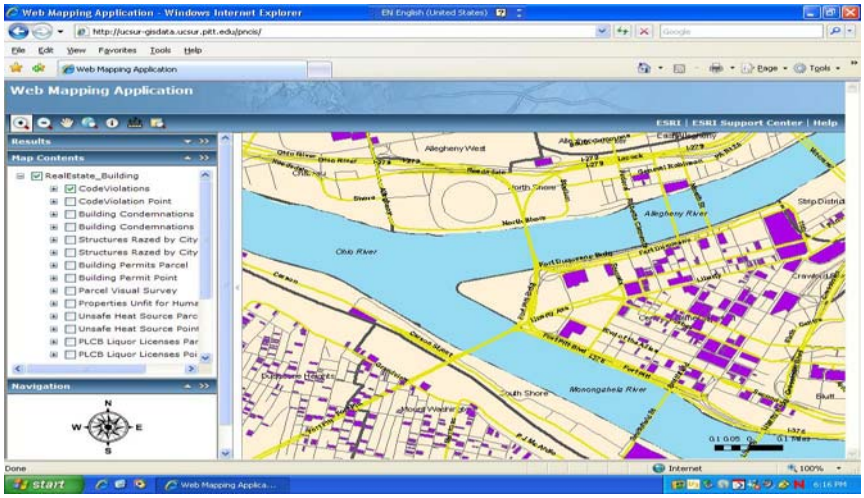

Figure 2-1: An Example of NIS: Pittsburgh Community Information System Screen Capture

(Source: Pittsburgh Neighborhood and Community Information System website[2])

This kind of information system can be found across the nation. In the early 1990s, NISs in Oakland, Boston, Providence, and Denver began distributing neighborhood socio-economic information to community-based groups. In 1993, Cleveland's CANDO[3] became the first Internet-based NIS, available through a telnet connection. As of 2007, 29 NISs were partnered

[2] PNCIS website is **http://wwwpghnis.pitt.edu**

[3] The Cleveland Area Network on Data and Organizing (http://povertycenter.cwru.edu/urban_poverty/dev/cando/overview.asp)

with the National Neighborhood Indicator Partnership (NNIP), an initiative of the Urban Institute (see Table 2.1).[4] Some of them are also partnered with National Infrastructure for Community Statistics (NICS)[5], a project of the Urban Markets Initiative of the Brookings Institution. A few others exist, and more are in the planning and development stages. This represents most of NIS population.

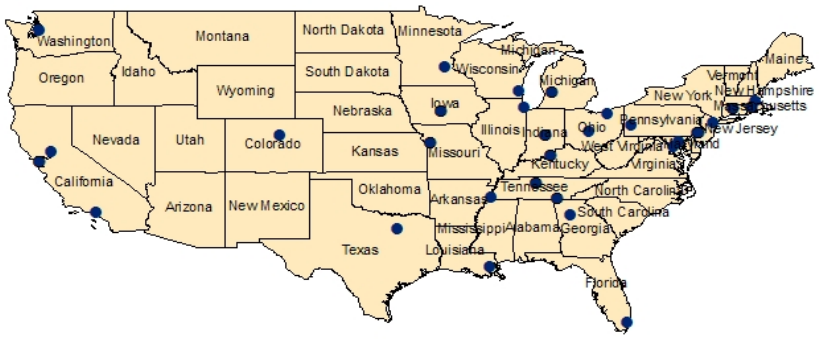

Figure 2-2: Neighborhood Information System Sites across the U.S. in 2007

Source: Author (Note: Dot=City)

[4] The National Neighborhood Indicators Partnership (NNIP) is a collaborative effort by the Urban Institute and local partners to further the development and use of neighborhood-level information systems in local policymaking and community building. NNIP Concept: In recent years all NNIP partners have built advanced information systems with integrated and recurrently updated information on neighborhood conditions in their cities. The creation of this capacity, which did not exist in any U.S. city a decade ago, represents an important technical and institutional breakthrough The full-scale implementation of NNIP began in late 1996, funded jointly by the Annie E. Casey and Rockefeller Foundations. NNIP works in three topical areas: (1) building databases as tools for community collaboration and action; (2) building community capacity to use data effectively; and (3) building indicators of neighborhood health and change. In short, NNIP acts as a national headquarter in tool building and facilitating learning and awareness. (see NNIP's website http://www2.urban.org/nnip/)

[5] Urban Markets Initiative, Brookings's website http://www.brookings.edu/

Table 2-1: Neighborhood Information Systems across U.S. (2007)[6]

City	State	Name	NNIP
Atlanta	GA	Neighborhood Indicators Project	Yes
Baltimore	MD	Neighborhood Indicators Alliance	Yes
Boston	MA	Indicators Project	Yes
Camden	NJ	Camconnect	Yes
Chattanooga	TN	Southeast Tennessee Information Service	Yes
Chicago	IL	Metro Chicago Information Center	Yes
Cleveland	OH	CANDO & NeoCANDO	Yes
Columbus	OH	Franklin County DataSource	Yes
Dallas	TX	Dallas Indicator Project	Yes
Denver	CO	Neighborhood Facts	Yes
Des Moines	IA	Child and Family Policy Center	Yes
Grand Rapids	MI	Community indicators	Yes
Hartford	CT	HartfordInfo	Yes
Indianapolis	IN	SAVI-Interactive	Yes
Los Angeles	CA	Neighborhood Knowledge Los Angeles	Yes
Louisville	KY	Community Resource Network Data	Yes
Memphis	TN	Shared Urban Data System	Yes
Miami	FL	Children's Trust	Yes
Milwaukee	WI	Neighborhood Data Center	Yes
Minneapolis	MN	Minneapolis Neighborhood Information System	Yes
Nashville	TN	Neighborhoods Resource Center	Yes
New Orleans	LA	Community Data Center	Yes
New York	NY	New York Housing and Neighborhood Information System	Yes
Oakland	CA	InfoOakland/Urban Strategies Council	Yes
Philadelphia	PA	Metropolitan Philadelphia Indicators Project	Yes
Providence	RI	Providence Plan	Yes
Sacramento	CA	Community Services Planning Council	Yes
Seattle	WA	Public Health of King County	Yes
Washington DC	DC	NeighborhoodInfo DC	Yes
Chicago	IL	CityNews	No
Philadelphia	PA	Neighborhood Information System	No
Philadelphia	PA	West Philly Data	No
Pittsburgh	PA	Neighborhood & Community Information System	No
Missouri	MO	Community Information Resource Center	No

[6] Note: During this dissertation research, Atlanta NIS was inactive, Grand Rapids NIS became a new NNIP partner in May 2006, and New York City and Minneapolis NISs became new partners in January 2007.

Kingsley (1998, p. 2) listed four factors in making an NIS feasible: (1) advances in computer hardware; (2) address-matching and advances in GIS software; (3) advances in the availability of automated administrative data; and (4) advances in local institutional development.

Some local institutions initiated NIS developments. Such local institutions are called 'data intermediaries' among NIS project teams. Mostly nonprofit organizations or universities play a role of data intermediaries. Kingsley (1998) explains the importance of the data intermediaries:

> In some form, such 'data intermediaries' are probably essential to the neighborhood indicators concept. Substantial economies of scale are implicit in this work. The job is far from trivial. It includes negotiating agreements with administrative data providers (police departments, assessors, social service agencies, registrars of vital statistics, etc.), frequently collecting automated records from those providers, cleaning and properly integrating and storing the files, and providing the data to users in an efficient manner. Potential users who would benefit greatly from having the data (for example, neighborhood associations and nonprofit service providers) could never afford to build such systems for themselves for their own purposes alone. It would also be wasteful and redundant if they tried. Instead, the typical workable approach is for a city to assign the system building/operating job to one entity or partnership that can learn to do the job well as its primary mission and then operate a "one-stop shop" to serve all interested users at a much reduced cost (p, 5).

Primary target users of NISs are community stakeholders such as community development corporations (CDCs) and community based organizations (CBOs) are grassroots organizations in the community to realize economic development and neighborhood revitalization. CBOs have shown increasing interest in working with Geographical Information System (GIS) in order to address issues of concern in their neighborhood (Craig & Elwood, 1998; Ghose, 2001; Nunn, 1999; Ramasubramanian, 2004). However, most CBOs are small with limited resources, like most nonprofit organizations. According to Green and Haines (2002, p. 69), most (65%) local development corporations (LDCs) indicate that they are

nonprofit, nontaxable organizations (501c3, c4, and c6). Most LDCs are relatively small, with a median budget of about $150,000.

A recent survey and report from SEEDCO[7] (2002, p. 3) confirms this. Almost half to two-thirds of their respondent groups, CDCs and CBOs, do not have a staff member specifically devoted to IT. This report also shows that more than half of CDCs and CBOs are small-size organizations, consisting of less than ten full-time employees.

In the nonprofit sector, most nonprofit organizations themselves are quite small. Forty one percent of the nonprofits that filed annual reports with the IRS in 1993 had annual expenses less than $100,000 (Ott, 2001, p. 6). In 2003, 42% of the nonprofits that reported to the IRS on 'Form 990' had annual expenses less than $100,000 according to the National Center for Charitable Statistics at the Urban Institute. In January 2006, this number was 47.5%.[8] It is clear, then, that community organizations usually do not have resources to collect and analyze the neighborhood data they need by themselves. Data intermediaries realized this situation and are building NISs in their locality.

Ghose (2003) and Kingsley (1998) showed the types of data that an NIS has (see Table 2.2 and 2.3 below).

[7] Founded in 1986, Seedco (the Structured Employment Economic Development Corporation), is a national community development operating intermediary.(http://www.seedco.org/)

[8] However, these organizations in the aggregate accounted for 0.4% of the total gross revenue of the sector. National Center for Charitable Statistics (http://nccs.urban.org/)

Table 2-2: Types of Spatial Data Most Useful to Community Organization

Neighborhood Issue	***Spatial Data***
Housing	Ownership, Zoning, Land use Assessed land/structure value Tax exemption status of land/structure Structural information on buildings Year of change of assessment code Property transfer information Tax delinquency status, Building code violations Raze status, Vacant lots, Boarded-up homes
Economic Development	Employment opportunities List of neighborhood businesses Membership in business associations Small business lending data Job training programs, Youth leadership
Crime	Incidents listed by dates, locations, types Parole data
Health/Environment	Health statistics Hazardous material storage sites Lead contamination data
Property Investment	Private mortgage data, Public lending data
School Data	Public school data
Client Data	Contact data about members, participants Date of participation Participation activities

Source: (Ghose 2003)

Table 2-3: Administrative Data Maintained by National Neighborhood Indicator Partnership Partners

Vital Statistics Agencies	Births, Deaths
Police Departments	Crimes, Child Abuse/Neglect, Police Calls
Public Assistance Agencies	AFDC, Food Stamps, General Assistance, Medicaid, WIC, Subsidized Child Care
School System	Student Enrollment/Performance, Special Education
Hospitals, Health Agencies	Hospital Admissions, Immunization
Tax Assessor/Auditor	Parcel Characteristics, Tax Delinquency Parcels, Vacant Parcels
Building/Planning Departments	Code Violations, Building Permits, Demolitions
Public Housing Authorities	Public Housing Units
Development/Budget Departments	CDBG Expenditures
Business Directories	Employment/Economic Activity

Source: (Kingsley, 1998)

Stakeholders can be a wide range of institutions and agencies, such as government agencies, nonprofits, universities and private organizations (see Table 2.4). They participate in development and use of the system. Community organizations generally provide feedback in the development processes. They are an important group of end users.

Table 2-4: Stakeholders in the NIS Development

Sector	***Stakeholder***	***Competence***	***Challenges***
Public	Local government	Data collection (ownership)	Poor access and thus perceived trust issue
Non Profit	Local Intermediaries Foundations	Quick turnaround, local network and knowledge, funding	Not an IT powerhouse
	CBOs/CDCs	Unique local knowledge and data Local presence and relationships with residents	Limited IT (GIS), data collecting, analysis resources Small geographic focus
	Universities and research institutions	Access to profs. & grad students GIS and IT infrastructure Local data collection and analysis	Is it part of university-wide vision? Perceived relationship with community
Private	IT (GIS) provider	Efficient development of technology project,	Cost Trust issue among collaborators Difficult to do long term commitment

Source: (Hwang, 2006)

Ease of visualizing and analyzing neighborhood-based spatial data makes an NIS especially useful. NIS enables storage, analysis, and mapping of geographic data such as demographic, housing, land-use, police, or environment data in a multiple scale. Stakeholders in community development are now realizing the need for collaborative efforts to create an NIS (Ghose & Elwood, 2003; Ghose & Huxhold, 2002). This collaborative effort will be discussed more in the next section.

2.2 PROBLEM STATEMENT AND RESEARCH QUESTION

Information accessibility and transparency is a major topic in public administration (Acar & Robertson, 2004; Roberts, 2000). Community organizations often do not have easy access to local government data. This is because the capacity of community organizations to process and analyze data is limited and the government's ability to disseminate data in a useful manner is limited by budget and other constraints. To bridge this gap between government data and nonprofits organizations' information needs, nonprofit organizations, universities, foundations, and government agencies in many areas in the U.S. have worked together to provide Neighborhood Information System (NIS) over the last decade in efforts to help community organizations.

The central question of this study is "what makes partnerships work to build an effective NIS?" This question has two corollaries. First, what defines an effective NIS? Second, what type of a partnership model works to build them? Detailed discussion of research questions and hypotheses will be discussed in the next chapter.

This dissertation researches the management of NIS, an important spatial analysis system for the local governance. Understanding this can bring important implications for public management, particularly for the understanding of partnership and collaboration of public and nonprofit organizations. In doing so, I pursue two major directions. First, this research looks at how community organizations utilize them. In other words, it addresses how effective an NIS is as a tool to enhance local governance. NISs have been around for a decade and half, and this research will be a timely assessment. Second, NIS is developed by partnership and collaboration. This research will examine public nonprofit partnerships in developing an NIS. This will help our understanding of public nonprofit partnership in local governance. In particular, the

framework of 'collaborative governance' is new in local governance and community development. Collaborative governance is utilized here to address partnerships and collaborations among public and nonprofit organizations. Many models of IT development, including e-government, Public Management Information Systems (PMIS), and Knowledge Management Systems (KMS) stress the need for PPPs. Rising demand from the public and declining budgets are classic drivers for PPPs (Holden & Fletcher, 2005; Roy, 2003; Sedjari, 2004; Snellen, 2002).

To analyze what constitutes an effective NIS, the research uses two methods: survey and interviews. I utilized a web-based survey and conducted complementary interviews in order to measure user-satisfaction for various NISs. The rationale for choosing a web-based survey will be discussed in the chapter 5 and the how the survey measured the effectiveness will be discussed in the chapter 7.

In looking at the partnership model question, I tested hypotheses concerning whether development of the effective NIS has a relationship to "collaborative environment dimension," "institutional arrangement dimension," and "managerial dimension." These three variables will be detailed in the next chapter. This part of research examined strength of partnerships and its relation to building an effective NIS by conducting interviews. I also investigated the relationship dynamics in the partnership networks, where development stakeholders work together, by using a network analysis and qualitative analysis.

2.3 SIGNIFICANCE OF STUDY

NIS, combining GIS with Web Technology, is only a decade and half old phenomenon. This dissertation research will provide a timely assessment. In summary, it serves two goals. First, it has an applied objective: empirical assessment of information system evaluation used by community development stakeholders. This research provides current status of NIS usage by public and nonprofit organizations. Utilizing survey and interview data, this research measures the effectiveness of NIS in its development stage. It also suggests some future directions. Second, it has a theoretical objective: to aid in understanding partnerships of government agencies and nonprofits in IT innovation projects through a framework of governance and partnership theories. It also helps our understanding of the relationship of IT innovations and collaborative governance: IT innovations can be harnessed to enable collaborative governance in local governance setting as well as collaborative governance helps building IT tools such as NIS.

This research fills the gap of knowledge in the public administration literature that studies issues concerning the advancement of IT in community development. The focus not only looks at governments but also at community development organizations for their effectiveness as stakeholders and user groups.

King, Keohane, and Verba (1994, p. 15) argue that all research in the social sciences should satisfy two criteria: a research question should be important in the real world and it should make a contribution to the framework of existing social science theory literatures. This research meets these criteria.

In pursuit of significance in the real world, this research studies two themes. First, the relationship between government agencies and nonprofit organization is one of increasing attention within the public administration community (Agranoff & McGuire, 2003; Kettl, 1988;

P. Kim & L. Wolff, 1994; Pierre, 1998; Werther & Berman, 2001). Recently, we see more of a collaboration between them in dealing with "wicked" social issues as complexities of social issues are increasing (Rittel & Webber, 1973).[9] Second, the role of IT in governance and management is a growing research topic among public administration scholars. We have seen exploding use of IT in society since the Internet became widespread in the 1990s. Public management information system, e-government, e-governance, and e-democracy are growing areas of research. How IT innovations foster citizen participation, government efficiency, and promote democratic values are getting attentions as important topics to study (Fountain, 2001; Garson, 1999; Ho, 2002; Kraemer & Dedrick, 1997; Moon, 2002). This research investigates the convergence of the above two themes.

Thus, in a theoretical domain, this research aims to contribute to the understanding of partnerships and collaboration among public and nonprofit organizations, adding an empirical study of collaborative governance in public administration scholarship. This study rather focuses on particular IT innovation context, than all-inclusive partnerships and collaboration in public administration.

The research also tries to make a contribution to emerging e-governance as it studies Public Private Nonprofit Partnerships in IT innovations. E-governance deals with the interaction of governments and other sectors through IT to enhance management and governance. Community development needs the benefit of having rich information/knowledge resources like an NIS to conduct analyses to help them achieve their goals of neighborhood revitalization. Due

[9] Rittel and Webber said the inherent wickedness of social problems has ten characteristics: There is no definitive formulation of a wicked problem. Wicked problems have no stopping rule. Solutions to wicked problems are not true-or-false but good-or-bad. There is no immediate and no ultimate test of a solution to a wicked problem. Every implemented solution to a wicked problem has consequences. Wicked problems do not have a well-described set of potential solutions. Every wicked problem is essentially unique. Every wicked problem can be considered a symptom of another problem. The causes of a wicked problem can be explained in numerous ways. The planner (designer) has no right to be wrong.

to the lack of resources that CDCs have today,[10] IT innovations like NIS can be very valuable to community development and local governance.

We have the established body of research regarding IT utilization in the public sector in the last decade. They stress the importance of recognizing unique characteristics of public-ness in utilizing IT for the public organizations, including political, organizational, and environmental constraints (Bretschneider, 1990; Bugler, 1999; Danziger & Andersen, 2002; Kraemer, King, Dunkle, & Lane, 1989). Yet, there are only handful of research on the discussion of IT in the community development field (Huxhold, 1991; Nunn, 1999; Ramasubramanian, 2004; Seedco, 2002).

Next, this research tries to make a contribution to mixed method research design literature, combining traditional statistical analysis with qualitative analysis approaches and network analysis techniques. As other studies often do, this is an attempt to employ triangulation in conducting research.

2.4 SUMMARY

This chapter provided the background and context of phenomenon, the Neighborhood Information System (NIS) by illustrating what it is, what it does, and who are involved. The chapter also provided the problem statement and research questions to be studied, following with

[10] One CDC director says, 'We know the power of GIS…but to be practical, GIS is a sophisticated software tool that needs a certain expertise to use and maintain. It is also expensive. I don't think it's cost-effective for a CDC of our size to invest in GIS software.' …past experience suggests that they should partner with universities or city planning departments. Results from the survey confirm the values of these partnerships: there is a significant correlation (r=.14>.002) between use of GIS by organizations in the sample and a technical assistance relationship with a university (Seedco, March 2002).

the contribution that this study intends to achieve. In the next chapter, I will discuss the existing scholarship that can be drawn to study the development of NISs.

3.0 LITERATURE REVIEW AND THEORETICAL FRAMEWORK

This chapter reviews the existing scholarship that can guide the study of NIS. The overarching theme of this section is the shift from government to governance paradigm in the recent public administration scholarship. Dealing with a changing world of public administration, the practice of collaboration and partnership between the government and organizations from other sectors has increased. The development of NIS is an exemplary illustration of this trend. The chapter is organized as follows. The first section of this chapter looks at the governance literature and partnership literature. This section reviews collaboration and partnership among public and nonprofit organizations. The second section of this chapter examines the use of Information Technology (IT) in public management. In the 1900s, IT became a powerful tool for reinventing government. IT played a part in enhancing the efficiency, performance, transparency, and accountability of government agencies. A shift of e-government to e-governance in the scholarship is addressed. The third section of this chapter examines the public participation Geographic Information Systems (PPGIS) literature. A group of scholars primarily in planning and geography domains have worked on using GIS technology in promoting public participation. In sum, this chapter provides information as to why and how this NIS study can be grounded in these three research streams.

3.1 NEW GOVERNANCE: SHIFT TO GOVERNANCE FROM GOVERNMENT

Collaboration and governance are major themes of the post-bureaucracy paradigm in public administration scholarship. There are many labels for the shift from government to governance. Three following terms, among many, are widely discussed for that changing shift. These three terms, "New governance," a term coined by Salamon (Salamon, 1995; Salamon & Elliott, 2002), and "Collaborative governance," by O'Leary and her associates (O'Leary, Gerald, & Bingham, 2006) at the Maxwell School Collaborative Governance Initiative, and "Networked governance" by Goldsmith and Eggers (2004), capture the direction of the public administration in the twentieth century. This group of work is relevant to this NIS study as it deals with the intersectoral collaboration in local governance.

Government has been increasingly working with the nonprofit sector in the context of local governance and community development. Salamon (2002, p. 3) describes this trend as "what exists in most spheres of policy is a dense mosaic of policy tools, many of them placing public agencies in complex, interdependent relationships with a host of third-party patterns." Frederickson and Smith (2003, p. 208) summed up that "the administrative state is now less bureaucratic, less hierarchical, and less reliant on central authority to mandate action."

O'Leary and her associates (O'Leary et al., 2006, p. 8) stated that "the world of public administration has changed. Technological innovations such as the Internet, globalism (which permits us to outsource anywhere abroad), devolution (which may bring intergovernmental conflict), and new ideas from network theory have changed the business of government. Public managers now find themselves not as unitary leaders of unitary organizations. Instead, they find themselves convening, facilitating, negotiating, mediating, and collaborating across boundaries."

Milward and Provan (2000) brought a term "hollow state" and a network perspective into public administration for the post-bureaucracy paradigm . They stated that "the last twenty years have seen the rise of the hollow state, a metaphor for government that contracts public service provision out to networks of mostly nonprofit organizations and reduces its role as a direct supplier of public goods " (p. 240).

Lynn and his associates (Lynn, Heinrich, & Hill, 2001, p. 1) described governance in the twentieth century as "public policies and programs in the U.S. and elsewhere that are being administered… through complicated webs of states, regions, special districts, service delivery areas, local offices, nonprofit organizations, collaborations, networks, partnerships and other means for the control and coordination of dispersed activities."

Goldsmith and Eggers (2004, p. 9) introduced the term, "networked government" and argued that today's trend of governments are networked are growing. They contended that their *Governance by network* represents the shift to governance paradigm. They listed four influential trends (p.9):

> *1) Third-party government: the decades-long increase in using private firms and nonprofit organizations-as opposed to government employees-to deliver services and fulfill policy goals,*
> *2) Joined-up government: the increasing tendency for multiple government agencies, sometimes even at multiple levels of government, to join together to provide integrated service,*
> *3) The digital revolution: the recent technological advances that enable organizations to collaborate in real time with external partners in ways previously not possible,*
> *4) Consumer demand: increased citizen demand for more control over their own lives and more choices and varieties in their government services, to match the customized service provision technology has spawned in the private sector.*

Kettl (2002, p. 119) defines governance as, "a way of describing the links between government and its broader environment-political, social, administrative." He argues the key challenge for public management is that no agency has a sole leverage or capacity to solve

government's tasks. Government's response to a problem must involve teamwork between agencies representing different jurisdictions, nongovernmental agencies and companies. Regularly, nonprofits and community organizations have acted as key stakeholders in local development decision making with local governments.

Among other major scholars of studying collaboration, Bardach (1998, p. 8) defines collaboration as "any joint activity by two or more agencies that is intended to increase public value by their working together rather than separately." Bardach is concerned with the capacity of public and nonprofit agencies to work together as a way of adding public value to explain 'interagency collaborative capacity.' Gray (1989, p. 5) defines collaboration as "a process through which parties who see different aspects of problem can constructively explore their differences and search for solutions that go beyond their own limited vision of what is possible."

Eglene and Dawes offered a helpful approach for collaboration, assessing the performance of the collaboration project "in terms of project itself" and "the service delivery program it supports" (Eglene & Dawes, 2006, p. 605). They also provided the definition of collaboration as "a reciprocal and voluntary agreement between two or more distinct public sector agencies, or between public and private or nonprofit entities, to deliver government services" and listed the following characteristics: "a minimum of two distinct organizations, a formal agreement about roles and responsibilities, a common objective, activity, or project aimed at the delivery of a public service, and the sharing or allocation of risks, benefits, and resources-both tangible and intangible."

These works are useful for this dissertation research as I examine the strength of NIS project team's collaboration itself, and effectiveness of NIS, including its impact on community development. In short, NIS is viewed as a phenomenon that was enabled in a changing shift to

governance in public administration. In studying public nonprofit partnership to build an NIS, governance, collaboration, and partnership studies are relevant and work as a theoretical framework. Particularly, collaborative governance provides an analytical framework. More discussion on collaborative governance as an analytical framework will be provided in the next chapter.

Some studies have specifically looked at interorganizational relationships in collaborative work settings. O'Toole, Jr. emphasizes that implementation in interorganizational settings is a complicated topic and relationships between parties can be crucial for policy implementation (O'Toole, 2003; O'Toole & Montjoy, 1984). Gray agrees that there is a growing need to promote collaborative problem-solving across various sectors of society, e.g., among business, government, and communities (Gray, 1985; Gray & Wood, 1991). Ferguson (Ferguson & Dickens, 1999, p. 589) maintains that effectiveness in building solutions to urban problems and approaching community ideals requires successful alliances. Some of the existing scholarship has identified specific factors as leading to success in the collaboration process. These factors include trust, leadership, resource interdependency, and the presence of champion and political support (Fletcher, 2003; Gulati, 1995, 1999; Landsbergen Jr. & Wolken Jr., 2001; Ring, 1996; Ring & Van de Ven, 1994). In addition to the factors mentioned above, selected variables of partnership or collaboration success from the selected literature are summarized in the table below (see Table 3.1). These variables will work as a roadmap in conducting this research, particularly being a foundation for coding the transcribed interviews and writing up the survey questions after identifying the key variables in hypotheses within an analytical framework. Thus, I am not drawing out any conclusion from the review of these variables yet but only to list them as a starting point for the implementation of this research.

Table 3-1: Partnership and Collaboration Success Variables, Selected Literature

Author	Variables	Method	Findings	Note
Fosler & Berger (1982)	Positive civic culture, realistic and commonly accepted vision, effective communication among key stakeholder in a network, civic entrepreneurship, continuity in policy	Case study	Local initiative supported by a strong civic foundation can mobilize public and private resources	Book
Gray (1985)	Conditions facilitating collaboration: degree of ongoing interdependence, coincidence in values among stakeholders, shared access power, legitimate/skilled convener	Essay	Synthesizing of researches through literatures	
M. M. Brown, O'Toole, & Brudney, (1998)	Size of the array, form of decision making, degree of resource interdependence, level of formality, presence of effective leadership	Survey questionnaire, ANOVA, K-W H test, regression	Leadership, resource interdependence, complexity, de-centrality and formality are important than structural characteristics of partnership	Perceptions are appropriate measures for use of technologies in organization
Rowley (2000)	Focal organizations response to see the interdependence in network	Network analysis with ANOVA	Density of a network and focal organization's position in the network affect how the focal organization will treat its stakeholders	
Kirschenbaum & Russ (2002)	Internal factors (top management support, partnership approach, outsourcing with strategic fit, commitment of financial and human resources, relationship management, management capacity), external factors (political environment, IT market place, characteristics of technology services)	Case study	Regardless of size and complexity of the projects, management is the key. Management of a good strategic partnership using performance measures and committing sufficient resources. Capacity building-knowledge and skills of IT and management	Outsourcing study but talks about strategic partnership in IT development
Schaeffer & Loveridge (2002)	Trust, cooperation, legitimacy, cultures (sectoral difference)	Essay with illustrative cases	PPP hides different forms of PPC, typology of PPC should be chose to fit the needs of participants	

Table 3.1 Partnership and Collaboration Success Variables, Selected Literature (continued)

Roy (2003)	Struggle between process-based accountability (democratic process rather than outcome)	Case study	A need for a mechanism that shares accountability across all key stakeholders and links it in part to performance outcomes	
M. M. Brown (2003)	Stakeholder participation, CIO reliance	Telephone survey, descriptive statistics, bivariate regression analysis	Stakeholder involvement had a high impact on curtailing problems	To what extend, stakeholder involvement influence IT innovation: e-Gov't? what barriers to involvement?
Hofmeister & Borchert (2004)	Cooperating network-centric approaches, optimize the use of scarce resources, identify rules of cooperation of network,	Case Study		
Holden & Fletcher (2005)	Dimensions of virtual value chain framework for IT (e-Gov't) partnership 1. Political, social, economic and cultural environment 2. Institutional, business, and technical environment 3. Characteristics and objectives of public and private partners 4. Collaboration Processes 5. Modes of collaboration 6. Project and collaboration performance measures	Case study	Culture of the IRS as perceived as problematic	
HDR (2005)	1. Political leadership (Commitment from 'the top') 2. Public Sector Involvement 3. A well Though-Out Plan 4. Communications with Stakeholders 5. Selecting the right partner not the lowest bid	Essay and case studies		Professional report from national council for public private partnership

A recent issue of *Public Administration Review*, special issue on collaborative public management (2006 December, supplement to Volume 66), exemplifies the trend of studying collaboration and governance in public administration scholarship and offers a comprehensive definition:

> *Collaborative public management* is a concept that describes the process of facilitating and operating in multi-organizational arrangements to solve problems that cannot be solved or easily solved by single organizations. Collaborative means to *co-labor*, to cooperate to achieve common goals, working across boundaries in multi-sector relationships.
> *Participatory governance* is the active involvement of citizens in government decision making. *Governance* means to steer the process that influences decisions and actions within the private, public, and civic sectors (O'Leary et al., 2006).

This exemplifies the convergence of two existing scholarship streams -collaboration and governance.

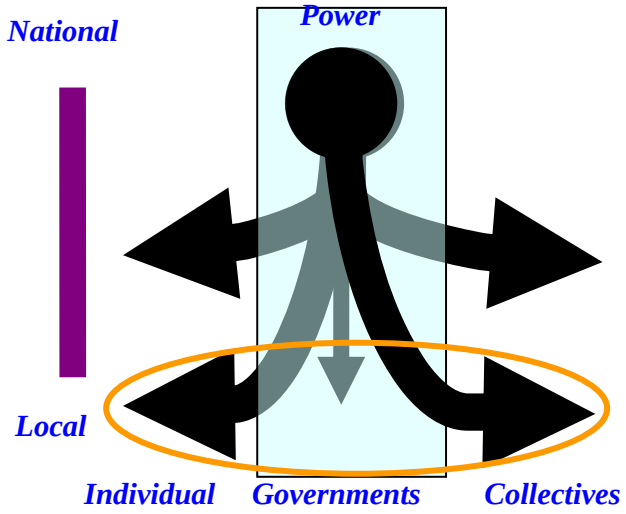

Figure 3-1: Theoretical Debate: A Shift from Governments to Governance (Adapted from D. Miller (2005))

Kettl (2000b) looks at the transformation of governance such as devolution and the changing role of government in his discussion of governance in the public administration literature. Scholars argue that there is a shift of power not only from national to local but also from government to civil society (Bovaird, 2004, 2005; Kernaghan, 2005). Figure 3.1 represents a shift of power from top (national) to bottom (local) and from center (governments) to outside (individual & collective), which has been debated in the discussion of governance vs. government in the recent public administration scholarship.

This research focuses on the local level interaction between government agencies and civil society (individual and collectives), in studying partnerships for building NIS, as the development of NISs has been happening in the post-bureaucracy paradigm.

3.1.1 NIS as Collaboration in Governance

This section places NIS and its expansion nationwide within the discussion of the shift from a government to a governance paradigm in the public administration scholarship. Thus NIS is an emerged phenomenon in the new governance and collaboration paradigm. To understand this shift, this section reviews sub-themes of the governance paradigm for public administration, particularly, the focus of New Public Management (NPM), Public Private Partnership (PPP) and collaborative governance.

In the 1980s, there was a change in the world of public administration and the government. Bureaucracy, including hierarchical executive branches and staff agencies, and organizational routines, was not dealing with the changing environment well. Although bureaucratic paradigm has been criticized by intellectuals since the 1930s, it was not until early

1980s that we witnessed the beginning of a post-bureaucratic paradigm (Frederickson & Smith, 2003).

Peters (1995, p. 337) summed up the changes of public administration well, stating administration of public programs became increasingly more difficult due to the decreasing resources of the public sector and increasing expectation from the public. Thus, public organizations are increasingly more closely working with the nonprofit and private sector organizations:

> But the administration of public programs became even more difficult during the 1980s, and problems continue to mount in the 1990s. This increasing difficulty of effective public management is a function of several aspects of the economic, social, and political environments within which administration is conducted. In addition, changes in managerial ideas and ideologies have generated serious challenges for public managers accustomed to hierarchical management and a Weberian bureaucracy. First, the most important factor affecting administration is the real-or perceived- scarcity of resources available to the public sector. The "go-go" days of the 1960's economy are now long past. Levels of employment growth will not move in parallel with productivity growth. Second, citizens have become increasingly wary of the power of the bureaucracy over their lives. Third, the increasingly centrifugal nature of government and its growing complexity make administration more difficult. Public organizations are increasingly more closely tied to private sector organizations.

Two milestone works, out of many, in public administration in responding to these changes are notable: "Reinventing Government" by Osborne and Gaebler (1993), and "Breaking through Bureaucracy" by Barzelay and Armjani (1992). This group of works is known as "Reinventing Government" and "New Public Management." Reinventing government in the United States is similar to the term "New Public Management (NPM)." NPM originated from New Zealand and has been used in the United Kingdom and elsewhere, as reinventing government is more used in the US (Kettl, 2000a). The reinventing government model regards citizens as customers and the central focus of government service delivery. This model also emphasizes the principles of catalytic government and community-ownership. This approach

urges officials to partner with citizen groups and nonprofit organizations to deliver public services more effectively.

Osborne and Gaebler (1993) argued that hierarchical and centralized governments do not work well any more stating: "the kind of governments that developed during the industrial era, with their sluggish, centralized bureaucracies, their preoccupation with rules and regulations, and their hierarchical chains of command, no longer work very well. Hierarchical, centralized bureaucracies designed in the 1930s or 1940s simply do not function well in the rapidly changing, information-rich, knowledge-intensive society and economy of the 1900s." (p.11)

Then, they called for an 'American *perestroika* 'in order to change how government works. They outlined a cultural and behavioral shift from what they call "bureaucratic government" toward "entrepreneurial government" and it was implemented by Clinton and Gore Administration.[11]

Barzelay and Armajani (Barzelay & Armajani, 1992) pointed to the direction beyond the bureaucratic paradigm by stating public managers use the concepts of customer service and should transform their organizations into more responsive, and user-friendly providers of services to the public.

Kim and Wolff (1994) argued that federal and local governments were trying to cope with fiscal stress by developing innovative strategies to cut costs, maintain services, and manage resources. This pushed governments to reinvent themselves and engage the civil sector more and more. Kettl (1988) added to ideas on the changing role of governments. He stated the original distinctions among sectors and jurisdictions are blurring. In fact, the conduct of government is

[11] Their work had 10 tenets: (1) government should act as catalyst- steering rather than rowing; (2) government should empower rather than serve; (3) government should be competitive; (4) Government should be mission-driven rather than rule driven; (5) government should be result oriented and should not base its actions on inputs; (6) it should be customer driven; (government should be enterprising; (8) government should anticipate rather than cure social ills; (9) government should decentralize, and (10) government should be market-oriented.

increasingly a partnership among all members of society, in patterns that are often extremely complicated. This growing interdependence raises several issues in areas such as sharing of authority, differences in values, and management techniques. Kettl and Dijulio (1995) described technology development as part of reinventing government initiative, saying reinventing government initiative equipped public managers with the better technology for the task they need to do. This illustrates that recent technology development also has been intertwined with reinventing government initiative. This was not happening only in the US. Internationally, Global Forums for Re-inventing Government started in 1999 to gather high-ranking representatives from the government and the private sectors internationally to discuss the democratic State and governance in the 21st century. Partner institutions include the United Nations Development Program, the World Bank, and the International Monetary Fund. At their third annual meeting in 2001, the Forum's theme[12] was 'Fostering Democracy and Development through e-government'.

3.1.2 NIS as Public Private Partnership

Related to the new governance paradigm and NPM, there is the notion of Public Private Partnerships (PPPs). PPPs have a long tradition in economic development and planning and part of urban renewal efforts, but they are also an important part of understanding the shift from government to governance (Bovaird, 2004; Salamon & Elliott, 2002; Sedjari, 2004; Vigoda-Gadot, 2003). PPPs are a source of energy and vitality for America's urban communities.

[12] http://www.unpan.org/globalforums.asp

In a local economic development policy domain, PPP[13] played an important part for decades (Committee for Economic Development, 1982; Fosler & Berger, 1982; Walzer & Jacobs, 1998). Fosler and Berger (1982) investigated the process by which the public and private resources of a community could be brought to bear on a wide range of commonly recognized needs using case studies of seven cities done by CED. Fainstein (1994) stressed the importance of political factors in addition to capital in urban redevelopment context. Processed and political environment factors were identified in those researches for local governance.

Peters and Pierre (1998) claimed PPPs play roles to promote growth in the local economy. Pierre (1998) dealt with three specific roles of PPP: creating synergy, increasing communication with relevant actors other than those constituting the partnership, and legitimizing pro-growth policies.

Mitchell-Weaver and his associates studied the role of PPP in the economic development process (Mitchell-Weaver, 1992; Mitchell-Weaver, Deitrick, & Rigopoulou., 1999). Particularly, they (Mitchell-Weaver & Manning, 1991) suggested two distinctive models operating at the regional or local levels that linked up with resource sharing and creation of ad-hoc consortium.

> The non-governmental organization model links government and non-government organizations through the provision of resources, while the quasi-public authority model links government and non-government organizations through creation of a single hybrid organization designed to carry out the development strategy chose by the government partner…These developmental tasks are most likely to occur at the regional or local levels (p. 58)

In the planning domain, a number of collaborative planning programs have been introduced in US cities as an attempt to provide an opportunity for citizens to participate formally and more actively in city revitalization tasks (Ghose, 2005). Programs such as

[13] Schaeffer and Loveridge (2002) use the terminology 'Public-Private Cooperation (PPC)'

Neighborhood Strategic Planning (NSP) of Milwaukee and Neighborhood Revitalization Program (NRP) of Minneapolis have been designed to incorporate citizens' visions to reshape blighted urban space (Elwood, 2002b).

Scholars of public administration also have studied PPP significantly. PPP has been used both in industrialized and developing countries with a trend of searching for new models for public service delivery, particularly since late 1980s. The logic of supporting partnerships is that, by working together, community organizations can draw on the broad range of resources and experience provided by the other organization in the network, and, as a result, the health and well-being of community members will be improved (Provan & Milward, 2001; Provan, Veazie, Staten, & Teufel-Shone, 2005).

In the US context, the use of nonprofit organization in this partnership has become an essential part, and gotten attention of the public administration scholars. Governments have been working with the third sector, organizations and civil society associations, in many cases with or without the involvement of business organizations. Drucker (1990) claimed that non profit institutions are central to American society and perform many of social tasks. Especially in the field of IT, governments are working together with private or nonprofit sector experts to design and implement effective and efficient service delivery systems (Heeks, 1999).

Agranoff (1991; 2003) and O'Toole (1997; 2003) highlighted the formation of cooperative partnerships or networks of mostly nonprofit and public organizations to address the broad needs of a community, especially in health and human services.

Given the importance of this body of literature, many scholars have provided the definition of partnership.

Vigoda-Gadot (2003, p. 21) defined the PPP as "an arrangement of roles and relationships in which two or more public and private entities coordinate/combine complementary resources to achieve their separate objectives through join pursuit of one or more common objectives." Walzer and York (1998, p. 48) discussed the definition of partnership, stating that the "ambiguous nature of partnerships and the varied ways in which they are managed force us to ask a set of detailed questions about the agencies involved and arrangements." They described *formal* partnerships in which the '*both the city and the private agency have a substantial long-term interest… these projects are usually formalized through an agreement…*' suggesting three basic ingredients: 1) long-term agreements between participants, 2) established procedures for managing the partnership and 3) economic development outcomes expected by participants.

In a report by National Council for Public Private Partnership, "PPPs are defined as contractual arrangements that lie between outsourcing and privatization, where public and private entities share goals, pool resources and divide responsibilities to achieve common as well as independent objectives. They differ from contracting out in that the private sector partner usually makes a substantial at-risk investment of its capital and other resources.[14] Partnerships can be established through the use of for-profit and non-profit entities (HDR, 2005, p. 1)."

Akintoye et al listed five features common to various versions of PPP concepts. First of all, partnerships involve two or more actors. Second, each participant is a principal, i.e. each participant is capable of bargaining on his or her own behalf. Third, they establish an enduring and stable relationship among actors. Fourth, each of the participants brings something to the

[14] 'Outsourcing is the contracting out to private sector firms for the supplying of government goods or services while the public entity remains fully responsible for their provision. This approach usually involves no transfer of public sector risk to the private sector.
Privatization is the shifting of whole functions and responsibilities from a public entity to a private entity, almost always involving the irrevocable transfer of public sector assets.

partnership. Fifth, a partnership implies that there is some shared responsibility for outcomes or activities (Akintoye, Beck, & Hardcastle, 2003).

What is similar among the slightly different definitions above is that partnerships consist of multiple actors who are not subjected to others but who work together to create synergy or common goals. In short, the actors are interdependent and there is no hierarchical structure.

In this dissertation research, the operational definition of partnership is "two or more organizations working together to achieve some common goal in an alliance," from the National Council for Public Private Partnership, which is common denominator through the works discussed above. Also, in this dissertation "partnership" denotes Public-Nonprofit (or w/ Business) Partnership for the NIS development. I use collaboration and partnership interchangeably in exploring how organizations in an NIS development partnership network work together, given the significant overlapping bodies of literature discussed in the previous two sections.

3.1.3 NIS as Information Technology in Public Administration

This section now moves to a review of the information technology discussion found in public administration scholarship. Throughout the literature review, it can be seen that research in this area is based on the premise that advanced IT in the1990s and 2000s has provided a powerful tool for reinventing local governments (Audirac, 2002; Bovaird & Loeffler, 2002; Ho, 2002; Kettl & DiIulio, 1995; Scavo & Shi, 2000).

NIS is an IT innovation application, which is built by a partnership network consisting of public, private, and nonprofit organizations engaged in local governance and community development. Studying bodies of literature that address the impact of IT on organizations is

relevant and thus follow below. First, information systems, database systems, and computing in public administration were the topics of the study particularly in earlier part of public administration scholarship that dealt with information technology. Based on this group of scholarly works of IT in public administration, e-Government and e-Governance studies have followed and increased since the late 1990s.

Over the past decades, information technology, particularly with the development of Personal Computer (PC) and the Internet, has steadily diffused to government organizations at all levels, following the diffusion of IT in the business sector. An earlier part of public administration scholarship delved into the study about adoption and utilization of IT in public administration. In public administration scholarship, the work done by Kraemer and his associates dating back to the late 1970s and 1980s is extremely relevant and considered as a milestone (Bretschneider, 2003). Bretschneider (2003, p. 738) stated that current e-government research for use of the Internet by government is very similar to a 20-year-old debate on the issue of public management information systems, "pitting proponents of new information technology against those who suggested that existing organizational and political relationships would dramatically influence any use of new technology." Thus, this line of scholarship is very relevant to this NIS study as the NIS development and utilization bring new IT in existing organizational and political environments of local governance.

As Kraemer and his associates' work set the stage for research of IT adoption and utilization in the public sector in public administration scholarship, they proposed a model that IT usage is influenced by external factors (for example, environment of the organization) and internal factors (for example, managerial control), based on local governments (Kraemer &

Dedrick, 1997; Kraemer et al., 1989). They basically asserted that IT must be combined with human and environmental resources to implement effective IT adoptions.

Bretschenider (1990) followed in a similar direction and found interdependence, accountability and the position of an IT director made a difference in IT adoption and utilization. Recently, Gil-Garcia and Pardo (2005, p. 191) summarized and expanded these works, listing factors of challenges for e-government initiatives as follows: "information and data, IT, organizational and managerial, legal and regulatory, environmental variables." Gagnon (2001) found that different types of behaviors by managers affect the adoption of new IT. Shi (2002) focused on organizational factors such as leadership style and strategic planning, and examined their influence on the implementation of electronic government commerce.

Advancing the works mentioned above, one of leading scholars in IT and politics, Fountain (2001) argued that agencies should consider customers and constituency in adopting IT. She builds on existing socio-technical perspective and asserts that organizational factors shape IT design and utilization. She classified three groups of variables as influences on institutional change with IT: technological variables, managerial variables, and political variables (Fountain & Osorio-Urzua, 2001). In short, Socio-technical systems theory recognizes the complexity of technologies and the embedded social system.

In critiquing Fountain's work, Norris (2003) argued her work was a repackaging of the dominant extant theory in the field, socio-technical systems theory. His critique suggested that Fountain's "Enactment Theory" model is also a same thing as a socio-technical systems theory. This debate is relevant for an NIS study because those recognized scholars identified political and managerial variables as important in implementing a new IT. The development of NIS is

more than simply putting new software or information system. It entails collaboration of local stakeholders who operate in a political and managerial environment locally.

According to Pardo et al, Socio-technical perspective or theory emerged from the work of Trist in the 1950s and 1960s to provide a framework for joining the social and technical perspectives of organizational studies (Pardo, M.Cresswell, Dawes, & Burke, 2004). Simply put, this foundational work relies on a basic premise: there is a joint system operating: a social and a technical system within which people perform functions. Thus, performance of an organization is dependent on the fit between these two systems. Socio-technical system is also embedded in an environment that is influenced by a culture and its values of organizations.

Heeks and his associate (Heeks & Bailur, 2007, p. 249) did a meta-analysis of 84 papers on e-government research and found that most of them are written from a socio technical perspective rather than social determinism perspective or technological determinism perspective, stating the majority of e-government researchers reject crude technological determinism in favor of a recognition that human or social factors have at least some role to play.

In short, these scholars see e-government research as mostly coming from a socio-technical perspective or making use of socio-technical systems theory, whether the research explicitly identifies their framework as such or not. Thus, most e-government studies fall on this category.

From the early work of public management information systems and computing to e-government studies, scholars of public administration stressed the importance of managerial and environmental resources in implementing IT tools. This point is applicable for an NIS study. Implementation of an NIS in this dissertation is an ongoing social and political process rather than a one-shot system installation. Impact of technology may not be direct or immediate and

politics can be either a barrier or enabler, depending on the situation. Thus, building an NIS is more than just an IT issue but embedded in local governance environment.

Some selected works to draw variables of IT adoption and utilizations are displayed in the following table (see Table 3.3) at the end of this section. This works as a foundation for studying the effectiveness of NIS and its development.

Just as public administration literature moved to an analysis of governance in changing face of the public sector from 1980s to today, the e-government literature now focuses on e-governance. E-government constitutes the way public sector institutions use technology to conduct administration and to embrace the delivery of existing services, such as government to citizens (G2C). E-governance, however, is not simply about technological or physical application for public affairs but about the ways political and social powers are organized and used. E-governance deals with how the citizens interact with the government or influence the legislative or public sector processes (P. Kim, 2004; Riley, 2003).

In 2000s, e-government studies is expanding to e-governance studies in public administration scholarship as Internet technology gradually has become a cost-effective and user-friendly medium for communication between governments and the public. IT helped shifting the focus of governance to its external relationship with citizens (Ho, 2002; Riley, 2003). Thus, inter-jurisdictional and inter-sectoral arrangements get more critical in IT enabled governance (Bovaird, 2004, 2005; Kernaghan, 2005). Moving from 'e[15]-government' to 'e-governance' in the recent scholarship, scholars have argued that e-governance stresses electronic engagement and networked societal guidance, which builds on characteristics of governance

[15] E (electronic) means digital technology that allows people to interact with anyone, at any time in any place, using the Internet and other ICTs' ((Song, 2002)

such as processes and coordination with the environment outside of government[16] (D. Brown, 2005; Coe, Paquet, & Roy, 2001; P. Kim, 2004; Riley, 2003; Snellen, 2002).

The rise of e-governance refers to the new processes of coordination made possible by the advent of technology (Roy, 2003). Understanding e-governance at all levels is also a key issue in local governance studies. NIS demonstrates e-governance at a community level and studying NIS management can contribute to the understanding of e-governance. In sum, this dissertation studies utilization of IT in the community development field from the lenses of 'local governance' and 'e-governance'. Thus, this group of work is relevant to this NIS study as well.

In the past decade, scholars have studied how IT influences the public sector's structure, functions, and performance. IT can drive governments to reinvent the way they work. Governments used IT from the late 1980s to improve efficiency within the organization (Ho, 2002). With the arrival of the Internet, IT steered governments to enhance its external relationship with citizens. IT played an important role in this change, and that can be labeled as reinventing government with IT (Scavo & Shi, 2000).

Scavo and Shi (2000, p. 170) explained that "IT simply makes it more possible for lower level government officials to do their jobs more effectively. This increased effectiveness can mean making it easier for line officials to deal with the public in such matters as responding to public questions, concerns, and requests. It can mean increasing the efficiencies of line officials in routine service activities. " One of their examples comes from the city of this dissertation pilot case study, Pittsburgh. Pittsburgh was awarded Innovations in American Government in 1999 by the Ford Foundation. In short, they claimed that utilizing IT helped governments improving efficiency and transparency of governments' business.

[16] Characteristics of governance by Kettl (Kettl, 2002)

There are other scholarly works that studied e-government and its interaction with the public. Musso et al (2000) found that a city government website works well as a management enhancement tool but does not contribute to democratic values. Scott (2006) investigated 100 municipal websites and learned that they provide a variety of information to citizens, but it can be interpreted differently according to the theoretical lens through which it is viewed, whether the expectation comes from a simple representative theory or direct-democracy theory. Danziger and Anderson (2002) did a meta- analysis on the impact of IT on public administration out of more than 200 articles published from 1987 to 2000 and found that almost half of the findings identify changes in capabilities the public sector, which are categorized into 'information quality,' 'efficiency,' and 'effectiveness.' About one fourth of the findings looked at the IT impact on interactions of governments with citizens or other sectors. The majority (65%) reported a positive impact of IT on interactions. Thomas and Streib (2003) cautioned, however, that most citizen contact through government web sites are only to obtain information and lack a true interactive potential. This group of works is relevant to an NIS study as it deals with governments' transparency, public participation, and community empowerment.

Some scholars in Europe also have looked at public participation with IT, which is what they call e-participation and e-consultation, stressing the point of citizen's involvement through IT. This is a part of or a big overlap with e-governance scholarship, but approached with more focus on the citizen participation. Macintosh (2006, p. 365) defined e-participation as "the use of information and communication technologies to broaden and deepen political participation by enabling citizens to connect with one another and with their elected representatives." E-consultation can be defined as "the use of electronic computing and communication technologies

in consultation processes and is complimentary to existing practices," according to e-consultation research project.[17]

Chadwick (2003) argued that a new form of digital technology has a democratization effect on e-government and e-democracy, in a study to understand how IT is reshaping governance. He outlined how these IT practices are converging in four principal areas: "online consultations integrating civil societal groups with bureaucracies and legislatures, the internal democratization of the public sector itself, the involvement of users in the design and delivery of public services, and the diffusion of open-source collaboration in public organizations."

Macintosh and her associates examined how current e-participation tools work as a way for local authorities to engage with citizens (Macintosh, 2002, 2006; Macintosh, Malina, & Whyte, 2002; Macintosh & Whyte, 2006). Coleman investigated how IT can enhance higher levels of citizen participation and democratic deliberation, including alternative voting methods (Blumler & Coleman, 2001; Coleman, 2001; Coleman & Gøtze, 2001).

Research of IT has shifted to the interaction of the government with its outer environment. With the exception of discussion of a few topics such as the intranet between government agencies (Welch & Pandey, 2007), many IT issues of government's inside operation and management have already been examined considerably, if not sufficiently. We are seeing a shift of research looking more at its relationship to the citizens and other sectors (Calista & Melitski, 2007; Evans & Yen, 2006; Parent, Vandebeek, & Gemino, 2005). Thus, the terminology of e-governance is gaining more attention, in distinguishing its research from classical managerial issues of e-government studies. This dissertation research can benefit from this body of scholarship as an NIS deals with more than just a managerial issue of IT

[17] http://www.e-consultation.org/

implementation but the interaction of public and nonprofit sector. I provide a brief illustration of similarities and differences between classic e-government studies and an NIS as e-governance study in the following table (see Table 3.2).

In sum, this section provided a relevant literature review of existing scholarship for an NIS study. First, earlier information system and computing in public administration studies and e-government studies can help answering IT implementation questions. Second, recent e-governance studies can help answering public participation and community empowerment questions.

Table 3-2: Comparing e-Government and NIS as e-Governance: Similarities and Differences

	e-Government	Neighborhood Information System
Domain	Public Service	Community Development
Technology	Web, database	Web, database, mapping technology (GIS)
	Succeeding Public Management Information System in parts	
Goal	Better service, cost-efficiency, effectiveness, responsiveness, public participation	Economic development, revitalization of community, neighborhood indicators, effectiveness of data sharing, public participation
Example	www.firstgov.gov, DMV - Licensing Service	http://neocando.case.edu/cando/index.jsp. social, economic, parcel data
	Census Data, Business Data, Some Tax data	
Key player	Government agencies	Nonprofits leading, Gov't & Univ partners
Theoretical relevance	New Public Management: Reinventing Government, Public-Private Partnership (Contracting out vs. in-house IT dept.), public participation	New Public Management: Reinventing Government, governing by network, Public-Private Partnership, University-Community Partnership, Nonprofit strategic alliance-partnership, public participation

Selected variables of adoption and use of information technology from the literature are summarized in the following table. These variables will work as a roadmap in conducting this research, particularly being a foundation for coding the transcribed interviews and writing up the survey questions.

Table 3-3: Adoption and Use of IT: Some Variables from the Literature

Author	Variables	Method	Findings	Note
Kraemer et al (1989)	External factors (size and economic activity of organizations), internal factors (managers' control)		Both internal and external factors affect	
Bretschneider (1990)	Interdependence, accountability, IT user (MIS) position	Factor analysis, Regression analysis	Greater interdependence, accountability in public sector makes PMIS face more red tape	
Bugler (1999)	Organizational motivations under differing environmental conditions: organizational and environmental factors, and their interactions	Survey, regression analysis	Agencies motivated to gain better tools to control the level of work internally tend to have higher levels of technology adoption. Strategic motives are shaped and conditioned by environmental changes. Environmental conditions are changing, agency strategies to improves departmental image reducing costs or promote service are associated with lower levels of technology adoption	
Scavo & Shi (2000)		Essay with literature review	Technology capacity such as in-house unit or IT director is important	
Fountain (2001)	Technological variables (quality of IT infrastructure), managerial variables (capacity, culture of an agency), political variables (administrative turn over, resistance, changes in executive direction)	Conceptual Essays w/ some cases	Only when these variables and interrelationships take place, org. and institutional changes occur	Book chapter

Table 3.3. Adoption and Use of IT: Some Variables from the Literature (continued)

Y.-M. Kim & Song (2001)	Transaction cost theory variables (market competition, Information System cost) Organizational Factors (Gov't type: council-manager vs. mayor-council, city size, IS dept existence, levels of hierarchy) Diffusion of innovation (imitation of other governments, attendance at conferences)	Survey, ANOVA, regression analysis	Council-manager type is more likely to allocate a higher percentage of IS outsourcing, more resources available to a city government, the less likely outsourcing its IS functions, information from neighboring gov't positively related to related to IS outsourcing	IT outsourcing study, but good reference for listing variables and measurement
Gagnon (2001)	Behavior of managers (typology-entrepreneurs and administrators, measures of behavior-strategic orientation, commitment to opportunities, to resources, management structure)	Survey questionnaire, descriptive statistics	To improve chances of successful adoption, different approaches to different types of managers are needed	
West & Berman (2001)	Management practices, stakeholders, politics and conditions	Survey, descriptive statistics	Use of IT is not affected by revitalized management practices but organizational impact of IT is.	
Rocheleau & Wu (2002)	Resource-oriented variables (IT staff, IT spending, training, etc) Perception-based variables (importance of IT in decision making, end-user training, CEO's attitude toward training)	Qualitative data Wave Analysis (to compare early vs. late users) t-tests to compare private and public sector variables	Private sectors invest more on IT training as they see IT as a core competency	Public Management Information Systems (PMIS) Comparison of information sharing needs to be researched
Northrop (2002)	Managers' support, ongoing training	interviews	IT constantly revolving, so is the challenge of its management and use	

Table 3.3. Adoption and Use of IT: Some Variables from the Literature (continued)

Moon (2002)	Barriers: lack of technical, personnel, and financial capacities	Descriptive Statistics	Municipality size and type of government (council-manager gov't more active in IT innovation than mayor-council gov't)	2000 e-government survey data collected by ICMA
Holden, Norris, & Fletcher (2003)	Demographic variables: population size, form (mayor-council or council manager) and type (city or county) of government, region (northeast, NCenral, west, or South) and metro status (central, suburban, or independent cities)	ICMA survey	Barriers: lack of technology staff, financial resources, technology expertise, security issue, upgrade IT issue	
Ho & Ni (Ho & Ni, 2004)	Internal organizational (resource, political support) and external peer influence (constituency pressure, progress of others) factors to influence the adoption decision of e-government features	Survey (single state study) Correlation analyses, Regression	political leadership and concerns about staff workload are significant factors	Points out concerns about a digital divide between urban and rural jurisdiction, good reference for survey questions
Kernaghan (2005)	Political/legal, structural, operational/managerial, cultural barriers	Conceptual essay	Creating new service delivery models, perfecting partnerships, establishing effective governance framework, dedicated funding as solutions	
Humphrey, Kim, & Dudley (2005)	Funding, staff, managers with high levels of discretion	Exploratory survey, ANOVA	Size does not affect, lack of funding is a challenge, designated funding increases IT	How nonprofits use IT (digital divide),
Ramasubramanian (2004)	Cost for systems and data, cost associated with training staff	Case study	Significant contributions of IT lie in their ability to assist CBOs in reframing problems to influence local policy decisions.	

3.1.4 NIS as Public Participation GIS

Next, as we move through the shift from government to governance, the advance in technology led to e-government and then e-governance. Related to this, there is the rise of public participation Geographic Information Systems (PPGIS), which developed in the context of economic development. Now in this section, it is reviewed within another sphere, PPGIS. This section provides a review of works done in a domain of PPGIS, which became a venue where many NIS project teams presented their works in addition to the scholarly works studying public participation with utilizing GIS.

GIS technology provides spatial information and can offer a complete view of a community to its citizens because GIS can overlay and analyze interrelationships among different kinds of data sets in a powerful visual manner. GIS is used by local, state, and federal governments in a wide range of domains including economic development, environmental management, public safety, planning, and disaster management and response (Eglene & Dawes, 2003). With a few exceptions that highlighted the potential of GIS in public administration and policy, GIS-related management and governance issues are not fully discussed in the public administration scholarship (M. M. Brown & Brudney, 1998; Haque, 2001).

The domain of urban planning, however, has a rich history of using and studying GIS. Over the last decade, scholars from urban planning and geography convened at GIS related workshops with a common interest of addressing barriers in the institutional settings within which GIS is practiced. They formed PPGIS workgroup and conference. PPGIS.net describes its history.

> The term 'Public Participation GIS (PPGIS), which was coined at the National Center for Geographic Information and Analysis (NCGIA) Workshop, Orono, Maine, July 10-13, 1996, to cover a specific geographical context (North America), and for a particular

purpose - how GIS technology could support public participation for variety of possible applications [18] ." Since then, this workshop has grown into an annual nationwide conference held by the Urban and Regional Information System Association (URISA), beginning in July 2002 at New Brunswick, New Jersey.[19]

So, this group of scholars was interested in utilizing GIS to help public participation. Many of them do some type of service learning and community outreach projects that they help community groups and citizens with their technology expertise. They sought ways to devise using GIS easier for the public.

According to Sieber (2001; 2006), PPGIS pertains to "the use of GIS to broaden public involvement in policymaking as well as to the value of GIS to promote the goals of nongovernmental organizations, grassroots groups, and community-based organizations." [20] Many scholars in the PPGIS domain are interested in studying spatial knowledge production for neighborhood revitalization and community development. Leitner et al (1998) proposed six models for making GIS available to community organizations: community-based (in-house) GIS, university-community partnerships, GIS facilities in universities and public libraries, map rooms (city planning office), Internet map services, and neighborhood GIS centers. Elwood and many others (Craig & Elwood, 1998; Elwood, 2002a; Elwood & Leitner, 2003; Ghose, 2001, 2003; Haque, 1998; Pinkett, 2003; Policy Link & LISC, 2002; Seedco, 2002; The Urban Institute, 1999) have examined how neighborhood organizations use GIS to produce spatial knowledge to

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[18]PPGIS website has its history (http://www.ppgis.net/ppgis.htm),

[19] I have been fortunate to be able to attend PPGIS conferences to follow up on and locate the relevant information for my dissertation research. As I was doing that, I presented a study, 'The Role of the University in the Partnership for IT innovations of Community Development: Utilizing Universities' Assets for 'Neighborhood Information System' Development' in 2005 PPGIS conference, which was a pre-study to this dissertation research, and it was published in an academic journal (Hwang, 2006). That study highlighted the asset of the university and its positive role in the NIS partnership.

[20] Doug Aberley and Renee Sieber provided a comprehensive scope of PPGIS definition at the first PPGIS conference in 2002. They stated that "*PPGIS is an interdisciplinary research, community development and environmental stewardship tool grounded in value and ethical frameworks that promote social justice, ecological sustainability, improvement of quality of life, redistributive justice, nurturing of civil society, etc;*."

help their revitalization strategies in their community development. Some argued that GIS helps in engaging citizen participation and empowering community organizations.

A couple of notable scholars have advanced this theme to look at the association of GIS, organizational, and political factors such as different types of community organizations and the complexity of citizen participation (Ghere & Rismiller, 2001; Ghose, 2005; Ghose & Elwood, 2003; Ghose & Huxhold, 2001; Ramasubramanian, 1999, 2004). The works of Ramasubramanian and Ghose were especially influential for this research as they dealt with organizational and political factors of GIS implementation and citizen participation.

With the development in desktop GIS and online mapping, some scholars in the planning domain, led by Sawicki and others, became interested in building neighborhood-level indicators as a means of measuring neighborhood problems and designing policies to address them (Kirschenbaum & Russ, 2002; Sawicki & Craig, 1996; Sawicki & Flynn, 1996; Treuhaft, 2006; Treuhaft, Chandler, Kirschenbaum, Magallanes, & Pinkett, 2007). Others furthered works of measuring neighborhood problems and assist community development by looking at developing Neighborhood Information Systems either providing comprehensive data sets or only topic specific ones such as ones on crime or housing, most of which were coordinated with NNIP (Bailey, 1997, 2000; Kingsley, 1998, 1999; Pattavina, Pierce, & Saiz, 2002).

A group of scholars led by Sawicki addressed the importance of the neighborhood indicators or information systems. Sawicki and his associate (Sawicki & Flynn, 1996, p. 179) summarized the role of neighborhood indicators as: "geographic indicators play a special role that is potentially more important than that of subject area indicators, because policy gets administered through geographic units and because neighborhoods and cities themselves affect the quality of people's lives." He diagnosed in 1996 that the geographic indicator movement was

in its infancy, especially on the neighborhood scale. A group of scholars including Sawicki, started building an information system to provide neighborhood conditions data. Some were heavily involved in the early works of NNIP as founding members. Since then, a decade has passed with solid work by NNIP partners and a few others. This dissertation revisits the theme of his work in this sense.

These works at PPGIS are relevant to public administration as they often discuss making government produced data open to the public. Hoffman (2003) pointed out that PPGIS depends on local governments sharing its data with nonprofits and citizens. He illustrated that competing ethical issues come into play when disseminating public data; 'transparency of government, privacy and security, fiscal responsibility.' As he pointed out, discussion of transparency of government is also meaningful. In sum, PPGIS literature is very relevant in studying NIS developments particularly for the discussion about transparency of governments and empowerment of citizens during the course of public participation.

A classic work by Arnstein (1969) is considered as the origin of scholarly work on public participation. She (1969, p. 216) describes participation as "the redistribution of power that enables the have-not-citizens, presently excluded from the political and economic process, to be deliberately included in the future" and offered a typology of participation, 'a ladder of citizen participation', which can serve as a guide to measure the degrees of public participation and empowerment. In this model, eight types are arranged into the three categories of citizen power, tokenism, and nonparticipation[21]. The model suggests that providing better access to data and knowledge will help move up the ladder of citizen participation.

[21] Eight types she offered were: Manipulation, Therapy (Non Participation), Informing, Consultation, Placation (Tokenism), Partnership, Delegated Power, and Citizen Control (Citizen Power).

Many public participation programs were implemented by the government because a requirement was specified in the by-law of state or federal government. Public participation became mandates or requirements in particularly in land use planning and environmental policies. Public hearings and other mechanisms were required before elected officials approve a final plan for the locality. Roberts (2000, p. 309) stated laws give citizens the right of access to government information, widely knows as freedom of information (FOI) laws. The US adopted its first Freedom of Information Act (FOIA) [22] in 1966 and all 50 state governments had similar laws by 1984. This was done from the public demand that American citizens had constitutional rights and government information should be available to the public. Also many mandated public participation programs are considered to be meeting the notion of democracy.

In generic public administration literature, the Tennessee Valley Authority (TVA) can be discussed as a starting point of the public participation as its purpose was to provide information to the public to sell public projects with gaining local support (Selznick, 1949). This was called a cooptation approach, which was to involve supportive members of the public for the public agency operations.

Succeeding these early milestone works, two notable groups of scholars in public administration have advanced public participation discussion. One group of scholars approached this as involving public in the decision making process of bureaucracy and deliberation of democracy. Thomas (1993; 1995; Thomas & Streib, 2003) applied a theory of decision-making to examine appropriate levels of public participation. He (1990) also tested that public decision

[22] The Freedom of Information Act (FOIA) is the implementation of freedom of information legislation in the United States. It was signed into law by President Lyndon B. Johnson on July 1966 (Amended 2002), and went into effect the following year. This act allows for the full or partial disclosure of previously unreleased information and documents controlled by the U.S. Government. The Act defines agency records subject to disclosure, outlines mandatory disclosure procedures and grants nine exemptions to the statute. ("Freedom of Information Act (United States),")

with greater managerial and technical elements yielded less public involvement and public decisions with greater legitimacy need yielded greater public involvement. Some other scholars (C. S. King, Feltey, & Susel, 1998; Webler & O'Renn, 1995; Weeks, 2000) studied ways that public participation can be better delivered in deliberative democracy context in public administration.

Another group of scholars studied 'citizen participation' as civic engagement, which calls for building stronger civil society by fostering collaboration between neighborhood groups with city agencies so that we could build more democratic governance. This body of work is best highlighted in a recent public administration volume 65 no 5 in 2005, from the Civic Engagement Initiative Conference[23] in 2004 led by Terry Cooper (Berry, 2005; Bingham, Nabatchi, & O'Leary, 2005; Boyte, 2005; Cooper, 2005; Kathi & Cooper, 2005; Portney, 2005). They are promoting and studying initiative from the grassroots for their collaboration and deliberation in the public policy process.

Public participation literature is very relevant in studying NIS as NIS endeavors empowering community groups with providing access to data and assisting their capacity building. So, this part of section provides foundation for a hypothesis regarding NIS and community empowerment, which will be discussed in the next chapter.

3.2 SUMMARY

This chapter provided the literature review of existing scholarship that are relevant to study NIS as a recent phenomenon happening in a post-bureaucratic paradigm. In the next chapter, I will

[23](http://www.usc-cei.org/?url=about.php , accessed March 19, 2008)

suggest an analytical framework and a conceptual model for investigating a partnership model to build an effective NIS.

4.0 ANALYTICAL FRAMEWORK AND HYPOTHESES

This section presents the analytical framework for this dissertation research, drawing from existing scholarship discussed in the previous section, and provides hypothesis to examine. The first part summarizes collaborative governance as an overarching theoretical lens for this dissertation research, which was formulated through literature review and a pilot study. The second part delineates the research questions and hypotheses, looking at "what makes an NIS effective" and "how the partnership works." The third section presents a conceptual model which illustrates the relationship between characteristics of collaboration and the effectiveness of NIS.

4.1 FRAMEWORK: COLLABORATIVE GOVERNANCE

The overarching theme of this NIS study in relation to public administration scholarship is new governance in a post bureaucracy paradigm. Within this theme, collaborative governance serves this dissertation research well as an analytical framework, since the NIS develops with the partnership and collaboration of multiple organizations from multiple sectors and operates in a local governance setting. In the previous chapter, I addressed the theme of this study, new governance. I will, here, briefly re-capture the discussed new governance literature. Yet, this is specifically focused on describing the 'collaborative governance' which serves as an analytical framework for this dissertation research.

Tang and Mazmanian[24] sum up a definition of collaborative governance well:

> "A concept that describes the process of establishing, steering, facilitating, operating, and monitoring cross-sectoral organizational arrangements to address public policy problems that cannot be easily addressed by a single organization or the public sector alone. These arrangements are characterized by joint efforts, reciprocal expectations, and voluntary participation among formally autonomous entities, from two or more sectors — public, for profit, and nonprofit — in order to leverage (build on) the strengths and resources of each (Tang & Mazmanian, 2007, p. 2)."

To recap, collaborative governance is a combination of two overlapping concepts, *collaboration* and *governance* as discussed in Chapter 3. Governance is a term used to highlight increasing public participation and nonprofits roles, indicating a shift from the government exercising its authority in a hierarchical manner. Government, then, can be defined within the jurisdiction of where its authority is exercised in conducting administration of policies. Governance is a broader term and includes both formal and informal relationships and networks for decision making and problem solving. Therefore, 'governance' framework broadens our attention to linkages between government and its broader environment (Kettl, 2002).

Collaboration is an essential tool for dealing with the increasingly complex social problems that public and nonprofit sectors are encountering nowadays. As Kettl (2006, p. 13) stated, "the growing complexity of problems and increasing interdependence in trying to solve them unquestionably increases the wickedness of policy issue." Thomson and Perry (2006, p. 20) further commented that "collaboration is becoming an imperative for public managers. Devolution, rapid technological change, scarce resources, and rising organizational interdependencies are driving increasing levels of collaboration." Fung (2006, p. 74) argued for the benefit of civic engagement in governance, stating that "citizen participation serves three

[24] the Bedrosian Center, School of Policy, Planning, and Development, University of Southern California (the Bedrosian Center's website: http://www.usc.edu/schools/sppd/bedrosian/consortium)

important democratic values: legitimacy, justice, and the effectiveness of public action in complex governance."

In this dissertation research, I use Tang and Mazmanian's definition of collaborative governance but operationalize broadly as "organizations from multiple sectors working together on a shared goal, which involves activities to increase public participation and civic engagement." This framework is suitable for studying NIS development because it involves collaboration and partnership between nonprofits, universities, government agencies, and sometimes private companies to build an IT project to contribute to increase civic engagement.

Although public administrators have always collaborated to some degree in the past, we have witnessed an explosion of collaborations in the public administration over the past decade, whether intergovernmental or sectoral (O'Leary et al., 2006). High profile cases of collaboration failure such as hurricane Katrina and September 11, 2001, terrorist attacks highlight the need for academic scholarship in this area.

Particularly with the rapid advancement of information technology in recent history, there are increased expectations and examples of collaborative governance and civic engagement. For example, '*AmericaSpeaks*'[25] came up with the innovative idea of using an IT tool to facilitate a new way to approach town meetings with the intention of engaging citizens in governance. The new electronic tool, '21st Century Town Meeting', can accommodate a huge amount of public participation. This was very popular in the press when they used it to convene the public so they could be involved in the decision making process of designing the future of lower Manhattan after the September 11 attack. In fact, many of us read about this in the popular media. This, too, can be labeled public participation with a relationship to IT, e-democracy, or e-governance.

[25] AmericanSpeaks's website is http://www.americaspeaks.org/

Although a lot less well-known than the 21st Century Town Meeting by AmericaSpeaks, the NIS has slowly established its presence in local economic development and community revitalization across the US in the past decade. The NIS aims to create better data access and knowledge utilization using an innovative IT tool, which in turn can increase public participation in the local governance. At present we are seeing the early fruitful indications of NIS endeavors in such forms as a success story of CDC's winning a grant in part by using an NIS.

In recent public administration scholarship, it is argued that collaborative governance offers a holistic approach, which promotes more public participation and civic engagement. It is also argued that collaborative governance increases the transparency and accountability of government agencies. Thus, it is fitting to use the lens of collaborative governance to discuss whether the effective NIS contributes to better data access and public participation or transparency of government agencies. In doing so, this NIS research can also serve as an empirical testing of a changing paradigm in public administration.

4.2 RESEARCH QUESTIONS AND HYPOTHESES

The central question of this study, 'What makes the partnership work to build an effective NIS?' can be broken down into two segments. One is 'What is an effective NIS?', and the other is 'Which partnership model works better to build an NIS?'

Accordingly, the following sets of questions have been formulated:

RQ1-1: Evaluation of the NIS effectiveness: How are NISs used by community development stakeholders?

RQ1-2: What constitutes NIS as an effective information sharing tool in community development? How can NIS help local governance?

RQ2: Governance/Partnership Model: What factor(s) makes partnerships able to develop a successful and effective NIS?

Kingsley (1999) identifies the characteristics effective and successful NISs have, saying they are:

1. Sustainable. They remain available and continuously update information over time, not just for a single funding cycle.
2. Data diverse and content rich. They include more than Census data.
3. Useful. Local decision makers actually use the system to help with decision making, planning, and evaluation.

Hypotheses

H1: Democratization of Information (Better Data Access): The NIS increases data sharing among stakeholders in community development in the region.

It discusses the NIS as an information sharing tool for the community development stakeholders or not. One of the principles underlying the NNIP project is that indicators must be capable of serving as a base for citizen action and public policymaking (Sawicki & Flynn, 1996). Success of these project illustrates that NIS should be designed to increase information sharing. As a first step to evaluate the NIS, this study will empirically assess whether the NIS created better access to local administrative and community data for local stakeholders. Better access and increased data sharing denote that local stakeholder in community development has gained

access to the local administrative and other types of data that were impossible or difficult to get before the NIS. The measurement and data collection will be discussed in the next chapter.

H2: Empowerment: NIS contributes to the empowerment of nonprofit groups.

Most NISs are designed to assist grassroots community organizations and nonprofits in doing their community development tasks or to help with the government information system management process. This hypothesis is set to examine if the use of NIS fostered public involvement in policymaking process. There is a wide range of public participation by the citizens and community groups, ranging from public hearings and policy advocacy. This research is not set out to differentiate which type of public participation is more influenced by the NIS, but rather to gauge at changes in public participation broadly. This hypothesis looks at how information technology tools such as NIS play a role in community empowerment[26]. The NIS aims to put the data and knowledge in the hands of community organizations and nonprofits. NIS could contribute to the empowerment of local community groups, if NIS provides appropriate data and knowledge to nonprofit groups. Empowerment means community organizations gain knowledge and build more capacity, which leads to the sense of empowerment and increased involvement in local governance. The concept of empowerment is big and thus difficult to oeprationalize and measure. For this research, survey and interview approach will gauge how nonprofit groups use their respective NISs.

H3: Transparency**:** An effective NIS contributes to the transparency of government agencies.

[26] Giving communities the power to solve their own problems (Osborne & Plastrik, 2000).

Does the NIS raise the transparency of government agencies? NISs aim to draw active engagement of government agencies in sharing data to result in the creation of better policies. As an instrument of government accountability, transparency has been heavily discussed in the public administration discipline recently. Transparency means information about activities of government is open and accessible. Transparency is important because it is often used as a means of holding public officials accountable. If the NIS is effective in sharing governments' data and disseminating it to the other stakeholders in local governance, it could also contribute to the transparency of the governments.

H4: Partnership Model: Interaction of government and civil society is positively associated with the NIS development partnership.

Switching the focus from assessing the effectiveness of NIS to the investigation of a partnership model to build an NIS, this hypothesis discusses the relationship of partnership and NIS development. This hypothesis is to test whether the collaborative governance aspect is positively associated with the development of an effective NIS or not. NIS is the phenomenon that would have not been possible or easy to implement in a strong bureaucratic paradigm, but was built and diffused across the U.S. within the context of a post-bureaucratic paradigm. Collaborative governance alludes to higher interaction of government and civil society and higher trust among them in this research.

The direction of causality, whether collaborative governance environment enables the development NIS or NIS promotes the governance structure, is a point to be studied in future

research. Yet, it seems that there is a cyclical relationship where the governance environment affects the development of NIS, which in turn then influences governance processes.

4.3 CONCEPTUAL MODEL FOR PARTNERSHIP AND THE EFFECTIVE NIS

A conceptual model of collaborative governance looking at the relationship of partnership and NIS development pertaining to the second research question –the partnership model- is presented below.

In this model, relevant constructs are identified according to the analytical model described above and the hypothesis suggested. They are 'effectiveness of NIS', 'strength of NIS project partnership', 'collaborative environment dimension', 'managerial dimension' and 'institutional arrangement dimension.'

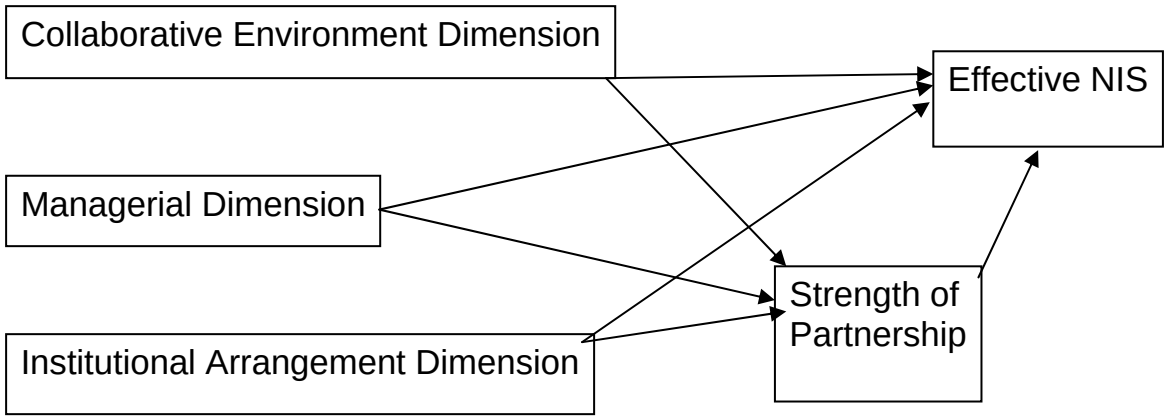

Figure 4-1: Conceptual Model of the Relationship of Partnership and NIS

This model is intended to describe the anticipated relationship of partnership characteristics with the NIS effectiveness. On the left side, the characteristics and environments

of NIS project partnerships are displayed. The model estimates the direct influence of those on building an effective NIS and the indirect influence via project partnership strength. In other words, I reason it is possible to have a situation where a strong partnership leads to the building an effective NIS or it is possible to have a case where the partnership itself worked great but didn't result in the building or sustaining of an effective NIS. The following table illustrates the operationalization of the constructs.

Table 4-1: Operationalization of the Constructs (Measurement)

Construct	Operationalized Indicator (Survey Question Items)
Effective NIS (Effectiveness of NIS)	Index of NIS effectiveness (data-richness + usefulness + user-friendliness)
Collaborative environment dimension	Interaction/Collaboration, Trust
Managerial dimension	Strength of NIS project management leadership, Cultural difference of project team
Institutional arrangements dimension	Formal agreement (legal agreement, MOU, contract), existing partnership history

The operationalized constructs are based on previous studies, inputs from experts, and my participant observation. The effectiveness of NIS has three composite variables such as data richness, usefulness, and user-friendliness. Those three encompass elements of the effective NIS, defined by Kingsley (1999) that were introduced earlier in this chapter, as well as user-friendliness that is generic and widely accepted measure of any information system.

For the partnership dimensions, degrees of collaborative interaction, managerial leadership, and institutional arrangements are to be looked at. More detailed discussion on this will be provided in the next chapter.

4.4 SUMMARY

This chapter provided the literature review of existing scholarship that are relevant to study NIS as a recent phenomenon happening in a post-bureaucratic paradigm. The chapter, then, suggested an analytical framework and a conceptual model for investigating a partnership model to build an effective NIS. In the next chapter, I will discuss the research design and methodology to conduct this research.

5.0 RESEARCH DESIGN AND METHODOLOGY

This chapter presents a research design and methods to study how to build effective Neighborhood Information Systems. As illustrated in the previous chapter, this dissertation looks at the research questions: 1) What is the effective NIS? 2) What kinds of partnership models work to build it?

This chapter is divided into two sections. The first section discusses the threats to valid and reliable results of a research study. The research design is a multi-method, combining qualitative and quantitative approaches, as an attempt to enhance validity and reliability.

The second section presents the three components of the research design. The first component is a pilot case study of the Pittsburgh Neighborhood and Community Information System development. The second component is an extensive study to cover the most of the population of NISs. A web-based survey was utilized and statistical analysis was done. The third component is a comparative small N case study, which is added as an extensive study to complement the quantitative part of the research.

The third section is to discuss the work plans for the data collection and analyses. It will briefly illustrate what types of analysis would be used in accordance with types of data collected as an effort to answer the research questions.

5.1 MIXED METHOD, COMBINING QUANTITATIVE AND QUIALITATIVE STUDIES

This section discusses the employed research design for the dissertation research. It provides a rationale for choosing a mixed method approach and discusses the issues of triangulation, validity, credibility, and reliability. Then, the later part of this section introduces three components of this dissertation research: exploratory pilot study, extensive study, and intensive study.

A multi-method approach or mixed method design is an approach that uses both quantitative and qualitative research methods because each has it advantages and disadvantages. The multi-method, therefore, improves the validity and reliability of your results if the different methods provide the same conclusions. Thus, mixed method design for this NIS study helps in addressing the threats to the validity and reliability. For instance, qualitative approach adds value when we need to look at how partnerships work to build an NIS, and quantitative approach works more effectively when we want to get feedback from NIS users in a wide range.

It is believed that quantitative methods have well-established statistical properties that support external generalization from a sample and for this reason, quantitative research is generally considered to be strong in testing hypotheses as a confirmatory science. Qualitative research is usually viewed as an exploratory or explanatory science with a weakness in generalizing the findings. The debate between two sides of research methods originates from different paradigmatic foundations and needs much more expansive and detailed discussion than this oversimplified summary.

Yet, this dissertation research attempts to bring strengths of both methods in research designing. I argue that using both quantitative and qualitative methods can enhance this research,

studying what kinds of partnership model work well to build NISs. Tashakkori and Teddlie (2003, p. 15) argue that "a major advantage of mixed methods research is that it enables the researcher to simultaneously answer confirmatory and exploratory questions, and therefore verify and generate theory in the same study."

This research is a methodologically mixed design that is comprised of three components. Three components are analyzed in a sequential order. The first component is an exploratory study. It is a pilot case study using qualitative methods including interviews, and fieldwork (meeting minutes and field notes)[27]. Case study can be a very appropriate method for an exploratory investigation (Yin, 2003a, 2003b). This case study serves as an exploratory study as a part of an upcoming larger parts of the dissertation research. The second component is an extensive study. It is a quantitative analysis using a survey instrument. The third component is an intensive study. It is a set of comparative case studies to complement the statistical analysis by adding the depth of the research.

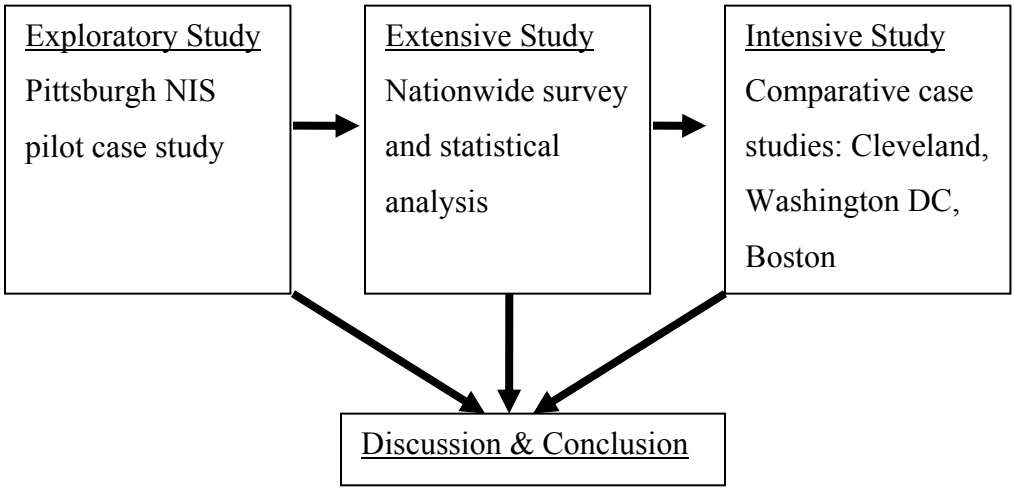

Figure 5-1: Three Components of Research

Source: Author

[27] Quasi-participant observation: I worked as project team member and the observation was used for setting up backgrounds and context for this research. I had some of 'loose' field notes based on meeting notes.

While complete in themselves, these components are to complement each other to make this dissertation research more robust (Brewer & Hunter, 1989; Creswell, 2003; Jick, 1979; Joanna, Lynne, & Kevin, 2002; T. I. Miller, Kobayashi, Caldwell, Thurston, & Collett, 2002). This dissertation follows a group of scholars (Morse, Barrett, Mayan, Olson, & Spiers, 2002; Morse & Mitcham, 2002), who believe one of the two competing paradigms should be given priority and serve as the foundation for mixed methods research. Statistical analysis from a survey serves as a center piece of the dissertation as giving a priority to the quantitative paradigm, in terms of setting up research design and chapters of this dissertation.

Statistical analysis of structured survey data is a strong method in testing external validity of a model (Babbie, 1998). This has an advantage to inference the findings from a sample to the general population and is a well established and popular choice of method in the discipline of public administration and other social science disciplines.

However, it might be difficult interpreting the results, particularly in putting the causality or explanation in the context. Such limitation can be overcome by adding a case study method. The case study method has strength that a researcher explores and traces how and why the outcomes arrived. Thus, the rationale for employing a multi-method approach in this research is to enhance its reliability and credibility.

In sum, this research combines the statistical analysis with a comparative case study using qualitative analysis. One part of the dissertation research is to investigate the influence of partnership models on the development of an NIS, which was discussed in the previous chapter containing research questions and hypothesis. The survey method is useful to examine which factors have a significant relationship on the effectiveness of NIS. Another part is to examine propositions discussed in the partnership and governance literature in the public administration in

an attempt to explain the relationship of the independent variables such as trust, leadership, and resource dependency to the development of NISs.

Next, qualitative analysis through a comparative case study is designed to investigate partnership characteristics in depth. This is to explore how the characteristics and quality of partnership affect the implementation of NISs. If we find the regular patterns among the variables from the qualitative data, the results can suggest a confirmation of theoretical arguments. Thus, the use of two methods in this dissertation research may achieve triangulation and enhance the validity of the findings.

5.1.1 Discussion of Triangulation, Validity, Credibility, and Reliability

One goal of the research is to test or evaluate a theory that it is believed to be valid. Then, a strategy of the research takes its consideration to internal validity, construct validity, external validity and reliability issues.

Cook and Campbell (1979, p. 37) state, "we shall use the concepts validity and invalidity to refer to the best available approximation to the truth or falsity of propositions, including propositions about cause…since one can never know what is true." This research employs the triangulation, using multiple sources of data, multiple methods, and multiple coders of qualitative data. This can bring "convergence of evidence (Yin, 2003b, p. 100)" that can guide us to a better understanding of the phenomenon.

So the benefit of employing the multiple methods is the triangulation that tests the consistency of findings through different research instruments, methods, and possibly different research philosophy traditions. This strategy attempts to recognize the weakness of each method and enhance the validity of the study as a whole by creating a synthesized strength. For this

dissertation research, quantitative analyses from the structured survey helps external validity, and qualitative analyses from semi-structured interviews will help reliability and credibility, particularly with multiple coders, and add the depth of understanding the context.

Usually, this effort of multi methods to minimize the threats to the validity is limited by resources such as time and finance.

External validity refers to the approximate validity with which conclusions are drawn about the generalizability of a causal relationship to and across populations of persons, settings, and times (Cook & Campbell, 1979, p. 39).[28] *Internal validity* and *construct validity* in the quantitative tradition is similar to *credibility* of qualitative study or case study. [29] *Reliability* refers to the consistency of measurement.[30]

Whether it is a qualitative or quantitative approach, it is important to ensure that the measurement tool used in the research is reliable. [31] This research tried to enhance reliability by employing multiple data source, multiple modes of analysis, and multiple coders. Whether it is about interview protocol or survey, measurement errors are threats to reliability. Pre-testing survey was done to raise reliability of survey measurement for statistical analysis. By bringing

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[28] (Refer to the works of Cook and Campbell, 1997 and Trochim, 2006 for the extensive discussion on the validity) External validity is to generalize the findings from the research. It is derived from the idea of statistical sampling, within an epistemology of positivists' tradition. Yin (1994, p. 32) introduced analytical generalization, stating case study approach does not rely on external validity in a statistical generalization sense but relies on analytical generalization to produce replicable studies.

[29] Internal validity is about establishing casual relationship and construct validity is about the validity of measurement of your constructs in operationalization in your study. In qualitative approach, credibility of the research refers to somewhat similar discussion of internal and constructs validity (Trochim, 2006). Yin (2003b, pp. 116-126) explains there are several ways to enhance credibility for case study approach such as pattern matching, explanation building, and time-series analysis. There is always a trade-off between external and internal validity as increasing similarities within observations would enhance internal validity and increasing heterogeneity within observation would contribute to external validity.

[30] Trochim (2006) uses the metaphor of target, 'Think of the center of the target as the concept that you are trying to measure. Imagine that for each person you are measuring, you are taking a shot at the target.'

[31] Some scholars have called reliability in qualitative research '*dependability*' (Trochim, 2006). Some others argue '*authenticity*' should be a main criterion to judge '*reliability*' concept (Silverman, 1993, 2004). Another group of scholars have sought ways of using computer software in coding the document and brining in multiple coders as an attempt to enhance reliability as a part of credibility building process. In sum, reliability is pertinent to both of quantitative and qualitative approach but there is a difference in terminology and practice.

another coder to analyze interview documents, this research also tried to raise inter-rater reliability.

In an effort to enhance credibility of the qualitative analysis, the analysis was conducted using a qualitative data analysis software package, 'ATLAS.ti', once qualitative data are obtained from interviews. ATLAS.ti allows researchers to administer, aggregate, and analyze meaningful data from the qualitatively sorted data. Shulman (2006, p. 11) stated "the benefits of using ATLAS.ti are significant. It allows for scalable, replicable, transparent, multi-coder passes over substantial quantities of text… as well as the possibility of systematic tests of inter-rater reliability." He also claims that multiple coders and multiple rounds of coding would enhance reliability of observations. This became my motive to hire an additional coder to review the interviews I have conducted. The central question for my interview was to ask 'How did you collaborate to build an NIS? How can we make an NIS more effective?' A list of elaborated questions of interview protocols is provided in the appendix.

This research aims to enhance internal validity by employing a multi-method approach. Particularly for the partnership model question, this research carried out crafting constructs carefully based on existing scholarship and my observation and experience in fieldwork well as utilizing multiple coders with qualitative data analysis software. For the effectiveness of NIS question, this research tried to cover most of NIS population in getting feedback from users in order to enhance external validity.

In sum, this approach of having multiple coders and multiple rounds of coding was to enhance the replicablility and credibility of the research. Chapters 6 and 8 will illustrate how this was done.

5.1.2 Potential Limitations of the Employed Research Design

This section discusses advantages and limitations of the mixed method research design, employed for this dissertation research. This section has two parts. First part briefly touches on the limitations of each method. Second part discusses the limitations of the mixed method approach and how this research coped with these constraints.

Quantitative analysis or statistical analysis is widely used in social science. Particularly using survey questionnaire, researchers can cover bigger sample sizes so they can make statistically significant inferences from a collected sample to a larger population. This is a classic way to attain a high level of generalization, which Cook and Campbell (1979) call external validity. In this dissertation research, the study population is NIS cities and I study collaboration and partnerships to build NISs. Findings of this research are significant to the NIS population but not necessarily generalizable to a broader population of government and nonprofit collaboration.

Statistical analysis does not automatically tell us causality of the variables. It does not take us easily to the in-depth look of how the event occurred and operated. It also can be difficult to obtain the information under the surface with a survey questionnaire approach. Thus, identification of causality of partnership variables is not automatic.

In contrast, qualitative analysis with interview data in a case study setting can provide a rich explanatory data. They can help us to go deeper and find the details in each case. They are not particularly designed for generalization for a broader population, but to obtain knowledge about how and why. In practice, knowledge generated from a case study gets compared to similar cases and transferred. The main weakness of this method is that it does not produce high external validity. However, some scholars argued that well-developed qualitative approach can

yield highly credible and valid results (Brower, Abolafia, & Carr, 2000; Lee, 1989; Yin, 2003b). Thus, selected four NIS cases here may not be generalized for the entire NIS population.

Ideally, employing both quantitative and qualitative approach should yield more robust and credible results. In practice, there are some challenges and constraints. First, different philosophical foundations of research traditions are embedded in each approach. Paradigms or worldviews of each approach were derived from very different research philosophical traditions (Creswell, 2003; Creswell & Clark, 2007). One of several ways to categorize different paradigms of methodology approaches is to classify these into positivism, post-positivism, critical theory, and constructivism (Guba & Lincoln, 1994; Silverman, 2004). Positivists or some of post-positivists share a belief system that facts can or should be separated from values in conducting research. They are interested in creating generalization in explaining the phenomenon. Post-positivists added the recognition of human values and a limited ability in rationalizing. Herbert Simon would be a typical case for recognizing limited but reasonable rationality, in which he called bounded rationality. Both of these traditions are influenced by the belief that social science should be scientific. In short, most research in these traditions were heavily relied on the concept of inferential statistics to generate a theory of generalization from a representative sample.

On the other hand, critical theory and constructivists claim that 'facts' cannot or should not be separated from 'values.' They refute the notion that the objective knowledge is out there to discover. They maintain knowledge is created and endorsed by humans, thus research should actively embrace it in interpretation and explanation. This helps us to pay attentions to the context to understand the phenomenon better.

Consequently, a practical approach has been used in mixed method approach in order to deal with a big challenge of fusing contrasting paradigms and research philosophy. One approach serves as a main foundation and another one is to complement (Creswell & Clark, 2007). In this research, a quantitative approach is positioned in the center, with a statistical analysis of a survey. Qualitative approach was used first to help a quantitative approach and to complement the quantitative analysis at the end. If this were to become shorter pieces, two approaches of this research might stand independent of each other, but this research as a dissertation intended to exercise the power and utility of both sides, which is to take advantage of statistical analysis for its greater external validity and qualitative case study for its rich story telling.

This brings a practical implementation issue. Using a mixed method design with multiple approaches would require more time and resources.

5.2 THREE COMPONENTS OF THE RESEARCH DESIGN

This section presents the three components of the research design: exploratory, extensive, and intensive studies.

5.2.1 Exploratory Pilot Study: Case Study of Pittsburgh NCIS Development

The first component of my research was a pilot case study of the Pittsburgh NCIS, which helped to craft the survey. This pilot study largely drew from my fieldwork engagement as a project team member of the Pittsburgh NCIS development over 2003-2006. The case study approach is particularly useful when the research is yet in the early stage with not so clearly structured research problems.

This dissertation study started from my experience of working as a team member of building the Pittsburgh Neighborhood and Community Information System (http://www.pghnis.pitt.edu). Working as a project assistant to Sabina Deitrick, Ph.D. on Pittsburgh Neighborhood Information System development, I produced benchmark studies and literature reviews for the partnership alliance. In doing so, I was able to witness partnership dynamics and issues with IT implementation.

My observation in this Pittsburgh NCIS development was informal but active. It was informal as there were no pre-designed observational protocols. It was active because I participated as a team member, contributing to the teamwork with benchmark studies. I also studied meeting notes and my own notes about meetings. My experience as a team member enabled me to observe partnership dynamics as an insider, particularly when the PNCIS project was a newly developing effort. At the same time, my role was not the project leader or key decision making stakeholder in the partnership, so it was possible in the sense of keeping some distance to observe the situation.

This pilot study of Pittsburgh case was exploratory. The goal of exploratory case study is to discover issues and patterns from a phenomenon (B. G. Glaser & A. L. Strauss, 1967). The purpose of this pilot study was to explore the partnership issues and dynamics with a plan to proceed with a second stage of extensive study. I used network analysis, and qualitative analysis using fieldwork observation and interviews of development stakeholders in exploring issues of NIS development. Network analysis was used to visually identify the dynamics of actors of the development partnership. Its goal was to provide a visual representation of partnership dynamics to help understanding of partnership of Pittsburgh NIS as an exploratory stage.

In short, this exploratory study developed to craft the research questions and hypotheses. Interviews and observation in fieldwork were used to explore the key issues of partnership. Grounded theory, "a general methodology for developing theory that is grounded in data systematically gathered and analyze" was utilized (Denzin & Lincoln, 1994, pp. 204-205). Grounded theory was used because it works well when investigating for relatively un-chartered territory or to gain new perspectives in a familiar setting (Stern, 1980). The Pittsburgh NIS case was relatively un-chartered study area and I wanted to get better understanding of the Pittsburgh NIS development.

Next, the choice of qualitative method was to use semi-structured interviews. I tried to keep the balance having neither too open nor too leading questions for the interviews (Kvale, 1996, pp. 133-135). How this was conducted, including whom I interviewed and how grounded theory approach was used will be discussed in detail in the next chapter.

With the information gathered from observation, meeting notes, and network analysis instrument, I tried to discover what organization with which resource plays a central role in the partnership network, utilizing network analysis method. Social network analysis was used to examine the partnership network structure of information exchange among these organizations. By measuring information exchange, it can show that the organization in a central position has a prestige and leverage in the network. Chapter 6 will discuss this pilot study.

5.2.2 Extensive Study: Nationwide Survey and Quantitative Analysis

The second component of the research was a quantitative analysis using data collected from a nationwide survey. The survey has two objectives. First, the survey is to collect feedback from users of NISs across the nation, such as their usage, satisfaction, and suggestions. This will be

used to assess the effectiveness of the NIS. Second, the survey has an additional goal to collect data from project team members regarding their partnership experiences to probe a working partnership model. Learning from Pittsburgh case study and literature review process, a survey instrument was developed as a Likert scaled user-perception survey.[32] The survey is used for a quantitative analysis as an extensive study to enhance the rigorous aspects of empirical social science research, particularly for the external validity. A structured survey is suitable for a larger number of observations. It works well when there is a need to collect data from a large number of organizations or individuals. Structured survey instruments with standardized questions produce data that can be a good fit for statistical analyses (Babbie, 1998).

The survey is comprised of two parts. First, it asks the perceptions of NIS users to evaluate their respective NIS to do a comparative study of NIS evaluation in terms of usage pattern, user satisfaction, and the effectiveness. Perceptions are appropriate measures for use of IT in organizations as, for instance, email and system usage logs cannot distinguish 'usage increase by confusion' from 'usage increase for productivity (M. M. Brown et al., 1998).' Second, it asks NIS development stakeholders to assess their partnership characteristics to identify a better working partnership model for a statistical analysis.

Descriptive statistics would be useful to see the patterns of usage across the different NISs. An effective NIS index was created by multiple question items, combined with data-richness, usefulness and user friendliness. One-way ANOVA test was used to see the difference of user satisfaction among different NISs.

There were three tasks in preparing and distributing the survey. The first task was choosing the format and type of distribution of the survey. An online format and distribution was

[32] Survey instrument is in the appendix (see Appendix C).

chosen. There were a number of reasons why an on-line format was chosen. First, the survey asks questions of information technology system users. The focus of the study is to compare the usage of NISs across the nation, thus online survey will better reach users of the NIS.

The second reason for an on-line format is resource constraints to conducting a traditional "pen and pencil" survey in the mail, nationally (Fink, 1998). Internet-based surveys are growing, in part they cost less and the survey administration and data collection is automated (Carr, 2006). Online survey was made using commercial online survey company service called 'Survey Monkey' (http://www.surveymonkey.com) for its inexpensive and user-friendly management tools. An alternative choice was to hire a programmer to design an online survey with a web server hosting service, but it was not chosen due to budget constraints although it can have an advantage of a full customization option. Using an online survey service helped me in recording of survey responses, which was designed to manage survey responses in a manner of automation. Graphics were minimized for a faster page downloads, which can improve response rates (Dillman, Tortora, Conradt, & Bowker, 1998; Fink, 1998). Furthermore, I made a starting point- the first page of the survey on the University of Pittsburgh web space (http://www.pitt.edu/~shwang/survey.htm). In doing so, I was able to legally use University of Pittsburgh logo with a full control of design of a starting page, which made my online survey looked more professional and academic rather than something of a random web marketing survey.[33]

[33] This method satisfies IRB because it has an advantage of alleviating privacy concern of IRB as it does not collect any identifiable information such as email addresses of respondents.

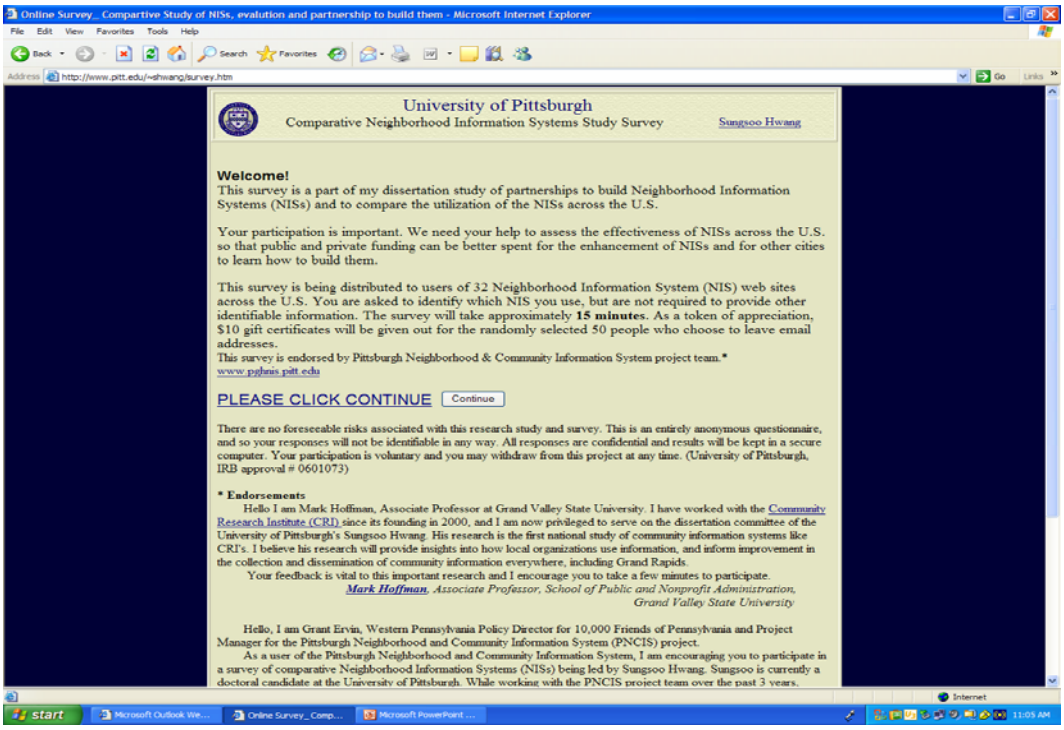

Figure 5-2: Screen Capture of the Welcome Page of the Online Survey

Source: http://www.pitt.edu/~shwang/survey.htm

Another advantage of online survey is that it can direct respondents to read questions in the desired order, using screening questions. Screening questions that direct the respondents to the certain portion of the survey can be confusing in paper surveys. Web-based survey can be programmed to only display the related questions, so there is no need for additional instructions (Carr, 2006).

Thus, research shows that using a web-based survey is expected to increase response rate from such a population who use computer and Internet in a regular basis compared to paper-and-pencil surveys (Selm & Jankowski, 2006).

The focus of the study is to compare the usage of NISs across the nation rather than to investigate how many citizens or nonprofits use the system at this stage. Online survey will leave out those who have no access to email and Internet. Yet, the population of this study is the users

of the NISs. In short, this research is to address the usage patterns and suggest the enhancements, rather than to study how diffused NIS usage is in the communities or general public. Thus, online survey is a good fit for this research.

The second task in preparing and distributing the survey was to identify potential respondents. The survey was conducted on a national scale, for 34 NIS sites on the web through email invitations (see table 1 in the chapter 2 for the list of NIS sites). Today, 29 NISs are partnered with the National Neighborhood Indicator Partnership (NNIP). There are more in the planning and development stage. NISs to be surveyed include 29 NNIP partner NISs plus 5 other NISs that I became familiar with the annual PPGIS (Public Participation Geographic Information System) conferences by URISA (Urban and Regional Information Systems Association). These NISs represent most of NIS population. They use many different governance and funding forms, which was studied in this research.

Emails were sent out as an invitation to participate. A web link was provided in the email so that respondents can come to the web site where they can answer the questionnaire.

The third task was to identify a mechanism to encourage potential respondents to complete the survey. A nominal lottery prize ($10 gift card) was devised in an effort to increase the participation and decrease the number of incomplete responses with an option of leaving their email addresses (Bosnjak & Tuten, 2003). This lottery prize has a danger of creating multiple entries with different email addresses by the same individual, but it does not pose a big threat with a very moderate amount gift, considering the population of the study. The rationale for making it an optional to put an email address is to protect confidentiality as an anonymous survey mechanism, which is an important issue. This part of the dissertation research will

enhance the empiricality of quantitative research. Chapter 6 will discuss the results of survey and statistical analysis.

5.2.3 Intensive Study: Comparative Case Studies with Qualitative Analysis

The third component of this research design is a comparative case study. It was conducted to complement the survey as an in-depth study. The main goal of a small N comparative study in this stage is to validate or improve the findings from the previous two components of the research. The rationale for multiple case study design is to pursue a detailed understanding of replications that yields similar or contrasting results. Three cases with contrasting conditions and results will add values to the understanding of a partnership question, given the nature of this project, which is to complement the quantitative part of the study. Thus, the goal of having three cases is to analyze not only within the context of one city, but to also compare similarities and differences that different cases may reveal. Case studies are well known practice for acquiring detailed information about a study subject (Lee, 1989; Yin, 2003a). In public administration literature, Barzelay (2001) and Heady (1996) urged to employ comparative case studies. Multiple case studies have often been used as comparative case studies in public policy discipline (Brewer & Hunter, 1989; Yin, 1993).

This part of the research focused on the question of the partnership because of the need to look at the process when studying partnership and collaboration, although identifying effectiveness of NIS was examined as well. Qualitative technique often has the advantage of looking at 'how' question, which looks at the processes, whereas my survey was better suited to find out the NIS usage patterns. Three NIS sites were selected by 'size of the city and partnership' and 'type of leading organization.' Case selection is elaborated more in the

following paragraph. Stakeholder analysis was first done to identify key players in NIS development partnership networks. Semi-structured interviews were conducted face-to-face and phone interviews were added to cover as many partners in the development partnership network as possible. Hybrid coding technique was used for this stage of research. Utilizing participation experience and coding from a first phase of this research, an explorative study of Pittsburgh NIS, I coded documents and reports produced by experts of NNIP at the Urban Institute to develop a coding scheme to code transcribed interviews in an effort to answer research questions of this research. It is illustrated more in the data analysis section and case study chapter 7 to follow.

In sum, this case study compares the NIS development partnership in four cities- Pittsburgh, Cleveland, Washington DC., and Boston based on 'size of the city and partnership' and 'type of leading organization.' I conducted interviews of key players in these sites, and staff members of National Neighborhood Indicator Partnership program at the Urban Institute in Washington D.C. The Urban Institute acts as the national headquarter for NNIP Partners.

Table 5-1: Case Study of the Four NIS Sites

City	Pittsburgh (Pilot Study Case)	Cleveland	Washington DC	Boston
NIS name	PCIS- Pittsburgh Community Information System	NEO CANDO- Cleveland Area Network on Data and Organizing	Neighborhood-Info DC	The Boston Indicators Project
Type of leading organization	Nonprofit-funding intermediary	University	Nonprofit- Urban Institute	Foundation
Size of city	Mid	Mid	Large	Large
Size of partnership- number of partners	Moderate (5~10)	Small- Few (up to 5)	Small	Small for project team, large for advisory board group
Coverage	City	City but expanding to region	Metro	City but expanding to region
Distinctive Characteristics	Non-NNIP member	A critical success story with a long standing sustainability	Regrouping/Rebuilding history	Indicator project advanced to build an information system

These cases represent critical case studies. First, Cleveland case is one of the prominent and one of the oldest NISs in the nation. Their system meets the criteria of an effective NIS through sustainability and data diversity. It has been viewed as one of the leaders in the NIS initiative. Cleveland NIS- NEO CANDO[34] is an example of university initiation. Cleveland case is also meaningful to study as the case bears an instant applicability and comparability to the Pittsburgh NIS development and sustaining progresses. The Cleveland case has collaboration from two universities and the city is very comparable to Pittsburgh in its characteristics such as size and history as it is located in the close region.

Washington, D.C. NIS- NeighborhoodInfo DC[35] is an example of that they are going through a transition of rebuilding the system. It is a partnership of the Urban Institute and the Washington DC Local Initiatives Support Corporation (LISC). The Urban Institute houses National Neighborhood Indicator Partnership and it has experienced staff in dealing utilizing and operating an NIS. DC LISC provides funding, technical assistance to community groups for housing and economic development issues. In short, the Urban Institute takes up on the data and technology management while LISC handles community outreach. This is a contrasting case to the Cleveland, as DC case faced sustainability challenges.

Boston represents yet another critical case for an NIS study. It is contrasting to many other NIS, as it started and focused on producing a solid neighborhood indicator reports, "Boston Indicators Project[36]" and then moved to build an information system, "Metro Boston Data Common[37]" to provide more access to regional data. This case also gives another contrast that a leading organization is a Boston Foundation, which is a nonprofit and a funding entity.

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[34] NEOCANDO's website: http://neocando.case.edu/cando/index.jsp
[35] NEighborhoodInfo DC's website: http://www.neighborhoodinfodc.org/
[36] Boston Indicator Project's website: http://www.bostonindicators.org/IndicatorsProject
[37] Metro Boston Data Common's website: http://www.metrobostondatacommon.org/

Pittsburgh is described in the previous pilot study section. Pittsburgh NIS[38] started from a vacant property working group, where nonprofits and universities worked together to solve vacant property issues in the neighborhoods and exemplifies a strong partnership between nonprofits and two universities. Chapter 5 will discuss the Pittsburgh case. Chapter 7 will discuss the other three cases and compare all four of them.

5.3 DATA

In this section, I describe the unit of analysis and processes of gathering empirical materials. Then, I present a plan for the analysis of collected data. The unit of analysis is related to the way that initial research question have been defined. The main unit of analysis likely to be at the level being addressed by the main study questions (Yin, 2003b, p. 25). The unit of analysis in this research is an organization. Organizations are the aggregate concerns of individuals who share problems and reflect their concerns as a collection (W. R. Scott, 1992, p. 159). This research includes organizations that are involved in the development of the NIS. These organizations are analyzed and compared to examine the proposed research question: probing a working partnership model. Each project team member represents his or her organization as a component of the organizations. The unit of observation for this research question is the individual project team members or other project partners at partnering organizations. Another unit of analysis is the NIS itself as an information system in answering the effectiveness of NIS research question: assessment of current effectiveness of the NIS. The unit of observation for this question is individual users of the NIS. Identifying data source and colleting data will be discussed next.

[38] Pittsburgh NIS website: http://www.pghnis.pitt.edu/

5.3.1 Data Collection

This dissertation conducted the data collection process using multiple sources of evidence: documents, interviews, observation, and survey instruments. This process started with identifying stakeholders using observation in my fieldwork and interviews for a pilot case study. Semi-structured interviews were conducted and transcribed to code for a qualitative analysis. Public archives including websites and reports are collected. Network data was also collected, although it was only for a Pittsburgh case. Structured survey data was collected as well. The table below summarizes data collection efforts in relation to the research questions.

Table 5-2: Data Sources and Needed Information

Research Questions	Data Source	Information
1-1. Evaluation of NIS: How are NISs used by community development stakeholders?	Survey Questionnaire	Perceptions of user group survey regarding usefulness of system Easiness of access to data sharing
1-2. Evaluation of NIS: What constitutes NIS as an effective information sharing network in community development?	Survey Questionnaire Public Archival (content analysis of web sites and reports)	Perception of data sharing among key staff members of organizations Comparing decision making process before and after NIS Sustainability and data diversity-content richness examined from the web
2. Partnership Model: Which partnership model or what makes partnerships work to develop a successful NIS?	Interviews Observation Network Analysis Survey Questionnaire	Successful community development decision makings due to NIS Resource interdependency, dynamics of power and communication

Given the small size of the NIS population, a decision was made to administer the survey to the entire sampling frame (i.e. conduct a census). As discussed in the previous section, the population consists of 34 NISs across the U.S. First, it was sent out to the NNIP partners and other NIS sites, asking to distribute to their email lists. Second, the email as an introductory letter asked respondents to forward to anyone who might be interested in participating. Third, the survey used email addresses of government agencies such as city planning, and IT departments

from their websites, which is public information. Fourth, I posted an invitation to the survey on a few ListServs, including NNIP ListServ and ARNOVA[39] ListServ.

The rational for choosing interviews for the case study parts is its strength in making us pay attention to processes. This often enables researchers to hear of stories behind and get more information from inside at times. The rationale for choosing online survey was discussed in the previous section of extensive study (5.2.2).

Field research was conducted in the three case study sites: Boston, Cleveland, and Washington DC. The purpose of these trips was to visit each NIS site and interview key players involved in the NIS development processes. In order to conduct interviews, I identified the key stakeholders with the help from the Urban Institute and representative partner from each site, knowing from either NNIP partner website or meeting in person from the conferences including Public Participation GIS and Urban Market Initiative Forum on Information and Urban Markets by the Brookings Institute.

Conducting the interviews and survey, I obtained an approval letter from the Institutional Review Board, University of Pittsburgh first. Details of conducting survey were discussed in the previous section (extensive study, 5.2.2.) and will be showed in the chapter 7 (extensive study results). Details of conducting interview will be discussed in the chapters 6 and 8. At times, phone calls were utilized. Interviewees were mostly project coordinators of NIS development and key partners who brought data, funding, or technology resources, in addition to some end users of the NIS. Interview protocols and survey instrument are in the appendix and the following chapters 6 to 8 will report the collected data and its analysis.

[39] Association for Research on Nonprofit Organizations and Voluntary Action (ARNOVA)

5.3.2 Data Analysis

The analysis of the research can be broken into three parts: 1) a descriptive analysis of stakeholders of an NIS development network; 2) a statistical analysis of partnership variables and NIS evaluation by effective NIS index; 3) a qualitative analysis of partnership dynamics of NIS development partnership networks. Elaborated discussions will be provided in the analysis chapters to follow.

A descriptive analysis of stakeholders of an NIS development network was accomplished by the first component of this research, an exploratory study, which will be discussed in the Chapter 6. A statistical analysis of the effective NIS index was accomplished by the second component of this research, an extensive study, which will be discussed in the chapter 7. There is not a consensus about what the effectiveness of NIS means and furthermore how to measure it. Even in the general Management Information System (MIS) domain, this has been the case as well. Delone and McLean (1992) stated that 'the dependent variable for information systems success has been an elusive one to define,' but introduced a comprehensive taxonomy, which posits six major categories, system quality, information quality, use, user satisfaction, individual impact, and organizational impact. Their work has established as a guiding taxonomy over the last decade with 150 articles referenced the Delone & McLean model in the MIS domain. Recently, they have revisited their model 10 years later and provided an updated model to measure e-commerce system success (Delone & McLean, 2003). As this dissertation research is one of very few studies about NIS, I took Delone & McLean model's approach and modified it to the NIS context. Yet, there is not an accumulated knowledge or body of scholarly work in how to measure its effectiveness. This is in part due to the fact that NIS is only a decade old phenomenon, and many of them are just a few years old. To measure the effectiveness of NIS in

this quantitative analysis, an index (composite variable) is created by combining three variables (composite survey measures), which are data richness (three survey question items), usefulness of NIS (four survey question items), and user-friendliness (three survey question items).

A qualitative analysis of NIS partnership dynamics was accomplished as the third component of this research, an intensive study, which will be discussed in the Chapter 8.

In an effort to enhance credibility of the qualitative analysis, the analysis was conducted using a qualitative data analysis software package, 'ATLAS.ti', once qualitative data are obtained from interviews. ATLAS.ti allows researchers to administer, aggregate, and analyze meaningful data from the qualitatively sorted data. Shulman (2006, p. 11) stated "the benefits of using ATLAS.ti are significant. It allows for scalable, replicable, transparent, multi-coder passes over substantial quantities of text… as well as the possibility of systematic tests of inter-rater reliability." He also claims that multiple coders and multiple rounds of coding would enhance reliability of observations. This became my motive to hire an additional coder to review the interviews I have conducted. The central question for my interview was to ask 'How did you collaborate to build an NIS? How can we make an NIS more effective?' A list of elaborated questions of interview protocols is provided in the appendix.

This approach of having multiple coders and multiple rounds of coding was to enhance the replicablility and credibility of the research. Chapters 6 and 8 will illustrate how this was done.

Network analysis is done by using UCINET,[40] a most widely used software tool in the social network analysis domain. This tool includes 'NetDraw' that allows visual representation of partners in the network and the links among them. Social network analysis is focused on

[40] Borgatti, S.P., Everett, M.G. and Freeman, L.C. 2002. Ucinet for Windows: Software for Social Network Analysis. Harvard: Analytic Technologies

uncovering the patterning of people's interaction. Network analysis is based on the intuitive notion that these patterns are important features of the lives of the individuals who display them. Network analysts believe that how an individual lives depends in large part on how that individual is tied into the larger web of social connections. Many believe, moreover, that the success or failure of societies and organizations often depends on the patterning of their internal structure.[41] This was done only for Pittsburgh case because of the practicality of network data collection.

For the statistical analysis, one way ANOVA and other comparing group mean tests were performed. Detailed discussion on statistical analysis will be provided in the Chapter 7.

5.4 SUMMARY

The purpose of a mixed method research is to enhance the understanding of the phenomenon by using a triangulation, as Tashakkori and Teddlie (2003, pp. 683-684) stated "systematic multiple ways of looking at a phenomenon can yield 'deeper' insights than a monostrand approach." For this dissertation research, this approach of a mixed method works well, given the nature of the research question, 'which partnership works well to build effective NISs?' Both of covering more population with a structured survey and statistical analysis, and covering in-depth for selected cases with qualitative analysis will give a better understanding of how partnerships works to build effective NISs and identifying better models in enhancing NISs, and possibly applying to other developing cities.

[41]What is network analysis?: The Study of Social Network by Linton Freeman, http://www.insna.org/INSNA/na_inf.html

For data collection, this research used materials from a range of sources: fieldwork observation, face to face/phone interviews, documentation study of publications and websites, and a structured survey. With the data collected, this research conducted 1) a descriptive analysis of stakeholders of NIS development networks; 2) a statistical analysis of NIS evaluation by effective NIS index; 3) a qualitative analysis of partnership dynamics of NIS development partnership networks. These analyses will be discussed in the next chapters 6 to 8.

6.0 EXPLORATORY STUDY: A CASE STUDY OF PITTSBURGH NCIS DEVELOPMENT

This chapter is a first of three components of the dissertation research, which set a stage for the following statistical analysis and comparative case study, serving as an exploratory study. This chapter explores the development of an NIS, particularly Pittsburgh case, utilizing descriptive stakeholder analysis with some visual displays in addition to interviews. Pittsburgh NIS case provides a newly developed and home-grown system.

Pittsburgh Neighborhood and Community Information System (PNCIS) project team started in the summer of 2003. A working group on vacant property, consisting of nonprofit program officers and university researchers, saw the need for a better data practice. In August 2006, PNCIS started its web services (http://www.pghnis.pitt.edu/). I have been involved as a team member from the beginning of the development in 2003. I contributed to the project team by providing benchmark studies and project marketing web site (http://infopitt.ucsur.pitt.edu/). This exploratory case study served as groundwork in building the survey for a quantitative analysis, which will be presented in the next chapter. I utilized my experience through my fieldwork and also conducted interviews for this exploratory study. My observation is mainly used for describing the background and help setting up other research tools such as interview and survey.

In 2007, the Pittsburgh case involved four organizations working together as a project team, partnering with seven City of Pittsburgh agencies, two other nonprofits in the region, and

two county government agencies. The project team is led by Pittsburgh Partnership for Neighborhood Development (PPND), a funding intermediary organization. Partnership dynamics of PNCIS development are illustrated in the analysis section of this chapter. The approximate cost to develop a system was $250,000. The next section provides more details on this.

6.1 BACKGROUND AND CONTEXT OF PITTSBURGH NIS

Although we can trace the origins of the concept and similar efforts done in Pittsburgh back to the late 1980's, the Pittsburgh Symposium on Vacant Land and Abandoned Buildings held in June of 2003 was a critical event. The symposium brought together universities, governments, real estate developments professionals, funding foundations, and others who were interested in creating a better information system about Pittsburgh neighborhoods. During the symposium, the Philadelphia Neighborhood Information System (http://cml.upenn.edu/nis/) presented their work and set off a drive of developing one for the Pittsburgh. Then, the current project team got together and started looking around existing examples across the nation to build a homegrown system. A well-articulated documentation of history can be found at Pittsburgh NCIS's website (http://www.pghnis.pitt.edu/history.htm). [42]

[42] University Center for Social and Urban Research, University of Pittsburgh (UCSUR) has a longstanding presence in developing a community database system. Over the previous two decades, UCSUR was able to put census data and other neighborhood indicators into the database system (See Appendix –a screenshot of an old Pittsburgh information system in 1970 and 1980's). However, technology advancements in the past decade, specifically in the area of the GIS and Web applications, have enabled NISs to work on a higher level with the result that today, by examining and analyzing neighborhood-based spatial data, organizations dedicated to community development are able to more efficiently and effectively engage in the dialogue of community development. The concept of developing a community information system in Pittsburgh goes back to the late 1980's. Researchers at the UCSUR began experimenting with various sets of government and social data to assist decision making in the areas of crime prevention and neighborhood improvement. As a hub for community information and applied research, UCSUR continued to hone the concept of improving neighborhoods by first improving the analytical view of the community. History of PNCIS is well documented at their website.

The Pittsburgh Neighborhood and Community Information System ascribes

> To the goals of the National Neighborhood Indicators Partnership, the Urban Institute: *To further the development and use of neighborhood-level information systems in local policymaking and community building.* The approach to create the Pittsburgh Neighborhood and Community Information System was based on building trust and creating relationships with key public sector partners in order to improve communities and people's lives and create positive neighborhood changes. To build trust, the project team attended dozens of meetings with representatives of many city and county departments, as well as several authorities and the Pittsburgh public schools (http://www.pghnis.pitt.edu/approach.htm)[43]

Figure 6.1 below documented milestones of PNCIS development history. In 2003, project team members and others in the community initiated the talk of developing a homegrown system particularly after the vacant property symposium held in Pittsburgh, through the meetings of Vacant Property Working Group at the Pittsburgh Community Reinvestment Group.

[43] (continuing from the quote in the main text) The CIS project team strives to work side by side with these partners to understand and demonstrate the value of information in addressing critical issues throughout Pittsburgh. These relationships have led to new partnerships and the acquisition of additional datasets. The process of developing such a system is incremental. It involves multiple players and the development of new relationships. The nature of these systems requires trust-building and networks, developed over time. The process is developmental and cumulative. We expect the nature of these relationships to strengthen over time and expect new partners and new users to be added continuously. Technology is an important component of CIS, but it is only a means to help community leaders to better address problems and act on opportunities. The CIS project team recognizes technology is not the end goal or automatic solution but is an enabler to effectively address community needs.

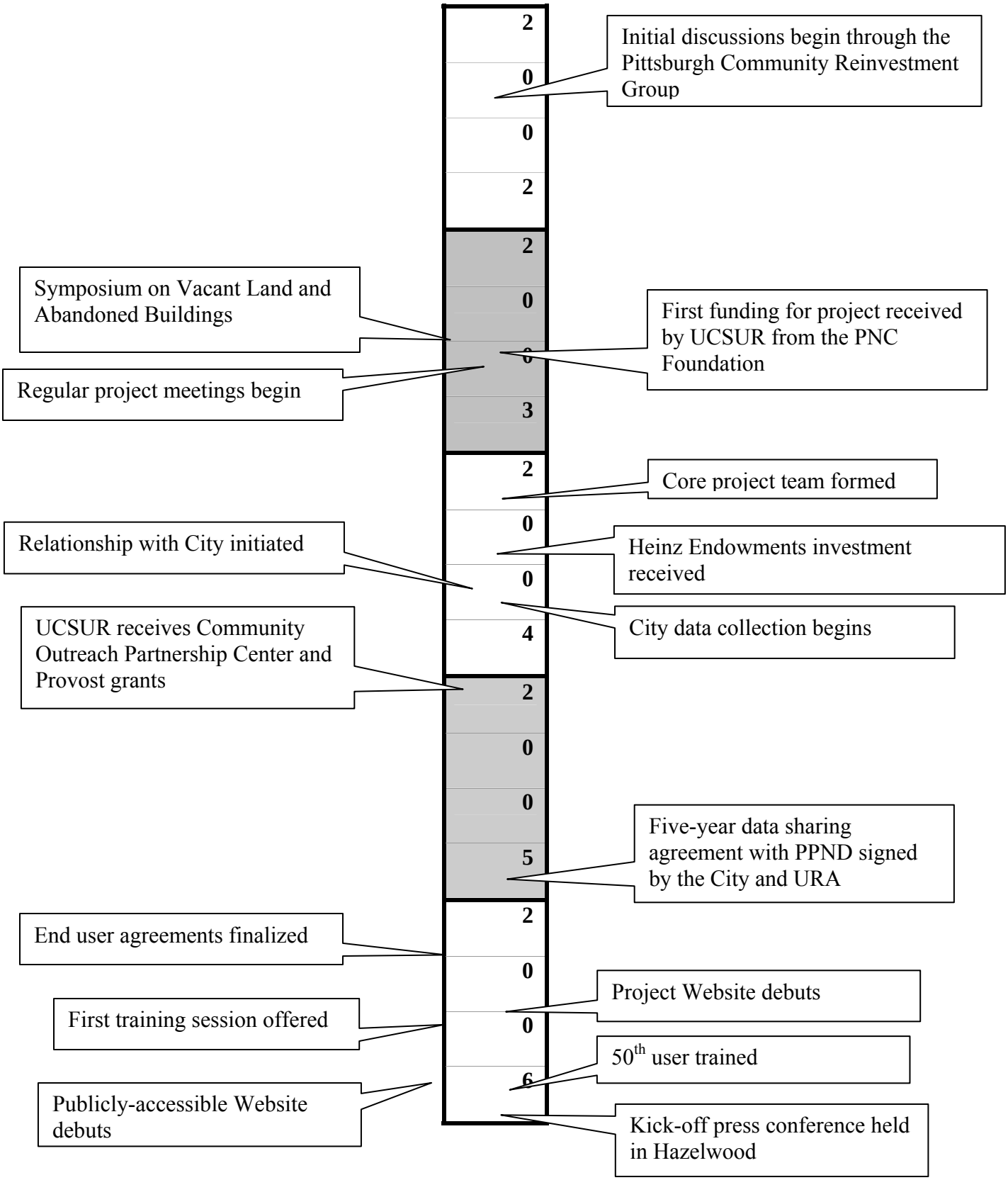


Figure 6-1: Milestone of PNCIS Development: (Source: PNCIS Business Plan May 2007, p16)

6.2 ANALYSIS OF A PITTSBURGH NIS DEVELOPMENT CASE

This section consists of two parts. First, stakeholder analysis is used to identify the participants in the Pittsburgh NIS development. Stakeholders include governments, nonprofits, universities, local foundations. Specific organizations will be discussed in the next section (see Table 6.1). Observations during my fieldwork and network analysis technique were utilized also with a stakeholder analysis.

Second, coding of transcribed interviews is presented in an exploratory manner, together with some descriptive survey results in probing the research questions.

6.2.1 Stakeholder Analysis

Stakeholder analysis is a technique to identify key people, groups of people, or institutions that may significantly influence the success of a project, policy or program implementation as well as for a collective decision making process. It assesses the roles of key actors and their importance (Mitchell, Agle, & Wood, 1997).

The stakeholder analysis here is descriptive. It is to identify the participants and their respective roles in the Pittsburgh NIS development in setting the groundwork for further analyses (See Table 6.1). For this research, participants in the PNCIS project are described. Network analysis technique was added to look at the changing dynamics of stakeholders.

Table 6-1: Participants in the PNCIS Development Process

Actor (Participant)	***Roles***	***Timeline***
Pittsburgh Partnership for Neighborhood Development /10,000 Friends of PA	Project team[44] (Project coordination, fundraising, marketing)	2003-current
University Center for Social & Urban Research, University of Pittsburgh	Project team (Web & data server hosting, data processing, training, technical assistance, fundraising, marketing)	2003-current
Center for Economic Development, Carnegie Mellon University	Project Team (Data processing, training, technical assistance, marketing)	2003- current
City of Pittsburgh (Mayor's office & other departments)	Data Provider (data sharing agreement), & funder,	2003-current
Community Technical Assistance Center	Data collection, training, technical assistance	2003-2006
3 Rivers Connect	Nonprofit Organization (Advocacy, outreach)	2003-2005
Maya Design	Private Company (Technology firm)	2003-2004
Heinz Foundation	Funding provider (Local foundation)	2003-current
Other Funding Entities (PNC foundation, McCune foundation)	Funding providers (PNC: initial research grant)	2003, 2007 respectively
Local Legislators	Advocacy (Advocating better data sharing and practice to help community organizations)	2003-current
County Government	Data provider (In talk for collaboration)	2003-current
Community groups	User groups (Providing feedback)	2003-current
Local Media	Advocacy (Promoting PNCIS)	2003-current

Figure 6.2 gives a visual display of the partners in the NIS development network. In Pittsburgh, a nonprofit organization played a leading role in the NIS development. Two universities worked closely in assisting with the maintenance of data and technology and providing the training sessions to the users.

[44] The PNCIS is a project of the Pittsburgh Partnership for Neighborhood Development (PPND), and is licensed to the University of Pittsburgh's University Center for Social and Urban Research (UCSUR). The Carnegie Mellon Center for Economic Development (CED) and 10,000 Friends of Pennsylvania assist in the operation and management of the PNCIS (source: PNCIS 3 year Business Plan, May 30 2007).

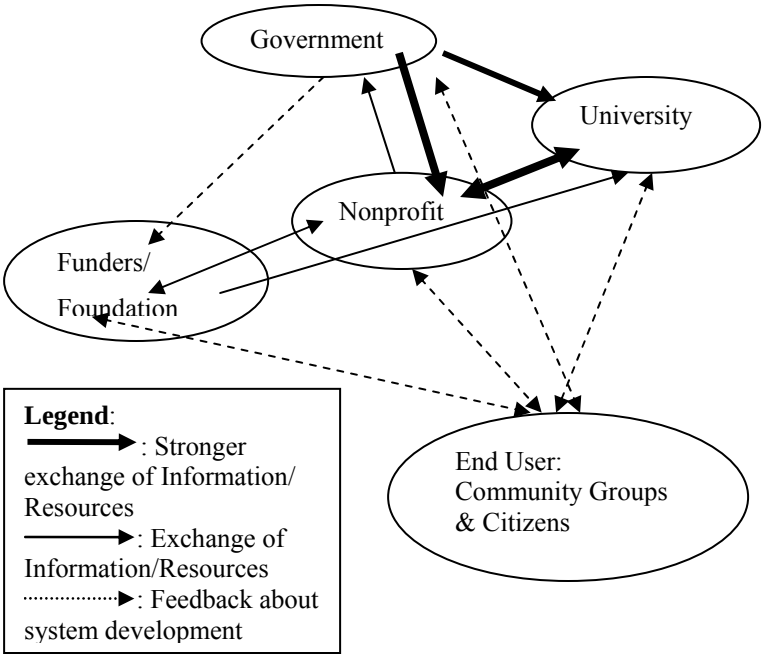


Figure 6-2: Graphical Display of Pittsburgh NIS Project Partnership Network (Hwang (2006))

PPND played a role of project coordinator, particularly leveraging its strong relationships with the city government and local foundations. UCSUR worked as a key partner in providing technology and human resources for IT implementation as well as reaching out to community groups, utilizing its existing relationship to the communities through the Community Partnership Outreach Center (COPC). The Carnegie Mellon University Center for Economic Development worked for data collection and management. These are three key partner organizations in the NIS development network. They have worked closely together for the past four years to develop PNCIS and now to sustain it, attending numerous meeting with local stakeholders including government agencies and community organizations. I have attended many of them to witness the relationship building process throughout the years.

One of the things I did was to visually map out the Pittsburgh Partnership. I employed network analysis technique[45] to see the patterns of the NIS project partnership, more specifically to examine the network structure of information exchange among these organizations.

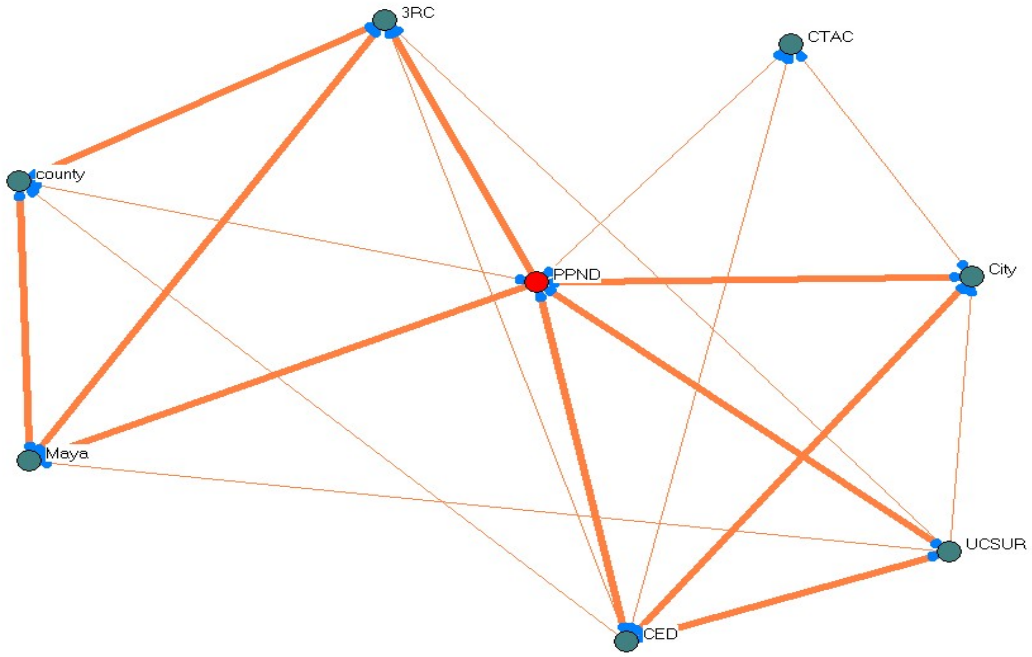
Network analysis or Social Network Analysis (SNA) is a way of investigating social structure and relationship between actors, whether actor is an individual or organization. It has emerged as a key technique in many disciplines in social science. A group of scholars in the SNA scholarship investigated relationships of 'structures of network,' 'leadership,' 'power,' 'information exchange among actors in the network.' In short, they demonstrated that actor (organization) in a central position in the network is a leader, by detecting the flow of information exchange in the network (Borgatti, 2005; Borgatti & Cross, 2003; Borgatti & Everett, 1992; D.J. Brass & Burkhardt, 1992; D.J. Brass & Burkhardt, 1993).

By utilizing this technique, Pittsburgh NIS development partnership case can be illustrated graphically. Where do these organizations obtain their information from and who are the central organizations in this exchange? 'Information Exchange Network (Advice Network)' can show which organization is at a significant position, subgroups, and degrees of interaction.

Network analysis used in this research is basic and aims to only to be illustrative. It provides two mapped network diagram to present partnership network dynamics among key stakeholders. Data for the first mapped network was collected qualitatively in the early 2005, using my observation and reading of the meeting notes. Figure 6.3 shows a pattern of information exchange among Pittsburgh CIS development stakeholders. Node represents an actor and the line represents the degree of information sharing (how much they talk to each other) among them. PPND is at the significant position as the center of the network and there existed

[45] Reading meeting notes produced a counting of communication patterns between actors, and plugged this into network data matrices with assigned numbers by participant observation.

two subgroups[46]. Simply, it means that PPND leads the project as a coordinator at this particular stage and there are two groups talking more among themselves than to others.



Legend:
PPND-Pittsburgh Partnership for Neighborhood Development
City- City of Pittsburgh
County- Allegheny County
UCSUR: University of Pittsburgh Center for Social and Urban Research
CMU-CED: Carnegie Mellon University Center for Economic Development
CTAC- Community Technical Assistance Center
3RC- 3 Rivers Connect
Maya- Maya Design
Size of line represents the strength of information sharing

Figure 6-3: Observation of Partnership Network: Information Exchange

In February 2006, a network survey instrument (see appendix A) was distributed to the partners in the Pittsburgh NIS partnership. Interestingly, non-respondents were the actors in the

[46] Running Freeman's degree centrality using UCI-Net shows highest centrality of PPND in both networks.

left subgroup (3RC, Maya, County) of the observation network. Thus, it confirmed a divide between the stakeholders, which was noted from my observation. This also is confirmed by the fact that data sharing legal agreement followed through later in the summer of 2006 involved only those five actors on the right afterwards.

Figure 6.4 (second network map done by the network survey instrument, see Appendix A) also confirms this. The scan confirmed my participation observation that project coordinator played a central role in the partnership network as being located in the center of information exchange. This simple exploratory exercise shed lights on the partnership network patterns, and set a direction for further qualitative analysis.

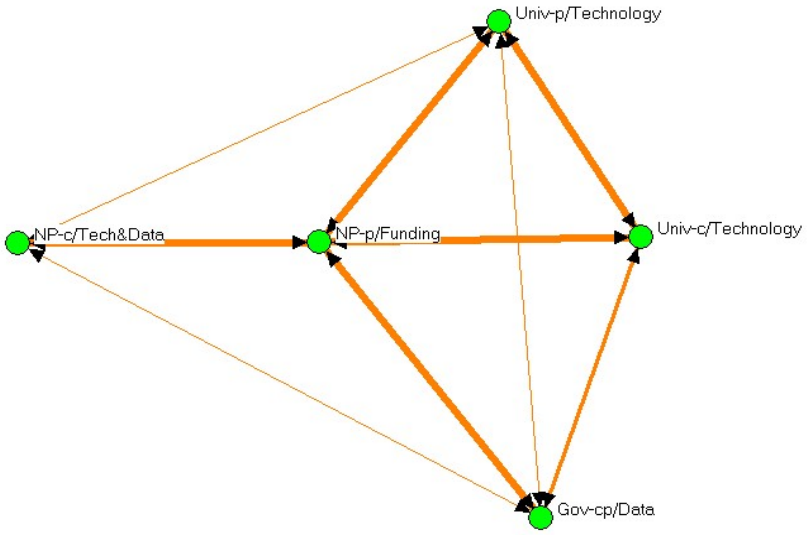


Figure 6-4: Partnership Network Excluding Non Respondents

So far, this section provided descriptions of the participants in the partnership to build PNCIS and illustrated it visually.

6.2.2 Exploring Emerging Themes: Coding the Transcribed Interviews and a Pilot Survey Result

Next, I conducted interviews of project team core members, data partners and some users during the fall 2006. I interviewed three core project team members, two government agency staff, and four program officers at nonprofits as users, a total of nine people. Using Atlas.ti, I performed a first round of coding, which was to bring out key concepts as an exploratory analysis. Learning from Herbert Simon's artificial intelligence study group, 'human (expertise) + computer (data processing)' can yield a better performance (Klahr & Kotovsky, 1989).

I created many codes using *open coding* and *code-in-vivo* (picking up key words), utilizing a grounded theory approach for the first round coding. Then I narrowed down by merging some similar codes. This was in a fashion of theory building process rather than theory testing in qualitative analysis spectrum. For the first round of coding, I explored text (transcribed interviews) by browsing and coding, annotating them. Next, I stored categories of concepts in index system (code manager in Atlas.ti). Whether browsing the documents to explore or coding them with a decided coding scheme, memos were used and stored to track the development of understanding of the data or to use them for write-ups.

Coding of the documents evolved around two key research questions: what is an effective NIS? What types of partnership model work to build one?

First round of coding was what grounded theory calls open-coding and later rounds of coding was similar to selective coding as this research first conceptualized from browsing and open-coding the documents and later moved on to applying the core concepts/variables to the documents (B. G. Glaser & A. Strauss, 1967). Parts of texts are read and many codes were

applied. Then, it gets read again to merge some codes to create categories, or coding scheme in this research. For this research, a paragraph was a building block for coding most of the time.

Table 6.2 illustrates the key concepts that emerged from the first round of coding the transcribed interviews. This solo work process is suitable for exploratory study as a starting point for upcoming components.

Table 6-2: Key Concepts Emerged from Exploratory Coding of Interviews

Code/Key concepts	***Definition and comments***	***Frequency***
Concrete, incremental implementation	Concrete examples, start small scale but solid, incremental approach not grand software/repository building"	High
Need for training	Need for training to promote usage, need for basic training, need for advanced issue specific training	High
Streamlined management of NIS	One stop service, one point of contact, branding of NIS	High
Better access to data	More convenient access to the data that you need creating access to the data that was impossible to get before CIS	Medium
Better data practice	Using the data better (effective) due to NIS, or using the better data due to NIS	Medium
Time & cost saving	Time saving , money saving	Medium
Up to date data	Up to date information, data accuracy	Medium
User-friendliness	Ease of navigation, user friendly interface	Medium
Government champion	Management support, political support, support from upstairs, leadership	Medium
Integration	NIS as an IT tool integrated into the tasks and works of organizations	Low
Local knowledge	Local, community knowledge, community survey beyond census data	Low

The following figure (Figure 6.5) displays one of many advantages of using Qualitative Data Analysis software, particularly Atlas.ti in this case. The coder can easily see merged codes in a definition window, as he explores the documents (Hwang 2008). For example, the definition

windows shows that code A (time saving) was merged with code B (cost saving) and code C (saving) on a certain date.

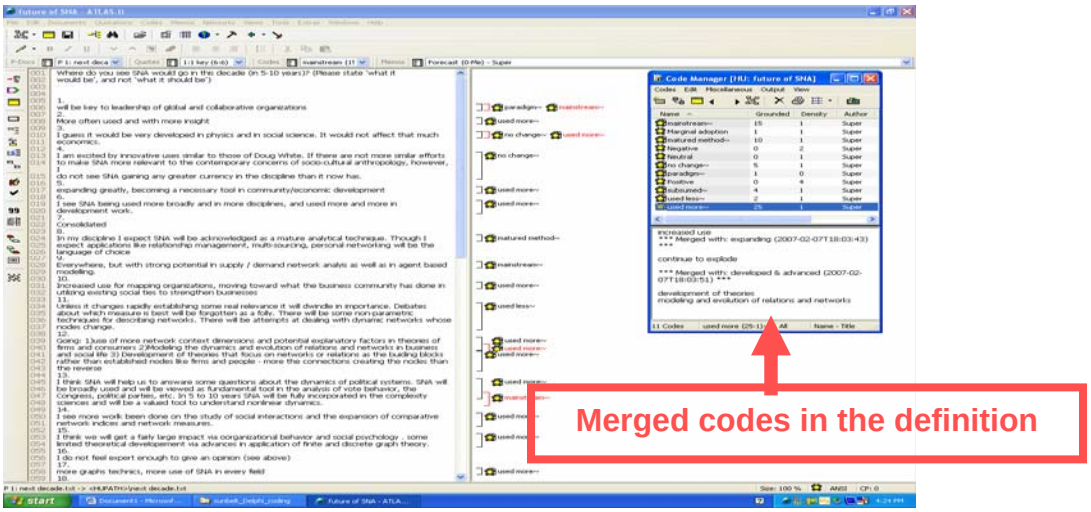


Figure 6-5: A screenshot of Atlas.ti, Coding Software, Merging Similar Codes (Hwang, 2008)

The first round of coding revealed some of important themes. In a nutshell, interviewees were asked to respond to 'What is an effective NIS? How can we build one?' Interview protocol is in the appendix (see Appendix B). A few key themes were emerged. The existence of a government champion who can support the NIS development was perceived as critical. This is inline with existing scholarship such as Bailey (2000) and Kingsley (1999). The development of Pittsburgh NIS, like many others, would not be possible without the support from the city government as local administrative data is an indispensable part. Through social networks and a few outreach events, the project team was able to locate a few supporters inside the government and finally PPND was able to connect with an executive from the mayor's office to get support, including a five year data sharing agreement.

As expected, data issues were discussed extensively. The need for better access to data was the drive for the NIS development in Pittsburgh, and thus data accuracy, availability of certain kinds of local data, and regular update of data were frequently talked about.

An incremental approach was stressed by key project members, echoing NNIP's message. A solid and concrete example that can demonstrate how it can help community organizations and government agencies in doing their works was a winner. Having sound and rich data sets is a necessary condition for the development of good NIS. An importance of training was highlighted to maximize the benefit of using NIS as a capacity building of community organizations. A key project team member stated that *"I think the ones that are pretty effective are the ones that really support the users and try to help the users with training and technical assistance as part of what they do."* Although NIS is a technology tool, it is a tool to help the ultimate goal, which is to help local stakeholders of community development. He added *"but if you don't know how people are going to use it and you haven't evaluated it, there is no point in throwing money at technology just at that point. You know, it is better to just kind of do a technical assistance mode for a while."* He stressed the importance of usability testing and capacity building in the course of an NIS development.

After the first round of coding, I developed a better understanding of NIS development and utilization, which in turn helped enhance the development of a survey questionnaire. The online survey was distributed in December 2006 to 50 Pittsburgh NIS users, who had completed training sessions and had access to its parcel level community information portal. A pre-notification email was sent out as a courtesy and an attempt to raise response rate to 50 people. Survey had 32 responses. This was a pilot testing of the survey. Detailed discussion about how the survey was conducted will be provided in the next chapter.

Table 6.3 shows user perception of the efficacy of NIS among Pittsburgh NIS users. Overall, users are generally satisfied with the Pittsburgh NIS' efficacy. They were also pleased with the training that they were provided, according to table 6.4.

Table 6-3: User Perception of Efficacy of NIS (Pittsburgh NIS Users)

Answer options	Strongly agree	Agree	Neither	Disagree	Strongly disagree
Overall, the NIS increases my productivity. Productivity is defined as increased value or results of the tasks for the same amount of time invested, either at the personal or organizational level.	3	12	6	0	0
On-line mapping features increases my productivity.	3	11	7	0	0
Predefined or pre-made maps increase my productivity.	0	13	7	1	0
Downloading tables of statistics increases my productivity.	2	14	3	1	0
Customized analysis/consulting done by the NIS team increases my productivity.	1	6	14	0	0
I can access to data that I need by using the NIS, which was difficult or impossible to get before the NIS.	8	11	2	0	0
The NIS contributes to the transparency of the local government agencies to the public.	8	8	4	0	1
The NIS contributes to public participation in the process of decision making for community development.	3	8	7	2	1
The NIS empowers community stakeholders by providing data and knowledge.	10	6	4	0	1
Technical support helps me to use the NIS effectively.	3	8	10	0	0
Training helps me to use the NIS effectively.	5	13	3	0	0
answered question: **21**					
skipped question: **11**					

Table 6-4: User Satisfaction on Training (Pittsburgh NIS Users)

Answer options	SA	Agree	neither	Disagree	SD	N/A	Average	Count
I was satisfied with the group training sessions I received.	6	14	0	0	0	1	1.7	21
I was satisfied with the individual training sessions I received.	1	1	0	0	0	14	1.5	16
answered question: **22**								
skipped question: **10**								

Table 6-5: User Perception on Use (Pittsburgh NIS Users)

Answer options	Strongly agree	Agree	Neither	Disagree	Strongly disagree
I use the NIS for proposal writing.	4	7	7	1	1
I use the NIS in strategic planning for my organization.	2	11	6	0	1
I use the NIS in evaluative processes, such as program evaluation and reporting.	3	8	7	0	2
I use the NIS as a basis for more complex and detailed analyses.	5	8	7	1	0
I find the NIS has diverse data sets that can help my tasks.	6	10	5	0	0
I find the NIS has accurate and up-to-date data sets.	1	11	4	5	0
The NIS works well with my existing computer software.	3	11	5	1	0
answered question : **21**					
skipped question : **11**					

All in all, this pilot study consisted of a first round coding to explore the interview documents and aid survey question design. The second round of coding was a hybrid coding to produce a coding scheme for additional coder to code Pittsburgh and three other cases as well, which will be presented in the chapter 8.

6.3 FINDINGS AND DISCUSSION

This summarizes the pilot case of the Pittsburgh NIS. A pilot case was conducted to explore the NIS development partnership. Pittsburgh case was selected to utilize my observation as I worked as a project team member for PNICS. The case used my observation and network analysis for the stakeholder analysis section. It used qualitative and quantitative approaches with survey and interview methods.

In sum, two notable themes have come out. First, users want some concrete examples of using NIS that can be helpful in performing their tasks. Second, project team members stressed the incremental implementation approach with government champion and community buy-in. These themes guided the interviews of the other three NIS cases and coding the interviews from those three cases later on, which will be discussed in the chapter 8.

Additionally, I brought in some discussion below in order to revisit the research questions and hypotheses specified in the chapter 4. Again, this chapter is an exploratory component of the dissertation research with a more of grounded theory approach rather than hypothesis testing overall. Thus the following discussion sets the groundwork for following two chapters-statistical analysis and in-depth case study.

1. Comments about better data access came forward. One interviewee testified that

"*Oh definitely, I definitely think it makes our work easier. We instead of downloading the all data ourselves . . . instead of having to sort of create your own data sets and things like that, that is all there for you, so how can you not benefit from it… overall I think it saves us a lot of time I think as far as research is concerned, trying to gather data sets and things like that. I think that's why it's key at least from our perspective to try and keep the data as up-to-date as possible because that's really a time saving mechanism for us.*"

One survey respondent left a comment that

"The NIS allows me to cobble together information that would otherwise be available after an exhausting search and visits to several different departments. With the information, I can pull together a more complete picture of what the condition of the neighborhood is."

2. Some respondents and interviewees talked about how they use an NIS for their task. One survey respondent left a comment

"*We have used it to track crime around nuisance bars in our commercial district. In addition, we have used it to track code violations in housing stock throughout the North Side of Pittsburgh."*

3. Comments about empowerment, bringing changes to the communities with better data and knowledge were surfaced. One interviewee said

"What makes an effective NIS: Not only that people are getting the right data that they're being able to use it to show neighborhood impacts. Yeah otherwise you just have a nice system, but what's the point? That point is to help people make a positive change in their neighborhood… So that's sort of a final thought that I might have, that we are not quite there yet to really see the full impact of using the system because people need a little bit more time. . ."

In some cases, however, providing better data and local knowledge has already helped the needs of both community organization and local government agencies to conduct their tasks. The director of a community development corporation in Pittsburgh stated

> "*Using two sets of data from Pittsburgh NIS, specifically Act 77 and [xx] Building Inventory data, [we] submitted an application to Rebuilding Together Pittsburgh for [our neighborhood] to be the primary location for the 2007 Rebuilding Day Event. Our application was successful in large part because of the sophistication and timeliness of this data; and as a result, [we] will benefit from over half a million dollars of home repairs and renovations for elderly, low-income and disabled homeowners*."

This is a typical success story of using an NIS as a tool for performing their tasks, but we need to hear more. As time goes on, NISs will be likely to create more success stories like this.

For future enhancement needs, survey respondents left some comments for more training, more data, and more user-friendly functions. The following are the comments collected in the open-ended question of the survey.

- *'The training session should be much longer, giving the user more trial-and-error time.'*
- *'Just continue to keep the information up-to-date!'*
- *'Need Allegheny County and PA administrative and other data sets comparable to the City of Pittsburgh. Also, need health data and indicators, as well as other substantive human service and needs data.'*
- *'Easier export abilities, to both excel and GIS'*

6.4 SUMMARY

The objective of this chapter was to set the foundation for the following two studies to come, serving as an exploratory case study. My experience in the project helped shaping research in context. A simple network analysis was done to gauge the partnership network pattern. Coding of interview data was done, particularly to produce a coding scheme for upcoming comparative case study.

In short, a couple of hypotheses were supported but more analysis and discussion will be followed in the next chapters to come. Additionally, the need for training has been highlighted, which also to be discussed more in the chapters 7 and 8.

7.0 EXTENSIVE STUDY: NATIONWIDE SURVEY AND QUANTITATIVE ANALYSIS

This chapter deals with the first part of research question: How effective are Neighborhood Information Systems (NISs) as an Information Technology (IT) tool for local governance? This chapter will report the survey results and present two things. First one is to address the effectiveness of NIS as an IT tool in assisting community development. It reports general user feedback from the survey. Second one is to compare the effectiveness among different NISs.

In sum, this chapter explains how the survey was conducted including pre-testing results. Then, the chapter reports survey responses in assessing the current stage of NIS effectiveness. In doing so, it also reports overall NIS usage patterns and user-satisfaction. These are all related to the hypotheses derived from the first part of research question: what is an effective NIS?

Finally, the last section reports the survey items for effectiveness variable in detail and compares two groups of NISs for their effectiveness.

7.1 THE PURSUIT OF AN EFFECTIVE NIS

To recap what was discussed about measuring the effectiveness of NISs in Chapter 5, I took Delone & McLean (1992; 2003) model's approach and modified it to the NIS context, following criteria suggested by Kingsley (1999). I provide a definition of effective and successful NISs, based on their work (see Table 7.12 for survey items for measurement):

1. Sustainable. They remain available and continuously update information over time, not just for a single funding cycle.
2. Data diverse and content rich. They include more than Census data.
3. Useful. Local decision makers actually use the system to help with decision making, planning, and evaluation.

From the pilot study, a number of important features of an NIS came out as well. They are user-friendliness, usefulness, data-richness and sustainability. This aligns with the literature on both e-government/information system and PPGIS.

In fulfilling NNIP's goal to further the use of data through an NIS in local policy making and community building, an effective NIS should be a useful and easy-to-use tool to enable us to access better the needed data, which ultimately contributes to local policy making.

There are three dimensions to measure effectiveness. First, user-friendliness of the information system or indicator system is most talked about in measuring its effectiveness as it is not only one of important features but also designing team's focus, which they have a full control most of the time. Can users find what they want easily? For the NIS, the issue of data richness has been raised. Presenting census data in a friendly format is helpful but having diverse set of local data is the key to a successful NIS development.

Second, you can track web statistics of an NIS site to gauge how people visit, what they look, search, or download particularly to gauge its usefulness. This is probably easiest to measure with advanced web stat tracking software today. For instance, Pittsburgh NIS keeps a track of user visits and usage to better service the users. I was informed that some other NISs also do this for their internal operation planning at the PPGIS conferences. However, this kind of information would be mostly internal and won't be shared for a dissertation research.

Thirdly, and probably most important, is to measure the impact on communities and policy changes, initiated or partly influenced by the use of an NIS, if an NIS is user-friendly and

people use it. This is hardest to measure, but most critical. That means we need to identify who the users are, and how the system can help to achieve their mission, goals, and outcomes. Even if the system is user-friendly and used often, if it does not help to shape policy changes, or community development, it means that it is at best incomplete or probably misleading. This is why we need to devise a long term feedback loop and research to collect success stories of users, for instance community based organizations.

With the aim of measuring the effectiveness of NIS, descriptive statistics from the survey results will be presented to display overall NIS usage patterns. In the second section of this chapter, inferential statistics to discuss how to measure the effectiveness of NIS will be presented.

7.1.1 Descriptive Statistics from the Survey: Overall NIS Usage Patterns

As discussed in the chapter 5, a web-based survey was conducted nationwide to reach many NIS users to ask overall NIS usage patterns as NIS is only a decade and half old phenomenon. This survey is first of its kind to reach out to NISs across the nation.

First, I will describe how I proceeded with the survey in terms of writing up, distributing, and collecting responses. Then, overall user-feedback from the survey will be reported.

7.1.1.1 Conducting the Survey

For my dissertation research, I conducted a user-perception survey asking questions pertaining to user satisfaction and usage patterns. I devised a few survey question items to ask usefulness of the NIS as a proxy of this measure, particularly for statistical analysis. Additionally, I tried to

collect stories of usages and subsequent success stories from open-ended questions of the survey in addition to the collected interview data, which will be presented in the next chapter.

A user-perception survey was an optimal choice for this dissertation research, as discussed before in the chapter 5.[47] Not only is it an appropriate measure to measure IT usage, but also most practical in an attempt to cover many NIS sites. Web usability testing and stat analysis would be useful, but it would not be feasible to conduct for a dissertation research as one man's project.

Although the survey instrument relied on existing literature of IT effectiveness and utilization, there were not widely accepted scales or measures to apply to this NIS study survey. A few models, including International City/County Management Association (ICMA)'s e-government survey, were the starting points but the development of the survey instrument heavily relied on my NIS project involvement experience with the input from dissertation committee members (see appendix D for survey instrument).

7.1.1.2 Pre-testing the Survey Instrument

Scholars stress the necessity and importance of pre-testing the survey instrument for to test how respondents answer the survey (Fowler, 1993), thus a pre-test was conducted. It was conducted not letting respondents to know the survey was a pre-testing one to avoid any bias, but a final question was devised to ask any general feedback on the survey itself.

First, I reached out to Pittsburgh Partnership for Neighborhood Development (PPND) to get an endorsement for the survey to aim for higher response rate.[48] Second, I chose Pittsburgh

[47] Perceptions are appropriate measures for use of IT in organizations as, for instance, email and system usage logs cannot distinguish 'usage increase by confusion' from 'usage increase for productivity' (M. M. Brown et al., 1998).
[48] PPND donated $50 of gift certificate for one selected Pittsburgh user. The staff carefully went over the questionnaire and offered some advice to edit for more clarity as a respondent. In exchange for a gift certificate, I

and Grand Rapids as a pre-test sample for a survey, as comparing two groups from the pre-testing can give an idea of how valid the survey can be. For the Pittsburgh group, I sent out pre-notice emails to raise more participation in my survey. At that time (December 2006), fifty users went through training sessions and were registered. I helped at the training sessions as mostly an assistant to the main trainer or a couple of times as a main trainer, which made me known to the users already for this survey. That was another rationale for sending a pre-notification email.

For Grand Rapids, Michigan, I was fortunate to get help from their NIS project team to share their email list of nonprofit organizations and research organizations in Grand Rapids. About 350 email addresses were provided to me, which was not a pre-selected NIS user group but a compilation of nonprofits in their region.

Two groups were chosen so that I could see if there was any difference between two groups in terms of their usage patterns. I compared group mean differences on some of the survey questions and it showed some difference, which served as a confirmation of the reliability of the survey instrument. All in all, pre-testing served its goal to reduce ambiguity. Minor edits were done and a few questions were added, thereafter. I also contacted a few NIS project teams to ask for help. I shared questionnaire to let them know what questions would be presented to the users as well as to get feedback. A couple of project teams made a few suggestions.

7.1.1.3 Executing the Main Round of Survey

After pre-testing the survey instrument, I made minor revisions and sent out the invitation to the entire list in January 2007 and I sent out a reminder in March 2007 to boost responses. More than

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added a few questions that PPND wanted to collect additionally. Again, web-based survey was convenient to do that as it will show the questions for only Pittsburgh users as they answered a screening question that is to identify Pittsburgh NIS for their NIS to use. I thank PPND for the donation.

half (117) of respondents answered in February 2007, and the remainder participated answering in January and March, except a very few afterwards.

The survey had total 221 responses. Given the size of the NIS population, a decision was made to administer the survey to the entire sampling frame (i.e. conduct a census). The population consists of 34 NISs across the U.S. First, it was sent out to the NNIP partners and other NIS sites, asking to distribute to their email lists. Second, the email as an introductory letter asked respondents to forward to anyone who might be interested in participating. Third, the survey used email addresses of government agencies such as city planning, and IT departments from their websites, which is public information. Fourth, I posted an invitation to the survey on a few ListServs, including NNIP ListServ and ARNOVA[49] ListServ. I had help from project teams of the seven NIS sites.[50] In short, survey response results were not ideal: It did not generate wide coverage of NIS population. Although there were responses from more than 20 NIS sites, only 7 NIS sites had sizable number of responses (see Table 7.1). There were only one or two responses for the other 13 NISs. I had help from project teams of the 7 NIS sites, which made a difference for the response rate. As described earlier, I did post my email invitations in the several ListServs and group-emailed to a couple of conference attendance lists. I also tested some spam emailing techniques to public email addresses collected from several city web sites. That is why there is no traditional response return rate for the survey results. A table below summarizes survey responses.

[49] Association for Research on Nonprofit Organizations and Voluntary Action (ARNOVA)
[50] Survey had originally 253 visitors. Thirty one (12.5%) were null entries, which I call 'window shopping' visitors. They came in and answered the very first screening question to proceed but not answered any question afterwards. It is believed that some project team members came in to check it out before they decide whether to help or not. It is also believed that some random web surfers came in to see while they were looking for a survey example.

Table 7-1: Summary of Survey Responses

NIS Site	# Sent	# Answered	Rate (%)	Note
Pittsburgh	50	28	56%	50= trained NIS users
Grand Rapids	350	36	10%	350= many kinds of nonprofits, not all of them are NIS users
Cleveland	N/A	11	N/A	Cleveland was conducting their own survey at the same time, my invitation email got forwarded to a small number of emails addresses
Minneapolis	N/A	6	N/A	Project team forwarded my email to their users.
NYC	660	33	5%	List obtained from NYC project team, many kinds of nonprofits, not all of them are NIS users
Philadelphia	N/A	52	N/A	Project team sent out email invitation directly to their users
Washington, D.C.	N/A	25	N/A	Project team forwarded my email to their users.
Others	N/A	30	N/A	
Total	**N/A**	**221**	**N/A**	

A key project team member of each site from Pittsburgh and Grand Rapids wrote a paragraph of endorsement on the welcome page of my online survey in hoping to attract the respondents. Out of seven NISs, one NIS project team wanted to send an email to their users with their own writings directly as they didn't want to share their user list, pertaining to a privacy issue.[51] Another three simply forwarded my invitation email to their selected users. Two of them shared their user list so that I could email them directly, and asked me not to abuse the user list. So for these six sites and Pittsburgh, I had meaningful responses. A few other project teams also said they would forward it to their users but I didn't have many responses collected. It is not too surprising to have a low response for a student's dissertation project. As a matter of fact, one NIS project team politely declined to participate, stating they won't be able to participate in non-funded research, given their busy operation schedule.

[51] I was not provided the number of their users on the list either.

Another challenge for email invitation for online survey is its character as a spam mail. Roughly speaking, I did some spam mailing. For the NIS sites that I didn't have the help from the project team, I did web-surfing to collect email addresses of government and nonprofit agencies, which are public information. It is not feasible to email individually for its size in this research, thus I used group emailing. Today's modern email server blocks some group emails automatically, which is usually called spam mail filters. As a possible indicator of this, I emailed to 50 email addresses as survey raffle winners, selected from email addresses that respondents opted to leave for a raffle. Only 35 answered back with their addresses so that I could send a gift card. Some of them got emails from their respective NIS project team but not directly from me. This would cause that some mail servers would recognize my email address as a spammer. Simply put, it was difficult to get a good response without the endorsement by a recognized authority such as a renowned research institution. Although web surveys often get lower responses, they do get a higher completion rate (Crawford, Couper, & Lamias, 2001).

Additionally, one could argue that the results have a self-selection bias, meaning these survey results are unrepresentative of NIS population. Respondents who answered the survey might be those who favor NIS as they voluntarily participated. This is a challenge of the results from this online survey. Yet, the survey also has attracted people who are frustrated with the current NIS as the email invitation specifically mentioned getting feedback for enhancements. As stated previously in Chapter 5, this survey is not to examine how well NIS is diffused in terms of its user base. Nonetheless, I recognize the limitation of this survey regarding its potential self-selection bias.

7.1.1.4 Reporting Overall Survey Responses

The following few tables show a frequency distribution of the sample by gender, age group and some descriptive information. There were an almost equal proportion of male and female respondents. Age group was also fairly well distributed but interestingly respondents in their 41-64 years old comprised 43%. This can be interpreted as a positive sign that NISs are not used by only younger generations who are comfortable with computers.

Table 7-2: Gender of Respondents

		Frequency	Valid Percent
Valid	1(male)	**89**	**50.6**
	2 (female)	**87**	**49.4**
	Total	176	100.0

Table 7-3: Age Group of Respondents

		Frequency	Valid Percent
Valid	1 (18-25 yrs old)	**15**	**8.5**
	2 (26-30 yrs old)	**30**	**17.0**
	3 (31-40 yrs old)	**52**	**29.5**
	4 (41-64 yrs old)	**77**	**43.8**
	5 (65 yrs old ~)	**2**	**1.1**
	Total	176	100.0

The position of respondents in their organizations was fairly well distributed as well. As expected, regular time program staff members use NISs most.

Table 7-4: The Position of Respondents in Their Organization

		Frequency	Valid Percent
Valid	0 (Other)	**34**	**19.3**
	1 (Board member)	**3**	**1.7**
	2 (Executive director or equivalent)	**32**	**18.2**
	3 (Deputy director, program director or equivalent)	**34**	**19.3**
	4 (Program staff/regular hours)	**48**	**27.3**
	5 (Part time staff or Volunteer/part time hours)	**15**	**8.5**
	6 (Independent researchers)	**10**	**5.7**
	Total	176	100.0

Respondents' organizational type and budget size are fairly well distributed as well. Respondents came from organizations with different sizes.

Table 7-5: Budget Size of Organization

		Frequency	Valid Percent
Valid	1 (0 - $25,000)	**22**	**11.5**
	2 ($25,000- $100,000)	**23**	**12.0**
	3 ($100,000 - $500,000)	**42**	**21.9**
	4 ($500, 000 – $1 Mil)	**24**	**12.5**
	5 ($1Mil - $5 Mil)	**38**	**19.8**
	6 ($5Mil - $10 Mil)	**13**	**6.8**
	7 ($10 Mil and over)	**30**	**15.6**
	Total	192	100.0

As expected, community nonprofit organizations are the largest group of users of the NIS, with about 30% of the respondents being community non-profit organizations. Government agencies are the second biggest user group with about 18% of respondents, which is a very positive sign of the NIS being an effective local information system. This indicates that government as a power stakeholder in the community development actually uses the data in the NIS for the local decision making process.

Table 7-6: Description (Type) of User Organization

		Frequency	Valid Percent
Valid	0 (Other)	**25**	**11.4**
	1 (Government agencies)	**39**	**17.8**
	2 (University or college)	**36**	**16.4**
	4 (Independent research center)	**4**	**1.8**
	5 (Community nonprofits, CDC or CBO)	**64**	**29.2**
	6 (Local intermediary nonprofits)	**17**	**7.8**
	7 (National intermediary, LISC)	**4**	**1.8**
	8 (Foundation)	**8**	**3.7**
	9 (Faith-based organization)	**6**	**2.7**
	10 (Individual)	**16**	**7.3**
	Total	219	100.0

Regarding the usage frequency, 70% of survey respondents answered they have used their NISs less than 3 years and another 22% answered more than 3 but less than 6 years. Most NISs came into existence recently, although there are some NISs that have existed for more than a decade. This result of the survey suggests that we have not fully realized the potential of NISs yet. This is because the adoption of information technology in general has lagged in the public and nonprofit sectors compared to the private sector. In using Rogers's (1962) scholarly term, '*Diffusion of Innovations*', public and nonprofit sectors are not usually early adopters in information technology innovations, especially community organizations.

Table 7-7: How Long Have You Used the NIS of Your Choice?

		Frequency	Valid Percent
Valid	1 (less than 1 year)	**56**	**30.9**
	2 (1-3 years)	**74**	**40.9**
	3 (3-6 years)	**40**	**22.1**
	4 (6-10 years)	**8**	**4.4**
	5 (10 years~)	**3**	**1.7**
	Total	181	100.0

For using NIS features, 'Finding specific statistics for neighborhoods, wards, or census tracts' is the most often used NIS feature, with about 57% (104 out of 180) of respondents answering they use always or often. Next, 'Finding specific statistics for cities, counties or regions' is often used with 47% (69 out of 180).

Table 7.8 presents the frequency of data types that are used. The type of data most used is demographics and housing. This was expected because 'demographics' is the foundation for most analysis and 'housing' is arguably the most important part of local economic development. Poverty/income and economic development data are more often used, compared to

transportation, health, environment, public work, and school data. About 58% of respondents answered that they often or always use demographic data. Other categories are: about 56% for housing, about 32% for property investment, about 50% for poverty/income, and about 38% for economic development. Less frequently used categories are: about 57% of respondents answered that they rarely or never used transportation. Other categories are: about 60% for health, about 60% for environment, about 55% for school data, and about 65% for public work data. Some relatively low usage might have stemmed from the fact that some type of data was not available in the system as different NISs might have different sets of data. The focus of this part of the survey is to gauge overall data usage and further study is required to investigate the availability of specific data sets in each different NIS.

Table 7-8: Usage Pattern of Categories of NIS Data

Q: How often do you use the following categories of NIS data?	Never	Rarely	Sometimes	Often	always
Demographic	8.8	8.8	23.6	40.1	18.7
Housing	10.8	12.5	21	36.9	18.8
Property Investment	23.1	22	22.5	24.3	8.1
Poverty/Income	15	11.6	23.7	32.9	16.8
Economic Development	17.8	17.8	25.9	28.2	10.3
Crime	18.3	21.1	29.4	24.6	8.6
Transportation	27.6	29.9	21.3	17.2	4
Health	27.9	33.7	18	14.5	5.8
Environment	29.7	30.8	19.2	16.3	4.1
School Data	25.9	29.9	21.3	19	4
Public Work	32.5	33.5	23.4	12.2	2.4

Table 7.9 measured user perception on the NIS use and data. This part of results from the survey confirms a previously done qualitative analysis: users use the NIS for proposal writing, which they think helped them in doing their tasks (about 50% of respondents answered they agree or strongly agree). It also shows users find their experience of using the NIS a very positive one. One of the enhancement needs they identify is more helpful online manuals and documents.

Table 7-9: User Perception on Use, Data, and Software

	Strongly disagree	Disagree	Neither agree or disagree	Agree	Strongly agree
I use the NIS for proposal writing.	18%	11.2%	20.5%	34.2%	16.1%
I use the NIS in strategic planning for my organization.	11.7%	10.5%	22.8%	42.6%	12.3%
I use the NIS in evaluative processes, such as program evaluation and reporting.	14.5%	12.6%	32.1%	30.8%	10.1%
I use the NIS as a basis for more complex and detailed analyses.	6.9%	11.3%	29.4%	35.6%	16.9%
I find the NIS has diverse data sets that can help my tasks.	3.7%	2.5%	17.9%	57.4%	18.5%
I find the NIS has accurate and up-to-date data sets.	3.1%	11.9%	27.7%	47.2%	12.1%
The NIS works well with my existing computer software.	3.7%	3.7%	18.6%	50.9%	23%
I find the interface of NIS (buttons, menus, screen layouts, navigation) satisfactory.	2.5%	11.2%	23.6%	47.2%	15.5%
I easily find helpful manuals and other online documents for using the NIS.	3.7%	12.4%	43.5%	34.8%	5.6%
I find the contents of NIS websites to be satisfactory.	1.9%	7.6%	21.5%	59.5%	9.5%

Table 7.10 shows user perception on the efficacy of the NIS. In general, users are very satisfied with the overall efficacy of the NIS. There seems to be a need for more trainings and technical support. More discussion on training in the pursuit of the effectiveness of the NIS will be presented next.

Table 7-10: User Perception on Efficacy of NIS

	Strongly disagree	Disagree	Neither agree or disagree	Agree	Strongly agree
Overall, the NIS increases my productivity. Productivity is defined as increased value or results of the tasks for the same amount of time invested, either at the personal or organizational level.	0.6	1.3	24.4	52.5	21.3
Online mapping features increases my productivity.	1.9	3.1	42.5	38.1	14.4
Predefined or pre-made maps increase my productivity.	0.6	3.7	39.8	43.5	12.4
Downloading tables of statistics increases my productivity.	0.6	2.5	35	44.6	17.2
Customized analysis/consulting done by the NIS team increases my productivity.	3.2	2.6	55.8	26.9	11.5
I can assess to data that I need by using the NIS, which was difficult or impossible to get before the NIS.	1.9	2.5	23.6	44.6	27.4
The NIS contributes to the transparency of the local government agencies to the public.	1.9	3.2	31	42.6	21.3
The NIS contributes to public participation in the process of decision making for community development.	2.5	3.8	38.9	39.5	15.3
The NIS empowers community stakeholders by providing data and knowledge.	1.3	2.5	21.5	45.6	29.1
Technical support helps me to use the NIS effectively.	0.6	3.8	52.9	34.4	8.3
Training helps me to use the NIS effectively.	1.3	3.8	43.9	37.6	13.4

Overall survey results generally support hypotheses derived from the first research question.

H1: Democratization of Information (Better Data Access): The NIS increases data sharing among stakeholders in community development in the region.

Both from this part of survey and interviews (which will be presented in the next chapter), it was evident that data access was improved. Community stakeholder gained better data access after the development of an NIS in their city.

Although it has not fully reached its potential by judging from collected qualitative data, the survey (table 7.9) showed that stakeholders started using NISs in their proposal writing, evaluation, and planning.

H2: Empowerment: NIS contributes to the empowerment of nonprofit groups.

Both survey (table 7.10) and interview data (which will be presented in the next chapter) suggest NISs promote empowerment of community organizations with better data access but it is not too apparent how much participatory decision making has been increased due to the NISs. This probably takes time to witness and should be a further research agenda.

H3: Transparency**:** An effective NIS contributes to the transparency of government agencies.

Both survey (table 7.10) and interview data (which will be presented in the next chapter) confirm NISs enhance the transparency of government agencies. Government agencies could and should utilize NIS or NIS like tools to improve the transparency and in turn advance their public relations. This will be discussed more in the implication section in the final chapter.

Table 7-11: User Satisfaction on Training Sessions

	N/A	Strongly disagree	Disagree	Neither	Agree	Strongly agree
I was satisfied with the group training sessions I received (n=153).	39.2%	0%	2.6%	7.8%	32.7%	17.6%
I was satisfied with the individual training sessions I received (n=134)	80.6%	0%	0.7%	9.0%	4.5%	5.2%

This study found some results supporting existing studies addressing the importance of data accuracy and user friendliness to make NISs effective, but also found the need for training to be more emphasized. Table 7.11 shows that many skipped questions and majority of responses were N/A. Except a very few studies including Bailey's work (2000), training has not been paid much attention partly due to the stage that the NIS development currently is in and partly due to the focus on software development on user-friendliness. There is a need for different trainings for different user groups, depending on whether users have a prior knowledge on GIS or not. Also there is a different degree of being computer savvy in general among users, for instance dealing with a pop up blocker embedded in some of the internet browsers.

These survey results serve as an illustration of patterns on the population of NISs. In sum, results show that users generally perceive an NIS as a very positive endeavor and are trying to use it as a tool in doing their tasks.

7.1.2 Further Statistical Analysis from the Survey: Comparing Effectiveness Indexes

This section discusses the effectiveness of NIS by employing statistical analysis. Table 7.12 below presents operationalization of effectiveness to create an index. It shows that the Cronbach's alpha coefficient for each of three composite variables was greater than 0.70, which meets a cut off criteria with the number of observation, 221 (Garson, 2006; Nunnelly, 1978). I conducted missing value analysis for these question items and found Little's MCAR (Missing Completely At Random) test is not significant amongst them[52], thus missing data may be assumed to be distributed randomly.

Table 7-12: Composite Variables of Effectiveness: Survey Question Items and Reliability Statistics

Index	Question items (5 point Likert scale: 1=strongly disagree, 5=strongly agree)	Cronbach's Alpha
Data richness	1. I find the NIS has diverse data sets that can help my tasks. 2. I find the NIS has accurate and up-to-date data sets. 3. I find the contents of NIS websites to be satisfactory.	.752 (not to delete any)
User-friendliness	1. The NIS works well with my existing computer software. 2. I find the interface of NIS (buttons, menus, screen layouts, navigation) satisfactory. 3. I easily find helpful manuals and other online documents for using the NIS.	.770 (not to delete any)
Usefulness	1. Overall, the NIS increases my productivity. Productivity is defined as increased value or results of the tasks for the same amount of time invested, either at the personal or organizational level. 2. The NIS contributes to the transparency of the local government agencies to the public. 3. The NIS contributes to public participation in the process of decision making for community development. 4. The NIS empowers community stakeholders by providing data and knowledge.	.817 (not to delete any)

[52] Little's MCAR test: Chi-Square = 4.768, DF = 5, Sig. = .445

Mean difference of data richness and user-friendliness among different respondents from NIS cities are statistically significant (user-friendly at α=.05, data richness at α=.1), but usefulness is not. Data richness and user-friendliness is statistically significantly different among respondents, but usefulness is not. Possible explanations are 1) most users see an NIS as a useful tool 2) question items are rather abstract and hard to measure including the empowerment of community groups and transparency of governments-which goes back to the point of the challenge to measure the effectiveness of NIS as described in the beginning of this chapter.

Table 7-13: Mean Difference of 3 Composite Variables of Effectiveness

		Sum of Squares	df	Mean Square	F	Sig.
data richness index of effective NIS	Between Groups	171.211	15	11.414	1.725	**.053**
	Within Groups	886.662	134	6.617		
	Total	1057.873	149			
user-friendliness index of effective NIS	Between Groups	139.036	15	9.269	1.892	**.029**
	Within Groups	695.799	142	4.900		
	Total	834.835	157			
Usefulness index of effective NIS	Between Groups	72.838	15	4.856	.628	.848
	Within Groups	1052.155	136	7.736		
	Total	1124.993	151			

Then, I grouped NIS cities into the two groups- established (old) NISs vs. new ones[53] to see if there is any difference of three effectiveness composite variables (Old sites: Philadelphia, Cleveland, Minneapolis, New sites: New York, Oakland, Pitt, GR, DC). I compared the mean values of three variables between two groups and found out that user-friendliness is only different (at α=.1). This result implies that established NIS sites have more user-friendly NIS websites. A possible explanation is that old ones had more chances to get feedback from users to

[53] New ones are less than three years of web service. Old/established ones are more than three years.

make the web site more user-friendly. As briefly discussed in the previous section, training might have helped this cause as well.

Table 7-14: Descriptive Statistics of Three Composite Variables between Two Groups

	grouping into old and new	N	Mean	Std. Deviation	Std. Error Mean
user-friendliness composite variable	old	61	11.1639	2.61521	.33484
	new	84	10.4643	2.00869	.21917
data rich composite variable	old	57	11.3158	2.22131	.29422
	new	83	10.9398	2.03835	.22374
usefulness composite variable	old	56	15.4464	1.94394	.25977
	new	84	15.2024	3.13465	.34202

Table 7-15: Comparing Means of Two Groups, Independent t-Test

		t-test for Equality of Means			
		t	df	Sig. (2-tailed)	Mean Difference
		Lower	Upper	Lower	Upper
user-friendliness composite variable	Equal variances assumed	1.822	143	**.071**	.69965
	Equal variances not assumed	1.748	108.082	**.083**	.69965
data rich composite variable	Equal variances assumed	1.034	138	.303	.37603
	Equal variances not assumed	1.017	113.560	.311	.37603
usefulness composite variable	Equal variances assumed	.519	138	.604	.24405
	Equal variances not assumed	.568	137.386	.571	.24405

A correlation matrix of the three effectiveness composite variables was computed. The zero order correlations among the three variables are presented in the following table (see Table 7.16). This analysis revealed some anticipated relationships of three dimensions of the NIS effective index. All are positively correlated. Correlation of data richness to user-friendliness and usefulness respectively is about the same and higher than user-friendliness and usefulness. This

implies that relationship of data richness to two other dimensions is important. This also suggests that the content (data) of the NIS is ultimately more important once you go over initial learning curve of using websites.

Table 7-16: Matrix of Correlation Coefficients among Three Variables

		data richness index of effective NIS	Usefulness index of effective NIS	user-friendliness index of effective NIS
data richness index of effective NIS	Pearson Correlation	1		
	Sig. (2-tailed)			
	N	151		
Usefulness index of effective NIS	Pearson Correlation	.642(**)	1	
	Sig. (2-tailed)	.000		
	N	146	153	
user-friendliness index of effective NIS	Pearson Correlation	.650(**)	.423(**)	1
	Sig. (2-tailed)	.000	.000	
	N	150	151	159

** Correlation is significant at the 0.01 level (2-tailed).

Since there is not mean difference of usefulness among different NISs, I only used two dimensions of data richness and user-friendliness to visually plot mean values of these two composite variables to capture the difference of effectiveness among the seven NISs. I calculated mean values by the city and plot in x-y graph (see Figure 7.1). This comparison needs to be interpreted carefully as expectations from each site can vary; users from an old and established site might have a higher expectation. This needs a further research to measure. Also the difference should not be interpreted in an exaggerated manner as they fall only between 9-12 scales.

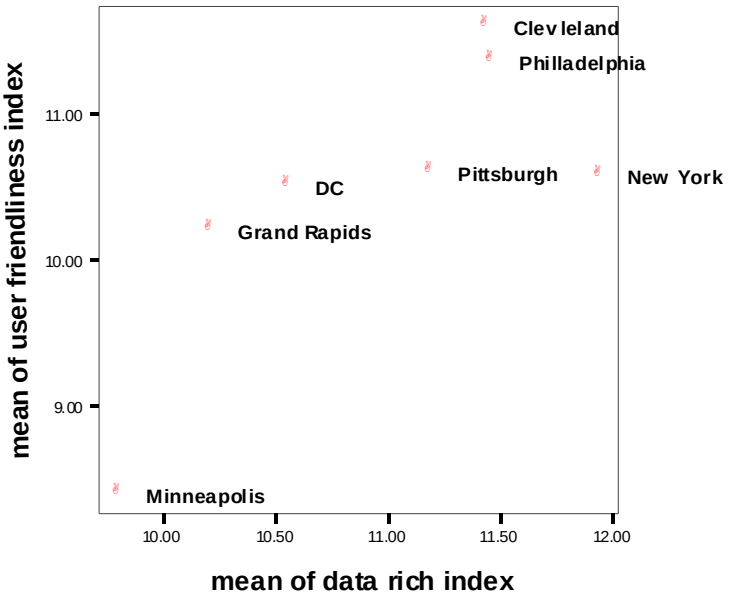

Figure 7-1: Visual Comparison of seven NISs by Effectiveness Indexes (Composite Variables)

Table 7.17 displays the overall average of effectiveness indexes for all the responses. All three show similar values (3.58, 3.67, and 3.81 respectively in a five point scale or 72, 73, 76 in a scale of 100). This table also implies that users perceive NISs as effective overall but there is also room for improvement.

Table 7-17: Descriptive Statistics of Three Indexes of NIS Effectiveness

	N	Range	Minimum	Maximum	Mean	Std. Deviation
user-friendliness composite variable	159	12.00	3.00	15.00	10.7484	2.30566
data rich composite variable	154	12.00	3.00	15.00	11.0195	2.14650
usefulness composite variable	153	16.00	4.00	20.00	15.2549	2.72061
Valid N (listwise)	147					

Another thing that I looked at was the perception on the roles of partner organizations. Table 7.18 shows the view of NIS project team members on data, funding, and technology organizations' roles. Data, technology, and funding are considered three main resources and data and technology organizations' role is perceived more important than that of the funding organization.

Table 7-18: Perception on Data, Technology and Funding Organizations' Roles (valid N=54)

	Strongly disagree	Disagree	Neither agree or disagree	Agree	Strongly agree
Organizations with technology expertise play more significant roles than other organizations in the development partnership.	0.0%	16.7%	31.5%	35.2%	16.7%
Organizations that collect and provide data play more significant roles than other organizations in the development partnership.	1.9%	9.3%	35.2%	38.9%	14.8%
Organizations that supply funding for the project play more significant roles than other organizations in the development partnership.	1.9%	26.4%	30.2%	26.4%	15.1%

Although funding was not the main focus of this dissertation research, funding of course plays a major role in an NIS development like anything else. Some received federal government grants to build and then local foundations' grants to sustain it. Some had city government funding, and some had funding from national funding organizations, such as the Annie E. Casey Foundation and the Fannie Mae Foundation that supports NNIP and its partner NISs. A little bit more discussion on the funding will be discussed in the following chapter- comparative case study.

7.2 SUMMARY

The objective of this chapter was to report the survey results and to do a basic mean difference statistical analysis to see the patterns of the NIS effectiveness.

In short, it found some evidence that hypotheses were generally supported. In a next chapter, this will be revisited and discussed more in a comparative in-depth case study setting.

8.0 INTENSIVE STUDY: COMPARATIVE CASE STUDY

This chapter serves as a complementary, intensive study to an extensive study of the previous chapter. This in-depth case study focused more on the question of the partnership to build NISs because case study can look at the dynamics and processes of partnerships in work closely, although identifying the effectiveness of an NIS was examined as well. This chapter employs a critical case study of three NISs to compare and contrast their partnership models and different NIS governance, plus the Pittsburgh pilot case. The goals are: First, it illustrates an example of a long standing and successful NIS; NEOCANDO in Cleveland, Ohio. Second, it discusses an example of an NIS in a regrouping stage; Neighborhood Info DC in Washington, DC. Third, it examines an example of an NIS advanced with a successful indicator project; Boston Indicators Project and Metro Boston Data Common, in Boston, Massachusetts. Chapter 5 presented the selection criteria used to choose these three cases (see Table 5.1).

By illustrating four cases mentioned above, this chapter will provide a cross-case comparison to reveal the similarities and differences of NIS governance and partnerships. That will help our understanding of how the NIS is operated in different settings and can be developed in other cities. I took a weeklong field visit to each of three sites and conducted interviews with the help from the project team in each city (see Table 8.1).

Table 8-1: Field Visit Sites and Number of Interviews

Site	Dates Visited	Number of Interviews
Cleveland, OH	March 19-24, 2007	10
Washington, DC.	April 2-6, 2007	4
Boston, MA	April 9-14, 2007	8

8.1 PITTSBURGH, PA: RE-CODING THE PILOT CASE

This section revisits the Pittsburgh pilot case to compare with the other three cases. First, I did re-code and re-analyze the interviews done for the Pittsburgh case. This was done with an additional coder as an effort to compare with the following other three cases.

After the survey, a second round of coding was done using a hybrid coding strategy: With the codes produced from the first round, I coded the Kinsley's publications, which are documents of the field expert (the director of NNIP, at the Urban Institute). He is widely accepted as one of the field experts in NIS endeavor and his reports have credentials to serve as guidance for this study. This was done because, firstly, the reports were dependable sources so that I could refine my codes from the first round. Secondly, it was to code the upcoming three other NIS cases with more of a theory testing manner, as a triangulation study to the quantitative analysis. The coding scheme was discussed with an additional coder to refine definitions and it has been revisited with multiple rounds of feedback as I, a first coder, and a second coder progressed.

Each coder conducted coding separately with the developed coding scheme (see Table 8.2), and then convened to discuss the results after a pre-test. Then, two of us separately coded all of the transcriptions of Pittsburgh NIS interviews.

Table 8-2: Coding Scheme for an NIS Study

Code	Definition
Awareness of NIS	• Pressure legislators, governments to share data, • Educate community groups, • Funding organizations about NIS, • Statements about local communities, • Statements about knowledge of NIS beyond Census data, • Statements about showing concrete examples of the benefits of using NIS
Executive Level Connection	• Statements about the reluctance or excitement of leaders to adopt NIS, • Executive level connections between governments, • Universities and nonprofits, • Statements about finding government champions (Doesn't include CDCs or CBOs).
Management Leadership	• Statements about streamlining of NIS management, • Statements about building NIS incrementally, • One point of contact for further assistance requests, • Management leadership of all partner groups involved, • Mediation of personality conflicts, coordination, communication
Legal Issues	• Agreements to share data only with authorized individuals, • Any legal issue
Process Groups/Events	• Statements describing types of partners, such as working groups, task forces, concept teams, symposia, etc
Resource Interdependency	• Linking the various groups with different resources such as data, technology, funding, etc.
Shared Goal	• Sharing a vision of creating some information system to help communities, • Focusing on meeting community needs
Relationship-building	• Statements about the relationships between community actors that facilitate effective NIS or hinder effective NIS.
Usefulness	• Statements about time and cost savings for NIS users, • Statements about the ability to track changes, • Statements about integrating NIS into one's work.
Data	• Statements about quality (accuracy), access, use, and timeliness of data
Training	• Statements about the role of training in effective NIS, • Statements about an online manual
User-friendliness	• Statements about the interface, navigation of website, • Statements about help menus
Interpersonal Issues	• Statements about personality conflicts, egos, etc.

Upon completing coding, the two coded documents were merged together to produce a 'Kappa' score report, which is a degree of agreements between coders to work as a credibility building. Shulman (2006, p. 52) stated that "Cohen's Kappa coefficient[54] is widely considered a better standard measure of the degree of agreement existing beyond chance alone across a wide range of annotation efforts." The general equation for kappa is: k = P*o*-P*e* /1-P*e* ; where Po is the observed proportion agreement and Pe is the expected proportion agreement by chance.

A useful annotation analysis tool[55] was developed and deployed on the Web by a graduate student computer science researcher and a programmer at The University of Southern California, Information Sciences Institute (USC-ISI), which Qualitative Data Analysis Program at UCSUR provided to me. The tool is for reporting the kappa coefficient and agreement index scores between two sets of annotations on a single set of documents. The kappa coefficients presented in this paper are based on only the coded output of an ATLAS.ti project.

Kappa score and F-measure produced moderate agreement scores[56] (0.40 and 0.48: see Table 8.3).

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[54] * *Kappa:* An index with a range _1.0-1.0 that measures agreement when both coders do or do not apply a code. A positive kappa indicates that observers agree more than they would by chance. A score of 0.8 or higher is considered a high level of agreement, whereas above 0.6 is considered substantial agreement (Landis & Koch, 1977; Krippendorf, 1980). Any such heuristic, however, may "oversimplify the interpretation of the values of kappa" (Suen& Ary, 1989: 113). Some statisticians argue you need to consider the cost of reaching wrong conclusions. Personal experience with this tool indicates it is a dubious indicator for specific codes when the raw counts are only a small portion of the coded text.
* *F-measure:* An alternate index with a range_1.0-1.0 that is proving more useful for reporting inter-rater reliability. When comparing two coder's annotations, the F-measure regards one set of annotations as the correct answer and the other as the coding system output. The equation, therefore assumes P is equal to (match)/(total number for coder 1) and R is equal to (match)/(total number for coder 2), allowing us to calculate an F-measure as (P * R * 2)/(P _ R) (Shulman, 2006).

[55] The Qualitative Data Analysis Program (QDAP) at the University of Pittsburgh's University Center for Social and Urban Research used this tool for merging two coders work for this research (http://www.qdap.pitt.edu/, & http://www.isi.edu/~nkwon/AnnoHelp/main.html.)

[56] There was a difference due to the coders' knowledge backgrounds, discovered from the meetings of the two coders and a coding project assistant. The three of us identified some of the differences as coming from the fact that I, as coder 1, had an expert knowledge on the subject matter as I worked for the NIS development project and conducted interviews myself, but the coder 2 was just a coder. In a way, that accounted for some of the lack of agreements. Coder 2 had an 'over-coding' tendency compared to coder 1, which means she applied more codes than

Table 8-3: Kappa Score Report: Coding of Pittsburgh Interviews

Code	Coder 1	Coder 2	Exact Match	Overlap	Kappa(incl. overlap)	F-measure(incl. overlap)
Awareness of NIS	10	22	0	5	0.23	0.30
Data	15	26	2	8	0.35	0.45
Executive Level Connection	12	21	3	6	0.48	0.53
Interpersonal Issues	0	1	0	0	0.00	0.00
Legal Issues	5	9	3	2	0.71	0.71
Management Leadership	19	23	2	10	0.47	0.55
Process Groups/Events	5	2	0	0	-0.01	0.00
Relationship-building	11	16	0	6	0.41	0.44
Resource Interdependency	4	13	0	2	0.21	0.24
Shared Goal	10	14	1	1	0.12	0.17
Training	9	13	0	10	0.81	0.83
Usefulness	11	15	1	7	0.55	0.59
User-friendliness	4	3	1	2	0.85	0.86
TOTAL	**115**	**178**	13	**59**	**0.40**	**0.48**

As the Kappa score report shows (see Table 8.3), coders had moderate agreement judging from Kappa and F-measure scores. Management leadership, executive level connection, and shared goal were the most important codes for the study of Pittsburgh NIS development partnership. Management leadership to coordinate all partners involved was perceived important among interviewees. Interviewees expressed that executive level connection- to find a government champion to support the project team and connect key players from funding entities,

coder 1 in every round. That also accounted for some of the lack of agreement. This-over coding tendency- was not particularly good or bad as two coders have different levels of understanding on the subject matter. But it was good that the tendency was consistent over the rounds, which can be a good indicator of reliability.

universities, and nonprofits in the city- was crucial. Coming from different sectors, sharing a vision-shared goal- focusing on community needs was considered important as well.

Not surprisingly, data was talked about a lot in terms of making an effective NIS. The need to make data constantly updated and accurate is a challenge but a necessary and critical element. Usefulness of NIS is talked about quite a bit. Interviewees indicated that NIS served as a useful tool to understand their neighborhoods and provide good information to drive better decision making for the communities. Coder 2 and I had a meeting with the NIS coding project assistant to discuss the merged coding works after each round. I decided to have us to identify a few 'miss-shots' that clearly coded wrong whether it was a simple mistake of coders or realized during the team meeting. This was an attempt to test increase the reliability. Kappa score report showed the increase just after a simple clean up for a few 'miss-shots' for all of the cases. However, we did not try to increase consensus just to raise an agreement score –Kappa score and F-measure. We agreed to disagree for most of unmatched codes to preserve the difference in comprehension and interpretation. For instance, coder 1 coded a part of an interview as 'usefulness' but coder 2 coded the similar range for that section as 'usefulness' and 'data'. This difference between coders was consistent for the entire coding process of this dissertation research.

Again, data issues are the core theme of building an NIS and making it effective. Management leadership was a key in the partnership of NIS development. Detailed discussion will be presented in the 'cross-case comparison' section later in this chapter.

8.2 CLEVELAND, OH: NEOCANDO, A CRITICAL CASE OF SUCCESSFUL NIS

This section discusses the NEOCANDO, which is a critical case study of a long standing, successful NIS (see Table 5.1 for case selection).

8.2.1 Background and Context of Cleveland NIS

Cleveland NIS is one of the founding members of NNIP at the Urban Institute and has existed for more than a decade as one of the exemplary NISs in the nation. The leading organization in the NIS partnership is a university research center- Center on Urban Poverty and Community Development, Case Western Reserve University, which started a poverty research project in 1988 with funding from Rockefeller Foundation and the Cleveland Foundation resulting into the building of an NIS. Then, they put out reports on neighborhood conditions for some neighborhoods in Cleveland, with a range of vital statistics, crime, property characteristics and census data, and they started getting many calls asking the same thing for other neighborhoods, according to a key staff member at the Poverty Center.

NEOCANDO progressed rapidly over the last decade. They exemplify a university led initiative. Claudia Coulton, the project leader based at the Poverty Center of Case Western Reserve University is one of the founding members of NNIP and a proponent of better data access with data democratization (Coulton, 1999, 2008).

NEOCANDO started as outgrowth of neighborhood studies including poverty research project mentioned above. NEOCANDO did not stop at just writing reports, but decided to put information into the hands of people who could act on, for example launching the first version of CANDO in 1992 to linking data from different sources to provide to community stakeholders.

Their latest version NEOCANDO has flexible online mapping with parcel level data, particularly after the merge with the Cleveland Info.[57]

NEOCANDO has accumulated wealth of data over the years of working together with many local entities. Their system is built from census but also contains some key data including vital statistics, crime, and Mortgage lending data (see Table 8.4)

[57] NEOCANDO website (http://neocando.case.edu/cando/index.jsp?tPage=about) states "NEO CANDO, Northeast Ohio Community and Neighborhood Data for Organizing, is a free and publicly accessible social and economic data system of the Center on Urban Poverty and Community Development, a research institute housed at Case Western Reserve University's Mandel School of Applied Social Sciences. NEO CANDO allows users to access data for the entire 17 county Northeast Ohio region, or for specific neighborhoods within the region. Academic researchers, community and economic development professionals, public officials, neighborhood activists, business leaders and concerned citizens of all types can easily use this system to explore aspects of the area such as population trends, poverty, employment, educational attainment, housing and crime. NEO CANDO users can generate data tables, maps, and charts, and either print them or export them into Word and Excel files. NEO CANDO represents a long-term collaboration between various non-profit organizations, foundations and government agencies, including the absorption of CleveInfo, the parcel-based data system jointly organized by the Cleveland Housing Network, the Enterprise Foundation and Neighborhood Progress, Inc. Efforts to enhance the property data tools located within NEO CANDO are underway as recommended by the National Vacant Properties Campaign report, "Cleveland at a Crossroads" as well as by the Vacant Properties Steering Committee, an interagency task-force consisting of several Cleveland City departments, Cleveland City Council, the Northeast Ohio First Suburbs Consortium, numerous departments within Cuyahoga County, community development organizations, and research interests. NEO CANDO will be a one-stop-shop for identifying vacant and abandoned properties as well as serve as an early warning system to provide a means for preventing more abandonment. NEO CANDO compiles data from many different sources and links to data provided by public agencies in order to have the most recent data available"

Table 8-4: Key Data and its Source in NEOCANDO

Data	Data source
Census	Census Bureau
Crime data	Cleveland Police Department
Vital statistics	Ohio Department of Health
Property characteristics and sales information	Cuyahoga County Auditor and Recorder
Public assistance data	Cuyahoga County Employment and Family Services
Juvenile delinquency data	Cuyahoga County Juvenile Court
Child maltreatment data	Cuyahoga County Department of Children and Family Services
Mortgage lending data (HMDA)	Federal Financial Institutions Examination Council
Enrollment and attendance	Cleveland Municipal School District
Foreclosure filings, Sheriff's deeds	Cuyahoga County Recorder's Office
Delinquent tax information	Cuyahoga County
Water shut-offs, Postal data, Mortgage data	Companies

Source: NEOCANDO website (http://neocando.case.edu/cando/index.jsp?tPage=about) and interviews

8.2.2 Analysis of a Cleveland NIS Case

Field work for Cleveland was done in the third week of March in 2007. A staff member at the Poverty Center was extremely helpful in identifying key partners and users so that I could contact them to ask for an interview. I conducted interviews for two key project team members, one previous project team member, two government agency staff, two data partners, and three users of community organization staff, a total of ten. Interviews lasted mostly about 30 to 45 minutes. I also talked to one data partner from a police department and one staff from a funding foundation over the phone for a short time, which was not recorded to be transcribed.

The Kappa score report of Cleveland case showed the increase just after a simple clean up for a few 'miss-shots' (See Table 8.5 and Table 8.6)

Table 8-5: Kappa Score Report: Cleveland Round 1

Code	Coder1	Coder2	Exact Match	Overlap	Kappa(incl. overlap)	F-measure(incl. overlap)
Awareness of NIS	5	17	0	2	0.12	0.17
Data	45	58	0	21	0.31	0.41
Executive Level Connection	4	6	0	3	0.49	0.55
Funding	8	19	0	8	0.46	0.55
Legal Issues	2	10	0	2	0.33	0.33
Management Leadership	12	11	1	3	0.28	0.33
Process Groups/Events	1	4	0	0	-0.00	0.00
Relationship-building	16	17	0	8	0.46	0.48
Resource Interdependency	6	12	0	3	0.32	0.33
Shared Goal	3	4	0	2	0.57	0.57
Training	17	13	1	10	0.65	0.69
Usefulness	32	36	0	15	0.34	0.43
User-friendliness	28	56	2	25	0.47	0.59
TOTAL	**179**	**263**	4	**102**	**0.37**	**0.46**

Table 8-6: Kappa Score report: Cleveland Round 2

Code	Coder1	Coder 2	Exact Match	Overlap	Kappa(incl. overlap)	F-measure(incl. overlap)
Awareness of NIS	8	8	0	4	0.42	0.47
Data	45	58	0	23	0.34	0.44
Executive Level Connection	4	6	0	3	0.49	0.55
Funding	8	19	0	8	0.46	0.55
Legal Issues	2	10	0	2	0.33	0.33
Management Leadership	8	9	1	3	0.46	0.47
Process Groups/Events	1	4	0	0	-0.00	0.00
Relationship-building	17	17	0	8	0.44	0.47
Resource Interdependency	6	6	0	4	0.66	0.67
Shared Goal	3	4	0	2	0.57	0.57
Training	16	13	0	10	0.64	0.67
Usefulness	32	36	0	14	0.33	0.41
User-friendliness	28	56	2	24	0.44	0.57
TOTAL	**178**	**246**	3	**105**	**0.43**	**0.49**

In assessing their partnership model, management leadership and relationship building had a high frequency of coding, but not the executive level connection or resource interdependency. I was amazed by the degree of autonomous and friendly interaction between partners while I was conducting the interviews during the weeklong visit to Cleveland. Government agencies, who are simultaneously data providers and users of NEOCANDO, and the NEOCANDO project team, had a high degree of trust in working together. There was one exception that one department in the city of Cleveland was not confident or too willing to share

data.[58] It took a long time to convince and pressure them to join data sharing only after the help of a supporter inside of city government, a government champion.

Having a government champion inside of city government was, of course, critical in Cleveland's case, but most of interviewees expressed a trusting working relationship between partners when asked about the factors of their successful partnership. A staff at the police department simply responded "*I trust so and so at NEOCANDO and share their value*". A project team member explained a bit more on that, "*In terms of, like I was saying, with the data providers, in the beginning there was very little issue of us getting buy-in from the police department, department of children and family services, where there's the child abuse, the data. We didn't have an issue with that. Again, because it started off as a research project that X was working on.*" When I asked how they had a positive working relationship with city government, a project team member responded "*I suppose it has something to with the fact that I believe we've been respectful of the agencies, we've tried to be a neutral party more than an advocate. We've stayed out of advocacy to the degree possible…we have not made NEO CANDO stand for any particular advocacy position. So, it's not anti-government, it's not anti-business, it's not pro-liberalism or anything [laughter]*…"

In every interview I conducted, they expressed that NEOCANDO is perceived as a highly respected and trusted organization. When I asked if they had challenges in collaborating, many shrug off and said it worked just great. There seemed that they had a high degree of interaction and trust between the other university in the city, government agencies, community organizations and the Poverty Center, the home of NEOCANDO.

[58] A government agency staff interviewed reasoned of resistance to data sharing for the lack of confidence in their data and perceived political risk. Political risk meant a possible attack or criticism on their work by media.

A social network and serendipity played minor roles in shaping today's NEOCANDO. NEOCANDO was CANDO a few years back when they did not have interactive online mapping with parcel level data, but 'CleveInfo', then managed by a funding intermediary organization, had that but was struggling with staff turnover. So that local funding intermediary organization approached the Poverty Center/CANDO and ultimately CANDO merged with CleveInfo and became more powerful and better NEOCANDO. During this process, one person played a connecting role serendipitously. He used to work for CleveInfo but started working for CANDO when the merger was happening. He contributed to the consolidation decision and also made the process smoother.

One staff member at NEOCANDO had a close personal relationship with one staff member at NODIS (Northern Ohio Data and Information Service) at Cleveland State University, where they serve as a census data expert for the communities. NEOCANDO and NODIS work together in providing training sessions for the community organizations for both of their services and products. NODIS had some funding from local foundations to host free training sessions to community organizations. Not only have they maintained a great working relationship to acknowledge each other's expertise and direct users to each other, they share and feed data to each other.

In sum, a long standing and trusting reputation of the Poverty Center laid out the foundation for great working relationships in building NEOCANDO-Cleveland NIS partnership. Interviews revealed that there was a high degree of collaborative interaction between universities, government agencies and local foundations. Now they get requests to be partnered and expanded from others close to the city, as a staff at NEOCANDO noted as below.

> *"I mean, we've been fortunate that, you know, since we've been here, we have people knocking on our door to establish partnerships. We have a new partnership developing*

with Star County. Because Star County, where Canton is, it's about 3 counties south of here, is still in the NEO CANDO service area. They actually were going to build their own information system. And then they realized, "Oh, wait, NEO CANDO has all the functionality and all the Census data, the HMDA data, the zip code pattern data, you know any national state data sources." So they're in the process of acquiring local sources, like public assistance data, from their department of jobs and family services. And they're working out the partnership between; it's being sort of directed by their United Way down there, United Way of Star County. And we told them, you know, "This is how you go about requesting data," and we're going to help them calculate the indicator and (GEO) codes. But they're going to take on the local data functions. And then when everything is prepared, just ship it to us and put it in NEO CANDO."

This actuality of well used and expanding NEOCANDO was not well captured in the number of survey responses (only 10) in the previous chapter, but the reason was that NEOCANDO was conducting their internal user-feedback survey at the time of my survey. They certainly did not want to burden their users with too many surveys and I also wanted to be courteous to NEOCANDO, especially as they were very helpful to my research. I did send out some invitations to public email addresses and asked forwarding as well, resulting in ten responses.

For the inquiry of probing what the effective NIS is and should be, data was most talked about as the coding results showed (see Table 8.6). Usefulness and user-friendliness went sort of hand in hand producing a similar numbers of codes. Training was talked about notably.

A government agency staff as a user noted for the importance of data for an effective NIS, *"I classify myself as a data user-so I have no interest in data that I can't use. And I'm eternally grateful that NEOCANDO is interested in all kinds of data. Because I don't necessarily know what it is that I need to use, so having this very comprehensive data set*

is very helpful to me. Because I can pick and choose what I want, uh, the interface is easy enough that I can navigate through."

A CDC staff as a user pointed out NIS' usefulness to a typical CDC by giving this example:

"We have a good sense of what's going on, of where the new housing's located, who's getting jobs. We deal with the public a lot of times through public meetings, through housing programs. It's just, when we want to compare other things to other parts of the city, or…that's how it's useful... Something like NEOCANDO is really helpful, that…if I wanted to compare our neighborhood to something on the left side of town, and see the trends for the last ten years…"

Another CDC staff as a user talked about the user-friendly side of the NIS, saying, *"it already has a very good, useful interface. And when you click something, you know what world you're getting into…if it's property characteristics or if it's about employment and social characteristics or if it's housing, I mean, they…it, it's spelled out for you… if I had to go in and name the name of the database, I wouldn't have a clue."*

Three interesting distinctions about NEOCANDO were discovered in terms of usage patterns. First, users liked the 'quick profile' feature which you click only a couple of times to get a quick capture of your neighborhood. Second, many viewed flexible geographical boundaries as a strong feature. Examples of boundaries are ward, census track, statistical planning area, and zip code. Third, both at Case Western Reserve University and Cleveland State University, some academic courses were designed to require the use of NEOCANDO to 1)

feedback to system enhancement and 2) to build capacity of the students, the future work force of the community.

In terms of sustainability question, NEOCANDO said they do projects usually funded by local foundation, which enables to go at a new data source and IT upgrades. For example, they did a project of children's health and collected data. They talked the data provider into putting the data into NEOCANDO. In doing so, they also used the project money for a necessary IT upgrades. Regular maintenance is usually picked up by the Poverty Center.

For future enhancements, they pointed out more data, for example, "*The NIS is lacking in environmental indicators,*" One CDC staff suggested a weekly email to keep users updated, "*maybe if they had more of a diplomatic effort about what you can find on NEO CANDO, like they sent out a weekly e-mail or something that "you know this type of data in Cleveland…*" A few months after the interview, NEOCANDO started doing this (and continuing as of May 2008). There was also a suggestion for more downloadable functions and availability of technical assistance.

In closing, a couple of interviewees summed up well in addressing the usefulness of NIS, particularly for proposal writing, stating NEOCANDO helped to make their arguments stronger.

> *"We have a good sense of what our strengths and weaknesses are in our own neighborhood. But when you have to convince someone else, you need information. You need the data, um, and quite often we're convincing other investors or grant makers of the, you know, the relative qualities of our neighborhood. So, um, actually one of the things NEO CANDO has is, uh, when you do a search on any target area, like we might pick up census tractor four or five that we pick, it will compare it with the city as a whole in the count. And, when I was doing something for, I mentioned, like the other half of the CDC, uh work, um, which is more or less social service programming… made our argument even stronger - we could show that we had lower average incomes than the county, higher than the city but lower than the county and lower educational attainment,*

than, in terms of, "last degree obtained"…which was our point, because we were saying people need, that they either need to get another degree or work on specific certifications and trainings, uh, to ready themselves for employment. But they're hard-working people. Well the data, when you just did that comparison… I didn't know how I was going to make my argument; I just started trying things on-line. The data just dropped the story in my lap. It's what we already knew, but we weren't sure how we were going to describe it."

"We'll use NEOCANDO to see, 'Do we have that demographic in our neighborhood?' We kind of have an idea that we do, but we use NEOCANDO as proof… evidence that we do have the demographic that this agency or city government entity is looking to serve."

8.2.3 Summary of a Cleveland NIS Case

Cleveland NIS case highlighted a partnership model operating in a high degree of trust and collaboration among the partners. It also showcased an example of a successful and effective NIS and its progress over the years and the current operation. More concluding discussion to answer research questions will be provided in the cross case comparison section at the end of this chapter.

8.3 WASHINGTON DC: NEIGHBORHOOD INFO DC, A CASE OF REGROUPING

This section discusses NeighborhoodInfo DC as an example of an NIS that went through a regrouping stage. In Washington DC, an NIS was in existence but faded away until the Urban Institute picked up to revive it in 2004. This case will shed a light on the sustainability perspective within this comparative case study (see Table 5.1 for case selection).

8.3.1 Background and Context of a Washington D.C. NIS

In 2004, the Urban Institute took charge of advancing an NIS in the DC area partnered with Washington DC Local Initiatives Support Corporation (LISC). Their website states that the goal of NeighborhoodInfo DC is to 'democratize data for use as a tool in civic engagement'.

> NeighborhoodInfo DC provides community-based organizations and residents in the District of Columbia with local data and analysis they can use to improve the quality of life in their neighborhoods. Established as a partnership between the Urban Institute and the Washington DC Local Initiatives Support Corporation (LISC), the goal of the NeighborhoodInfo DC is to democratize data for use as a tool in civic engagement. In building and operating NeighborhoodInfo DC, data sharing partnerships and other formal agreements have been negotiated with City data providers such as: Office of Planning, Metropolitan Police Department, Office of the Chief Technology Officer, Department of Human Services, Office of Income Maintenance. NeighborhoodInfo DC cleans and stores data files from these and other sources and makes the data available in a manner consistent with the agreements negotiated with these providers. NeighborhoodInfo DC currently collects the following regularly updated items: US Census Demographic Housing Data, & Vital Statistics Records, TANF and Food Stamp Cases, Voter Registration Records, Home Mortgage Lending Activity, Property Sales, Crime Reports & Arrests. NeighborhoodInfo DC receives funding from local and national sources, who provide general support and fund specific projects and products. Current funders include The Annie E. Casey Foundation, The Fannie Mae Foundation, The Washington Area Women's Foundation, The Meyer Foundation, The Community Foundation for the National Capital Region/Brookings Institution (jointly), The D.C. Children's Trust Fund,

The Morris & Gwendolyn Cafritz Foundation, and The D.C. Department of Housing and Community Development. NeighborhoodInfo DC partners with The Greater New Orleans Community Data Center in designing and maintaining the web site (http://www.neighborhoodinfodc.org/about.html).

In the late 1990s, a nonprofit organization called DC Agenda was operating an information system to feed neighborhood information to nonprofits in the region. The organization worked to provide information and technical assistance to local stakeholders in the Washington, DC area for issues including economic development, youth, family, and neighborhood development. DC Agenda ceased its operation in 2004. Then, the Urban Institute picked it up.

A staff at the Urban Institute described, giving its background of an NIS faded away before,

> "*then a few years ago, what happened was DC Agenda went out of business for reasons that had nothing to do with the neighborhood information… [But] business issues related to their operation and they just decided that they couldn't really continue what they were doing and so they just said, they announced they were going to be closing.*"

As NeighborhoodInfo is in re-grouping stage, it does not provide online mapping features like Cleveland. However, it provides neighborhood information, reports, and other data and resources support community groups and others. For instance, it provides fact sheets, other local data, reports, and where to get help for an issue on sub-prime and high interest rate mortgage lending.

8.3.2 Analysis of a Washington D.C. NIS Case

Although I had over 30 responses to my survey with the help from the Urban Institute as they forwarded my email to their user list of NeighborhoodInfo DC in the spring of 2007, I only was able to conduct interviews of four people. They are the only ones who expressed the interest in meeting me to talk in person. Thus, interview data for Washington D.C. NIS case has some limitation.

I particularly was trying to get an interview opportunity with government agency staff members who were involved in the data partnership, but NeighborhoodInfo DC project team was very cautious of referral. I sensed a big city setting where government employers were busier than other cities not responding to my cold calling. And project team was being careful as they were right in the process of establishing new data partnerships. I prepared a list of my questions for a review that DC project team at the Urban Institute could evaluate and forward to the data partners but didn't succeed in connecting to the data partners in the government. Nonetheless, I conducted two interviews of project team members and two users – one from a government agency and one from a CDC- during my weeklong visit to Washington, DC in April 2007.

I followed the same coding procedure for this case as well. As very similar to the round of Cleveland coding, Kappa score and F-measure went up after a simple clean up for 'miss-shots' (see Table 8.7 and 8.8).

Table 8-7: Kappa Score Report: DC Round 1

Code	Coder 1	Coder 2	Exact Match	Overlap	Kappa(incl. overlap)	F-measure(incl. overlap)
Awareness of NIS	8	10	0	5	0.51	0.56
Data	9	12	1	6	0.52	0.61
Executive Level Connection	4	1	0	0	-0.02	0.00
Funding	4	9	0	3	0.43	0.46
Legal Issues	3	4	0	2	0.56	0.57
Management Leadership	3	12	0	1	0.09	0.13
Relationship-building	5	5	0	3	0.58	0.60
Resource Interdependency	4	2	0	1	0.32	0.33
Shared Goal	0	2	0	0	0.00	0.00
Training	4	3	0	2	0.56	0.57
Usefulness	6	18	0	5	0.27	0.38
User-friendliness	2	2	0	1	0.49	0.50
TOTAL	**52**	**80**	1	**29**	**0.36**	**0.44**

Table 8-8: Kappa Score Report: DC Round 2

Code	Coder 1	Coder 2	Exact Match	Overlap	Kappa(incl. overlap)	F-measure(incl. overlap)
Awareness of NIS	8	10	0	5	0.51	0.56
Data	9	11	1	6	0.56	0.64
Executive Level Connection	3	2	0	2	0.80	0.80
Funding	4	9	0	3	0.43	0.46
Legal Issues	3	4	0	2	0.56	0.57
Management Leadership	5	6	0	2	0.33	0.36
Relationship-building	5	5	0	3	0.58	0.60
Resource Interdependency	4	0	0	0	0.00	0.00
Shared Goal	1	2	0	1	0.66	0.67
Training	3	2	0	1	0.39	0.40
Usefulness	9	18	2	9	0.66	0.73
User-friendliness	2	2	0	1	0.49	0.50
TOTAL	**56**	**71**	3	**35**	**0.50**	**0.58**

In assessing their partnership model, most of codes were well distributed in terms of their frequency. Awareness of NIS coded more than executive level connection, management leadership, relationship building, and resource interdependency. This is because NeighborhoodInfo DC is at the fairly early stage of redevelopment or regrouping, when it is compared to the Cleveland case in the previous section.

In terms of conducting interviews, it seems that there is a unique culture of Washington DC as the nation's capital where many public agencies and employees are. One interviewee briefly mentioned that there are too many government agencies and levels of hierarchy in Washington DC and people get easily frustrated. This plus just being a big metro city makes people less prone to talk to a student researcher, I believed. One partner organization staff

responded to my cold calling saying, *"Oh, you should talk to xx at the Urban Institute. He knows all.*" I explained that I was going to, but she seemed too busy to find the time to talk about the NIS development. Or maybe that could be, in part, an indicator that an NIS in DC is at the early stage of regrouping and does not have a presence among local stakeholders.

> A project team member explained how to go about raise awareness of NIS in the region, "*I think it's been kind of a common, I think in many NNIP cities as here…I mean you have to find some issues that people are really interested in, and then you have to demonstrate how the neighborhood data can contribute to people better understanding that issue and then finding solutions for it… So for example there's obviously a lot of interest right now in sub-prime and predatory lending in the home mortgage market. We had been already working with some of the home mortgage disclosure act data."*

He, then, added the recent partnership history. The Urban Institute reached out to the local office of LISC so that they can focus on being data expert and LISC to be responsible for community outreach. His statement of explanation is below.

> "*so we worked basically, doing it on our own for maybe almost a year, and then we made an agreement with the local office of Local Initiative Support Corporation, or LISC. So, that's the new partner that we have now. And we've been doing this now with them for a couple years. And, I think it's, it's been working pretty well, but it's still kind of evolving, as a relationship. So, we…again, the idea was that we would be doing a lot of the data research side of things, and relying on LISC to be more of the community outreach to work with, with figuring out how to use the data and apply it to community issues. They have been kind of learning how to do that. I mean it's, it's not something again that was, they were doing already. But again, because they have kind of a broad city-wide focus… I think it's, it's a good relationship but just needs to kind of continuing to develop. But I'd say still right now, probably 90 percent of the NIS activity's still he*re."

A social capital played a role in shaping today's NeighborhoodInfo DC in Washington DC case as well, similar to Cleveland's. A staff worked at DC Agenda and moved to the Urban Institute during the transition. The project team leader explained;

> *"It wasn't like we had to come in and not know what was going on. In fact, somebody from the Urban Institute went and worked at DC Agenda and then, I guess we thought that was good model because then that person left DC Agenda to take a job somewhere else and then we ended up, another person who was working here ended up going and taking his place…at DC Agenda. And he was there for a little while before they closed. And then when he closed, we actually hired him back here, so we were able to transfer him back to us, which I think helped a lot with the transition, because basically it was the same person and he was just working for us now. So, so it really was pretty smooth. And the other thing…the funders were really good about continuing to support the work, even though DC Agenda was not part of it anymore, and they said "We still want to be supporting you and what you're doing,"*

In sum, the presence of the Urban Institute was instrumental in building an NIS first at DC Agenda and now at the Urban Institute. The Urban Institute is nationally recognized as a trusted research institution and NNIP being led by the Institute made easy for the Urban Institute to pick up the system from DC Agenda and turn it to NeighborhoodInfo DC and to continue to get support from funding communities as well as some local government agencies. This is different from Cleveland case in terms of the degree of interaction between partners and potential partners. Judging from my cold calling experience and interviews, I sensed there was not a high degree of interaction and communication between the partners or stakeholders. Many people said that I need to talk to the Urban Institute as declining to meet for an interview. As the Urban Institute is taking the charge, Washington DC's case is less dispersed or networked among local stakeholders but a more centralized model. This case also gives us a question of sustainability of

nonprofit organizations when they house an NIS project, which should be included in the future research.

For the inquiry of probing what the effective NIS is and should be, data was most talked about as the coding results showed (see Table 8.8). Next, usefulness was coded often. User-friendly was not talked about often, compared to Cleveland's case.

A government agency staff as a user noted for the importance of data for an effective NIS and its usefulness:

> *"So let's say we had a census in 2000, so in 2005 they had some estimates, and then in 2010 we had a new census. We need something more up-to-date because when you're in government and you're doing policy, you're looking at trends. You cannot look at data from 1995-2000 and then 2005 to make policy. You need something more, every three years at least. Every three years, I think, is something reasonable. We can see trends and also that's it broken down by, in the case of Washington DC, by wards, which is the way we deliver services. So it's a better tool to monitor performance, to monitor where resources should be devoted, if we keep better track of that. The other one in the city with so many um demographic changes like Washington DC, we need more information on movements by race, by income, by age group, in a more periodic manner. …because that in the end that's what helps us do better policy, to adjust our programs and to measure things much better."*

A CDC staff as user pointed out how NIS can be useful in what she does by illustrating her using NeighborhoodInfo DC in her proposal writing processes;

> *"Well, I am a grant manager at the XXX and we are a community center that focuses on mentoring for children that we consider to have high risk factors. So, we need a lot of information about just our community in general to receive grant funding either from the government or from private foundations. There's always a section that talks about the needs of your community and before this website, the NeighborhoodInfo DC, I would just look on the census and try to go through all the data and try to figure out what cluster*

and how to pull together information about everything from what percentage of the community is on subsidized housing, … do they receive TANF, are the children, like education-wise are the schools on target…just sort of different things about our communities. So that's what I get information about…and realized that they had already compiled a lot of the data that I had been looking at before"

For future enhancement, responses collected from open-ended questions revealed that users want more data. Some of collected comments are;

"Expanded data sets for many more indicators, more in-depth analyses to either point out issues important for the city or to inform the public and policymakers about issues at the forefront."

"It would be helpful if they would take the lead on having the District government collect more and better information. The fact that their (NIS) data is accessible is useless if the data is not useful."

"More mapping and raw data files"

In closing, a CDC staff summed up well in addressing the usefulness of an NIS, particularly for conducting her research to prepare for the proposal writing.

"One of the things I found really helpful…, in the cluster section, you can compare what the cluster data is compared to the broader ward or the bigger ward. And so that's helpful to see… well, we have a higher rate of people over twenty-five without a GED, but we also have a community that raises that has more money then the broader ward or something. So that's helpful… And so these are just some of the things that we find helpful. Looking at the unemployment rate…especially as it compares to this number is for this ward and then it goes through and talks about the average for the city as a whole so you can see how it compares to the broader city."

It would be very interesting to see how NeighborhoodInfo DC progresses as they finish the regrouping stages. It will be worthwhile to continue studying how their model of a

centralized approach, given their environment and history, would compare with other grass root and home grown models and multi player partnership models in the near future.

8.3.3 Summary of a Washington D.C. NIS Case

Washington D.C. case highlighted a re-grouping and transitioning NIS case with a partnership model operating in less of collaboration among the partners. It showcased a challenge of sustaining an NIS project. More concluding discussion to answer research questions will be provided in the cross case comparison section at the end of this chapter.

8.4 BOSTON: THE BOSTON INDICATORS PROJECT, A CASE OF INDICATORS REPORTS ADVANCING AN INFORMATION SYSTEM

This section discusses a case of Boston NIS development, which brings a unique approach of developing an NIS. Boston NIS project team, first, focused on producing neighborhood indicator reports and then moved onto building the information system itself (see Table 5.1 for case selection).

8.4.1 Background and Context of a Boston NIS

Boston NIS project started with an indicators report project initiated by the Boston Foundation and advanced to build an online information system. This case, as briefly described in chapter 5, draws two distinctions: One; a local foundation played a central role in the development of an NIS. Two; although they started with the same motive in realizing the importance of data access, they took a direction of producing comprehensive city wide indicators reports and build an information system later as they proceeded. Boston indicators project is led by the Boston Foundation in partnership with the City of Boston and the Metropolitan Area Planning Council. They state:

> The Boston Indicators Project offers new ways to understand Boston and its neighborhoods in a regional context. It aims to democratize access to information, foster informed public discourse, track progress on shared civic goals, and report on change in 10 sectors: Civic Vitality, Cultural Life and the Arts, the Economy, Education, the Environment, Health, Housing, Public Safety, Technology, and Transportation. It aims to democratize access to information, foster informed public discourse, track progress on shared civic goals, and report on change in 10 sectors: Civic Vitality, Cultural Life and

the Arts, the Economy, Education, the Environment, Health, Housing, Public Safety, Technology, and Transportation.[59]

The indicator project reports were distributed in prints but also were available online as going through a couple of web site design upgrades over the last few years. A project team leader recalled the history as the following;

> *"But I had started to work on something like this, the idea of democratizing access to data, in 1991. That's how long it took, through different iterations. We, for years, worked on something called the Boston Children and Family's database that, that's kind of a precursor, but just for Boston. Trying to get public agencies to share their data, putting it into one system, making it available, and doing training…We started the first meetings about that in 1991. We released our first discs with big maps and really big maps-in 1994. And big pieces of acetate with oil pencils where you draw your community, and then you can you put that on a real map, and then you draw it. Then you take the acetate to the census tract map so you can see what your census tracts were…"*

In 2006, they launched an interactive online mapping website, 'MetroBoston DataCommon[60]' after three years of preparation. They utilized a soft launch strategy before a full launching in 2006 as a usability and market testing.

8.4.2 Analysis of a Boston Case

I took a weeklong field visit to Boston in April of 2007. A couple of key project team members were helpful in identifying key partners to conduct interviews. I interviewed three key project team members, including nonprofit organization and government agencies. I interviewed one university partner as a technology expert, and two government agency staffs as users, total of six.

[59] (Source: http://www.bostonindicators.org/IndicatorsProject/Content.aspx?id=602)
[60] http://www.metrobostondatacommon.org/

I conducted interviews for two other government agency staffs, but decided not to include in the coding report after coding and the coders' meeting. Two interviewees were found that they were not the users or key partners. They participated in the 'sector convenings' for Boston Indicators Projects, but had very limited engagement in the project partnerships. Sector convening describes the process of inviting experts and citizens in setting up indicators in each sector, such as Civic Vitality, Housing, Public Safety, etc.

I followed the same coding procedure. As very similar to the rounds of Cleveland and DC coding, Kappa score and F-measure went up after a simple clean up for 'miss-shots' again this time (see Table 8.9 and 8.10).

Table 8-9: Kappa Score Report: Boston Round 1

Code	Coder 1	Coder 2	Exact Match	Overlap	Kappa(incl. overlap)	F-measure(incl. overlap)
Awareness of NIS	7	5	1	1	0.30	0.33
Data	10	19	1	5	0.33	0.41
Executive Level Connection	2	2	0	1	0.49	0.50
Funding	2	3	0	1	0.39	0.40
Interpersonal Issues	0	1	0	0	0.00	0.00
Management Leadership	9	8	0	3	0.30	0.35
Process Groups/Events	2	2	0	0	-0.02	0.00
Relationship-building	5	3	0	1	0.22	0.25
Resource Interdependency	7	1	0	1	0.24	0.25
Shared Goal	2	3	1	0	0.39	0.40
Training	4	6	0	5	0.90	0.91
Usefulness	5	19	0	4	0.28	0.33
User-friendliness	6	10	0	3	0.33	0.38
TOTAL	**61**	**82**	3	**25**	**0.32**	**0.39**

Table 8-10: Kappa Score Report: Boston Round 2

Code	Coder 1	Coder 2	Exact Match	Overlap	Kappa(incl. overlap)	F-measure(incl. overlap)
Awareness of NIS	6	5	2	1	0.52	0.55
Data	10	15	1	5	0.42	0.48
Executive Level Connection	3	2	0	2	0.80	0.80
Funding	2	3	0	1	0.39	0.40
Interpersonal Issues	0	1	0	0	0.00	0.00
Management Leadership	9	8	0	3	0.30	0.35
Process Groups/Events	2	2	0	0	-0.02	0.00
Relationship-building	6	3	0	2	0.42	0.44
Resource Interdependency	8	2	0	2	0.38	0.40
Shared Goal	2	3	1	0	0.39	0.40
Training	4	6	0	5	0.90	0.91
Usefulness	10	19	0	9	0.57	0.62
User-friendliness	6	9	1	3	0.50	0.53
TOTAL	**68**	**78**	5	**33**	**0.43**	**0.52**

In assessing their partnership model, management leadership had a high frequency of coding. Almost every interviewee applauded a key project team leader's passion and efforts for the Boston Indicators Project and stated that it would not have been the same without her. One partner described her as the following; *"X's an amazing visionary to work with. Makes you nuts sometimes, because I'm practical, but that's why we make a good team. So she's just amazing."* Another partner echoed *"X's efforts in a place like Boston have been good."* Another key partner praised her saying, *"some of the things that X is doing over there, I think, is really fabulous. For instance, the data warehouse thing."*

The Boston Foundation (TBF)'s presence in the region was influential. As a fairly large local funding entity, TBF is perceived as a trusted and neutral ground where nonprofits and government agencies could convene. A partner from government side stated the following in this regard.

> *"I think TBF is the leader in civic engagement. I still remember that when we were developing the project, there were some people that I would call if I made calls to people, and I said, "I'm calling from the city of Boston, I want you to get involved in this." People are just, you know, it was like a shut door. Because I'm from the city, they don't want to talk to someone from the city. Whereas if TBF called, you know, "I'm calling from TBF, I want you to get involved in the city," people came. Because one is, it was a funder, and the other is that it had this kind of image in the community that it was on their side… It is seen as a neutral player, it has the connections with community, and because it is a funder, it can actually influence things even in government."*

Another distinctive aspect of Boston's case was that 'Resource interdependency'. Three key partner organizations brought in different assets to the partnership. It seemed that three key organizations coming from different sectors with different expertise including data and funding. One key project team member described as the following;

> *"If it wasn't that it had a partnership in the foundation and the city. So they are very critical partners, that is why we sort of called it the 3 legs of the stool, because they brought very specific expertise and very specific power to this project."*

Another key partner reaffirms it by saying the following.

> *"What it also did, in terms of a partnership, was that when a project depends on just a single partner, then if that partner, if leadership changes or that partner decides that they don't want to support it or something happens, the project dies. But when you have multiple partners, then a project has much more staying power. So, you know, if the city decided not to support it, then the foundation was there to support it. And in fact, over*

time, as you probably heard from X, that the project went from having, being a partner with the city to including the MAPC as a third partner."

These three distinctions -strong managerial leadership of a project team leader, a presence of the Boston Foundation in the region, including its influence as a funder, and a balanced and interdependent three way partnership- sum up the characteristics of Boston's NIS partnership.

For the inquiry of probing what the effective NIS is and should be, data and usefulness were most talked about as the coding results showed (see Table 8.10). One interviewee pointed out the benefit of data access and usefulness of an NIS to the users linking to empowerment of communities. She summed up well in light of the ultimate goal of an NIS to create a policy change.

"Yeah, DataCommons. I think that's to really give communities the ability and empower them, I think is a terrific idea. I actually think that's actually one of the most valuable things that this project has done… really empowering and providing access to data so that people can really use that to create change, and create change on the basis of real information, rather than the perceptions. If you're trying to create some community change, you can have the perceptions about what is going on. But if you are grounded in data, then they're not the perceptions. This is real data that is informing your project. And I think that's a much more valuable way of creating change."

Another user, a city planner described the benefit of data available through an NIS in the following. She pointed out the usefulness of comparing her municipality to others. Boston's project team recently started to expand its geographical boundaries with the MetroBoston DataCommons.

"We have our own GIS analyst who has built us phenomenal data sets. That's really useful, but it's only X's borders. And that is fine if we're looking at some really small project or if we're looking for information about a single parcel. But if we really want to look for regional implications of a project, or if we're trying to make a case for how we compare to the rest of the region for grant application, that information can be…, I spent days for an application once, going town by town in the census and getting the data I needed from every single town. But, you know, this tool sort of allows you to just set it all up and look at it with just a couple of clicks. So it's sort of the way that the information is put together and the fact that it's regional has been, you know, that's sort of why it has been really useful and attractive, from my perspective."

Data was the main talk for a future enhancement need question as well. Another city planner responded with her need to get environmental data for her ongoing proposal preparation.

"In terms of an enhancement, and this is more of a content issue with the DataCommon, and it's fresh in my mind 'cause I've been struggling with this all afternoon. I think (they) lack the ability to find easy-to-access environmental data. So like, air quality, or like, health statistics, whether it's like, asthma or things like along those lines, that sort of get at the health impact of sprawl or if you're doing smart growth, and trying-like I'm trying right now to do a grant application for our transit development project, and I need some data to show how our project might improve health or the environment. And I'm sort of struggling to find data to show that. Even like baseline information. There seems to be stuff at the state level, maybe at the MSA level, but not town-specific. And, so, maybe it doesn't exist, and this is not my strong suit in terms of looking for health data. So, but having that capability on the DataCommon would be great. I don't think it exists, or I just haven't found it. I think that kind of stuff is helpful for grants."

8.4.3 Summary of a Boston NIS Case

Boston NIS development was a case of indicator report first and then information system approach, which a strong nonprofit leading the project with a partnership model operating in less of collaboration among the data partners. It showcased a unique model: indicator reports first, also in a big city environment with a rather stronger bureaucracy. More concluding discussion to answer research questions will be provided in the following cross case comparison section.

8.5 A CROSS CASE COMPARISON

This section is to compare the three cases studied in this chapter, plus the Pittsburgh case in the chapter 6. By comparing and contrasting them, this section will show an overarching theme across the cases and unique characteristics for each NIS. Summary of findings across the cases is discussed. First, discussion of the partnership model of this study is to be discussed and second the pursuit of effective NIS focus follows.

Summing up, Cleveland case was an example of a long standing and effective NIS with a high degree of interaction among partners from different sectors. Washington DC case illustrated an NIS in the re-grouping stage due to the sustainability issue of nonprofit organization that housed an NIS before. Boston case displayed a focus of setting up indicators reports and advanced to build an information system with the strong presence of the Boston Foundation, a local funding organization as a leader. Pittsburgh case was an example of local intermediary taking the lead but working closely with universities.

Table 8.11 sums up four case studies, illustrating case selection criteria and other characteristics. Cleveland is the oldest one, while Pittsburgh represents as a newer, and non-NNIP NIS.

Table 8-11: Summary of Case Studies: Selection Criteria and Other Characteristics

City	Pittsburgh (Pilot Study Case)	Cleveland	Washington DC	Boston
NIS name	PCIS- Pittsburgh Community Information System	NEO CANDO- Cleveland Area Network on Data and Organizing	Neighborhood-Info DC	Boston Indicators Project (& MetroBoston DataCommon)
Date started	2006	1992	2004	2000 (& 2006)
Home (of NIS)	University of Pittsburgh	Case Western University	Urban Institute	Boston Foundation (& Metropolitan Area Planning Council)
Key partners	Pittsburgh Partnership for Neighborhood Development, Carnegie Mellon University - Center for Economic Development, City of Pittsburgh (Mayor's Office, City Planning, Bureau of Building Inspection, Fire Bureau, Police Bureau, Dept. of Environmental Services, Dept of Finance and Real Estate), Urban Redevelopment Authority of Pittsburgh	Various Cleveland city departments (Neighborhood planning, police, etc), The Cleveland Foundation, Enterprise Community Partners, The George Gund Foundation, Neighborhood Progress, Inc, Center for Housing Research and Policy at Cleveland State University, Cuyahoga County, Northeast Ohio First Suburbs Consortium	Washington DC Local Initiatives Support Corporation, Various city departments (Office of Planning, Metropolitan Police Department, Office of the Chief Technology Officer, Dept. of Human Services, Office of Income Maintenance)	City of Boston, MIT Department of Urban Studies and Planning Urban Information Systems Group

Table 8.11 : Summary of Case Studies: Selection Criteria and Other Characteristics (continued)

Features	Online mapping, static maps and reports on its website	Online mapping, static maps and reports on its website	Static maps, and reports on its website	Online mapping, static maps and reports on its website
Technology	Off-the-shelf GIS software (ArcGIS Server)	ArcGIS + customization/programming	Static websites	GeoCortex IMF + ArcIMS
Project characteristics (data, focus)	Focus on property/housing issue data and expanding to others, voting/election data, assist CDC, CBO, vision to create a standard for city's data collection	Children study data, crime and vital statistics, foreclosure data and others, wide range of data sets, geographically expanding to other adjacent counties	Child well-being indicators, sub-prime mortgage data/studies, Produces quarterly reports on housing issues	Comprehensive economic indicator report (MBDC:civic vitality, education, public health, registered voters& many more)
Type of leading organization	Nonprofit-funding intermediary	University	Nonprofit- Urban Institute	Foundation
Size of city	Mid	Mid	Large	Large
Size of partnership-number of key partners	Moderate (5~10)	Small- Few (up to 5)	Small	Small for project team, large for advisory board group
Coverage	City	City but expanding to region	Metro	City but expanding to region
Distinctive Characteristics	Non-NNIP member	A critical success story with a long standing sustainability	Regrouping/Rebuilding history	Indicator project advanced to build an information system

Two important elements for an NIS development were identified. These are relevant across the all four cases. First, a buy-in from community organizations is necessary, as community organizations such as CDCs are primary users for an NIS. Cleveland project team has a long standing respect and trust from the communities and government. Boston project team had an advantage of being led by the Boston Foundation who had an established a local presence over the years. Both of these project teams were perceived as 'neutral ground' where organizations from different sectors can convene. Pittsburgh's case also had built a positive relationship with the communities. A leading organization, PPND, is a local intermediary to connect community organizations to the funding organizations and they have a considerable trust from organizations from different sectors in the region. A key partner, University of Pittsburgh has also established a positive relationship with surrounding communities, particularly after a successful Community Outreach Partnership Center effort in recent years. Washington DC's case was somewhat different as the Urban Institute had a strong recognition as a research institution but not so much interaction with community organizations in the city. However, they recognized the importance of reaching out, and partnered with a local LISC.

Second, administrative data from the government agencies is necessary in building an NIS. Thus, governments' willingness to share data with the project team is a must. Cleveland project team had enjoyed a very friendly relationship with various city government agencies, including the police department. Pittsburgh project team was able to connect to the city at the executive level to produce a data sharing agreement on top of existing efforts of collecting data from some agencies by a university team. DC project team obviously benefited for its recognized research institution status, but they were in the early stage of revitalizing the data sharing relationship with the city government agencies. Project team leaders specified that they are in the

process of entering some agreements with some agencies. Boston team was able to get cooperation from the government partly from the influence of the Boston Foundation and partly from the leadership at the top of the city government. A key partner informed me that she experienced a sudden stoppage of support on this project after a new administration at one point.

In looking at the partnership models, I compared the frequencies of the coding across the cases (see Table 8.12). This should be interpreted carefully. This is just a frequency of coding, which means talked about a lot, but it does not mean one case had more characteristics of that particular code. For instance, it could be 'we had a strong executive connection' or 'we had a good executive connection.' Coder's experience and interpretation should be followed to look at this table.

Table 8-12: Comparison of Code Frequency across the Cases (Partnership Focus)

	Cleveland	DC	Boston	Pittsburgh
Executive level connection	Low	Low	Low	High
Management Leadership	Mid	Mid	High	High
Relationship building	High	Mid	Mid	Mid
Resource Interdependency	Mid	Low	High	Low
Shared goal	Low	Low	Low	High

As discussed before, Cleveland enjoyed a high degree of collaborative governance environment and relationship building was most talked about. In DC, management leadership and relationship building were talked about more than others but I did not detect any distinctive characteristics of their partnership. This was because of low interview numbers-only four in part but also there was not much of multi partner partnership in action as the Urban Institute is leading to regroup currently.

Boston had a benefit of strong leadership from a project team leader as well as the positive influence of the Boston Foundation as the above table illustrates the high coding frequency of management leadership. They also had a three way partnership, which was called as 'three legged stool' by an interviewee. Each partner brought different resources and assets to the partnership and that worked well for a Boston NIS case.

Pittsburgh case, compared to others, had executive level connection coded frequently as they were able to produce a data sharing agreement and accelerated the development of an NIS. Shared goal was talked about more than other cities. This was because Pittsburgh project team had invited many partners at the early stage but had to navigate differences of participants, coming from different sectors and different agenda. Management leadership was talked about because now they are at the second phase stage to sustain it. Some users expressed the opinions of one point of contact, which falls on a management issue. Thus, concerns and suggestions for the second phase to sustain it were linked to management issues, which then coded as management leadership.

In sum, there were two macro characteristics of partnerships. One was collaborative governance environment, which organizations from public and nonprofit sectors practice higher interaction and collaboration. The other was a strong leadership, which a project team leader or leading organization takes an initiative and pull out the consensus and successful implementation of the project. In putting these two in a spectrum, Cleveland and Pittsburgh fall close to one end, which is a collaborative environment model, while Boston and DC fall close to the other end, which is a strong leadership model. The following table shows these two models across the cases.

Table 8-13: Summary of Case Studies II: Variables Investigated

City	Pittsburgh	Cleveland	Washington, D.C.	Boston
Collaborative environment	Moderate	*Strong*	Weak	Weak
Management leadership	Strong	Moderate	Moderate	*Strong*
Institutional arrangement	Moderate	Weak	Moderate	Weak

In short, Cleveland and Boston examples serve as examples of horizontal and vertical structures of government exercising its authority (see Figure 3.1). Cleveland had horizontal governance structure, where city government and non-profit sector working together closely in a less-bureaucratic manner. Boston case showed a contrast that NIS management team had to exercise a strong leadership as there was a higher-bureaucratic setting was in place.

For the inquiry of an effective NIS, 'data' and 'usefulness' were most talked about across the all four cases (see Table 8.14). In all four cases, the importance of data availability and an NIS being useful in what the users do and to create an impact on community change have been noticed.

Both project team members and users recognize the need and importance of user-friendly feature and training in Cleveland. One of the reasons why user-friendliness is not talked about a lot in other three cities is that interactive online mapping features are rather new (Pittsburgh and Boston) or not existing yet (DC), compared to Cleveland's system which has existed for a long time.

Table 8-14: Comparison of Code Frequency across the Cases (Effectiveness of NIS Focus)

	Cleveland	DC	Boston	Pittsburgh
Data	Very High	High	High	High
Usefulness	High	High	High	High
User-friendliness	High	Low	Mid	Low
Training	High	Low	Mid	High

The ultimate goal of an NIS is to create a policy change or community change in their cities as an NIS being an effective and useful tool (see Figure 9.1). This was acknowledged throughout the cities whether they are in a well established stage or a newly developed stage, or whether they have an online mapping feature or not. It appears that it takes time to develop an NIS and it takes time to witness changes made with the help of using an NIS. More discussion on this will be presented in the next chapter, 'discussion and implications'.

8.6 SUMMARY

This chapter provided an in-depth look at the selected four cases in investigating the partnership model. The next chapter will discuss and conclude findings from this chapter and the previous chapters, and provide policy and management implications.

9.0 DISCUSSION AND IMPLICATIONS

This chapter concludes the dissertation research. I summarize and interpret the findings from the analyses in both theoretical and practical perspectives. The findings, I hope, will help us better understand how a partnership for the NIS development works and what makes an NIS effective. In turn, I also hope discussion of findings will help understanding the relationship of IT innovation and collaborative governance. In this chapter, I will first discuss the main findings in reference to the hypotheses specified in the chapter 4. Second, I will have a conclusion section of the dissertation research, based on the previous analysis chapters. Third, I will discuss policy implications of this NIS study. Lastly, I will talk about the limitations of the study and a future research direction.

9.1 MAIN FINDINGS AND DISCUSSION

First, I discuss the first research question of this research, 'What is an effective NIS?' An effective NIS can and should deliver circular data and knowledge sharing among local economic development stakeholders (see Figure 9.1). As the saying 'knowledge is power' goes, an effective NIS can serve as a vehicle to empower citizens and nonprofit groups by providing easy access to a variety of local data and information. Still, one must recognize that information can become knowledge only when well analyzed and presented. Knowledge can become power only

when one knows how to use it politically, in this case of a local governance setting. The process of collecting local data and creating better access to it is not a sufficient but is a necessary condition to steer policy or political changes.

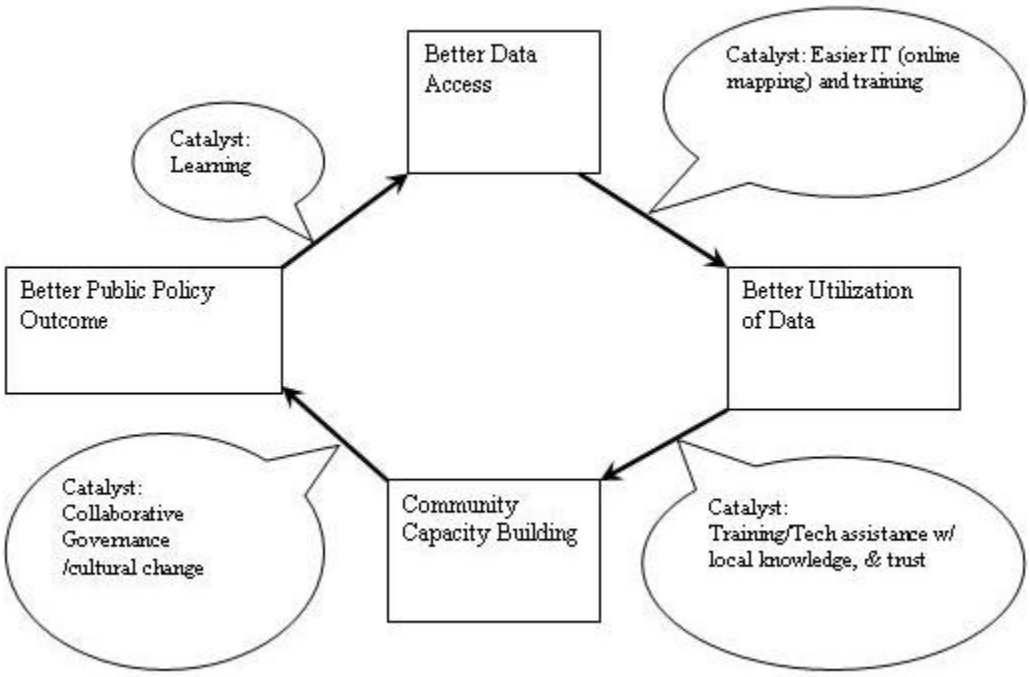

Figure 9-1: The Goal of NIS: Creating an Information Chain Reaction
(Source: Author)

The goal of an NIS is, in my own words 'to create an information chain reaction[61].' The figure above represents the life cycle of an NIS. To create an information chain reaction, which is a better policy outcome from better data practice, we should pay attention to the catalyst in this cycle. Advancing IT has been well pursued recently with the NIS movement in the U.S., but training and technical assistance have not been stressed enough yet. I argue it is time to develop

[61] This figure, information chain reaction is created, in part, with an adaptation from Weitzman et al (2006) and Treuhaft (2006).

and conduct advanced training sessions that are tailored to different groups of users with issue and task specific modules.

NIS is designed to incorporate local stakeholders including grassroots, and community organizations. For this reason, NIS is an example of how IT innovation can be enabled by collaborative governance and IT innovation can be harnessed to foster collaborative governance in turn.

Continuing with the first research question, I discuss each hypothesis below.

H1: Democratization of Information (Better Data Access): The NIS increases data sharing among stakeholder in community development in the region.

Both survey (section 7.1.1.4) and interview data (section 8.5) clearly demonstrated that NIS created better data access for community stakeholders, particularly for the community organizations and some government agencies. Local stakeholders, both government and nonprofit sectors can access to data that previously was difficult or impossible to get before the existence of their respective NIS. NIS helps increasing their productivity in conducting tasks.

It seems that different NISs are at different degrees of data sharing, but it was found that the NIS works well as an information sharing tool for the community development.

H2: Empowerment: NIS contributes to the empowerment of nonprofit groups.

Most NISs are designed to assist grassroots community organizations and nonprofits in doing their community development. Both the survey (section 7.1.1.4) and interview data (section 8.5) strongly showed that the NIS contributed to the empowerment of community organizations by allowing better data access and capacity building. Putting the needed data in

nonprofit groups' hands helps their sense of empowerment in looking at their community issues and participating in the local decision making. However, it was not apparent how much participatory decision-making has increased due to the NIS. The survey and interview data showed a positive but not strong indication on public participation. This probably takes time to witness and should be a further research agenda.

H3: Transparency: An effective NIS contributes to the transparency of government agencies.

The NIS aims to draw active engagement of government agencies in sharing data and then making better policies. As an instrument of government accountability, transparency has been heavily discussed in the public administration discipline recently. Both the survey (table 7.10) and interview data suggest that the NIS has contributed to an increase of transparency of the government. In some cases, including Washington DC, data sharing and enhancing the transparency of government agencies are still work in progress. Yet, Cleveland case clearly demonstrates NIS, an IT innovation tool, can foster transparency of government agencies by sharing data and opening up to the civil sector.

H4: Collaborative Governance Environment: Development of an effective NIS is positively associated with the interaction of government and civil society.

Results from interview data suggest that there is a positive relationship between them. The direction of causality, whether governance environment enables the development of an NIS or an NIS elevates the governance environment, is for the next research. Yet, it seems that there is a cyclical relationship - that the governance environment affects the development of an NIS

and in turn the NIS influences governance processes. It appears that collaborative governance affects the development of an NIS first. Then, an effective NIS can foster collaborative governance back.

This component of the research was to test a theoretical model based on a 'Collaborative Governance' framework. A qualitative analysis in a comparative case study setting demonstrated that collaborative governance and an effective NIS are positively related.

Chapter 4 addressed what the collaborative governance is. In addressing how to define a collaborative environment in an NIS study context, I list some of the things to look for to determine if a government is collaborative or hierarchical/bureaucratic. As Cleveland and Boston case comparison showed, collaborative governments would show more willingness to share data with the NIS team or other nonprofit organizations. They would put more efforts in community engagement, including various public participation tools. There usually is a government champion within the bureaucracy, supporting and closely working with nonprofit organizations. There would be also informal network and social capital that government sector employees and nonprofit organization staff form together, including funding entities.

Why does a city need an NIS? As an IT innovation tool, NIS can be compared with 'CitiStat' in this sense: that IT drives reinvention and performance management of governments. Citistat with a root from 'CompStat' of New York city police department, is a nationally recognized innovation, which started off from Baltimore's performance strategy and adapted to a number of cities in the U.S. CitiStat is similar in the sense that it promotes and thrives on better data practice (Behn, 2006).

While CitiStat is a change from inside of government, NIS is mostly initiated by civil society sector but built by the partnership with government, which can be understood through the lens of collaborative governance perspective.

So the crucial difference is that while users of CitiStat remain within the hierarchy of traditional governments-mayors, agency heads, managers, NIS is designed to incorporate more local stakeholders and the public. For this reason, NIS is an example of how IT innovation tool can help local governance and foster collaborative governance.

Although some cities try to share their CitiStat reports with the public-New York City's CitiStat/311 posts some reports on the web, there largely remains the issues of data sharing challenges including government's view of data as an asset [62] (Hoffman, 2003).

9.2 CONCLUSIONS

The NIS is a phenomenon that has gained increasing attention in the field of local governance and community development in recent years. The NIS has the potential to produce better decision-making and policy changes in communities, cities, and regions, by providing better data access to the stakeholders of community development. The Web and GIS technologies have advanced tremendously in the past decade, enabling the development of the NIS that is user-friendly and useful for what community organizations and government agencies do, including proposal writing and evaluation.

[62] I also found out, through the observation and interview, that some city departments use some data as a revenue generating source.

The use of partnership has been a dominant approach in the development of IT projects in recent years. The NIS, mostly initiated by nonprofits, is developed by the public nonprofit partnership strategy to build the information systems. Political environment of collaboration and managerial leadership have been identified as two important dimensions of strong partnerships and effective NISs.

The study found that the NISs have achieved their goal of creating information sharing networks to help local economic development and community revitalization. By providing a 'data warehouse', community organizations, government agency staff, and researchers can come and access the data they need, which was difficult or impossible to get before the NIS. This enhanced the empowerment of community organizations. It also has led to a start in an increase in public participation. The study also found that the NIS contributed to the transparency of government agencies. All in all, the NIS contributed to the local collaborative governance. This study served as an empirical examination of a theoretically matured discussion of a shift from a hierarchical government to a horizontal governance paradigm in public administration scholarship.

This study has also revealed that data is more important than other resources, such as funding or technology, in developing an NIS. The study suggested more emphasis on training should be in place in reaching out to diverse user groups. I argue that the ultimate criteria for determining the effectiveness of an NIS should be to measure the NIS's impact on users' work and performance and to follow changes in policy or in their neighborhoods. I claim that we should collect more success stories of community development created in part with the use of NISs. It will take time to witness more success stories from communities as figure 9.1 in the previous section implies.

The case study not only served as a confirmation of the results of the statistical analysis, but also provided some lessons and strategies for other cities that are developing the NIS. Roughly speaking, the collaborative governance environment model suggested focusing on the relationship building and executive connection in the social and professional networking sense. On the other side of spectrum, the strong managerial leadership model suggested focusing on leveraging leading organization's assets and strengths to elicit consensus and support of other partners in the city or region.

How to create a successful NIS, which is effective and sustaining, is of practical and theoretical interest. Practically, public managers and community leaders are working hard to improve their local economic development and to spur community revitalization. This study showed contexts and processes of NIS developments and suggested some strategies to go about building one. It has demonstrated the benefit of data sharing and working together closely. Theoretically, this study generated some helpful knowledge about the association of partnership strength and the effectiveness of NISs, rooted from the perspectives of information technology, GIS, and public administration studies. There are few scholarly efforts that aided in understanding of information technology in local governance settings. Yet, this study contributes to the understanding of rising 'collaborative governance/public nonprofit partnership', and 'e-governance'.

9.3 POLICY IMPLICATIONS

This section presents some of the theoretical contributions and policy implications of this research. One of the theoretical contributions of this research is the testing of a partnership model

in a collaborative governance framework. Shifting from government to governance and the increasing collaboration among sectors have been extensively discussed and debated in recent public administration scholarship. This research was set out to examine that shift empirically. This study showed that collaborative governance, including interactions and trust between sectors, is positively related to the NIS partnership and the development of an effective NIS, supporting the arguments of collaborative governance framework. In terms of building an NIS as an information system, the result of this study was also in line with the IT studies done from a socio-technical perspective in public administration scholarship. The organizational environment and management leadership associated with organizations are factors important to successful IT implementation (Bretschneider, 1990; Fountain, 2001; Kraemer et al., 1989).

From the analysis, it appears that more collaborative governance in a city leads to a stronger NIS partnership and a more effective NIS. In turn, it seems that an effective NIS can foster collaborations of local governments and nonprofits: enabling collaborative governance. It shows that IT innovations can help collaborative governance. Often, the public do not have rich understanding of public problems, often as a result of not having adequate data. NIS provides a potential way to overcome this problem of the public not having adequate data, fostering a type of performance informed dialogue and enhance public participation. In sum, this study was meaningful in testing the recent development of collaborative governance framework empirically in studying the NIS partnership.

This study makes some empirical contribution as well, as the survey was a first of its kind in an attempt to cover NISs across the nation although the survey responses could have been better. The comparative case study part can be also useful for other cities in the process of

development as a knowledge transfer. There are few good studies about data practice and NIS development, mostly from NNIP, and this study adds to the ongoing efforts of those works.

A practical lesson for NIS project teams and other cities developing an NIS can be drawn from this study. We can utilize different partnership model approaches for different settings. For instance, you can have a strategy of building relationship and collaboration where a high degree of collaborative environment exists such as in Cleveland. Where a high degree of collaborative environment is not in place already, such as in Boston, it is more functional to find a strong leader to take on the NIS project, utilizing his/her influence in the community.

This study also found some results supporting existing studies addressing the importance of data accuracy and user friendliness to make the NIS effective. Yet, it also found the need for more training. There is a need for different types of trainings for different user groups, depending on whether users have a prior knowledge of GIS or not. Along this line, NIS project teams can benefit from having advanced training that are issue and task specific beyond basic training of system navigation. This can be explained in part due to the fact that Pittsburgh NIS, like many others, is recently established. In the course of information system development, developing user friendly features is usually the first objective. Even with usability testing, developers are mainly concerned about building up easy navigation rather than training the future users. One interviewee brought a very informative user perspective, stating *"I liked this idea of tailored training, specific usage. What you need is to get people saying; wow I need to use this, not like wow that was cool. You want to become like Microsoft word not like some game."*

In some cities where you have a high turn over rate in the nonprofits or government, there also is a need for constant training of new staff.

NIS project teams also should use marketing and branding strategy more. For instance, it would be effective to reach out users in a regular time frame to remind them of data updates, news and events. The study found that providing data and subsequent training is a two way street for NIS project teams and users. An NNIP staff member explained:

> *"I mean some of it is getting driven by audience, what they say they need. But some of it is also, like X's latest work on sub-prime lending, we think this is really important, and people should be paying attention to this. So, we're doing this on our own even though nobody came to ask us for it…so that training and education is really a two-way, it's a mutual relationship of us learning what they need and us…"*

NISs also need effective project management in order to become more effective systems. Effective management means to have streamlined management, which can provide one point of contact, and one stop service through good branding of an NIS. This point is most important when the NIS project teams include multiple partners from various organizations. These organizations are necessary to the development of NIS because of pooling multiple resources but multiple partners may make it more confusing for users after the launching of the system. That is because users need to contact the team for questions and technical assistance but contact point might not be clear then. Using an analogy of business, an organization needs a stabilized management in place when a venture business leaps to an established stage. One interviewee stated *"It is not often clear who to contact about…there should be one contact…who cares whose the system is but someone needs to know who to deal with and call."*

An effort to institutionalize informal data-sharing relationships is worth paying attention too. Some partnerships worked well based on social and professional networking, but often there is a need for a formal MOU (Memo of Understanding) or other agreements for sustainability. A

few NISs have established MOU or data-sharing agreements, including Pittsburgh. As an NNIP staff member illustrates:

> *"Formal MOU is where you should be headed because it's the beginning of an institutional relationship, and gives people some cover, like "This has been done before" as opposed to "Oh yeah, Vicki used to give me this stuff. Don't worry about it." [laughter]"*

The biggest challenges users face are a lack of data accuracy and data not being up-to-date, followed by difficulties with user-friendliness, identified from open-ended questions of the survey and some interviews. Thus, the pursuit of data accuracy and being up-to-date may be more of a constant improvement process rather than an ultimate stage. Enhancements that users want to see are additional training sessions, easier interface and enhanced usability, and, of course, more data.

9.4 LIMITATIONS OF THE STUDY AND FUTURE RESEARCH

In order to sustain an NIS, funding is indispensable. Although many NISs generate revenue from projects and some sort of fee-for-service structure, general funding is often needed and received from national and local foundations. This paper did not address the funding issue; however, it is a vital part of NIS sustainability.

Further research to look at the evolution of partnership networks is needed, which would involve the collection of longitudinal data on partnership dynamic networks. Though network analysis was done in this study to look at the partnership dynamics for the Pittsburgh case, only cross-sectional data collection was available and feasible for this study. Utilizing the data

collected here, longitudinal data can be collected in the future to examine the evolution of a partnership network. In general, longitudinal data collection is difficult and costly. The data collected from the survey and interview can serve as a base line for future data collection and a longitudinal study. Partnerships do change over the time and it is important to track the evolution of partnership dynamics to better understand how partnerships work.

Along with longitudinal study discussion, the partnership model in this research operated in a specific time frame premise, which was that environmental and managerial dimensions affect the partnership and the effective NIS. However, it seems that there is a cyclical relationship in that effective NISs and NIS partnerships also affect the organizational environment, namely collaborative governance. Causality with different directions in different time frames has to be studied to fully understand its changing causality directions as time goes on.

The number of responses to the survey could be better. The next round of the survey should reach more users and project partners across the nation by vigorously seeking out more endorsements from major research institutes, including the Urban Institute.

A total of four cases were used for this study as an attempt to add depth in looking at the partnership processes. If a new NIS development would exercise strategies identified by the case study part of this dissertation, an additional future case study of that new development would serve as an empirical test for the results derived from the comparative case study in the dissertation.

The combination of methods used in this study aimed to provide a methodologically strong research design by taking advantage of each approach-qualitative and quantitative. Yet, there might be some disconnection between results and interpretation using both methods

together. That may be in part because of a difference in philosophical foundation or exercise of analysis. That also may be in part because of limitations to the author's expertise.

In sum, future research should attempt to develop a longitudinal design to explain the evolution of partnership and causal relationships among governance environment and partnership and subsequent effects on the effectiveness of the NIS.

APPENDIX A: Network Data Survey Instrument

NETWORK DATA SURVEY INSTRUMENT

Thanks for participating! I, Sungsoo Hwang, am conducting a dissertation research to understand how partnership works for IT innovations such as Neighborhood Information System development. This survey targets the partnership network that exists for the development of NIS. As a key member of partnership network, your participation is needed.

Listed below are organizations in [*name of site*] that we believe are involved in some way in the development of a NIS. I would like to know the extent to which your organization is involved with, or linked to, the others on the list for developing NIS.

I have included two types of involvement. One is exchange of information and communication among organizations. The other is exchange of resources-data, funding, technology.

Part I: Personal Information

Title:
Organization:
Sector: Government [ ], Nonprofit [ ], university [ ], business [ ]

Part II: Information Share Assessment

Using the following scale, indicate the extent to which you agree with statements
1=strongly agree
2=agree
3=neither agree or disagree
4=disagree
5=strongly disagree

--- 1. Key stakeholder organizations in the partnership network for [site name] NIS share their information with one another.

--- 1-1 Key stakeholder organizations in the partnership network for [site name] NIS share their information with some but not with others.

--- 2. I feel open to sharing my information and knowledge with the other organizations
--- 2-1. I feel open to sharing my information and knowledge with some organization but not with the other organizations

Part III: Resources Share Assessment

--- 1. Key stakeholder organizations in the partnership network for [site name] NIS share their resources with one another.
--- 1-1. Key stakeholder organizations in the partnership network for [site name] NIS share their resources with some but not with others.
--- 2. Technology is shared in the partnership network.
--- 3. Funding is shared in the partnership network.
--- 4. Data is shared in the partnership network.

Part III: Network Assessment

Simply, place a number in the box that applies.
-1= negative relationship with this organization
0= No relationship with this organization for
1= Minimal relationship with this organization for
2= Fair relationship with this organization for
3= Good relationship with this organization for
4= Excellent relationship with this organization for

	Sharing general information about project	Sharing data	Sharing funding	Sharing technology	Trust level
Organization A					
Organization B					
Organization C					
Organization D					
Organization E					
Other Organizations					

Data: census and administrative data such as housing, and crime data from government agencies in addition to mapping data such as base maps.
Technology: Hardware (Servers, computers, and PDAs) and software (database, mapping software)
Funding: direct and indirect cost designated for the development of NISs

APPENDIX B: Interview Protocol

INTERVIEW PROTOCOL

[A printed copy of IRB approval and interview questions was handed out to the interviewee.]

Introduction:

Thanks for meeting me to talk about the NIS. My name is Sungsoo Hwang, a doctoral student at the Graduate School of Public Affairs, University of Pittsburgh. This interview is a part of my dissertation research.

This interview is to explore why and how the partnership for the NIS development worked and to study inner working relationship among the organizations in the network of local community development.

Your participation in this interview is very important, but all your responses will be strictly confidential. Your personal information or any identifiable information will not be revealed to anyone. All the information you provide in this interview will be held in strict confidence. Also, this interview will be used for this research only and will be tape-recorded for transcription and analysis. The final product and tape may be provided to you at your request.

This interview is targeted to development stakeholders and users of the four selected NIS sites across the nation.

Interview Questions:

1) Let's start by talking about what you do in relation to the NIS.

a) Prompt: please tell me your role in the NIS development, how did you get engaged? How did you get to use NIS?

2) Can you please tell me about how the partnership worked?
   a) Prompt: How did organizations initiate collaborative efforts to bring all the parties to the table? How do the private, public and non-profit sectors work together despite their different cultures and conflict of interests, if there was any? How did they gain the trust and support from government agencies and CDC's to implement NIS? How did government agencies move to share information and delegate data to nonprofit organizations and universities?

3) How would you advise to other cities if they were to start an NIS development now?
   a) Prompt: What are the structural relationships and power issues in the collaborative alliance? How was funding located? In what specific ways do you think your organization has collaborated and communicated between organizations in the partnership?

4) How would you define the effective NIS?
   a) Prompt: Academics, including me, like to define things. What is your definition? What is your take on the good, bad, and ugly NIS?

5) Please tell me how we could improve the NIS
   a) Prompt: what are the future enhancements you would like to see? What kinds of suggestions do you have for other cities to develop one?

6) Do you have any last comments?

End/Thanks:

Thank you very much for your time and helping my dissertation.

Please feel free to contact me in the future for any question or comments.

APPENDIX C: Survey Invitation Email

SURVEY INVITATION EMAIL AND THE WELCOME PAGE ON THE WEB

Texts of Survey Invitation Email:

Subject Line: Please help; Invitation to a web-survey of a comparative NIS study from Sungsoo Hwang

Body of the email:

*Apologies for cross-posting. *Invitation to a web based survey

[If you use any Neighborhood Information System, or were involved in the development partnership, please consider helping my survey. If this survey does not apply to you, please accept my apologies.]

Dear [ ],

I am Sungsoo Hwang, a doctoral student at University of Pittsburgh, Graduate School of Public and International Affairs. I have worked past three years as a project team member of Pittsburgh Neighborhood and Community Information System. I am writing my dissertation on a comparative Neighborhood Information System study, looking at partnerships and effectiveness of NISs. As a part of this, I am surveying the users of 30 plus NISs across the US. I would like to ask you to participate in my survey as users of your Neighborhood or Community Information Systems. The survey will ask your feedback.

If you have used NIS more than once, your feedback will be helpful to decide enhancements, training and other needs. Your participation will be greatly appreciated. The

survey will take approximately 15 minutes. As a token of appreciation, $10 gift certificates will be given out for the randomly selected 50 people who choose to leave email addresses.

Please visit the following link to take the survey. http://www.pitt.edu/~shwang/survey.htm (You may have to copy and paste this link into a web browser.) The survey is anonymous and you will not be identified as an individual.

Thank you for your participation. Please feel free to forward this email to anyone who might be interested and email me if there is any question. shwang@pitt.edu

Again, the link to the survey is: http://www.pitt.edu/~shwang/survey.htm

Sincerely,
Sungsoo

Sungsoo Hwang
Ph.D. Candidate, Research Assistant
University Center for Social and Urban Research
University of Pittsburgh
121 University Place, Rm 301
Pittsburgh, PA 15260
Tel: 412-624-7371

Welcome Page on the Web: (http://www.pitt.edu/~shwang/survey.htm)

Welcome!

This survey is a part of my dissertation study of partnerships to build Neighborhood Information Systems (NISs) and to compare the utilization of the NISs across the U.S.

Your participation is important. We need your help to assess the effectiveness of NISs across the U.S. so that public and private funding can be better spent for the enhancement of NISs and for other cities to learn how to build them.

This survey is being distributed to users of 32 Neighborhood Information System (NIS) web sites across the U.S. You are asked to identify which NIS you use, but are not required to provide other identifiable information. The survey will take approximately **15 minutes**. As a token of appreciation, $10 gift certificates will be given out for the randomly selected 50 people who choose to leave email
addresses.

This survey is endorsed by Pittsburgh Neighborhood & Community Information System project team.* http://www.pghnis.pitt.edu/

PLEASE CLICK HERE TO CONTINUE THE SURVEY

There are no foreseeable risks associated with this research study and survey. This is an entirely anonymous questionnaire, and so your responses will not be identifiable in any way. All responses are confidential and results will be kept in a secure computer. Your participation is voluntary and you may withdraw from this project at any time. (University of Pittsburgh, IRB approval # 0601073)

*** Endorsements**

Hello I am Mark Hoffman, Associate Professor at Grand Valley State University. I have worked with the Community Research Institute (CRI) since its founding in 2000, and I am now privileged to serve on the dissertation committee of the University of Pittsburgh's Sungsoo Hwang. His research is the first national study of community information systems like CRI's. I believe his research will provide insights into how local organizations use information, and inform improvement in the collection and dissemination of community information everywhere,

including Grand Rapids. Your feedback is vital to this important research and I encourage you to take a few minutes to participate.

***Mark Hoffman**, Associate Professor, School of Public and Nonprofit Administration, Grand Valley State University*

Hello, I am Grant Ervin, Western Pennsylvania Policy Director for 10,000 Friends of Pennsylvania and Project Manager for the Pittsburgh Neighborhood and Community Information System (PNCIS) project.

As a user of the Pittsburgh Neighborhood and Community Information System, I am encouraging you to participate in a survey of comparative Neighborhood Information Systems (NISs) being led by Sungsoo Hwang. Sungsoo is currently a doctoral candidate at the University of Pittsburgh. While working with the PNCIS project team over the past 3 years, Sungsoo has been developing his doctoral dissertation on the growth of Neighborhood Information Systems across the country. Your feedback is important in assessing how we measure against other neighborhood information systems and in teaching us how we can enhance the PNCIS. Thanks in advance for your input.

***Grant Ervin,** 10,000 Friends of Pennsylvania*

***Sponsors of the survey**

Pittsburgh Partnership for Neighborhood Development (PPND), a $50 gift certificate for survey raffle

Please contact Sungsoo Hwang for more information. www.pitt.edu/~shwang
Research Assistant, University Center for Social and Urban Research
Ph.D. Candidate of Public Affairs, Graduate School of Public and International Affairs
University of Pittsburgh

PLEASE CLICK HERE TO CONTINUE THE SURVEY

APPENDIX D: Survey Instrument

SURVEY INSTRUMENT

In order to preserve the web environment design of the online survey, a separate pdf formatted file is merged at the end of this dissertation document.

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Introduction [1/9pages]

Welcome! [Version. 1/10/2007]

Thank you for your participation.

Please contact Sungsoo Hwang for more information. www.pitt.edu/~shwang

Click "Next" to get started with the survey.
If you'd like to leave the survey at any time, just click "Exit this survey". Your answers will be saved.

Please, identify the local NIS that you use primarily . [2/9pages]

1. Please, identify which Neighborhood Information System you primarily use. Please select only one at a time (If you use more than one, please choose your primary NIS first here and then select your second or third one at the end of this survey.).

- ◯ Atlanta, GA, Neighborhood Indicators Project
- ◯ Baltimore, MD, Neighborhood Indicators Alliance at http://www.ubalt.edu/bnia
- ◯ Boston, MA, Indicators Project at http://www.tbf.org/indicatorsProject
- ◯ Camden, NJ, Camconnect at http://www.camconnect.org
- ◯ Chattanooga, TN, Southeast Tennessee Information Service at http://www.setnis.org
- ◯ Chicago, IL, Metro Chicago Information Center at http://www.mcic.org
- ◯ Chicago, IL, CityNews at http://www.newschicago.org
- ◯ Cleveland, OH, CANDO & NeoCANDO at http://povertycenter.cwru.edu/
- ◯ Columbus, OH, Franklin County DataSource at http://www.datasourcecolumbus.org/
- ◯ Dallas, TX, Dallas Indicator Project at http://www.dallasindicators.org/
- ◯ Denver, CO, Neighborhood Facts at http://www.piton.org/
- ◯ Des Moines, IA, Child and Family Policy Center at http://www.cfpciowa.org/
- ◯ Grand Rapids, MI, Community indicators at http://www.cridata.org/
- ◯ Hartford, CT, HartfordInfo at http://www.hartfordinfo.org
- ◯ Indianapolis, IN, SAVI-Interactive http://www.savi.org
- ◯ Los Angeles, CA, Neighborhood Knowledge Los Angeles at http://nkca.ucla.edu/
- ◯ Louisville, KY, Community Resource Network Data at http://www.crnky.org/
- ◯ Memphis, TN, Shared Urban Data System at http://www.suds.memphis.edu/
- ◯ Miami, FL, Children's Trust at http://www.thechildrenstrust.org/index.asp
- ◯ Milwaukee, WI, Neighborhood Data Center at http://www.nonprofitcentermilwaukee.org/index.php
- ◯ Minneapolis, MN, Minneapolis Neighborhood Information System (MNIS) http://apps.ci.minneapolis.mn.us/mnisapp/
- ◯ Nashville, TN, Neighborhoods Resource Center at http://www.tnrc.net/
- ◯ New Orleans, LA, Community Data Center at http://www.gnocdc.org/
- ◯ New York, NY, New York Housing and Neighborhood Information System (NYCHANIS) at http://www.nychanis.com/NYU/NYCHANIS/

- Oakland, CA, InfoOakland, Urban Strategies Council at http://www.infooakland.org/
- Philadelphia, PA, Metropolitan Philadelphia Indicators Project at http://www.temple.edu/mpip/
- Philadelphia, PA, Neighborhood Information System at http://cml.upenn.edu/nis/
- Philadelphia, PA, West Philly Data at http://westphillydata.library.upenn.edu/
- Pittsburgh, PA, Neighborhood & Community Information System at http://www.pghnis.pitt.edu/
- Providence, RI, ProvidencePlan at http://provplan.org
- Sacramento, CA, Community Services Planning Council at http://www.communitycouncil.org
- Seattle, WA, Public Health, King County at http://www.metrokc.gov/health/
- Missouri, MO, Community Information Resource Center at http://circ.rupri.org/
- Santa Barbara, CA, Community Indicators Project at http://www.ucsb-efp.com/indicators/index.htm
- Washington DC, NeighborhoodInfo DC at http://www.neighborhoodinfodc.org
- Other (please specify)

General Information about your organization [3/9pages]

Please provide some general information about your organization by answering the following questions.

2. Which best describes your organization? Please select only one.

- Government agencies
- University or college
- K-12 school or district
- Independent research center
- Community nonprofit organizations, such as Community Development Corporation or Community Based Organization
- Local intermediary nonprofit organization
- National intermediary nonprofit organization, such as LISC
- Foundation
- Faith-based organization
- Individual
- Other (please specify)

3. What are the main responsibilities of your organization? If more than one applies, please choose up to three and rank them as 1.2. 3.

	1	2	3
Community Organizing			
Economic Development			
Housing Development			

Employment-Related Services	◯	◯	◯
Human Services	◯	◯	◯
Education	◯	◯	◯
Advocacy	◯	◯	◯
Ministry	◯	◯	◯
Arts and Culture	◯	◯	◯
Service to members	◯	◯	◯
Research	◯	◯	◯
Recreation	◯	◯	◯
Safety	◯	◯	◯
Planning	◯	◯	◯
Other	◯	◯	◯

4. Please specify, if you chose other above.

5. How many people work in your organization?

Full Time (Full-time equivalents: at least 40 hours per week)

Part Time (Paid, work 10 or more hours per week)

Volunteers (unpaid or work less than 10 hours)

6. What is the budget size (annual expense) of your organization?

- ◯ 0 ~ $25,000
- ◯ $25,000 ~ $100,000
- ◯ $100,000 ~ $500,000
- ◯ $500,000 ~ $1Mil
- ◯ $1Mil ~ $5 Mil
- ◯ $5Mil ~ $10 Mil
- ◯ $10Mil and over

7. What is the source of funds? Please specify by percentage.

% public

% foundation

% membership

% individual donors

% fees for service

% others

Was your organization involved in the development? [4/9pages]

8. Was your organization (or yourself) involved in the development of your local Neighborhood Information System (NIS) in any way?

- ◯ Yes, my organization (or myself) is(was) involved in the development of NIS.
- ◯ No, my organization (or myself) is(was) not involved in the development of NIS but I use NIS. [This will take you to page 6.]

Partnership and Development [5/9pages]

Your organization was involved in development of the NIS. Please continue with this section of the survey.

9. What was the main role of your organization in your local NIS development partnership? (You can choose multiple answers.)

- ☐ Coordination and management
- ☐ Data provider
- ☐ Technology Provider
- ☐ Funding Provider
- ☐ Other (please specify)

10. The following questions ask for your general opinion regarding the partnership and governance structure of Neighborhood Information System development.
Please indicate the extent to which you agree or disagree with the following statements.

	Strongly Agree	Agree	Neither agree nor disagree	Disagree	Strongly Disagree
Organizations with technology expertise play more significant roles than other organizations in the development partnership.	◯	◯	◯	◯	◯
Organizations that collect and provide data play more significant roles than other organizations in the development	◯	◯	◯	◯	◯

partnership.					
Organizations that supply funding for the project play more significant roles than other organizations in the development partnership.	○	○	○	○	○
In building our NIS, we have (or had) a high degree of the interaction (communication or collaboration) among government and non government organizations.	○	○	○	○	○
In building our NIS, we have (or had) a high degree of trust among partners in the partnership to build NISs. Trust is defined as a clear understanding of respective agenda and relying on each others' roles.	○	○	○	○	○
In building our NIS, we have (or had) a strong leadership from central organization of partnership. Leadership is defined as initiating meetings/works, delegating duties, directing with a vision, and making implementation works.	○	○	○	○	○
In building our NIS, we have (or had) a high degree of cultural differences of participating organizations, coming from different sectors.	○	○	○	○	○
In my self-assessment, NIS partnership in our city was strong. Strong partnership is defined as partners collaborating well on attending meetings, communicating (email/phone/in person), and resource sharing to build a NIS.	○	○	○	○	○

11. In building our NIS, we have (or had) a formal agreement such as legal agreement or Memo of Understanding (MOU) between partners.

- ○ Yes.
- ○ No.
- ○ Don't Know

12. In building our NIS, our partnership size seemed

- ○ too big, too many partners.

- ◯ just about right.
- ◯ too small, not enough partners.
- ◯ I don't know.

13. Our NIS partnership was

- ◯ a part of other existing partnership efforts.
- ◯ newly formed.
- ◯ I don't know.

14. In my opinion, the funding to build our NIS was

- ◯ about enough so that we could plan a long range plan.
- ◯ moderate so that we could plan a short term plan.
- ◯ limited or minimal.

15. Please share your funding information and operating budget of your local NIS if you know of.

16. Thanks for sharing your partnership experience. Do you also use your local NIS yourself?

- ◯ Yes, I use my local NIS.
- ◯ No, I don't use my local NIS even though I was (am) involved in building it. [This will take you to page 8.]

NIS utilization [6/9pages]

Please provide some general information about how you use your choice of NIS by answering the following questions.

17. How often do you use these NIS features?

	Always	Often	Sometimes	Rarely	Never
Finding specific statistics for cities, counties or regions	○	○	○	○	○
Finding specific statistics for neighborhoods, wards, or census tracts	○	○	○	○	○
Accessing standardized community profile reports	○	○	○	○	○
Downloading data tables (such as Excel files)	○	○	○	○	○
Downloading static or predefined maps and images (such as PDF files)	○	○	○	○	○
Downloading geographic data files (such as ESRI shape files)	○	○	○	○	○
Using interactive online mapping functions	○	○	○	○	○
Finding contact information	○	○	○	○	○
Submitting questions or request for customized information, tables or maps	○	○	○	○	○
Other	○	○	○	○	○

18. Please specify if you chose other above.

19. How often do you use the following categories of NIS data?

	Always	Often	Sometimes	Rarely	Never
Demographic	○	○	○	○	○
Housing	○	○	○	○	○
Economic Development	○	○	○	○	○
Crime	○	○	○	○	○
Transportation	○	○	○	○	○
Health	○	○	○	○	○
Environment	○	○	○	○	○
Property Investment	○	○	○	○	○
School Data	○	○	○	○	○

Public Work	◯	◯	◯	◯	◯
Poverty / income	◯	◯	◯	◯	◯
Other	◯	◯	◯	◯	◯

20. Please specify if you chose other above.

21. How long have you used the NIS of your choice?

- ◯ Less than 1 year
- ◯ more than 1 but less than 3 years
- ◯ more than 3 but less than 6 years
- ◯ more than 6 but less than 10 years
- ◯ 10 or more years

Perception / Satisfaction of NIS use [7 / 9pages]

Please indicate how satisfied you are with your local NIS.

22. Please indicate the extent to which you agree or disagree with the following statements on use, data, and software.

	Strongly agree	Agree	Neither agree nor disagree	Disagree	Strongly disagree
I use the NIS for proposal writing.	◯	◯	◯	◯	◯
I use the NIS in strategic planning for my organization.	◯	◯	◯	◯	◯
I use the NIS in evaluative processes, such as program evaluation and reporting.	◯	◯	◯	◯	◯
I use the NIS as a basis for more complex and detailed analyses.	◯	◯	◯	◯	◯
I find the NIS has diverse data sets that can help my tasks.	◯	◯	◯	◯	◯
I find the NIS has accurate and up-to-date data sets.	◯	◯	◯	◯	◯
The NIS works well with my existing computer software.	◯	◯	◯	◯	◯
I find the interface of NIS (buttons, menus, screen layouts, navigation) satisfactory.	◯	◯	◯	◯	◯

I easily find helpful manuals and other online documents for using the NIS.	◯	◯	◯	◯	◯
I find the contents of NIS websites to be satisfactory.	◯	◯	◯	◯	◯

23. Please indicate the extent to which you agree or disagree with the following statements on efficacy of system.

	Strongly agree	Agree	Neither agree nor disagree	Disagree	Strongly disagree
Overall, the NIS increases my productivity. Productivity is defined as increased value or results of the tasks for the same amount of time invested, either at the personal or organizational level.	◯	◯	◯	◯	◯
On-line mapping features increases my productivity.	◯	◯	◯	◯	◯
Predefined or pre-made maps increase my productivity.	◯	◯	◯	◯	◯
Downloading tables of statistics increases my productivity.	◯	◯	◯	◯	◯
Customized analysis/consulting done by the NIS team increases my productivity.	◯	◯	◯	◯	◯
I can access to data that I need by using the NIS, which was difficult or impossible to get before the NIS.	◯	◯	◯	◯	◯
The NIS contributes to the transparency of the local government agencies to the public.	◯	◯	◯	◯	◯
The NIS contributes to public participation in the process of decision making for community development.	◯	◯	◯	◯	◯
The NIS empowers community stakeholders by providing data and knowledge.	◯	◯	◯	◯	◯
Technical support helps me to use the NIS effectively.	◯	◯	◯	◯	◯
Training helps me to use the NIS effectively.	◯	◯	◯	◯	◯

24. Please tell us about your training to use your NIS, if there was.

	Yes.	No.
I attended a group training session.	◯	◯
I received an individual training session.	◯	◯

25. Please indicate the extent to which you agree or disagree with the following statements.

	strongly agree	agree	neither agree or disagree	disagree	strongly disagree	N/A
I was satisfied with the group training sessions I received.	◯	◯	◯	◯	◯	◯
I was satisfied with the individual training sessions I received.	◯	◯	◯	◯	◯	◯

26. How often do you use the NIS of your choice?

- ◯ once or more per day
- ◯ once or more per week
- ◯ once or more per month
- ◯ once or more per quarter
- ◯ once or more per year
- ◯ Less than once per year

Demographics [8/9pages]

Please provide some general information about yourself.

27. What is your gender?

- ◯ male
- ◯ female

28. What is your age group?

- ◯ 18-25 yrs old
- ◯ 26-30 yrs old
- ◯ 31-40 yrs old
- ◯ 41-64 yrs old
- ◯ 65 and more

29. What is your position?

- ◯ Board member
- ◯ Executive director and equivalent
- ◯ Deputy director, program director or equivale
- ◯ Program staff (Regular hours)
- ◯ Part time staff or Volunteer (Part time hours)
- ◯ Independent researcher
- ◯ Other (please specify)

Optional Open-End Questions [9/9pages]

Please share your expereinces.

30. Please describe how you use the NIS of your choice in more detail.

31. What enhancements of NIS do you want to suggest? How should we do it?

32. We would like to hear of stories of NIS users. Please share stories how your using NIS helped your work.

33. Please share challenges that you had in using your NIS.

34. Do you use more than one NIS? Do you like to leave your assessments on another NIS you use besides the primary one you just answered?

- ◯ Yes, I do. I will answer questions for another choice of NIS that I use.
- ◯ No, I don't. I will go to the end of this survey to finish.

Please leave your assessment on another NIS you use. [10 / 12 pages]

35. Please, identify which Neighborhood Information System you use as a second choice. Please select only one at a time.

- ◯ Atlanta, GA, Neighborhood Indicators Project
- ◯ Baltimore, MD, Neighborhood Indicators Alliance at http://www.ubalt.edu/bnia
- ◯ Boston, MA, Indicators Project at http://www.tbf.org/indicatorsProject
- ◯ Camden, NJ, Camconnect at http://www.camconnect.org
- ◯ Chattanooga, TN, Southeast Tennessee Information Service at http://www.setnis.org
- ◯ Chicago, IL, Metro Chicago Information Center at http://www.mcic.org
- ◯ Chicago, IL, CityNews at http://www.newschicago.org
- ◯ Cleveland, OH, CANDO & NeoCANDO at http://povertycenter.cwru.edu/
- ◯ Columbus, OH, Franklin County DataSource at http://www.datasourcecolumbus.org/
- ◯ Dallas, TX, Dallas Indicator Project at http://www.dallasindicators.org/
- ◯ Denver, CO, Neighborhood Facts at http://www.piton.org/
- ◯ Des Moines, IA, Child and Family Policy Center at http://www.cfpciowa.org/
- ◯ Grand Rapids, MI, Community indicators at http://www.cridata.org/
- ◯ Hartford, CT, HartfordInfo at http://www.hartfordinfo.org
- ◯ Indianapolis, IN, SAVI-Interactive http://www.savi.org
- ◯ Los Angeles, CA, Neighborhood Knowledge Los Angeles at http://nkca.ucla.edu/
- ◯ Louisville, KY, Community Resource Network Data at http://www.crnky.org/
- ◯ Memphis, TN, Shared Urban Data System at http://www.suds.memphis.edu/
- ◯ Miami, FL, Children's Trust at http://www.thechildrenstrust.org/index.asp
- ◯ Milwaukee, WI, Neighborhood Data Center at http://www.nonprofitcentermilwaukee.org/index.php
- ◯ Minneapolis, MN, Minneapolis Neighborhood Information System (MNIS) http://apps.ci.minneapolis.mn.us/mnisapp/
- ◯ Nashville, TN, Neighborhoods Resource Center at http://www.tnrc.net/
- ◯ New Orleans, LA, Community Data Center at http://www.gnocdc.org/
- ◯ New York, NY, New York Housing and Neighborhood Information System (NYCHANIS) at http://www.nychanis.com/NYU/NYCHANIS/
- ◯ Oakland, CA, InfoOakland, Urban Strategies Council at http://www.infooakland.org/
- ◯ Philadelphia, PA, Metropolitan Philadelphia Indicators Project at http://www.temple.edu/mpip/
- ◯ Philadelphia, PA, Neighborhood Information System at http://cml.upenn.edu/nis/
- ◯ Philadelphia, PA, West Philly Data at http://westphillydata.library.upenn.edu/
- ◯ Pittsburgh, PA, Neighborhood & Community Information System at http://www.pghnis.pitt.edu/
- ◯ Providence, RI, ProvidencePlan at http://provplan.org
- ◯ Sacramento, CA, Community Services Planning Council at http://www.communitycouncil.org
- ◯ Seattle, WA, Public Health, King County at http://www.metrokc.gov/health/
- ◯ Missouri, MO, Community Information Resource Center at http://circ.rupri.org/
- ◯ Santa Barbara, CA, Community Indicators Project at http://www.ucsb-efp.com/indicators/index.htm

- ○ Washington DC, NeighborhoodInfo DC at http://www.neighborhoodinfodc.org
- ○ Other (please specify)

NIS utilization - your second choice of NIS [11/12pages]

Please provide some general information about how you use your second choice of NIS by answering the following questions.

36. How often do you use these NIS features?

	Always	Often	Sometimes	Rarely	Never
Finding specific statistics for cities, counties or regions	○	○	○	○	○
Finding specific statistics for neighborhoods, wards, or census tracts	○	○	○	○	○
Accessing standardized community profile reports	○	○	○	○	○
Downloading data tables (such as Excel files)	○	○	○	○	○
Downloading static or predefined maps and images (such as PDF files)	○	○	○	○	○
Downloading geographic data files (such as ESRI shape files)	○	○	○	○	○
Using interactive online mapping functions	○	○	○	○	○
Finding contact information	○	○	○	○	○
Submitting questions or request for customized information, tables or maps	○	○	○	○	○
Other	○	○	○	○	○

37. Please specify if you chose other above.

38. How often do you use the following categories of NIS data?

	Always	Often	Sometimes	Rarely	Never
Demographic	○	○	○	○	○
Housing	○	○	○	○	○
Economic Development	○	○	○	○	○
Crime	○	○	○	○	○
Transportation	○	○	○	○	○

Health	◯	◯	◯	◯	◯
Environment	◯	◯	◯	◯	◯
Property Investment	◯	◯	◯	◯	◯
School Data	◯	◯	◯	◯	◯
Public Work	◯	◯	◯	◯	◯
Poverty / income	◯	◯	◯	◯	◯
Other	◯	◯	◯	◯	◯

39. Please specify if you chose other above.

40. How long have you used the NIS of your choice?

- ◯ Less than 1 year
- ◯ more than 1 but less than 3 years
- ◯ more than 3 but less than 6 years
- ◯ more than 6 but less than 10 years
- ◯ 10 or more years

Perception/Satisfaction of NIS use [12/12pages]

Please indicate how satisfied you are with your second choice NIS.

41. Please indicate the extent to which you agree or disagree with the following statements on use, data, and software.

	Strongly agree	Agree	Neither agree nor disagree	Disagree	Strongly disagree
I use the NIS for proposal writing.	◯	◯	◯	◯	◯
I use the NIS in strategic planning for my organization.	◯	◯	◯	◯	◯
I use the NIS in evaluative processes, such as program evaluation and reporting.	◯	◯	◯	◯	◯
I use the NIS as a basis for more complex and detailed analyses.	◯	◯	◯	◯	◯
I find the NIS has diverse data sets that can help my tasks.	◯	◯	◯	◯	◯
I find the NIS has accurate and up-to-date data sets.	◯	◯	◯	◯	◯
The NIS works well with my existing	◯	◯	◯	◯	◯

computer software.					
I find the interface of NIS (buttons, menus, screen layouts, navigation) satisfactory.	○	○	○	○	○
I easily find helpful manuals and other online documents for using the NIS.	○	○	○	○	○
I find the contents of NIS websites to be satisfactory.	○	○	○	○	○

42. Please indicate the extent to which you agree or disagree with the following statements on efficacy of system.

	Strongly agree	Agree	Neither agree nor disagree	Disagree	Strongly disagree
Overall, the NIS increases my productivity. Productivity is defined as increased value or results of the tasks for the same amount of time invested, either at the personal or organizational level.	○	○	○	○	○
On-line mapping features increases my productivity.	○	○	○	○	○
Predefined or pre-made maps increase my productivity.	○	○	○	○	○
Downloading tables of statistics increases my productivity.	○	○	○	○	○
Customized analysis/consulting done by the NIS team increases my productivity.	○	○	○	○	○
I can access to data that I need by using the NIS, which was difficult or impossible to get before the NIS.	○	○	○	○	○
The NIS contributes to the transparency of the local government agencies to the public.	○	○	○	○	○
The NIS contributes to public participation in the process of decision making for community development.	○	○	○	○	○
The NIS empowers community stakeholders by providing data and knowledge.	○	○	○	○	○
Technical support helps me to use the NIS effectively.	○	○	○	○	○
Training helps me to use the NIS	○	○	○	○	○

effectively.

43. Please tell us about your training to use your NIS, if there was.

	Yes.	No.
I attended a group training session.	◯	◯
I received an individual training session.	◯	◯

44. Please indicate the extent to which you agree or disagree with the following statements.

	strongly agree	agree	neither agree or disagree	disagree	strongly disagree	N/A
I was satisfied with the group training sessions I received.	◯	◯	◯	◯	◯	◯
I was satisfied with the individual training sessions I received.	◯	◯	◯	◯	◯	◯

45. How often do you use the NIS of your choice?

- ◯ once or more per day
- ◯ once or more per week
- ◯ once or more per month
- ◯ once or more per quarter
- ◯ once or more per year
- ◯ Less than once per year

Thanks!

Thank you for your participation. Your participation will help my research in examining the management and development of NISs.
Sungsoo Hwang www.pitt.edu/~shwang

46. Please leave your email address, only if you would like to try a raffle of gift certificate, or to be notified when the results of survey become available.

47. Please leave any other comments if there is any.