COLLABORATION AMONG HUMAN SERVICE NONPROFIT ORGANIZATIONS: MAPPING FOMRAL AND INFORMAL NETWORKS OF EXCHANGE

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Submitted to the Graduate Faculty of

Graduate School of Public and International Affairs in partial fulfillment

of the requirements for the degree of

Doctor of Philosophy

University of Pittsburgh

2006

UNIVERSITY OF PITTSBURGH

GRADUATE SCHOOL OF PUBLIC AND INTERNATIONAL AFFAIRS

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University of Pittsburgh, 2006

Much of the current debates in the social service delivery have focused on the blurring boundaries between three sectors – the nonprofit, business and public sector. Surprisingly no empirical research has been given to this phenomenon from macro and comparative perspectives. First contribution of the study to is the conceptual and methodological model to link organization and strategic management theory with network theory. The study calls this new framework as collaboration network. Second, this survey of 33 nonprofit organizations in the Allegheny County, Pittsburgh, Pennsylvania uncovers the hidden patterns of collaboration between the sectors including empirical evidence of blurring boundaries. In order to reveal the hidden patterns of collaboration, the study adopts blockmodel from network analysis that is useful to reduce complex networks into concise and easily understandable forms. Major findings uncovered by network analysis are; 1) Network structures are different according to specific types of collaboration relationships. Network structures become less dense as the collaborative relationships intensify. While nonprofits do not have to spend much of their valuable resources such as time and money on maintaining informal or infrequent information sharing or work referral relations, nonprofits should commit themselves to maintaining intensive relations such as formal contract or joint program. In addition, the types of six network structures are different from each other. For example, while formal contract network is shaped as a cohesive subgroup structure, resource sharing network shows a central-periphery system. 2) When three sector organizations are participated in the work referral network, the social service system emerges. Three sectors play a unique role respectively – a sender for public agencies, a service provider for businesses. As a major actor in the social service field, nonprofits not only play these two roles, but also play a coordinating or broker role between three sectors. 3) When either of the business or public sector is introduced in the collaboration network, new network structures replace the network structure which is composed exclusively of nonprofits. For example, when

the public sector is involved in the formal contract network, the network structure changes from a cohesive subgroup system to a hierarchy system.

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DEDICATED TO MY WIFE, JUNG A AND MY FAMILY

I. INTRODUCTION

1.1 PROBLEM STATEMENT

Currently, it is not unusual to witness collaboration across three sectors – the nonprofit, for-profit, and public sectors - in the social service field. These collaborative relationships reflect the interdependency among the sectors (Hall, 1987; Saidel, 1991), which originates in the complexity of social problems. Social problems are so inherently complex that the public, for-profit, or nonprofit sectors cannot solve these problems by one sector alone. Rather, it is necessary that all the three sectors must work together to solve social problems simultaneously (Sagawa and Segal, 2000; Shore, 1999).

In addition to dealing with the complexities of social problems, the nonprofit sector, as a leading player in the social service field, is experiencing rapid changes in its external environments, such as declines of government grants and private donations, changes in public policies (i.e., devolution), and increases in demands for social services (Alexander, 2000; McCormak, 1996: Salamon, 1993, 1995, 2002). In response to these and other challenges, many nonprofits have established new types of partnerships with other nonprofits, businesses and government organizations in order to minimize risk, conserve scarce resources, and enhance the prospects for mission accomplishment. As a result of increases in interdependency through cross-sector collaboration efforts, the boundaries between the three sectors are blurring. This phenomenon of blurring boundaries among sectors can be called "the seamless economy".

There is abundant anecdotal evidence (i.e., case studies about collaboration between two or three organizations) of successful partnerships or collaboration between nonprofits and for-profits (e.g., see Austin, 2000a; Dees, et al., 2001; Sagawa and Segal, 2000; Shore, 1999). Also, of the literature provides normative advice for developing successful cross-sector collaborations (e.g., see Austin, 2000a, 2000b; Dees, et al., 2001; Sagawa and Segal, 2000). However, there

has been neither macro level research on cross-sector collaboration nor comparative research of same-sector and cross-sector collaboration.

On the basis of these knowledge gaps, the main thrust of this study is to open new ways of seeing collaboration efforts in the seamless economy. Since the seamless economy is composed of diverse and complex relationships, macro level analysis using social network analysis and/or regression analysis will reveal hidden patterns of collaboration which previous case studies did not explore. These patterns may involve same-sector as well as cross-sector relationships among organizations. Thus, this research will make a significant contribution to the literature, which has yet to empirically document these complex patterns of relations with respect to nonprofits, business, and government organization.

This study proposes the concept of a "collaboration network," defined as a network that catalyzes and facilitates collaboration strategy by helping organizations identify new opportunities and build social capital. Theoretically, the collaboration network is an integrated model of two mutually reinforcing concepts: collaboration and network. Practically, the concept of collaboration originating from organizational theory and strategic management theory will provide a construct of collaboration operationalized as a continuum of collaboration from informal information exchange to formal agreements for collaborative service delivery.

1.2 KNOWLEDGE GAPS

As stated in the problem statement, the main purpose of this study is to address knowledge gaps in the existing literature that fail to address a variety of issues regarding the cross-sector collaboration. The existing literature has many case studies of cross-sector collaboration but provides no strong empirical research regarding patterns of collaboration between many organizations in a given geographic area. Also, there is very little evidence regarding the distinctive features of cross-sector collaboration patterns compared to same-sector collaboration patterns.

Previous studies explore individual collaborations at the micro level (i.e., the case study of two or three organizations and anecdotal evidences from the case study) in terms of forms, perceived outcomes, and problems of collaboration. However, no study has explored hidden

patterns of interactions at the macro level (i.e., both formal and informal relationships including communications, information and resources exchanges, etc.). Moreover, we do not know the distinctive features of cross-sector collaboration because there has been no comparative study of within-nonprofit sector and cross-sector collaboration. The uncovered macro-level patterns of this comparative study may show several patterns of cross-sector collaboration that are deeper and broader than previous studies.

1.3 GOAL OF THE STUDY

This study will be an exploratory study that will generate hypotheses for future research as well as describe hidden patterns of collaboration in the seamless economy. It does not test existing theories or propositions.

The research questions of this study are:

- Do network patterns of collaboration among nonprofit, government, and business organizations suggest the existence of a "seamless economy" of mutual interdependence?
- What if any characteristics of the seamless economy emerge from the comparison of same-sector and cross-sector collaboration patterns?
- What are the implications of these patterns of interdependency for promoting collaboration or partnership among organizations?

1.4 ASSUMPTIONS OF THE STUDY

This study assumes that nonprofits' current efforts to collaborate, especially cross-sector collaborations, produce positive results. Many studies about collaboration also assume it as a positive strategy that empowers organizational efficiency. However, there is a dark side to collaboration. Nonprofits can make collaborations with inappropriate intentions, such as only to escape from a short-term financial problem, that have long-run negative effects. In addition, if

nonprofits blindly chase with limited capacity or purpose, collaboration with others may cause the nonprofit to deviate from their mission, as one nonprofit executive noted in the course of this research.

1.5 CONTRIBUTIONS OF THE STUDY

There are two types of research findings in this study – those of localized or issue-specific and those of broader methodological and theoretical implications to the nonprofit sector. Since issue-specific findings are mainly of local importance, they are explored in the body of the study.

There are three main theoretical and methodological contributions, which are briefly described below. Firstly, this study provides future research of a theoretical and empirical framework to explore collaboration (Chapter 2). The most valuable conceptual and methodological contribution of the study is its linkage of the conceptual model of collaboration from organizational and strategic management theory and methodological models of network structures. This combination of the concept of collaboration as a continuum and the concept of network is useful in uncovering hidden patterns of collaboration. These patterns provide evidence of the blurring boundaries between the sectors.

Secondly, from a macro and comparative perspective, this study helps bridge the knowledge gap of previous research. This research provides empirical evidence of distinctive collaboration patterns between within the nonprofit sector and across the sectors.

Thirdly, this study creates a distinctive approach by exploring the concept of collaboration from multiple levels and methodologies. Using network analysis, this study explores collaboration patterns both at an individual and group level (Chapter 4, 5 and 6). At the same time, combination of network analysis and regression analysis shows two different dimensions of the collaboration simultaneously – the external, structural aspect of collaboration and the internal, organizational aspect of collaboration (Chapter 6 and 7).

1.6 ORGANIZATION OF THE STUDY

This study is composed of 8 chapters. Chapter 1 describes the problem statement of this study; the current research does not offer systemic empirical studies of the blurring boundaries between the nonprofit, business and public sector in macro and comparative perspectives. Chapter 2 explains the historical background and the current debate about why the cross-sector collaboration is indispensable for the nonprofit sector. Then, the theoretical framework for the actual research is presented, which is a collaboration continuum measured by the intensity of collaborative relationships. This framework is rooted on theories of collaboration, organizational and strategic management. Chapter 3 presents a blueprint for the research of this study, including research questions, explanation about research method used, data collection, data analysis and so forth. Chapter 4 to Chapter 7, analyses report the results. Chapter 4, 5 and 6 present external properties of collaborative relationships with the help of network analysis. Chapter 4 describes features of collaboration patterns within the nonprofit sector by presenting various network properties both at the individual and group level. Diverse analyses, such as distance analysis, correlation analysis between six collaborative relations, network centralization analysis and actor centrality analysis, uncover interesting patterns of collaboration, including the importance of strategically significant actors in a network. Most significantly, a sociogram maps complex relationships among organizations in two dimensional space. This visual mapping enables observation of different patterns of collaboration. Chapter 5 repeats the same analysis technique in Chapter 4 for cross-sector collaboration networks. Simple comparisons of sociograms and other analysis resulting from cross-sector collaboration networks (Chapter 5) and within the nonprofit sector collaboration networks (Chapter 4) show that a new network structure emerges when business and public organizations are introduced, which is different from the network structures that is composed exclusively of nonprofits. Chapter 6 provides more detailed evidence of structural changes through a sophisticated technique – blockmodel. These structural changes are evidence of the blurring boundaries between sectors. Blockmodeling shows that the impact of business in nonprofit collaboration networks is different from the impact of public agencies. Chapter 7 focuses on the influence of the internal (i.e., organizational) attributes of the collaboration patterns of the nonprofit sector. Two regression models – multiple regression and logistic regression – reveal which organizational factors enhance collaboration. The logistic

model, in particular, shows which organizational characteristics are helpful in strategically collaborating with business or public sector organizations. Chapter 8 summarizes analysis results from Chapter 4 to 7 and proposes several policy implications resulting from analysis.

II. LITERATURE REVIEW

2.1 INTRODUCTION

This chapter describes theories regarding the cross-sector collaboration from the previous studies. Then, on the basis of organization and strategic management theory, the framework for this study – a continuum of collaboration by the intensity – is presented. This framework is a starting point for the design and empirical research in the following chapters.

2.2 THE SEAMLESS ECONOMY: BLURRING BOUNDARIES BETWEEN SECTORS

2.2.1 The new governance system: Characterizations of the seamless economy

2.2.1.1 Interactions among three sectors prior to the 1980s

Before the 1980s, three sectors – the public, nonprofit and for-profit sectors – were seen as distinct from each other in "organizational terms, in motivational values, in their source of support, and in the work they carried out" (Young and Salamon, 2002, p.440), although "there was much interaction among them" (p.439). Then, as now, a major difference between the sectors was perceived to be their respective sources of revenue. Governments raise money from taxes and businesses generate profits from selling goods or services to their customers. Nonprofits, on the other hand, raise money from more diversified sources such as government grants and contracts, private donations as well as commercial activities and fees for services (Drucker, 1990). According to Ferris and Graddy (1989), blurring boundaries between the nonprofit and other sectors begin from this diversification of revenue source, which makes

nonprofits intensely interact with other sectors. In other words, the very nature and composition of their diverse revenue streams places nonprofit organizations in direct contact (sometimes competitive) with the other two sectors.

Until recently, the principle assumption was that each sector operated independently of the others with governments providing public goods, business providing private goods, and nonprofits providing the rest (Ostrander and Langton, 1987). Under this assumption, unequal exchanges were conducted across sectors (Austin, 2000a, 2000b). The idea of unequal exchange between the nonprofit sector and other sectors means that providers of (financial) resources – governments or for-profit organizations – to nonprofits are not direct beneficiaries for their supports. The below Figure II-1 exhibits these interactions among three sectors.

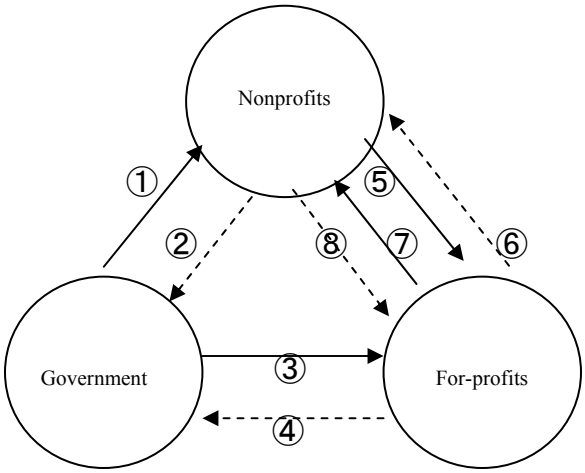


Figure II-1) Interactive relationships among three sectors from the mid 1960s to the early 1980s.

In the above Figure II-1, straight lines indicate actual resource flows such as financial resources from government to nonprofits. Conversely, dotted lines designate indirect resources. First, grants or contracts flow from government to nonprofit and/or for-profit organizations (straight lines ① and ③ in the Figure II-1). In return, nonprofit and for-profit organizations provided public services (dotted lines ② and ④ in the Figure II-1) (Saidel, 1991) which are not direct returns to government. Because many nonprofit organizations depended on governments for most of their financial resources, two problems arose: 1) resource dependence of nonprofits on governments leaving them vulnerable to shifts in government priorities and 2) bureaucratization of nonprofits as they establish mechanisms for complying with the every growing array of government rules and guidelines as a condition for government funding (Smith

and Lipsky, 1993; Ott, 2001). Moreover, a purely financial relationship between the nonprofit sector and the for-profit sector was not mutual exchanges, but one-way relationships (i.e., unequal exchanges) typified by businesses making charitable donations or gifts in-kind to nonprofits with little or no return on their investment other than helping to fulfill their philanthropic obligations. Straight line ⑤ in the Figure II-1 refers to subcontracts of government contracts from nonprofits to for-profits (O'Regan and Oster, 2000) in return for provisions of public services by for-profit organizations indicated by the dotted line ⑥ in the Figure II-1. On the other hand, corporate donations flow from for-profits to nonprofits as indicated by straight line ⑦ in the Figure II-1. Usually, nonprofits did not return anything for these donations but provisions of public services (dotted line ⑧ in the Figure II-1). Also, in dotted line ⑧, nonprofits provide for-profits with a "good feeling" of having fulfilled their charitable obligation.

In sum, prior to the 1980s, the character of interactions between government, nonprofits, and businesses was that there was no direct mutual benefit among interactive actors. A nonprofit organization, as a charitable entity, took resources from the other sectors, but did not return practical benefits to them.

2.2.1.2 New governance – 1980 to present

Young and Salamon (2002; Salamon, 2002) argue that old solutions or programs from the old governance structure – distinct separation among three sectors – have not responded to persistent social problems such as poverty. Complex social problems such as hunger and poverty cannot be solved by any one sector's efforts alone but by coordinated efforts of cross-sector partnerships (Shore, 1999; Sagawa and Segal, 2000).

Cross-sector collaboration is not a new phenomenon. For example, it has existed especially between universities, industries, and governments for many years (see, Geisler, 1997; Weisbrod, 1998a, chapter 9). Currently, cross-sector mutually beneficial partnerships in the social service field, especially between nonprofits and for-profits are increasing. Beyond old types of interaction of which purpose is to raise more money, the new types of reciprocal partnerships are aimed at strategic goals and outcomes.

The new reciprocal partnerships in the seamless economy are different from the old partnerships in terms of two things: 1) mutual benefits for all participating parties (Austin, 2000a,

2000b) and 2) the so-called "double bottom line" of nonprofit organizations wherein social missions are used to generate income streams as well (Dees et al, 2001: Shore, 1999). The characteristics of the new partnership will be discussed in the next section.

Current challenges in the social service nonprofit sector such as scarce resources and increasing demands for social services force nonprofit organizations to change their perspectives. Light (2002) argues that environmental challenges drove nonprofit organizations to reform their managerial paradigm from passive taker of donations or grants to active seeker of their new types of resources and partnerships.

As an active and pragmatic response to environmental challenges, nonprofits become engaged in the market and adopt business sector strategies for social sector successes (Kearns, 2000). The nonprofits' market involvements can be explained as commercialization and entrepreneurial approach to social purposes. Practically, nonprofits' market involvement strategies are summarized into three – fees for services, experimentations with commercial ventures, and cross-sector collaboration (Young and Salamon, 2002). Among them, this study focuses on the cross-sector collaboration.

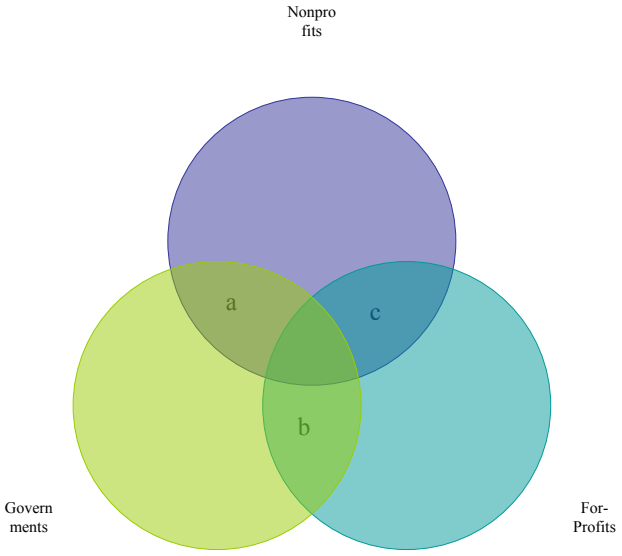


Figure II-2) The seamless economy[1]: Blurring boundaries among the three sectors

[1] The term "*seamless economy*" and Figure 2 is first introduced by Kevin P. Kearns in his class lectures.

Due to interdependent relationships between sectors, boundaries between them are more blurring or blending. Young and Salamon (2002; Salamon, 2002) argue that the new collaboration relationships form the new governance system in the social service field. The specific characteristic of the new governance is nonprofits' market involvement in terms of obtaining resources (Weisbrod, 1998a) as well as enhancing their organizational capacities (Letts et al., 1999). This study calls the new governance system "the seamless economy." The above Figure II-2 illustrates the relationships among three sectors which are blurring each other (a, b, and c area in the Figure II-2).

In this new governance system, a fundamental problem that nonprofits are facing in the market involvement is "whether nonprofits can adapt *without* compromising the qualities that distinguish them from for-profit organizations" (Ryan, 1999, p.128; Dees, 1998a; Weisbrod, 1998a).

Since the focus of this study is the nonprofit sector, relationships between governments and for-profits (b in the above Figure II-2) will not be considered. Specifically, in order to investigate nonprofits' market involvement, the main attention will be on the area c in the Figure II-2, which are collaborative interactions between the nonprofit and for-profit sector.

Blurring areas in Figure II-2 can be explained in two ways – competition and collaboration. The main focus of this study will be on the collaboration aspect of the seamless economy. Next sections will describe characteristics of the seamless economy in detail.

2.2.2 Interactive relationships between nonprofits and governments

Most of the nonprofit literature views relationships between nonprofits and governments as collaborative, not competitive. However, a few authors have noted that the relationship between nonprofits and government has certain competitive elements that occasionally produce tension between the two. Young (2000) notes that nonprofits and governments sometimes pursue competing interests. For example, nonprofits often engage in advocacy for minorities and underserved populations, challenging government to do more to meet their needs. When these populations do not receive public services they want, they may organize voluntary associations (i.e., a nonprofit organization) to advocate for their interests and eventually to reflect their interests on public policy. As an answer to minorities' advocacy, "government may react by

trying to defend majority interests" (p.157). Another form of tension between government and nonprofits involves the tax exempt status of nonprofits. Weisbrod (1998b) notes that nonprofits compete with governments from the economic perspective; "when nonprofits expand, government loses revenue" (p.401). Because nonprofits do not pay corporate income taxes and property tax, the expansion of nonprofit organizations results in loss of tax revenue, especially in the local government level.

Collaborative relationships between nonprofits and governments can be explained in two ways. First, contracting out is the most common form of partnerships between nonprofits and governments (O'Regan and Oster, 2000). Nonprofits are complementary to government in that nonprofits provide social services on behalf of governments (Young, 2000). In other words, government finances public services and nonprofits deliver them (Salamon, 1995). In this partnership, grants or contracts are flowing from governments to nonprofits; public service provision from nonprofits to governments. Because social service (delivery) is inherently complex, governments prefer the nonprofit sector to for-profit sector in contracting out (O'Regan and Oster, 2000). Saidel (1991) views these partnerships as resource interdependence (or symmetrical resource dependence) between nonprofits and governments. According to Saidel, governments provide resources such as "revenues; information, including expertise and technical assistance; political support and legitimacy in the sense of external validation; and access to the nonlegislative policy process" (p.381). In return for these provisions, nonprofits "supply their service-delivery capacity, information, political support, and legitimacy to state agencies" (p.381).

Second, though it is rare, there are some cases of joint venture between nonprofits and governments. For example, "the University of California, Los Angeles (UCLA), is collaborating with the state government of California to sell a license plate that finances student scholarships" (Weisbrod, 1998b, p.402).

Finally, current literature reported interesting findings that nonprofit-government collaboration relationships are initiated and maintained by the existing personal relationships rather than economic or managerial incentives of government such as reducing costs, gaining flexibilities by moving money around from year to year among nonprofits reflecting changing priorities, or placing more responsibility on the private nonprofit sector to define and solve problems (Shaw, 2003; Van Slyke, 2004). "The successful partnerships… were built not on

negotiated agreement but on years of experience with partner agencies on the part of the individuals who actually worked together and had genuine affection of each other" (Shaw, 2003, p.118).

2.2.3 Interactive relationships between nonprofits and for-profits

2.2.3.1 Competition aspects of blurring boundaries between nonprofits and for-profits

During the past two decades, for-profit organizations have penetrated nonprofit markets where nonprofit organizations were exclusively dominant in the pre-1980s, and vice versa (Salamon, 1993, 2002; Weisbrod, 1998a). As a result of for-profits' market penetration, nonprofits are losing their market share over for-profits in certain services (Salamon, 2002). For example, nonprofits' percentage of child care jobs declined from 52% to 38% and percentage of home health jobs declined from 60% to 28% between 1982 and 1997 (Salamon, 2002, p.15). During the same period, governments' outsourcing for social services grew, and accordingly the scope of social service market expanded (Ryan, 1999). As government agencies adopt "a business mind-set" (p.129), governments seem to prefer for-profit organizations as their contract partners. Eventually, the market penetration brings severe competition between the nonprofit and for-profit sector. It is difficult to clearly explain why competition happens during the last two decades (Salamon, 2002), but the following four reasons partly describe the reason (Gronjberg and Salamon, 2002).

First, privatization of government to the non-governmental sector intensifies competition between the nonprofit and for-profit sector. Because governments promoted for-profits to engage in contracts for various social services where nonprofits used to be dominant, the real impact of the privatization has been "to increase for-profit competition for many of the grants and contracts that nonprofit organizations were already receiving" (Gronjberg and Salamon, 2002, p.454).

Second, the shift to consumer-side subsidies "made it easier for-profit firms to enter markets formerly dominated almost exclusively by nonprofits" (Gronjberg and Salamon, 2002, p.455; Salamon, 2002). The format of government support was shifted from "producer-side" subsides to "consumer-side" subsidies. While producer-side subsidies – direct support to the

producer of services through grants or contracts – decreased, consumer-side subsides such as vouchers, tax credits, and loan guarantees have increased substantially over the past decade. For example, in 1986, more than 70 percentage of federal support to nonprofits were consumer-side subsidies (p.455).

Third, governments award contracts to social service providers not by "what they are," but by "what they can do" (Ryan, 1999, p.129). Pressures of high performance on nonprofits drive nonprofit organizations to make their efforts on cost-control or efficient service delivery with which nonprofits are not familiar. Because nonprofits usually are not good at managing cost-control or efficiency, for-profit organizations that are inherently good at management of efficiency have competitive advantages to enter markets traditionally dominated by nonprofits.

Fourth, the welfare reforms in 1996 shifted the focus of federal support "from services and income support to work readiness and employment, not fields where traditional nonprofit social service agencies have had a particular advantage" (Gronjberg and Salamon, 2002, p.458). For this reason, the number of state governments that choose for-profits as contract partners are growing (Frumkin and Andre-Clark, 2000).

Another critical issue to consider in nonprofit – for-profit competition is the mythology of competition. Recently, Van Slyke (2003) reported that marketization trends in the social service field may not result in more efficient social service delivery. On the contrary, the author argued that the mythology – competition will bring efficiency – is not always true because of several barriers to develop competition. These are environmental constraints, actions by nonprofit organizations, networked relationships, and government-enacted barriers (Van Slyke, 2003). According to Van Slyke, *environmental constraints* of government indicate that government does not have enough capacity to monitor multiple nonprofit organizations' performance and to enforce accountability. *Actions by nonprofit organizations* are reflected on niche market specialization of the nonprofit sector. Because a few nonprofits in the specific service field provide services which nobody wants to provide or deliver, they can achieve an expertise and specialization in these particular service areas. Thus, it is difficult to find out competitors in that specific service area. Personally or politically connected *network relationships* are positively correlated with winning contracts. For example, if the newly elected officials are formerly connected with nonprofit personnel who helped officials in the election campaign, contracts decided by these officials would be by no means competitive or objective.

Lastly, because public-public partnership reduces costs of contracting out, sometimes governments select other government agencies as their partners instead of the private sector (neither nonprofits nor for-profits). These *government-enacted barriers* would reduce or eliminate competition among nonprofits.

In sum, changes in market share among sectors reflect "a complex set of shifts in the basic composition" – i.e., blurring boundaries - of social service industry (Salamon, 1993).

2.2.3.2 Collaboration aspects of blurring boundaries between nonprofits and for-profits

Currently, cross-sector collaboration between nonprofits and for-profits is growing. This section will first briefly review incentives for cross-sector collaboration for nonprofit and for-profits respectively. Then, specific characteristics of cross-sector collaboration will be discussed.

Driving forces of cross-sector collaboration

a. Driving forces in the nonprofit sector

From the nonprofit standpoint, the following incentives drive nonprofits to collaborate with for-profits: 1) financial pressure such as decline of government (federal, state, and local) funding (McCormak, 1996; Salamon, 1993, 1995, 2002) and decline of private/corporate donations (Salamon, 1993, 2002), which makes nonprofits spend more time and energy on securing revenue sources, 2) devolution of federal, state, and local government services (Alexander, 1999) increases responsibilities of service delivery as well as workloads, and 3) social and demographic shifts have resulted in increases in the demand for social service that nonprofits have traditionally provided (McCormak, 1996; Salamon, 1993, 1995, 2002). These three incentives provided nonprofits with both challenges (1 and 2) and opportunities (3). In responding to these challenges and opportunities, nonprofits harness challenges and opportunities by expanding their partnerships with businesses through utilizing nonprofits' peculiar assets, such as "reputational capital" (Salamon, 2005, p.94). In other words, these cross-sector collaboration driving forces "are leading to a blurring of sector boundaries and a call for more entrepreneurial spirit in the social sector. Specifically, they have led social entrepreneurs to search for more sustainable solutions to social problems and to more sustainable funding sources" (Dees et al., 2001, p.13).

Governments have been one of the most valuable partners as sources of financial resources to nonprofits. However, due to the severe fiscal cutback of the social service field in the Regan Administration (in the early 1980's), "federal support to nonprofit organizations, outside of Medicare and Medicaid, declined by approximately 25 percent in real dollar terms in the early 1980s and returned to its 1980 level only in the late 1990s" (Salamon, 2002, p.12). "Although … these fiscal pressures eased significantly during the 1990's, the experience of the 1980s and the early 1990s left a lingering financial scar. That scar has been reopened in the early years of the new century by a combination of tax reductions, economic recession, and increased military and antiterrorism spending that is causing new cutbacks in health, education, and social welfare funding and hence new pressures on nonprofit finances" (Salamon, 2005, p.84). On the other hand, between 1977 and 1997, private giving's share of total revenue in the nonprofit sector was declined from 27 percent to 20 percent (Salamon, 2002). Moreover, though not a big potion of private giving, corporation's contribution "fell 14.5% in real dollars in 2001, and over the last 15 years, corporate giving as a percentage of profits has dropped by 50%" (Porter and Kramer, 2002, p.57). At the same time, corporation's spending money on nonprofits is shifting to "favor more commercial approaches" (Dees, 1998a, p.140; Anderson, 1996) from the previous "check writing" relationships. Along with these fiscal pressures, social service needs are increasing from the several reasons such as growing number of older people, downturn of the economy, and governments' devolution of responsibilities of social services to the private sector.

As the "resilient sector", nonprofits have successfully responded to these incentives of cross-sector collaboration by adopting entrepreneurial approach to market (Salamon, 2002). For example, nonprofits "view earned-income-generating activities as more reliable funding sources than donations and grants" (Dees, 1998a, p.140). In other words, nonprofits become more entrepreneurial -- working with business and becoming more businesslike -- to grow enough to meet more social needs rather than maintaining the old sources of money. As the best way to learn business methods of management and as a growing strategy (i.e., horizontal integration through collaboration) to meet growing needs, nonprofits become strategically interacting with for-profits.

b. Driving forces in the for-profit sector

Porter and Kramer (2002) argue that for-profits can enhance their competitive advantage through cross-sector collaboration. In the long-term perspective, for-profits adopt a strategic approach to philanthropy to improve their "competitiveness context – the quality of the business environment in the location or locations where they operate" (Porter and Kramer, 2002, p.58; Shore, 1999). According to Porter and Kramer, "philanthropy can often be the most cost-effective way…. It enables companies to leverage not only their own resources but also the existing efforts and infrastructure of nonprofits and other institutions" (p.61).

In order to achieve this strategic competitiveness, corporations change their relations with nonprofits from "giving" or "writing checks" to business "partnerships." Deep involvement in social problems "is not charity; it is R&D – a strategic business investment" (Kanter, 1999, p.124). For example, funds for cause-related marketing which is the strategic collaboration between nonprofits and for-profits do not come out of philanthropic or corporate giving budget, but from marketing budget (Anderson, 1996).

Characteristics of the new relations between nonprofits and for-profits

The incentives for cross-sector collaboration described above require a new paradigm (Gronjberg and Salamon, 2002; Kanter, 1999; Light, 2002; Sagawa and Segal, 2000) or new partnership (Salamon, 1993, 2002) which encourages active engagement by both for-profits and nonprofits in the resolution of social problems. A new paradigm aims at "real change – sustainable, replicable, institutionalized change that transforms schools, job prospects, and neighborhood" (Kanter, 1999, p.124). Therefore, the new partnership should see cross-sector relationships differently from the traditional relationships. Anderson (1996) summarizes key conditions for achieving a new paradigm:

- Nonprofits' goal and corporate strategy should align with each other;
- Each partner should have complementary competencies that the other does not have; and
- Collaboration efforts should be long-term relationships.

This study assumes that cross-sector collaboration has two characteristics – a new concept of exchange and double bottom line, which will be illustrated in the next two sections.

a. New concept of exchange

Along with the marketization of the social service field, cross-sector collaboration is designed "to leverage the competencies of each partner and create two-way value" (Austin, 2000a, p.2). Indeed, nonprofit - for-profit collaboration relationships are shifting from "philanthropic stage" toward strategic collaboration, which is characterized by strategic fit and mutual benefits (Austin, 2000a). In order to gain the most from cross-sector collaboration, nonprofits adopt strategic approaches from the business sector. On the other hand, under the new exchange paradigm, business transfers its unique skills and capabilities (e.g., Bell Atlantic's engagement in wireless education in inner city in New Jersey) beyond the simple charity giving (Kanter, 1999).

In this new paradigm of cross-sector interaction, nonprofits make efforts to collaborate by exploring strategic fit between nonprofits and for-profits, and also by discovering common objectives. When it comes to actual cross-sector collaboration, both nonprofits and for-profits should "invest" their resources on the common objectives, because "investment by both partners builds mutuality" (Kanter, 1999, p.128). On the basis of this new approach to cross-sector collaboration, the characteristic of exchange is changing from unequal to equal exchange (Austin, 2000). Opposed to the old type of exchange, "an (new) exchange occurs when a business and social sector organization recognize that their needs can be met by the other" (Sagawa and Segal, 2000, p.11).

These new exchanges eventually result in mutual benefits to both sector organizations. From the passive grant-takers, nonprofits shift its relationships with for-profits to strategic exchanges. For example, through cross-sector collaboration, nonprofits can learn or receive training of business management skills or knowledge which many nonprofits simply do not possess. In addition to these intangible resources, nonprofits can get such benefits as cost savings, economies of scale and scope, synergies, and revenue enhancement (Austin, 2000a, pp.8-11). Specifically, via cross-sector collaboration, nonprofits build two types of organizational capacity – tangible and intangible capacity (Dees et al., 2001). Tangible capacity is built through tangible resources. Nonprofits can usually receive financial resources as well as facilities or technologies (expertise) from the for-profit sector. Intangible capacity is built upon diverse intangible resource exchanges such as business managerial skills and knowledge, credibility, and visibility of the market or industry.

Beyond a charitable receiver of the corporate giving, nonprofits provide strategic values to their for-profit partners such as good images of nonprofits (Anderson, 1996), greater visibility in the community (Sagawa and Segal, 2000), strategy enrichment, human resource management, culture building, and business generation (Austin, 2000a, pp.11-14 ;Dees, 1998). Cross-sector collaboration "complements the corporation's goals and eventually increases its bottom line" (Anderson, 1996, p.130). In the short term, nonprofits provide mostly intangible resources of which for-profits don't possess. These intangible resources are likely to enhance organizational capacity of the for-profit sector as well. However, in the longer-term, these intangible values turn into tangible values. Indeed, through cross-sector collaboration, for-profits can save costs (e.g., see Kanter (1999) as Marriott did with its engagement in Pathways to Independence, and also create higher productivity and market expansion (i.e., horizontal integration).

The background of these mutual exchanges is acknowledgement of strategic fit between a nonprofit and a for-profit organization (Austin, 2000a). In other words, nonprofits have what for-profits don't have and vice versa. For example, nonprofits have programmatic expertise, social capitals (networks in community and neighborhood level), and skills to build employee favor atmosphere. On the other hand, for-profits have size (i.e., economies of scale), responsiveness, capital (or better access to capital), and managerial skill for efficiency (Ryan, 1996). Through these complementary capabilities, both parties "are able to accomplish more together than they are separately" (Austin, 2000a, p.10). When these complementary capabilities are met, both sector organizations can enjoy synergy effects.

Strategic fit also comes out of inherent differences between nonprofit and for-profit sector organizations. Differences in economic characteristics of each sector organization such as differences in tax (exemption) status and in availability in resources (e.g., volunteers) create mutual benefits out of exchanges between nonprofits and for-profits (Weisbrod, 1998a).

The strategic fit between two sector organizations can be seen as "*inescapable interdependent relationships*"[2] (Austin, 2000). Strategic fit and sectoral difference coupled with nature of social problems that cannot be solved by any one sector organization illustrate why relationships between nonprofits and for-profits are inescapably interdependent.

[2] The concept that no single entity has all the inputs necessary to address an identified social need effectively (Austin, 2000, p.10).

When this interdependency of the two sector organizations transforms to cross-sector collaboration, both sector organizations can benefit from what Huxham calls "collaborative advantage" (Huxham, 1996). Collaborative advantage is achieved when objectives of partners or strategic fit between partners are met. Collaborative advantage focuses on "outputs of collaboration that could not have been achieved except through collaborating" (p.15) … In some cases, it should also be possible to achieve some higher-level… objectives for society as a whole rather than just for the participating organizations" (p.14).

In short, the new type of exchanges between nonprofits and for-profits will enhance social well-being as a whole in the end.

b. Double bottom line

The term "double bottom line" refers to the simultaneous achievement of the charitable mission as well as financial performance through market engagement, social enterprise, or collaboration with for-profit firms (Dees, 1998a, p.146). Simply put, the double bottom line involves the generation of social capital thereby promoting social improvements for communities. In order to achieve the double bottom line, many nonprofits are adopting business management methods. As nonprofits embrace market values and methods, leaders in nonprofit organizations become a social entrepreneur (Dees, et al., 2001; Shore, 1999). Through social entrepreneurship, the ultimate goal of nonprofits should be to make sustainable social changes to meet demands of social services or solve social problems such as hunger, homelessness, and so forth. Social entrepreneurs pay attention to achieving the double bottom line through blending social and commercial methods. Social entrepreneurs are different from commercial entrepreneurs in that "social entrepreneurs set out with an explicit social mission in mind" (Dees et al., 2001, p.4). "Social entrepreneurs act as change agents" (p.5) by creating social values, social engaging innovation, pursuing new opportunities, and exploring all resource options.

These entrepreneurial approaches enable nonprofits to enter into new partnerships with for-profit organizations (Dees et al, 2001; Eikenberry and Kluver, 2004; Reis and Clohesy, 1999). While engaging in the social entrepreneurship, nonprofits should be careful not to fall into money-chasing which makes nonprofits deviate from their core missions. In other words, generating income through cross-sector collaboration or other commercial activities such as fees for services "should not drive out philanthropic initiatives" (Dees, 1998a, p.136)

The best suitable organizational form for achieving double bottom line is a hybrid form which locates between pure philanthropy and pure commercial business (Dees et al., 2001). The hybrid form is also a bi-product of the seamless economy (Dees, 1998a; Dees et al., 2001; Young and Salamon, 2002). The hybrid form is called as social enterprise. As a blurring or hybrid form, social enterprise is identified not by a particular organizational form (i.e. nonprofit or for-profit organizations), but by intent or purpose of organizations (i.e., pursuit of social mission). In other words, social enterprise is an organization that pursues public or social goals regardless of its sectoral identity (Young and Salamon, 2002).

Dees (1998a, 1998b; 2001) puts forward three characteristics of hybrid form which go hand in hand with the concept of the double bottom line. First, method of hybrid form is mission and market driven method. Second, goals in a hybrid form are to accomplish social and economic values at the same time. Third, motives for hybrid form are mixed with pure philanthropic and commercial motives.

In order to achieve double bottom line, nonprofits need the strategic restructuring toward entrepreneurial cross-sector collaboration. The strategic restructuring should wisely integrate "social impulses[3]" with the "best aspects of business practice" (Dees, 1998a). By doing so, cross-sector collaboration can become a successful hybrid form. Shore (1999) suggests several tips for nonprofit organizations to achieve double bottom line through entrepreneurial approaches. First, nonprofits should facilitate partnerships with businesses in order to create resources to redistribute social wealth, not just to collect and redistribute the social wealth. Second, unlike the simple check writing relations with for-profits, nonprofits should cultivate a new donation culture - donating skills as well as money (Shore, 1999).

c. Advantages of cross-sector collaboration strategy

As discussed in the above, nonprofits can reap many benefits from the cross-sector collaboration. Through a shared commitment to the same social mission, both nonprofits and for-profits can achieve mutual benefits (Austin, 2000a; Dees et al., 2001). Specifically, cross-sector collaboration can result in additional financial resources, services or goods, access to other corporations, technology and expertise, new perspectives, and greater name recognition (Austin,

[3] Something that cannot get out of market transaction, but out of "giving" (Dees, 1998, p.165).

2000(b), p.76). In the mid to long term, cross-sector collaboration offers the following advantages (Dees et al., 2001, p.14):

- It improves efficiency or effectiveness
- It models self-sufficiency
- It provides an unrestricted funding stream
- When nonprofit organizations experience risks, partnerships with for-profits can allow nonprofits "to leverage resources beyond their own organizations that may prove critical to their ability to anticipate, negotiate, and manage a variety of potential risk factors" (Dees et al., 2001, p.148).

In sum, numerous successful stories about cross-sector collaboration from the literature have showed that working together closely with each other nonprofits and for-profits can produce mutual advantages and have positive impacts on social problems and needs.

2.3 FRAMEWORK OF THIS STUDY: THE COLLABORATION NETWORK

2.3.1 Collaboration network

This section will define the concept of the collaboration network. The collaboration network is combination of two mutually reinforcing concepts, *collaboration* and *network.* First, networks are "incubators of collaboration" (King, 2004; Prusak and Cohen, 2001) because networks help organizations collaborate through providing new information, opportunities and social capitals. In return, successful collaboration not only reinforces existing relationships, but also is likely to create new relationships which eventually reinforce networks of one organization. "Successful collaboration in one endeavor builds connections and trust – social assets that facilitate future collaboration in other, unrelated tasks" (Putnam, 1993, cited from Prusak and Cohen, 2001, p.93). Thus, this study argues that synergy effects are likely to emerge through these mutually reinforcing processes. On the basis of this argument, this study defines the collaboration network as *networks that catalyze and facilitate collaboration strategy by helping organizations identify new opportunities and build social capitals*.

2.3.1.1 Collaboration continuum: a definition of collaboration

When one tries to figure out the meaning of "collaboration", she or he will encounter semantic ambiguity because a definition of collaboration varies over different perspectives of researchers (for example, see Appendix1). There is general agreement on four aspects of collaboration. First, collaboration is used as a positive meaning opposed to negative interorganizational relations, such as conflicts (Huxham, 1996). Second, collaboration goes beyond simple form of sharing information (i.e. personal connections) and has to be more than resource sharing with mutual obligations (Snavely and Tracy, 2000). Third, collaboration creates a "high degree of (perceived) opportunity for *joint value creation*" among participating organizations (Jarillo, 1988, p.38). The joint value creation comes out of mutual exchanges and mutual adjustment (Powell, 1998). Fourth, collaboration does not conform to just one form or approach. That is, collaboration spans from informal to formal collaboration (O'Looney, 1994; Rogers and Whetten, 1982).

Table II-1) Collaboration continuum: Summary of literatures

Collaboration type by intensity / Characteristics	Collaborative efforts		Strategic Restructuring
	Tactical Collaboration	Strategic Collaboration	Corporate Integration
Shared Goal/ Mission	Low overlapping	Moderate to high overlapping	Mission integration
Autonomy	Autonomy	Interdependence	Integration
Shared Rule	Yes/No	Yes	Yes
Structure's Duration	Temporary	Mid- to long-term	Permanent
Inter/Intra Sector	Both	Both	Mostly intra sector
Decision Making	Remains with individual orgs.	Shared	Dissolution to one or more orgs.
Interaction level	Moderate	Moderate to intensive / Regular	N/A
Strategic value	Low to modest	Modest to high	High
Example	Information exchanges and work referrals	Joint venture and programs, and resource sharing	Merger

Considering complex concepts of interactive relationships, it is helpful to propose a conceptual framework for collaboration that captures the range and intensity of collaborative relationships rather than to adhere to one definition. Also, a continuum of collaboration is

suggested by many researchers (See appendix 2). Table II-1[4] elaborates complex dimensions of collaboration based on previous literatures.

Though not many authors include tactical collaboration in various types of collaboration, this study includes it because of its potential value for future collaboration[5]. Most authors see collaboration as strategic collaboration (Arsenault, 1998; Kanter, 1994; Kearns, 2000; La Piana, 1998, 2001).

Collaboration is aligned with intensity of interactions. Tactical collaboration involves less intense relationships between organizations such as information exchanges or work referrals. In these relations, it is not necessary for partners to mutually exchange tangible or intangible resources. These relations can be a passive form (i.e., work referrals) or just offering something without expecting a return from a partner (i.e., information exchanges). Because these relations do not demand much effort from each partner, each partner maintains their autonomy. Relations in the tactical collaboration also do not mandate an organization to commit its efforts to initiate and/or maintain these types of relations. These relations are relatively loosely connected relations and thus, could be temporary (but not necessarily). On the other hand, Strategic collaboration means that there are moderate to intensive relationships between partners. Intensive relations directly suggest that partners mutually exchange intangible and/or tangible resources. Examples of strategic collaboration are joint venture, joint planning, resource sharing, or cause-related marketing between nonprofits and for-profits. In order to gain the most out of these relationships, partners sometimes agree to share decision making processes for a shared goal in which they are involved together. Thus, their relationships can be described as interdependent relationships.

Finally, as the most intensive form of interorganizational relations, strategic restructuring (i.e., corporate integration) is different from collaboration because it involves "a total change in the locus of control of one or more of the partnering organizations" (La Piana, 2001, p.6).

A definition of collaboration in this study is a little different from Table II-1. First, this study will not include strategic restructuring in the collaboration continuum. Theoretically, strategic restructuring, especially merger, is an important dimension of the collaboration continuum because it can reduce wastes of resources by decreasing overlapping services and

[4] Characteristics in this table are made based on Austin (2000a), Gray (1989) and La Piana (2001).
[5] For examples of including tactical collaboration in the collaboration definition, see Huxham, (1996) and Murray (1999).

programs within the same geographical area (La Piana, 1998, 2001). However, this study will not consider strategic restructuring because this happens mostly intra-sector, and once merger is conducted, it is difficult to measure relations between two organizations.

Second, this study includes irregular information exchanges – informal and/or irregular contacts such as exchanges of information or advice – in the definition of collaboration. The importance of irregular information exchanges in networks is evidenced in three ways. First, information exchanges result in "blurring of professional and personal relationships" (Williams, 2002, p.110). Thus, information exchanges bring many positive features to organizations that maintain these relations, such as sharing values, building trust, and so forth.

Second, information exchange relations have enough potential to be developed into more intense forms of collaboration. When these relations are accumulating through continuous contacts, organizations that maintain these relations can build the ability to use these relationships as a form of human capital (Mandell, 1999b).

Third, information exchanges represent "weak ties" which are important in building social capital. Although weak tie is strategically important (Granovetter, 1973; Gummer, 2001; Seibert, Kraimer, and Liden, 2001), most of the literature does not regard weak ties as a form of collaboration because it pertains to a relationship that is too loosely connected. However, due to its strategic value, this study includes information exchanges in the collaboration continuum, especially to measure weak ties.

On the basis of the above arguments, this study proposes Table II-2 as the definition of collaboration in this study.

Table II-2) Collaboration continuum: Definition of collaboration in this study

Irregular information exchange	Tactical collaboration		Strategic collaboration		
Informal affiliation			Formal affiliation		
Exchanges of information and advice	Work referrals	Regular meeting	Physical/ personnel resource sharing	Formal contracts	Strategic alliances
Intensity of collaboration efforts Weak → Strong					

The definition of collaboration in this study is composed of three different collaborative relationships which are irregular information exchanges, tactical collaboration, and strategic

collaboration. As stated in the above, these are arrayed according to its intensity of collaboration relationships.

Information exchanges are either short-term or long-term "informal relations that exist without any defined mission, structure, or planning effort" (Winner and Ray, 1994, p.22).

Tactical collaboration – work referrals and regular meeting - is different from information exchanges in that organizations connected with tactical collaboration relations "share information only about the subject at hand" (Winner and Ray, 1994, p.22), while organizations connected with information exchange relations communicate general subjects.

Compared with strategic collaboration, the first feature of tactical collaboration is informal affiliation[6]. Organizations with tactical collaboration relations usually don't rely on formal written documents for maintaining these relations but mostly on trust between organizations[7]. Another feature of tactical collaboration is maintenance of total autonomy over decision making and administrative operations. That is, organizations connected via tactical collaboration maintain their independence and autonomy in operations, governance, and strategy. The third feature of tactical collaboration is that strategic value, in terms of joint goals and/or joint values, is low to moderate because organizations connected with these relations are independent in operating their missions.

Tactical collaboration relations are subdivided into work referrals and regular meetings. Tactical collaboration includes work referrals which are not cited by the previous researchers. Work referrals are not usually based on the formal written documents among human service organizations. However, work referrals are important to provide human services in a timely manner because work referrals are an open conduit where organizations can ask for help when they have clients whose problems are beyond their ability.

Strategic collaboration relations are subdivided into physical/ personnel resource sharing, formal contracts, and strategic alliances. Physical/ personnel resource sharing occurs when organizations share personnel and/or physical resources such as offices. Formal contract in this study refers to a contract with other organization(s) to perform or jointly perform services. Strategic alliances involve joint activities such as joint programs or joint venture. In the cross-sector collaboration,

[6] However, regular meeting is not necessarily informal.
[7] Trust as long standing relationships is "faith in the moral integrity or goodwill of the other" (Ring and Van de Ven, 1994). Trust is different from mere interpersonal relationships. Trust is built on recognition of professional respects which come from excellent performance in the past.

strategic alliances includes cause-related marketing (such as transaction-based promotions, joint issue promotions or licensing, Anderson, 1996), loyalty arrangement or event-sponsorship. The first feature of strategic collaboration is formal affiliation. Organizations connected with strategic collaboration relations often maintain their collaborative relationships based on formal written documents. The second feature is interdependency. Based on written agreements, organizations connected via strategic collaboration relations share decision making processes to achieve shared goals. The third feature is creation of strategic value. Through these collaboration relations, the possibility of creating joint goal and value is higher than less intensive types of collaborative relations.

In sum, the collaboration continuum proposed above has two advantages. First, the continuum is practically fitted to a human service system. The definition includes two relations – information exchanges and work referrals – which are not usually included in the previous collaboration study. Second, the continuum allows for collaboration relationships that are dynamic because organizations can maintain multiple relations with others simultaneously (maximum six relations at the same time). Since collaboration relations are defined as multiple relations, decision makers in organizations can strategically choose from a very large number of combinations of relations based upon their needs and capabilities.

2.3.1.2 Potential contributions of networks on collaboration

The most substantial contribution of social network to collaboration is its ability to support partnerships and alliances between organizations (Cross and Parker, 2004). "Social network analysis can illuminate the effectiveness of such (collaboration) initiatives in terms of information flow, knowledge transfer, and decision making" (p.8). Network analysis is more useful when it comes to examination of informal relations, because informal relations represent an important type of collaboration initiatives. Specifically, social network analysis provides both practical and new information which is crucial to cross-sector collaboration.

Social network analysis provides practical ideas or information that can be directly used by practitioners when they undertake a collaboration strategy. In other words, "getting an accurate view of a network helps with managerial decision making and informs targeted efforts to promote effective collaboration" (Cross and Parker, 2004, p.7). Network analysis can give practical information such as who are overloaded by information flows, who are disconnected

from most of others, or who bridges between subgroups of a network. If a manager in a nonprofit organization undertakes collaboration initiatives "without understanding the inner workings of a network" or does not know where her organization places and who the most significant organization in the network is, she might waste precious resources to search for as many connections as possible based on "an implicit philosophy that more connections and collaboration are better" (p.7).

From the strategic point, "rather than pursue initiatives that create connections indiscriminately[8], managers need to make a more targeted approach, keeping in mind that collaboration has a cost….. Managers who target strategic points in social networks can quickly increase an organization's effectiveness, efficiency, and opportunities for innovation" (p.8). Therefore, for example, if a manager in a nonprofit organization not only acknowledges that her organization is relatively insular from other organizations in the network, but also understand the importance of networks and who strategically significant actors in the network are, she could improve overall connectivity by making connections with a few organizations who has many important relationships with another central organizations or who bridge between other organizations. On the other hand, if a manger discovers that her organization is overloaded by information flows in the network, she could develop a strategy to decrease time-consuming connections using network analysis (Cross and Parker, 2004).

Network analysis can reveal new information that is often contradictory to intuitive perception of nonprofit managers (Cross and Parker, 2004). For example, contrary to the common sense, an organization with excellent reputation could be insular in terms of its connectivity with other organizations. Another piece of valuable information obtained through network analysis is discovery of strategically significant actors in terms of their unique relational patterns distinctive from those of others. For example, "connectors" (Gladwell, 1999) or "gatekeeper" (Flemming and Juda, 2002) in networks can be discovered by network analysis. Connectors are small number of individuals (or organizations) who are responsible for a large percentage of interactions such as information sharing, work referral flows, or resource flows, both within and across a subgroup. Mostly, connectors place in between subgroups where actors have strong and dense ties. Burt (1992) argues that connectors are strategically significant in the

[8] An indiscriminate increase in connections can be a drag on productivity (Cross and Parker, 2004, p.8).

network because they are rich in structural holes[9]. This argument is directly connected to social capital which will be discussed in the below.

Practically, in order to gain the most out of cross-sector collaboration, nonprofits need to build organizational capacities that will facilitate them to work together with for-profits smoothly. These capacities can be built from managing social networks. Specifically, Dees et al. (2001) suggest two critical managerial issues that would improve network management for cross-sector collaboration: opportunity recognition and building social capital.

First, networks allow nonprofits to understand when a window of opportunity is open. When nonprofits are "in the right place at the right time," nonprofits can increase chances to meet for-profits that have strategic fit with nonprofits. "Being in the right place at the right time has more to do with the connections people make than their geographical position….. The more connections you make and the more people who know and understand your mission, the greater your chances of finding new opportunities" (Dees et al., 2001, p.47). In other words, through the "relational capability of organizations," nonprofits can recognize "how and when organizations are able to combine their existing competencies with the abilities of others" (Powell, 1998, p.229).

Second, social capital is a useful concept for nonprofits to develop strategic partnerships and to enhance community relations (King, 2004). It is said that nonprofits have fluent social capital because "nonprofits represent the epitome of social capital in action: groups of people coming together voluntarily to meet a collective need" (King, 2004, p.483). Besides, nonprofits have been playing a role of building social capital (Eikenberry and Kluver, 2004). This social capital inherent in nonprofits is very useful to mobilize resources for launching social enterprise (in this study, cross-sector collaboration), because social capital coming out of network relations is likely to provide practical and new information about other organizations that would be potential matches as collaboration partners (Dees, et al., 2001).

Though there are numerous differences in definitions of social capital (see Adler and Kwon, 2002), most agree that social capital not only can be represented by relationships with others, but also is built through networks (King, 2004). Roughly, social capital is explained by two different aspects: bonding and bridging social capital (King, 2004). While *bonding social*

[9] "A structural hole is a relationship of nonredundancy between two contacts. The hole is a buffer, like an insulator in an electric circuit. As a result of the hole between them, the two contacts provide network benefits that are in some degree additive rather than overlapping" (Burt, 1992, p.18).

capital focuses on networks rich in connections, *bridging social capital* focuses on networks rich in structural holes. Bonding social capital "conveys standard norms for its members, helping them to optimize performance". On the other hand, bridging social capital "facilitates bringing information and resources" (p.476). Between two types of social capital, bridging social capital is more appropriate in this study because this study explores strategic values created from diverse relationships (i.e., information and resource flows) among organizations. In this sense, this study follows a simple definition of social capital which is more relevant to interorganizational relationships: "the relationships that make organizations work effectively" (Prusak and Cohen, 2001, p.86).

2.3.2 Independent Variables

In addition to external properties such as relationships with other organizations or social capital, this study will take into account organizations' internal properties coming out of each organization's specific features. As Blau (1982) argued, the whole picture of actors' behavior can be taken into account when actors' network properties from external relationships and attributes from internal characteristics are analyzed in a complementary way. In this context, this study proposes six organizational attributes which are important in this study.

First, *sectoral differences* are expected to be associated with an organization's choice of collaboration partners, because there is a tendency for organizations to have strong connections between organizations that share similar professional norms (Provan and Milward, 1991).

Second, prior research showed that *size* is an important variable to explain patterns of collaboration. The size of organizations is measured in different ways, such as the number of employees, the amount of assets, and the degree of revenue or expenditure (Miller, 1991). Among these three measurements, the number of employees has been used most often as a measurement of organizational size, but this measurement is very sensitive to the technology (Miller, 1991). In other words, the number of employees is negatively correlated with the technology. An organization may be quite large with relatively few employees if the organization employs high degree of technology which can reduce the number of employees. Thus, in addition to the number of employees, this study will use revenue and expenditure as a measurement of size because this measurement is less affected by the technology.

Third, the *goals* of organizations (i.e., a mission or programs) may affect an organization's choice of collaboration partners (Wood and Gray, 1991). In other words, organizations that have the same or similar programs and target population are expected to have more possibility to work together.

The fourth variable is *geographical proximity*. Geographical proximity means physical distance between organizations. Many research found that geographical distance tends to decrease chances of contacts (e.g., Baker, 1992; Blau and Schwartz 1984; Kearns, 1989). Thus, it is reasonable to assume that organizations near each other would have more chance to contact each other and would be more willingly to collaborate with each other.

Finally, other variables such as *diversity of board members, diversity of programs, proportions of administrative expenditures, generating revenue from social enterprise, government grants or commercial activities,* and *diversity of revenue sources* will be included because these internal features could have impacts on collaboration patterns with other organizations. For example, if a nonprofit organization has a board member whose background is for-profit management, this nonprofit would have more possibility to have connections with a for-profit organization.

2.4 SUMMARY

Complex and rapid changing environments have required nonprofits to collaborate with each other as well as with businesses and/or public agencies. The phenomenon of the seamless economy is not unfamiliar with academics or practitioners. The cross-sector collaboration enables nonprofits to improve organizational efficiency (or effectiveness) through strategic fit and active market involvement. This study proposes the collaboration continuum which combines organizational and strategic management theories, as a framework to analyze collaboration phenomenon. This framework links two mutually reinforcing concepts – the concept of collaboration and of network structure.

III. RESEARCH DESIGN

3.1 INTRODUCTION

On the basis of the literature review, this chapter outlines the research scheme by presenting research questions, data collection, and research methods. These are the blueprint to the actual research and analysis.

3.2 RESEARCH METHODS

This study represents what Kerlinger and Lee (1999) call a field study. As a field study, this research is exploratory. The purpose is to propose hypotheses for further research rather than test or replicate an existing theory to check the accuracy of the evidence or make predictions (i.e., causal inference). In other words, the goal of this study is to discover unknown or hidden relationships, and finally generate hypotheses for future studies (i.e., descriptive inference) (King, Keohane, and Verba, 1994). Unlike a simple description of facts or explanation of results from analysis, the descriptive inference is "the process of understanding an unobserved phenomenon on the basis of a set of observations" (King, Keohane, and Verba, 1994, p.55) and the processes of "distinguishing between that which is systematic about the observed facts and that which is nonsystematic" (King, Keohane, and Verba, 1994, p.34).

Specifically, this study adopts the grounded theory approach (Glaser and Straus, 1967) in order to produce relevant explanation of structural patterns in various kinds of networks. Through the analysis of evidence in hand (i.e., various types of collaborative relationships and characteristics of actors), this study purposes to uncover and generate certain patterns of

collaboration networks. On the basis of comparisons of uncovered patterns, certain categories emerge to illustrate the collaboration patterns in the macro perspective.

In sum, this study tries to "to lay the groundwork for later, more systematic and rigorous testing of hypotheses" (Kerlinger and Lee, 1999, p.586) by discovering or uncovering hidden patterns of collaboration.

3.3 RESEARCH QUESTIONS

Do human service nonprofit organizations display identifiable patterns of collaboration with each other and with organizations from the business and government sectors?

In order to answer this research question, this study proposes the following researchable sub-research questions.

1. *What are the characteristics of interactions among nonprofits in the human service sector and across other sectors? How pervasive are collaboration partnerships and what is the variety of forms and contents of these relationships?*

2. *Is network analysis useful in uncovering hidden patterns of interactions within and across sectors?*

2-1. Are there distinctive patterns of interactions between same-sector and cross-sector collaboration?

2-2. What communication roles are displayed in the network and what organizations play these various roles?

2-3. How are diverse organizational attributes related to the nature and extent of cross-sector and same-sector collaboration?

2-4. How is intangible organizational competence built through network management (i.e., such as social capital or reputation of an organization) related to the nature and extent of cross-sector and same sector collaboration?

2-5. Are there identifiable differences between the sectors in terms of their collaborative relationships?

3. *What practical implications and hypotheses can be drawn from the analysis?*

3.4 DATA COLLECTION

3.4.1 Population boundary: Selection of target organization

The research design for the network analysis is different from the traditional survey research design in terms of sampling; the research design in network methods does not draw samples (Hannemen, 2001; Wasserman and Faust, 1994). "Because network methods focus on relations among actors, actors cannot be sampled independently to be included as observations. If one actor happens to be selected, then we must also include all other actors to whom our ego has (or could have) ties" (Hanneman, 2001, p.5). Instead of sampling, this study draws a population boundary by "demographic" or "ecological" approach (Hanneman, 2001).

First, it is necessary to define actors of collaboration who generate and maintain collaborative relations in this study. As stated, the focal type of organization is nonprofit organizations. Nonprofit organizations are linked in complex webs of relationships among diverse stakeholders. These stakeholders include beneficiaries of services, capital providers (foundations, individual donors, governments, loans from banks, and fees), work forces (paid staffs, volunteers, and board members), and other organizations (organizations that offer related, similar, and substitutable programs and services) (Dees et al., 2001; Kearns, 2000). This study includes capital providers and other organizations as the objective of analysis because the main interest of this study is to explore external relationships of nonprofit organizations.

Second, it is difficult to make a complete list of organizations (nonprofit organizations, capital providers, and other organizations) for the purpose of this study. For this reason, this

study uses a list of target organizations[10] supplied by an informant organization - the North Hills Community Outreach[11] - based on a prescribed geographical boundary[12], and their involvement in human service programs[13]. In effect, this study is undertaken in a quasi-laboratory setting, by studying relations among organizations in a relatively small and discreetly bounded geographic area. Many, but not all, of these organizations are presumed to have relationships of various types and intensity with each other as a result of their shared geographic marketplace. Moreover, the informant organization, North Hills Community Outreach (NHCO), is in a good position to define the population boundary for this study because it is a focal point and clearinghouse for many of the social service activities in this particular geographic area, and therefore is familiar with many of the primary social service actors in the region.

3.4.2 Unit of analysis

The unit of analysis is an organization and its relationships within the nonprofit sector and across other sectors (i.e., the business and public sectors) both at the micro (i.e., individual) and macro (i.e., the whole network) level. The individual level relational data is used for macro level analysis in the network analysis; ties between two individual organizations are meaningful "as parts of the social networks in which they are embedded" (Wellman, 1988, p.37).

[10] For the complete list of organizations, see appendix 4.

[11] This study chose *North Hills Community Outreach* as an informant for following reasons: 1) NHCO's service area - in terms of geographical area as well as human service area - covers most of the North Hills Community with one headquarter and two branch offices. 2) As a renowned and leading organization in terms of service delivery and collaboration efforts in the North Hills community, NHCO not only recognizes the importance of collaboration in the human service field, but also practices numerous collaborative works across business, governments, and secular nonprofits, as well as Faith-Based organizations. NHCO's work relationships range from formal collaboration partnerships (about 60 organizations) to informal, but important service referral relationships (several hundreds organizations). In addition, NHCO was a founding member of the North Hills Nonprofit Consortium, which coordinates human service areas among nonprofits in order to prevent unnecessary competition.

[12] See the Appendix 3 map for the geographical boundaries.

[13] This study defines human service programs based on the NTEE (National Taxonomy of Exempt Entities) code. They are; Children's, youth services, Family services, Personal social services, Emergency Assistance (food, clothing, and/or cash), Residential, custodial care, Services to promote the independence of specific population (P), Mental health , crisis intervention (mental health treatment, alcohol or drug abuse, hot lines for rape etc.) (M), Employment assistance, job training , vocational rehabilitation (J), Food Service, Free Food Distribution Programs (K), Housing development/Home repairs, rent assistance (L), Crime prevention/ legal services(I), and Recreation, sports, leisure, and athletics (N).

3.4.3 Design of collection of relational data

In network analysis, it is important to design a method of collecting relational data. In this study, two types of relational data must be collected; collaborative relationships within nonprofits and collaborative relationships between nonprofits and two other sectors – businesses and public agencies. On the basis of this research scheme, this study used two methods for collecting network data given the population boundaries. First, the full network method (Hanneman, 2001, p.7) was applied for the 33 nonprofit organizations that responded to the study. This study collected all six types of collaboration relations between the responded nonprofits. Second, the ego-centric network method (Hanneman, 2001, p.9) was applied to identify businesses and public agencies to which responded nonprofit organizations are connected. Taken in consideration of the research questions, the collaborative relationships of social service provider among businesses, among public agencies, or between businesses and public agencies are not of significance for this study. For this reason, this study approached the ego-centric network method by collecting network data between focal actors (i.e., nonprofit organizations) and the two other types of alter (i.e., businesses and public agencies).

3.4.4 Data collection

Data was collected in the two rounds. The first round of surveys began on 10 May 2005 and ended on 6 June 2005. Surveys went to 42 nonprofit organizations and 13 surveys were returned. After the first round, the investigator contacted the 29 non-responding organizations with three options for survey completion; personal visiting to 26 organizations, emails and phone calls to 29 organizations, and resending the survey in mail to 7 organizations. It took 6 weeks to finish the second round of data collection (6 June 2005 to 16 July 2005). Through the second round, 20 more surveys were returned. In total, 33 out of 42 surveys were collected, with a response rate of 78.6% (Table III-1). Considering the difficulties in mail-in survey in the nonprofit sector (Cordes, Henig, Twombly, and Saunders, 1999; Hager, Wilson, Pollack, and Rooney, 2003; Kearns, Park, and Yankosky, 2005), this response rate can be considered strong for the analysis.

Table III-1) Response organizations

Number	Name of Organization	Abbreviation	Response
1	AARP	AARP	Yes
2	Allegheny County Bar Association	ACBA	Yes
3	Allegheny Valley Association of Churches	AVAC	Yes
4	Bradley Center	BC	No
5	Bread of Life Food Pantry	BLFP	Yes
7	Community Auto	CA	Yes
8	Crisis Center North	CCN	Yes
6	Christian Literacy Associates	CLA	Yes
9	Emanuel Lutheran Church	ELC	Yes
10	Forbes Funds	FF	Yes
11	Glenshaw Valley Presbyterian	GVP	No
12	HEARTH	HEAETH	Yes
13	Holy Family Institute	HFI	Yes
14	Hosanna Industries	HI	Yes
15	Light of Life Ministries	LLM	Yes
16	Lutheran Service Society	LSS	Yes
17	Manchester Craftsmen's Guild	MCG	Yes
18	Millvale Food Cupboard	MFC	Yes
19	Mt. Nazareth	MN	Yes
27	Northern Area Multi Service Center	NAMSC	No
28	Northside Common Ministries	NCM	Yes
20	Network of Hope	NH	Yes
21	North Hills Community Outreach	NHCO	Yes
22	North Hills Food Bank	NHFB	Yes
23	North Hills YMCA	NHYMCA	Yes
24	North Hills Youth Ministry Counseling Center	NHYMCC	Yes
25	North Suburban Adult Services	NSAS	Yes
26	North Way Christian Community Pantry	NWCCP	Yes
29	Open Door Ministries	ODM	Yes
30	Papen-North Chapter	PNC	No
31	Priority Two	PT	Yes
37	St. Mary's Church	SMC	Yes
36	St. Margaret Foundation	SMF	No
33	Share One Food Pantry	SOFP	Yes
38	St. Paul's United Methodist Church	SPUMC	Yes
35	Society of St. Vincent DePaul, Council of Pittsburgh	SSVD	Yes
34	Sharpsburg/ St. Vincent DePaul	SVD	Yes
32	Sewickley Valley YMCA	SVYMCA	Yes
40	Treasure House Fashions	THF	Yes
39	Tickets for Kids Foundation	TKF	No
41	United Way of Allegheny County	UWAC	No
42	YWCA of Greater Pittsburgh Center for Race Relations	YWCA	Yes

During the second round of data collection, two reasons were identified for the non-response. The first is the turnover of the CEO around the survey periods (three organizations among 9 non-responses: 33%). Second, four organizations (44% of 9 non-responses) identified busy schedule or being tired of the frequent surveys as a reason for non-response. Several CEOs directly mentioned that they are tired of frequent surveys from outside of their organizations. Two organizations stated that they would return the survey in the second round, but did not, despite several contact attempts.

3.4.5 Bias in the population of this study

Even though the target organizations in this study are defined as a 'population' suited for the network analysis, these 42 nonprofit human service organizations are a part of a bigger population, nonprofit human service organizations in Allegheny County. Using budget data from the 32 responses[14] in this study and the recent study of Allegheny County human service nonprofit organizations (Kearns, Park, and Yankosky, 2005), this study identified if there was a bias in the 33 respondent organizations in terms of budget size.

Table III-2) Revenue Distribution Comparisons

	Revenue		
	Population (Allegheny County)	Population (this study)	Survey (Kearns et. al, 2005)
N	680	32	226
Year data collected	2000-2001	2005	2004
Median	$303,889.50	$422,526.5	$612,750
Mean	$1,982,380.71	$4,112,203.0	$3,000,637
Standard Deviation	$14,028,386	$11,249,140.05	$7,400,005
Less than $25,000	1.3%	18.8%	3.5%
Less than $100,000	27.6%	37.5%	17.3%
More than $1,000,000	23.2%	31.2%	39.4%
25% quartile	$82,405	$26,702.2	$167,550
50% quartile	$303,889	$422,526.5	$612,750
75% quartile	$960,581	$1,575,000.0	$2,309,875

The respondent organizations are skewed to middle to large organizations. The median annual revenue of respondents in this study is $422,526 (mean is $4,112,203), whereas the

[14] Among 33 responses, one organization did not answer its annual budget.

median annual revenue of Allegheny County nonprofit human service organizations is $303,889 (mean is $1,982,380). In comparison to Allegheny County population distribution, the skewness of respondents in this study is shown in three ways. First, small scale nonprofits (annual revenue less than $25,000) are over-represented (1.3% in the Allegheny County vs. 18.8% in this study). Second, middle scale nonprofits (annual revenue from $25,000 to $1,000,000) are under-represented (75.5% in the Allegheny County vs. 50% in this study). Third, large scale nonprofits (annual revenue more than $1,000,000) are over-represented (23.2% in the Allegheny County vs. 31.2% in this study).

3.5 MEASUREMENT

3.5.1 Development of survey instrument

The first draft of the survey questionnaire was designed to measure both interorganizational relations and various organizational attribute variables. Potential variables were drawn from extensive review of the literature. The basic design of the survey was drawn from the survey questionnaires used in the previous research in which the author participated (Kearns, Park, and Yankosky, 2005). After making the first draft, the survey was discussed with Professor Kevin Kearns and two nonprofit CEOs (Ms. Fay Morgan from NHCO and Sister Linda Yankosky from Holy Family). Based on several discussion sessions with them, the initial draft of the survey was revised into the second draft of the survey. The pilot test of the survey was completed by seven nonprofit CEOs (22 March 2005). With feedback from the pilot test, Prof. Kevin Kearns and other dissertation committee members, a final draft of the survey was completed (7 April 2005).

The final draft includes several questions about organizational attributes (i.e., independent variables) and five tables asking for interorganizational relations. The following components are questions of the survey (See Appendix 4):

· Organization information
· Description of mission
· Age of organization
· Programs provided

· Diversity of board members

· Diversity of revenue sources

· Number of full-time staff members and volunteers

· Total revenues and expenditures

· Percentage of program and administrative expenditures

· Six interorganizational relationships between the target organizations

· Six interorganizational relationships between the target organizations and other nonprofit organizations not listed

· Six interorganizational relationships between the target organizations and business

· Six interorganizational relationships between the target organization and public agencies

· Positive and negative aspects of collaboration

3.5.2 Operational definition of variables

First, interorganizational relationships are measured on the basis of the collaboration continuum described earlier. This study measures a total of six relationships; 1*) irregular information exchanges*, 2) *work flows* (service referrals received and sent), 3) *regular meetings*, 4) *physical/personnel resource sharing*, 5) *formal contract*, and 6) *joint programs*. The definitions of the six relationships, as presented in the survey are;

· **Irregular information exchange**: Your organization has informal and/or irregular contacts such as exchanges of information or advice with the organization listed.

· **Referrals received**: Your organization receives client referrals with some regularity from the organization listed.

· **Referrals sent**: Your organization refers clients with some regularity to the organization listed.

· **Regular meeting**: Your organization meets regularly (at least quarterly) to discuss problems or to share knowledge with the organization listed.

· **Physical resource sharing**: Your organization shares personnel and/or physical resources such as offices with the organization listed.

· **Formal contract**: Your organization has a contract with the organization listed to perform or jointly perform services.

· **Joint programming**: Your organization undertakes joint activity such as joint programs or joint ventures with the organization listed.

Among these six relationships, one relationship is measured as directed ties (work referrals) and the remaining five are measured as bonded or undirected ties (information exchanges, regular meetings, physical/personnel resource sharing, financial resource sharing, and joint programs).

Using the above six relationships, this study introduces the *collaborative relation index* (hereafter CRI). This index measures the degree of collaboration efforts by aggregating the six collaborative relationships. Since the six collaborative relationships are differentiated by the intensity of collaboration efforts, the aggregation of the six relations expresses "how much a nonprofit has made an effort to collaborate with other organizations" and "the strength of the collaborations a nonprofit maintains." The calculation of the CRI is done in two steps; weighting by 1) intensity of collaborative relationships and 2) reciprocity. First, this study uses weights in order to differentiate between intensive and less intensive relationships. Based on intensity of relationship, this study assigns weights of one to irregular information sharing, two to tactical collaboration (work referrals and regular meetings), and three to strategic collaboration (physical/personnel resource sharing, formal contract and joint programs). Second, in measure of the work referral tie, this study applies the principle of reciprocity. When the work referral is one way (i.e., not reciprocal), this study assigns a weight of one instead of two.

The CRI is expressed in the following equation;

CRI =
1 × (the number of information sharing + the number of work referrals received + the number of work referrals sent) +
2 × (the number of regular meetings + the numbers of physical resource sharing) +
3 × the number of formal contracts + the number of joint programs)

For example, nonprofit A shares information with two organizations, has one sending (but no receiving) referral relationship with one organization, has one regular meeting with one nonprofit and one joint program with one organization. Therefore, its CRI is calculated as; 1×(2

information sharing + 1 work referral) + 2×(1 regular meeting) + 3×(1 joint program). CRI = 1×3 + 2×1 + 3×1. CRI in nonprofit A is 8.

Second, the independent organizational variables, as discussed in the above chapter, are *sectoral difference*, *size*, *organizational goal* (a mission or programs), *geographical proximity*, budget-related variables (*revenue from government, revenue from social enterprise, revenue from commercial activity, revenue diversity and proportion of administrative expenditure*), *program diversity*, *proportion of board members from the business sector*, and *years in operation*.

For the measurement of sectoral differences, this study divides sectors to either the public, for-profit, or nonprofit sectors. Size is measured in terms of a budget size (revenue or expenditure in US dollar). An organizational goal is measured through programs that the organization currently operates (For details see Appendix 4 survey questionnaire). The geographical proximity is measured by the shortest driving distances (miles) between each of the 42 organizations. Other organizational attributes are used in regression analysis as independent variables. Operational definitions and scales of other organizational variables are presented in detail in Chapter 7.

3.5.3 Validity and reliability

3.5.3.1 Accuracy

Because this study relies on the self-reported responses of interorganizational relationships and most respondents depended on memory, there is a risk of inaccuracy. In order to reduce this inaccuracy, this study defines the time period of interactions as "within the past year." In addition, in order to reduce another possible inaccuracy from differences between unit of analysis (organizations) and unit of observation (individuals), the surveys were completed by persons who are designated as representatives of the organization. Among the 33 respondents, 27 were completed by the CEO or CEO equivalents (such as president, chairperson, or pastor). The remaining seven respondents occupied at least a director level position. As in the Galaskiewicz's research (1985), this study assumes that the CEO equivalent who answered the survey "in fact has knowledge of the information being sought" (Wasserman and Faust, 1994, p.57).

3.5.3.2 Validity

● Construct validity

In network study, among other validities, construct validity is important because definitions of relationships could be ambiguous (Wasserman and Faust, 1994). This study double-checked the definitions of the six interorganizational relationships by asking eight CEOs and one staff member within the nonprofit sector to review the definitions. All of them stated that they could clearly understand what the six interorganizational relationships meant. From this result, this study assumes that survey respondents understood the definitions of interorganizational relationships accurately.

● External validity

As described in the previous section, there are budget size biases in the target organizations in this study. In addition to this, there is the obvious artificial element of the design of the study because of the selection bias. The organizations in the population are selected on the basis of known activities and involvement in the social service delivery system in the North Hills communities; the probability of interaction among these organizations is much higher than the probability of interaction among randomly selected organizations. Thus, it should be noted that the generalization of results is difficult because the selection of organizations is not random.

3.5.3.3 Reliability

According to the literature, there are three methods ensuring reliability of measurement in network research (Marsden, 1990; Wasserman and Faust, 1994). Among them, this study uses "comparison of alternative question formats" (Wasserman and Faust, 1994, p.58). For this comparison, this study conducted correlation tests of two pairs of variables to test reliability. First, two variables which are 'the number of programs in collaboration with other organizations' and 'CRI' (collaborative relation index) were analyzed. If an organization provides many service programs in collaboration with others, this nonprofit is likely to have many (strong) collaborative relationships with other organizations. The correlation coefficient between these two variables is 0.47, which is statistically significant at 0.01 level. Second, this study applied two other variables which are 'revenue from government' and 'formal contract relation with

public agencies.' The relationship between these two variables is also intuitively assumed as highly correlated to each other because when nonprofits generate revenue from government, they are likely to have formal contracts or other types of strategic collaboration with public agencies. 87.1% of responses showed their consistency in their answer[15]. The correlation coefficient turned out to be quite high, 0.714, which is statistically significant at 0.01 level. Following these results, this study assumes that answers from respondents are reliable.

3.6 DATA ANALYSIS

The most suitable method to explore the hidden patterns of interaction within and across sectors is through network analysis. Social network analysis enables one to map invisible patterns of various interorganizational relationships. For example, because network analysis can discover who is overloaded or critically disconnected from others, it is helpful in revealing patterns of connectivity in specific types of ties and types of organizations (i.e., nonprofit, for-profit or nonprofit organizations) (Cross and Parker, 2004). In this study, simple techniques of traditional network analysis model, such as sociogram and actor centrality analysis, are used in Chapter 4 and 5. Although those techniques are useful in exploring the overall shape and characteristics of a network, it is difficult to see whether there are *systemic* structural differences (or similarity) between different types of networks. For example, when network figures in Chapter 4 and 5 do not particularly reveal any distinctive patterns because they are too complex and/or sometimes look similar. For this reason, this study applies a *blockmodel* to uncover an underlying dynamics of interconnectedness and compare different types of networks (Chapter 6) because the blockmodel can reduce complex networks into simple and easily understandable figures. This method not only enables comparison of different types of collaboration networks within and across sectors but also explores whether there is a strategically significant position in a network. Simply put, blockmodeling partitions individual actors in a network to a small number of blocks that cluster actors that have substantially similar patterns of relationships with each other

[15] This study designates consistency of answer as parallel answers to a pair of survey questions. For example, in the case of the question five (revenue generation from government) and eleven (formal contrat with government) , if a respondent gives positive (or negative) answers to both questions – a respondent raises revenue from government and has formal contracts with public agencies at the same time –, this study recognizes it as consistent answering.

(Wasserman and Faust, 1992; Doreian, et.al., 2005). Blockmodeling is composed of three separate analyses – validation of a blockmodel using organizational attributes, description of block positions and description of overall blockmodel. Since blockmodeling is a specific technique, the following section explains what blockmodeling is and how this study applies it to answer the research questions in detail. In addition to network analysis, this study uses regression analysis to explore relationships between dependent variables (collaboration relationships) and independent variables such as years, size, etc. Since this study does not intend to explain causal relationships, regression analysis addresses whether there is a plausible relationship between dependent and independent variables rather than to test causal relationships. This study uses UCINET and SPSS computer programs for network analysis and regression analysis respectively.

3.6.1 Network analysis: Blockmodel

3.6.1.1 Equivalence model

As stated in the above, blockmodeling aims to reduce the complexity of networks by partitioning actors into a small number of blocks called positions[16]. For example, an information sharing network composed of 95 actors is reduced into six positions through blockmodeling and each pair of six positions may have a tie within or between the positions (See 6.4.1 in Chapter 6). By assigning individual actors into positions, the blockmodel "presents general features of the network, such as the ties between positions, rather than information about individual actors (Wasserman and Faust, 1994, p.395). Assigning actors to blocks is done through equivalence or similarity of relational patterns. Simply put, *equivalence (model)* is to group actors who are equivalent or similar. Grouping similar actors clarifies structural roles and positions within a network. Thus, equivalence model is "a vehicle for describing the structure of role relations" (Burt, 1987, p.1293). Equivalence model is different from such traditional network models as prominence (e.g., actor centrality) and cohesion model (i.e., subgroup by clique) in that "the analytical frame of reference shifts from dyad to social system" (Burt, 1987, p.1294).

This study applies two equivalence models - *structural equivalence* and *regular equivalence*. *Structural equivalent actors* are substitutable actors. Two actors are structurally

[16] The technique to identify several types of block positions will be discussed in the following section.

equivalent if two actors "occupy the same position in the social structure and so are proximate to the extent that they have the same pattern of relations with occupants of other positions. More specifically, two people are structurally equivalent to the extent that they have identical relations with all other individuals in the study population" (Burt, 1987, p.1291). *Regularly equivalent actors* are "regularly equivalent if they are equally related to equivalent (but not necessarily the same, or same number of) actors" (Hanneman, 2001, p.137). In other words, two actors are regularly equivalent if "actors have similar 'types' of actors at similar distances in their neighborhoods" (Hanneman, 2001, p.138). Unlike structural equivalence, actors are regularly equivalent "if they have similar ties to any members of other sets" (Hanneman, 2001, p.127).

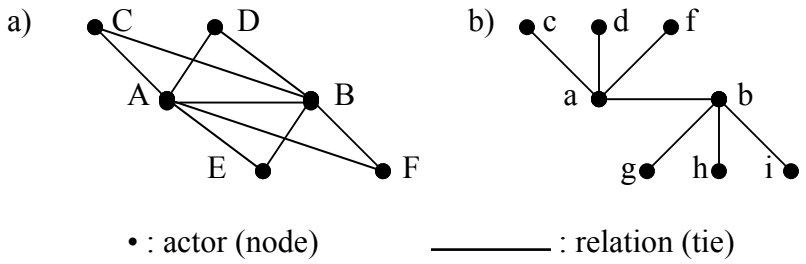


Figure III-1) Structural equivalence and regular equivalence

Figure III-1 clearly illustrates this difference. As shown in a), actors A and B are structurally equivalent because A and B have the same pattern of ties with the same other actors (actor C, D, E and F). And A and B are substitutable each other. On the other hand, as shown in b), actors a and b are regularly equivalent but not structurally equivalent because two actors have the same pattern of ties with different actors (i.e., a is connected with c, d and f, and b with g, h and i). Actor a and b are not substitutable each other because they have relationships with different set of actors.

Structural and regular equivalence are different in terms of information redundancy (Burt, 1992). Regular equivalence is strategically better than structural equivalence because regularly equivalent actors have non-redundant information sources, while structurally equivalent actors have the same (redundant) sources of information. For example, actor A and B in the above Figure a) share four redundant information sources while they maintains five relationships. Actor a and b in Figure b) share six different sources of information while each of them maintains four relationships. In sum, the difference between structural and regular equivalence

can be explained by substitutability among structural equivalent actors and information redundancy in structural equivalent actors.

3.6.1.2 Blockmodel building procedures

In order to identify the most appropriate blockmodels, this study applies the *generalized blockmodeling approach* (Doreian et.al., 1994; 2005). The logic of grouping actors into blocks in this type of blockmodel is different from the conventional blockmodel. The logic of the conventional approach to build blockmodels is to first choose types of equivalence between structural or regular equivalence and then to identify blocks on the basis of the specified methods, which are profile approaches such as Euclidian distance and Pearson correlation. Finally the specified blockmodel is evaluated (for details, see Burt, 1976; Wasserman and Faust, 1994). However, there are some weaknesses in this approach; 1) the profile approach that is normally used in conventional blockmodel is likely to mispredict certain kinds of class homogeneities, and 2) the post-evaluation of the conventional blockmodeling is limited to certain types of blockmodel (Hanneman, 2001).

	C_j				
C_i	1	1	1	1	1
	1	1	1	1	1
	1	1	1	1	1
	1	1	1	1	1

Complete

	C_j				
C_i	0	1	0	0	0
	1	1	1	1	1
	0	0	0	0	0
	0	0	0	1	0

Row-dominant

	C_j				
C_i	0	0	1	0	0
	0	0	1	1	0
	1	1	1	0	0
	0	0	1	0	1

Column-dominant

	C_j				
C_i	0	1	0	0	0
	1	0	1	1	0
	0	0	1	0	1
	1	1	0	0	0

Regular

	C_j				
C_i	0	1	0	0	0
	0	1	1	0	0
	1	0	1	0	0
	0	1	0	0	1

Row-regular

	C_j				
C_i	0	1	0	1	0
	1	0	1	0	0
	1	1	0	1	1
	0	0	0	0	0

Column-regular

	C_j				
C_i	0	0	0	0	0
	0	0	0	0	0
	0	0	0	0	0
	0	0	0	0	0

Null

	C_j				
C_i	0	0	0	1	0
	0	0	1	0	0
	1	0	0	0	0
	0	0	0	1	0

Row- functional

	C_j				
C_i	1	0	0	0	
	0	1	0	0	
	0	0	1	0	
	0	0	0	0	
	0	0	0	1	

Column-functional

* Table borrowed from Doreian et.al. 2005. p.86.

Figure III-2) Examples of ideal types of blocks with types of connections

Instead of separating the two processes of determining the type of equivalence and the process of evaluating equivalence, generalized blockmodel conducts partitioning and evaluation at the same time. A key to this approach is its use of ideal types of block that is represented as nine ideal types of blocked adjacency matrices in Figure III-2. Doreian suggests using nine ideal types of blocks to partition and conform block type instead of sticking to a strict definition of structural or regular equivalence. According to Doreian (Doreian et.al. 1994), the generalized blockmodel approach typically provides better partitioning, or at the minimum level the same, than the conventional approach. The following four steps are procedures for building blockmodel in this study.

1. There is no rule of thumb to identify the best blocked adjacency matrixes that are either structural or regular equivalent matrix. Rather, the best blockmodel is usually found through trial and error processes. In order to identify blocked adjacency matrix similar to Figure III-2, this study first presents 10 different candidate blocked adjacency matrixes[17]. These 10 candidate matrixes are produced by Tabu searches[18]. Then, this study compares the 10 different blocked adjacency matrixes each other.
2. Among the 10 matrixes, this study selects the most acceptable blocked adjacency matrix based on the Doreian's ideal model criteria[19] (Figure III-2). This study identifies a block as a structural or regular equivalent block if an adjacent matrix of this block falls into any of the above nine ideal types of blocks in the above figure.
3. In order to build the best blocked adjacency matrix, this study conducts permutations by changing or exchanging actors from one block to another. Again, target actors for permutations are selected to satisfy the Doreian's ideal blocks to the best degree.
4. Finally, this study transforms blocked adjacency matrix into image matrix by assigning one or zero to blocks.

[17] In order to produce the best blockmodel, it is best to try several possible blockmodels that are different in terms of the number of blocks. This study tries 10 blocked adjacency matrixes for the initial point to identify the best blockmodel. The 10 candidates are made by the number of blocks from three to seven times two different equivalence models (5×2=10). The reason to make a range of the number of blocks from three to seven is that blockmodels should be simple enough to be understandable (Hanneman, 2001). If the number of blocks is smaller than two, it may be too simple to find the significant structural patterns. On the other hand, if the number of blocks is greater than eight, relationships among blocks may be too complicate. This is likely to prevent this study from identifying meaningful structures and comparing different blockmodels with each other.

[18] In order to obtain the initial partitioning, this study conducts tabu searches. As a recent development for blockmodeling, tabu search relies on extensive use of the computer. Tabu search partitions blocks "by searching for sets of actors who, if placed into a block, produce the smallest sum of within-block variances in the tie profiles" (Hanneman, 2001, p.109).

[19] It is used in two ways; 1) Criteria to find (specify) the best blockmodel (plus the number of inconsistency) and 2) Criteria to determine zero and one block.

This study applies two criteria to assign one or zero to blocks. The first criterion is α density criterion (Wasserman and Faust, 1992), which is the most commonly used method to determine one or zero block. The observed block is assigned one if the density of the block is greater than or equal to α. The value of α in this study is network density[20]. The second criterion assigns one if an observed block is more than row- or column-functional, which is a minimum condition for regular equivalence (Doreian et.al. 2005). Only if an observed block satisfies both two criterions simultaneously, it is assigned a value of one.

Table III-3) Properties of one block and zero blocks

Characteristic / Type of relation		Directly substitutable each other (the same patterns to the same actors)	Compatible each other (the same patterns with different actors)
1 block	Structurally equivalent relation	Yes	Yes
	Regular equivalent relation	No	Yes
0 block	No equivalent relation	No	No

There are two types of one block in this study (Table III-3). In the real social network, it is difficult to have a perfect structural equivalent block of density one in an observed block. Therefore, this study regards an observed block as a structural equivalent block (hereafter SE) if its block density is greater than 0.75, which is considerably large. Second, in this study, a regular equivalent block (hereafter RE) means that block density is not only greater than overall network density, but also it is at least row/column functional block. Otherwise cases are zero blocks. Table III-3 summarizes meanings of one block and zero blocks.

3.6.1.3 Interpretation of patterns of relationships among blocks

a. Validation of a blockmodel using actor attributes

Actors' attributes can describe structural positions in a blockmodel for two reasons. First, "if there are systemic differences between positions in the characteristics of their members, then we have some external validation for the blockmodel" (Faust and Wasserman, 1992, p.28). Second, research has showed that the likelihood of interaction is dependent on homogeneity of

[20] A definition is; "the proportion of all ties that could be present that actually are" (Hanneman, 2001, p.42).

actors' characteristics or the homophily principle; social interactions are more likely to occur among actors who share similar characteristics, such as socio-demographic attributes or a common reference framework (McPherson and Ranger-Moore, 1991; McPherson, Smith-Lovin and Cook, 2001). All types of social network ties in this study, such as information flows, resource exchanges, friendships, and so forth, depend on this homophily principle. On the basis of the above two arguments, this study explores both socio-demographic and structural characteristics of block positions to identify whether blocks show systemic differences in characteristics (Table III-4).

Table III-4) Organizational and structural attributes

		Scale	NPO network	NPO and business (government)
Socio-demographic characteristics	Size (budget)	Ratio	Yes	No
	Years in operation	Raito	Yes	No
	Revenue from government source (RG)	Ratio	Yes	No
	Revenue from commercial activity (RC)	Ratio	Yes	No
	Proportion of business (public) sector	Ratio	No	Yes
Structural characteristics	Collaborative relation index (CRI)	Ratio	Yes	Yes
	Power centrality	Ratio	Yes	Yes
	Betweenness centrality	Ratio	Yes	Yes

Structural characteristics[21] are complimentary to socio-demographic attributes. The mean of CRI identifies which block is more active or has more interests in collaboration. Mean of power (Bonacich) centrality is used in a limited way because this measure is only suitable to networks with real flows of contents. Rather, it is used to infer directions of information flows, resource flows and money flows by identifying dependency relationships among blocks. Thus, power centrality will be listed only in three types of collaboration network (i.e., information sharing, resource sharing and formal contract). Means of betweenness centrality identify which block occupies broker positions.

b. Descriptions of block positions

In the last decades, methodology to describe structural positions of blocks has significantly progressed. Among others, two approaches are most popular – Burt's typology (Burt, 1976) and graph theorists' classification (e.g., Harary et al. 1965; Marsden, 1989). When applied alone, either approach can fail to make a correct distinction of different types of block

[21] The definition of the power and betweenness centrality will be presented in the next chapter.

positions, especially in non-directed networks. Thus, this study not only adopts both approaches, but also adds one more classification.

The first typology of block positioning comes from Burt's framework (1976), which divides block positions into four different positions – primary[22], broker[23], sycophant[24], and isolate[25] - on the basis of relationships of within-block ties and received ties (Table III-5).

Table III-5) Typology of positions by Burt

	Total number of ties received in block k ~ 0	Total number of ties received in block k > 0
$\frac{\text{Number of ties within block k}}{\text{Total number of Ties sent from block k}} \geq \frac{g_k - 1}{g - 1}$	Isolate	Primary
$\frac{\text{Number of ties within block k}}{\text{Total number of Ties sent from block k}} \leq \frac{g_k - 1}{g - 1}$	Sycophant	Broker

* g: the number of actors in a network. g_k: the number of actors within a block k.
** This table is adopted from Faust and Wasserman (1992) p.33.

The second typology is adopted from graph theorists' idea which focuses on nodal in- and out-degree relationships. Using ratio of ties received to ties sent, this study distinguishes three block positions - a receiver, sender and carrier. When a block has significantly different patterns of sending from receiving ties[26], this block is named as a sender (or a receiver). Otherwise blocks are assigned as carrier if they have similar proportion of sending and receiving ties. The followings are the specific criteria to distinguish these three positions.

- Receiver: the ratio (ties received/ties sent) ≥ 2
- Sender: the ratio (ties received/ties sent) ≤ 0.5
- Carrier: $0.5 <$ the ratio (ties received/ties sent) < 2

This typology is applied only to the work referral network because only this network has nodal in- and out-degrees.

[22] The prmary psoitin receives "choices" both from other positions, and from its own members (Faust and Wasserman, 1992, p.32).
[23] Brokers both receive "choices" and send 'choices' to other positions (Faust and Wasserman, 1992, p.32).
[24] Sycophants give more "choices" to other positions than to themselves, and do not receive many "choices" (Faust and Wasserman, 1992, p.32).
[25] Isolate positions neither give many "choices" nor do they direct many choices to other positions (Faust and Wasserman, 1992, p.32).
[26] For example, if ties received in a block are more than two times the ties sent, this study calls the block as "receiver", and vice versa.

Finally, this study proposes another typology to distinguish block positions, which focuses on external relations of blocks. This typology identifies which block has denser relationships with other blocks without considering the reflexive relationships (i.e., within block ties). In this typology, the stronger a block's external relationships with other blocks, the more central the block becomes. This study uses block degree centrality to produce four types of a position – central, intermediate, periphery, and isolate positions. Let $P(B_k)$ be the function of this typology. This function is computed as follows;

$$\mathbf{P(B_k) = C_D(B_k) \times d(B_k)} \text{ -------- Equation 1}$$

Where, $C_D(B_k) = \dfrac{\text{Block k's degree centrality}}{\text{Number of actors in block k}}$[27]

$d(B_k)$ = Degree (or in/out-degree) of block k in the reduced sociogram excluding a reflexive degree

This study uses a weight to clearly distinguish central from periphery positions. The logic of this weight is that the more block k maintains structurally and/or regularly equivalent relationships with other blocks, the more central position block k occupies. Specifically, the positions are determined by the mean and median of $P(B_k)$. If the mean value of $P(B_k)$ is bigger than the median value of $P(B_k)$, then;

- Central position: $P(B_k) >$ Mean
- Central to intermediate position: Median $< P(B_k) \leq$ Mean
- Intermediate position: Median $\approx P(B_k)$ ($\approx$: around the value)
- Periphery position: Median $> P(B_k)$
- Isolate position: $P(B_k) = 0$

And if the median value of $P(B_k)$ is bigger than the mean value of $P(B_k)$, then;

- Central position: $P(B_k) >$ Median
- Central to intermediate position: Mean $< P(B_k) \leq$ Median
- Intermediate position: Mean $\approx P(B_k)$ ($\approx$: around the value)
- Periphery position: Mean $> P(B_k)$
- Isolate position: $P(B_k) = 0$

A central position means that $P(B_k)$ is a significantly large value comparing to other block $P(B_k)$ values. A periphery position denotes that $P(B_k)$ is a significantly smaller value comparing to other block $P(B_k)$. An intermediate position denotes a $P(B_k)$ value around the median (or mean)

[27] Block k's degree centrality is total number of ties sent from (or received to) Block k excluding within block k ties.

value. The limitation of the above three approaches to describe block positions is its inability to test statistical significance (Wasserman and Faust, 1992).

c. Descriptions of overall blockmodels

a) Four ideal types of blockmodel images with more than two positions

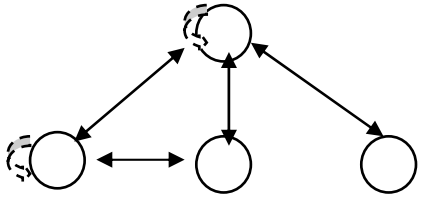
One of the simplest and powerful ways to represent blockmodel is through the image matrix and/or a reduced sociogram where there are more than two positions in a blockmodel (Faust and Wasserman, 1992). Faust and Wasserman (1992) illustrate five types of theoretically important structural patterns for the image matrix.

Cohesive subgroups

	B_j			
B_i	1	0	0	0
	0	1	0	0
	0	0	1	0
	0	0	0	1

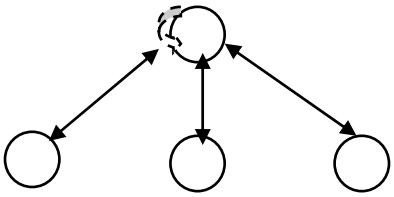
Center-periphery system

	B_j			
B_i	1	1	1	1
	1	1	1	0
	1	1	0	0
	1	0	0	0



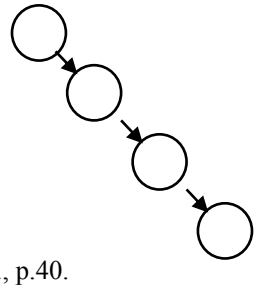
Centralized system

	B_j			
B_i	1	1	1	1
	1	0	0	0
	1	0	0	0
	1	0	0	0



Hierarchy system

	B_j			
B_i	0	1	0	0
	0	0	1	0
	0	0	0	1
	0	0	0	0



* Image matrices are adopted from Faust and Wasserman. 1992., p.40.

Figure III-3) Examples of ideal images and reduced sociograms for blockmodels

This study applies four appropriate types (Figure III-3). First, *cohesive subgroups* are a structural system in which blocks have only within ties and no between ties. The image matrix of cohesive subgroups "will have oneblocks on the main diagonal" (Faust and Wasserman, 1992, p.39). Second, *a center-periphery structure* is a structural system that consists of "a core position which is internally cohesive and … other positions connected to the core positions. The peripheral positions may or may not be internally cohesive" (p.40). Third, "*a centralized system* has all relational ties going toward (or away) from a single position. All oneblocks would be in the same row" (p.41). Fourth, *a hierarchy system* "would appear as asymmetric, positive, relational ties directed from each position to one position immediately 'above' it" (p.41).

b) Strategically significant position and role: brokerage and boundary spanner

The identification of strategically significant blocks is vital for this study. The first type of strategically significant position is a *broker position*. Brokerage is defined as a strategically significant position because the broker can take advantages of opportunities from diverse but non-redundant information, service referrals, resource or money sources (Burt, 1992). According to Burt (1992), the most strategically significant position in a network is that where one can maintain many non-redundant information ties. Since redundant relationships (i.e., structural equivalent relations) could bring actors confusions or information overloads, it could eventually result in inefficiency of networks (Burt, 1992). Therefore, broker positions with regular equivalent relations are strategically significant.

Table III-6) Interpretations of broker roles by collaboration relationships

Collaboration Networks		Brokerage Role
Collaborative relationship	Information sharing →	Information intermediary
	Regular meeting →	
	Work referral →	Human service coordinator
	Resource sharing →	Resource flow coordinator
	Formal contract →	Money broker
	Joint program →	Service program coordinator

The specific role of brokerage is different according to the collaboration relationships (Table III-6). In information sharing and/or regular meeting relations, organizations usually exchange information or discuss problems at hands or current issues. Thus, a broker in these two types of networks plays an information intermediary role. Work referral flows are conditioned

by social service programs that the nonprofit currently undertakes. For example, if organization A does not have a specific service program that client B wants, organization A usually sends client B to organization C that provides the service client B needs. Thus, a broker nonprofit D in the work referral network plays a service coordinator role between two organizations, A and C. In the strategic collaboration, organizations are likely to choose their collaboration partners by a criterion of strategic fit between them and their counterpartners. In the resource sharing network, a broker coordinates other organizations by helping them find best-fitted partners that maintain the resources the organizations want. In the formal contract network, money flows through the network. A broker in this network not only arbitrates money flows between organizations, but also plays a subcontractor role. Likewise, organizations make joint program relationship when they find strategic fits in terms of social service program. A broker in the joint program network will mediate between organizations to find organizations that have strategic fits.

The second type of strategically significant position/role is a (sectoral) boundary spanner or boundary blurrier. It applies only to networks composed of nonprofits and other sector organizations (businesses or public agencies). This study presents two types of the sectoral boundary spanner. The first type is a special type of brokerage that locates between nonprofit blocks and other sector blocks. This special type of brokerage is strategically significant because these spanners mediate one sector organizations with other sector organizations through a gate role between two different sectors. The second type of the boundary spanner is a block where nonprofits and other sector organizations coexist[28]. The coexistence block is strategically significant because this block is the evidence of structural isomorphism between the sectors; that actors are assigned into the same block means that they have the same or similar patterns of relationships each other.

3.7 SUMMARY

This chapter has outlined the research schemes for actual analysis and provided an understanding of the quality of the data set used in this study. On the basis of the design built in this chapter,

[28] This study defines the "coexistence" block as: a block where organizations from two different sectors coexist. One sector organizations occupy more than 30% and less than 70% of all memberships, and vice versa.

the next four chapters will provide results from network analysis (Chapter 4, 5 and 6) and regression analysis (Chapter 7).

IV. DESCRIPTIONS OF COLLABORATION PATTERNS WITHIN THE NONPROFIT SECTOR

4.1 INTRODUCTION

This chapter is designed to present various features of collaborative relationships within the nonprofit sector organizations. In order to investigate these relationships, analyses are conducted at the individual level and group level. At the individual level, this study applies three different approaches: actor centrality, correlations between six collaborative relationships and distance analysis. At the group level, two approaches are applied: network size analysis and robustness analysis. Through diverse analyses, this chapter presents the following findings; 1) types of collaborative relationships determine the shape of network structure. For example, the network structure of information sharing and joint programs is different, 2) in the less intensive collaboration relationships, such as the information sharing and work referral, network structure is cohesive and robust; however, the network structure in the intensive collaboration relationships, such as the formal contract and joint program, are localized and fragile, 3) while nonprofits that occupy a broker position play a strategically significant role in the intensive collaboration networks, broker nonprofits in the less intensive networks are strategically less significant, 4) when selecting new partners for regular meeting, nonprofits favor geographically neighborhood nonprofits; when seeking partners for joint program, nonprofits show no preference in regard to geographical distances in their choice of partners, and 5) the work referral network enables nonprofits to efficiently provide social services.

4.2 NETWORK PROPERTIES OF SIX RELATIONSHIPS

4.2.1 Network size analysis

Six different collaboration relationships show six different types of networks that are different in terms of size and structural properties. Table IV-1 illustrates the network size of these six collaboration networks. First, the number of nonprofits that participate in the networks decreases as the collaborative relationship intensifies. In the least intensive collaborative relationship (i.e., information sharing), all 42 nonprofits are connected to each other. In the most intensive form of collaborative relations, such as formal contract and joint program, the number of actors is less than half the number of actors in the information sharing network. In the same line, the number of ties that connects nonprofits with each other declines as the collaborative relationship intensifies. Second, the formal contract network is the most fragmented as it is composed of three disconnected components.

Table IV-1) Descriptive statistics of collaborative relations

	Information sharing network	Work referrals network	Regular meeting network	Resource sharing network	Formal contract network	Joint program network
N (actors)*	42	41	35	34	26	22
Size (ties)	490	239	198	106	56	58
Tie per actor	11.67	5.83	5.66	3.12	2.15	2.64
Direction of ties	No	Yes	No	No	No	No
Component	1	1	1	1	3	1

* Isolates are excluded.

4.2.2 Correlations among collaboration relationships

This section examines correlations among the six collaborative relationships. Since the relational data is measured as binominal (i.e., 1 or 0), conventional correlations, such as Pearson or Spearman correlation analysis, are not appropriate. Thus, this study applies tetrachoric correlation, which is designed specific to binominal data correlation analysis (Lindeman, et al.,

1980) [29] . Through the correlation analysis, similarity and difference between the six collaborative relations are investigated.

Table IV-2) Tetrachoric correlation coefficients and 95% confidence interval of correlation

		Coefficient	ASE*	Lower CL**	Upper CL**
Information sharing	Work referrals	0.2849	0.0457	0.1953	0.3745
	Regular meeting	0.1737	0.05	0.0757	0.2718
	Resource sharing	0.1578	0.0512	0.0574	0.2581
	Formal contract	-0.1389	0.058	-0.2526	-0.0252
	Joint program	0.157	0.0535	0.0522	0.2619
Work referral	Regular meeting	0.3937	0.0455	0.3046	0.4828
	Resource sharing	0.1627	0.0517	0.0613	0.2641
	Formal contract	0.2257	0.0577	0.1126	0.3388
	Joint program	-0.0519	0.0559	-0.1614	0.0575
Regular meeting	Resource sharing	0.2606	0.0522	0.1583	0.3628
	Formal contract	0.437	0.0526	0.334	0.5401
	Joint program	0.0966	0.0575	-0.0162	0.2094
Resource sharing	Formal contract	0.4394	0.0531	0.3352	0.5435
	Joint program	0.7296	0.0326	0.6657	0.7934
Formal contract	Joint program	0.3065	0.0604	0.1881	0.4248

*Asymptotic standard error ** Confidence level

There are three interesting findings in the correlation analysis. First, there are two negative relationships between information sharing and formal contract and between work referrals and joint program. With a confidence interval of 95% confidence, the correlation coefficient between information sharing and formal contract is negative (Table IV-2). Also, with confidence interval of 95%, the correlation between work referrals and joint program mostly ranges in the negative region. Thus, it is safe to state that the direction of these two correlations is negative. This negative direction indicates that information sharing / formal contract, and work referral / joint program are mutually exclusive relations, respectively. For example, if nonprofit A shares information with nonprofit B, nonprofit A would not have formal contract relations with nonprofit B and vice versa. The negative correlation between work referral and joint program[30] indicates that when it comes to service delivery to clients, nonprofits maintain only one of two possible relationships with other nonprofits in order to prevent duplications of service delivery route. In addition, we can assume that the work referral network is similar to a value chain system (Porter, 1985) because it shares three characteristics of a value chain system;

[29] To calculate tetrachoric correlation, SAS program was used.
[30] These two relations directly concern service-delivery to clients

1) there is no transactional cost for sending or receiving clients, 2) there is goal congruence, which is the improvement of the quality of life in the community through delivering social services; and 3) nonprofits act as separated units to deliver services[31]. On the basis of these findings, this study proposes a proposition; nonprofits make efficient service delivery through the social service chain system where nonprofits avert duplication of the same service delivery by other nonprofits.

Second, correlations between regular meeting and two strategic collaborations (i.e., formal contract and joint program) are important because these correlations quantify the ability to resolve conflicts emerging from strategic collaboration. In the strategic collaboration, conflicts should be recognized as "a necessary antecedent to collaboration" (Weiss and Hughes, 2005, p.101). Regular meetings are a buffering zone to resolving conflicts because they increase chances of discussing existing or potential conflicts. While the correlation between formal contract and regular meeting is fairly large (0.44), the correlation between joint program and regular meeting is small, 0.1, and therefore it is hard to determine statistical significance (Table IV-2). Thus, nonprofits that are connected with joint programs are likely to encounter serious problems when conflicts emerge during the joint program procedures because they lack formal ways to discuss problems. In contrast, nonprofits that maintain formal contract with each other seem to have a relatively higher capacity to resolve existing conflicts or to recognize potential conflicts that would rise from formal contract relationships.

Third, correlations among strategic collaborative relationships turn out to be medium to strong. In particular, the correlation between resource sharing and joint program is strong (0.73). For example, once nonprofits are connected with resource sharing, they are likely to extend their strategic relationships to joint program relations. On the contrary, informal collaborative relations (information sharing) and passive collaborative relations (work referral) are weakly or negatively associated with other collaborative relations. These findings are interpreted as showing that nonprofits build trust through the intensive relationships by means of mutually verifying in their choice of collaboration partners - competence at the job and likeability (i.e., enjoyable to work with) (Casciaro, T. and M.S. Lobo. 2005). This study proposes that while

[31] The work referral network is the same format as the value chain system which will be shown in the chapter 7; work referral network is reduced by blockmodeling into input block, broking block (transformation processes in value chain), and service delivery block (outputs in the value chain system).

strategic collaborative relationships are helpful to build trust, less intensive types of collaboration (i.e., informal information sharing relationships) have little or no effect on building trusts.

4.3 NETWORK DESCRIPTIONS BY SOCIOGRAM AND ACTOR CENTRALITY

4.3.1 Definition various centrality measurements

Before going into descriptions of networks, it is necessary to explain the definitions and applications of centrality measurements used. Since Freeman (1979) presented the formal concepts of three basic centralities – degree, closeness and betweenness, many complimentary centrality measurements have been developed in order to compensate for the weakness of these basic centrality measures. Including these three basic measurements, this study applies three more centralities that are complimentary to the basic centrality measurements.

Degree centrality is based on adjacency. Degree centrality takes into account how many immediate ties (i.e., dyadic relations) an actor has. Degree centrality is useful to see the prominence of an actor in a local neighborhood as well as in a global network. Actors who have a high degree centrality are considered significant or powerful in the network under the assumption that the more ties an actor has, the more opportunities and alternatives the actor has on networks. This actor is thus less dependent on any specific actor.

Directed ties provide more information. Out-degree centrality is the measurement of "how influential the actor may be" (Hanneman, 2001, p.43). On the other hand, in-degree centrality is the measurement of how prestigious the actor may be. An actor who has many in-degree ties can be said to occupy a prestigious position because other actors want to be known by the actor.

Degree centrality is limited in explaining the concept of power because power cannot be defined in terms of dyadic relations but relationships over dyadic relations (Degenne and Forse, 2004, p141). Thus, this study introduces Bonacich's power as a complimentary measure to the degree centrality. Bonacich power centrality is different from the degree centrality in that Bonacich power reflects "how many the connections the actors in the neighborhood had" (Hanneman, 2001, p.72). According to Bonacich (1987), power comes from being connected to

less-connected neighborhoods because these neighborhoods are dependent on the actor: "The more connections the actors in your neighborhood have, the more central you are. The fewer connections the actors in your neighborhood, the powerful you are" (Hanneman, 2001, p.79). The Bonacich power is sensitive to the parameter beta[32], which has two dimensions - the degree and direction of absolute value. When the absolute value of beta is large, its effects become global (i.e. the connections in the whole network), when it is small, the Bonacich power reflects the local effects (i.e. its neighborhood's connections). When parameter beta is negative, this weight works negatively on well-connected others and positively on less-connected others (Degenne and Forse, 2004), because power "arises when connections are made to those who are powerless" (Wasserman and Faust, 1996, p.209). There is no rule of thumb in selecting the value of beta (Degenne and Forse, 2004). However, because this value is theoretically responsive to the transitivity (Degenne and Forse, 2004), this study uses the percentage of transitivity in a network as beta value. The direction is negative because this study wants to assess the power of actors.

Closeness centrality is a centrality measurement based on geodesic distances[33]. "Closeness centrality approaches emphasize the distance of an actor to all others in the network by focusing on the geodesic distance from each actor to all others" (Hanneman, 2001, p.65). Thus, closeness centrality is useful when it comes to the consideration of relationships with all other actors in the network. Actors who have a high degree of closeness centrality are regarded as central under the assumption that "actors who are able to reach other actors at shorter path lengths, or who are more reachable by other actors at shorter path lengths have favored positions" (Hanneman, 2001, p.62). Closeness centrality is often misled by local actors who have high closeness centrality in a limited small group but who are not prominent in the whole network (Hanneman, 2001). Eigenvector centrality (i.e., Bonacich centrality) compensates for this weakness of closeness centrality by paying more attention to the global structure of network and less to the local structure. Thus, eigenvector centrality represents an actor's global reachability (i.e., global influence) to other actors.

Betweenness centrality indicates an actor who is between two or more actors and "on whom other actors must depend to conduct exchanges" (Hanneman, 2001, p.70). "Betweenness

[32] The equation of Bonacich power is, $C_i = \sum_j(\alpha + \beta C_j)r_{ij}$ (for details, see Bonacich, 1987)
[33] For details of geodesic distance, see section 4-6 in this chapter.

centrality views an actor as being in a favored position to the extent that the actor falls on the geodesic paths between other pairs of actors in the network" (p.67). Actors who have high degree of betweenness centrality are considered significant or powerful in a network under the assumption that the more dependent actors are on other actors to make connections, the more opportunities and alternatives the actor has. A weakness of between centrality is its assumption of geodesic path. For example, two actors who are connected with several paths may not use the geodesic path because these two actors do not like the between actor in the geodesic path. Rather, they may use other detour path connecting them, even though that path is longer than the geodesic path. Flow centrality expands the betweenness centrality under the assumption that actors will use all pathways that connect them proportionally to the length of the pathways.

Using centrality measurements, this study explores the structurally peculiar behaviors of actors in the collaboration networks. Actors can be strategically significant when they have relatively low degree centrality but high closeness centrality simultaneously because these actors are efficient in dealing with collaboration relations. An organization is efficient in the network when it can reach other actors in the shortest way (i.e., high closeness centrality) with relatively small amounts of cost (i.e., maintenance costs of collaborative relations; the more collaborative relations one has, the more resources one spends on maintaining them) (Ko, Lee and Park).

There is another type of strategically significant actor in the network – a broker or mediator. An actor plays a broker role if the rest of the actors in the network must pass through this actor to exchange information, resource or money with other actors in the network. However, a broker is not a dominant or powerful actor in the network but is high in betweenness and/or flow centrality. In order to distinguish a broker that is strategically significant from a dominantly powerful actor who has high betweenness centrality as well as other types of centralities, this study borrows the concept of power behavior typology (Knoke, 1990). Among other centrality measures, two Bonacich centralities explain power behaviors of actors. As Knoke argues, "influence is a relational dimension of power because a communication must exist between influencer and influencee ….. Domination is clearly relational, because it involves one actor exchanging some valued resource for obedience by another actor" (Knoke, 1990, pp.3-4). While Bonacich power quantifies an actor's dominance over other actors or dependence of certain actors on an actor, Bonacich centrality measures an actor's global influences by his or her

reachability in the whole network structure[34] (Degenne and Frose, 2004). By locating these two indicators in two dimensions, Knoke (1990) refines four different types of power behaviors (Knoke, 1990; Degenne and Frose, 2004).

Table IV-3) Four different types of power behavior (Power by influence matrix)

		Influence (Bonacich centrality)	
		Absent***	Present**
Domination (Bonacich power)	Present**	Coercion	Authority
	Absent***	Power broking	Persuasion

* Table borrowed from Degenne and Frose. (2004), p.142.
** Present: If an organization ranks within top 5 of either of Bonacich centrality
*** Absent: If an organization ranks below top 5 of either of Bonacich centrality

Among the four types of power behavior, this study focuses on the power broking dimension which is titled power broker[35]. Organizations that play a power broker role are neither influential in the whole network (i.e., low in Bonacich centrality) nor dominant in the local (i.e., low in Bonacich power). Clearly, these organizations do not possess power but they behave as a broker or mediator because they have high betweenness or flow centrality[36]. This typology is structurally extraordinary in the network because this type of actor is indispensable for exchanging information, resources, money, and so forth among network actors.

4.3.2 Information sharing network

This section presents visual images of nonprofit collaboration networks using a sociogram. "A sociogram is a picture in which people (or more generally, any social units) are represented as points in two-dimensional space, and relationships among pairs of people are represented by lines linking the corresponding points" (Wasserman and Faust, 1994, pp.11-12). A sociogram

[34] The basic assumption here is that transmission of information and other types of collaborative relationship will alter or at least influence another actor's behaviors. Under this assumption, since an actor who has high eigenvector centrality can reach others in the most efficient (i.e., shortest) manner, this actor can be called an influential actor in the network.
[35] Definitions of other three types of power behaviors are; *coercive* in which actor is surrounded by organizations that are dependent on them, *authority* in which the actor is both influential across the whole network and dominant in the local network but exert dominant power to its local dependents under acceptances from dependents because of previously established beliefs that these organizations are influential in the network (Knoke, 1990), and *persuasion* in which the actor is globally influential but not coercive (Knoke, 1990).
[36] Within top 5 ranks of betweenness or flow centrality in the next section.

enables us to understand the overall figure of networks because the sociogram portrays precisely how a network looks. Throughout this study, a dot (●) represents an organization and a line (–) represents a tie between organizations (for example, see Figure IV-9).

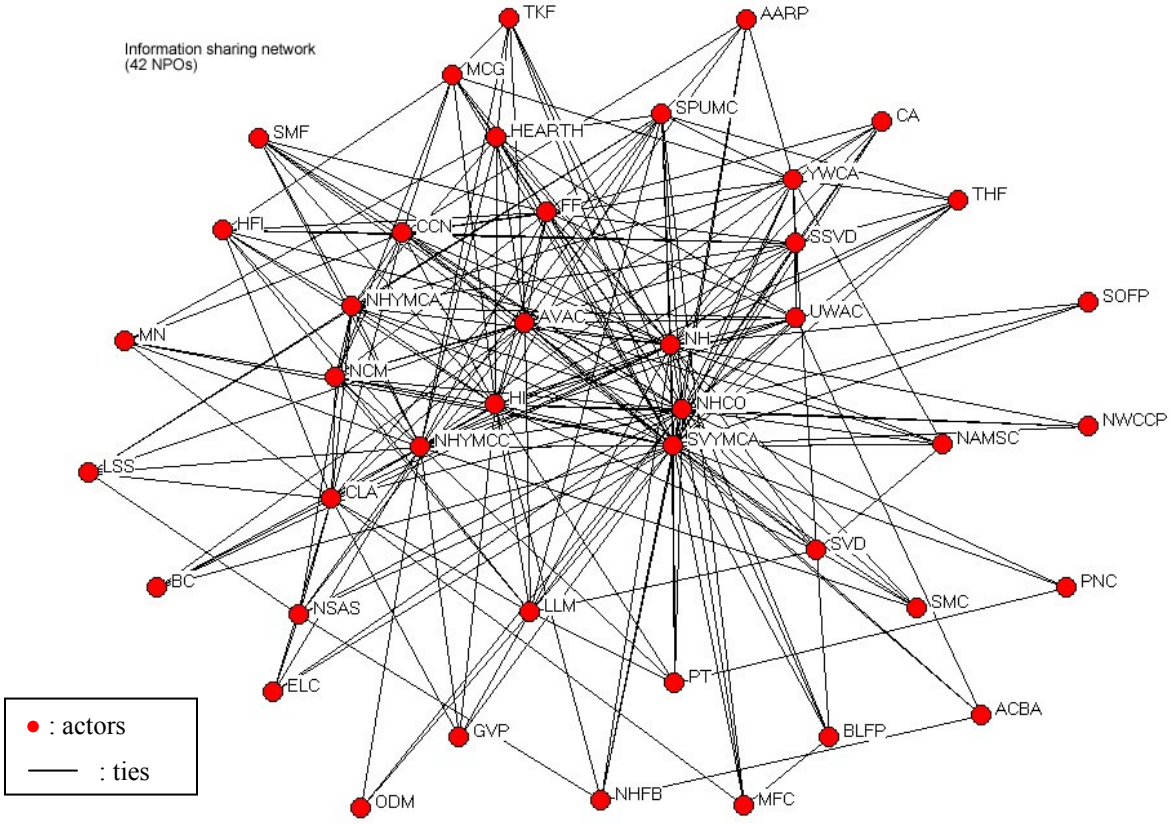


Figure IV-1) Information sharing network sociogram

Figure IV-1 depicts information sharing relationships among 42 nonprofits. While some nonprofits that have many relationships with others are located in the center of the network (e.g., NHCO, NH and so forth), others that maintain relatively small number of relations are located on the periphery of the network (e.g., SOFP, LSS, and so forth). Other nonprofits such as LLM, SVD or CLA are located between two central and periphery actors.

Table IV-4) Top five actors of various centralities in the information sharing network

Rank	Degree centrality	Power centrality	Closeness centrality	Between-ness	Eigenvector centrality	Flow centrality
1	SVYMCA	SVYMCA	SVYMCA	SVYMCA	SVYMCA	SVYMCA
2	NHCO	NHCO	NHCO	NHCO	NHCO	NHCO
3	NH	NH	NH	NH	NH	NH
4	NHYMCC	NHYMCC	NHYMCC	NHYMCC	NHYMCC	NHYMCC
5	HI	HI	HI	AVAC	HI	AVAC

Table IV-4 demonstrates the top 5 centrality actors in the information sharing network. SVYMCA is dominant over all six centrality measures. Right behind SVYMCA, three nonprofits (NHCO, NH, and NHYMCC) are ranked as the second, third and fourth in all six centrality measures. This indicates that the information network is considerably centralized in a few nonprofits. For this reason, almost all information flows from, to and through these highly centralized nonprofits. Finally, there is no strategically significant actor in the information sharing network but several dominant actors.

4.3.3 Work referral network

Figure IV-2 illustrates a visual picture of 41 nonprofits' work referral relations. Unlike other types of collaboration, work referral has directions (i.e., sender and receiver of work referrals). An arrow in the relational tie is a sign of directionality.

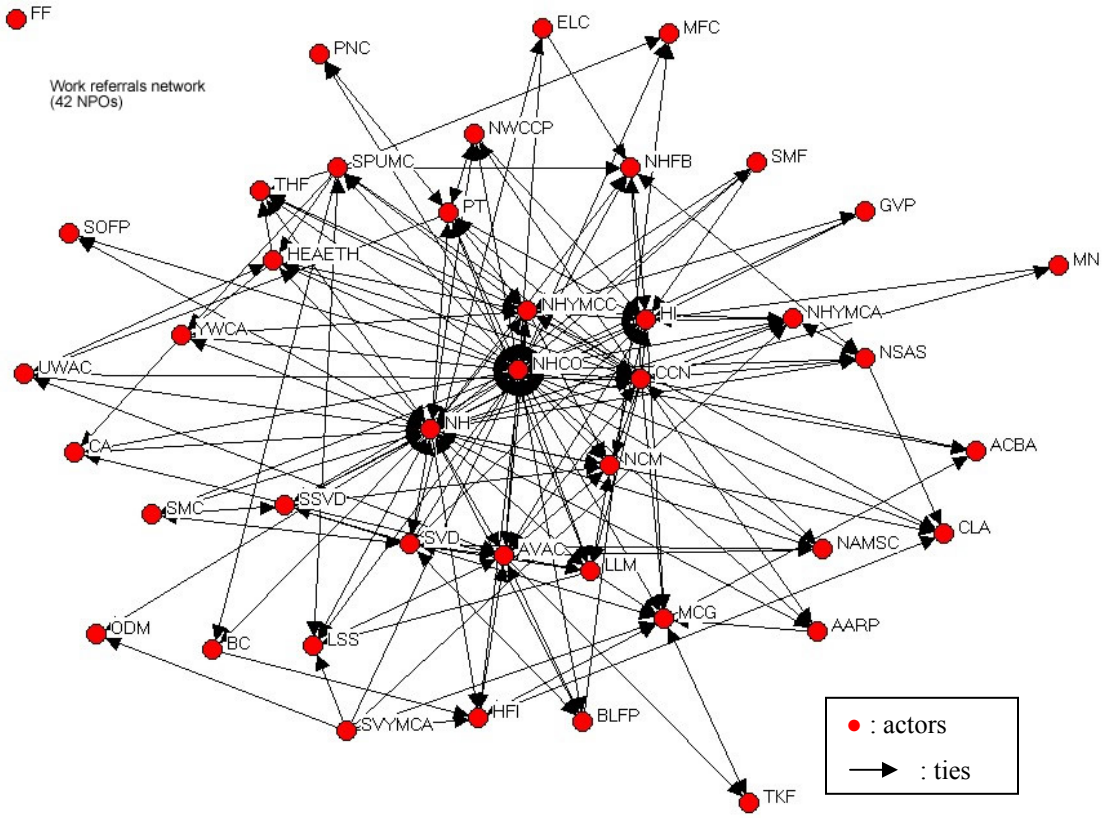


Figure IV-2) Work referral network sociogram

Like the information sharing network, the work referral network is quite dense and shows a spider-web like shape. By viewing Figure IV-2, we can roughly discern central, intermediary and peripheral actors. For example, NH and NHCO occupy the center of the network and maintain many ties. On the other hand, MFC, ODM, TKF and so forth are located in the edge of network. Finally, SSVD, MCG, PT and so forth are located in between the center and edge.

Table IV-5) Top five actors of various centralities in the work referral network

Rank	Out-degree	In-degree	Power	Out-Close	In-Close	Between-ness	Eigen-vector	Flow centrality
1	NH	NHCO	NHCO	NHCO	NH	NH	NH	NHCO
2	NHCO	NH	NH	NH	NHCO	NHCO	NHCO	NH
3	CCN	HI	HI	HI	LSS	AVAC	HI	UWAC
4	NHYMCC	NHYMCC	NHYMCC	NHYMCC	AVAC	HI	NHYMCC	NHYMCC
5	AVAC	AVAC	AVAC	MCG	NHYMCC	NHYMCC	LSS	HI

It is clear that two nonprofits (NH and NHCO) are dominant in the work referral network (Table IV-5). The second dominant organizations are HI, AVAC and NHYMCC. Except HI, the ties of the four dominant nonprofits are reciprocal in terms of sending and receiving referrals because they are central in both out and in-degree centrality. While CCN mostly sends many referrals, it is not central in out-degree centrality. HI is central in terms of receiving referrals. From this simple analysis, we can identify various roles of nonprofits - receiver, sender and broker (service coordinator) - in the work referral network[37]. Finally, it is difficult to find strategically significant actors in the work referral network.

4.3.4 Regular meeting network

Figure IV-3 illustrates the regular meeting network of 35 nonprofits. First, this network is less dense than the previous two networks. However, there is one region of dense relations. Dense regions on the upper-left in Figure IV-3 indicate the North Hills Nonprofit Consortium. Including one other nonprofit (FF), the Consortium strongly intertwines members. In terms of network structure, this network is composed of central actors – the Consortium members – and peripheral actors – other nonprofits.

[37] The position and role analysis will be conducted in detail in Chapter 6.

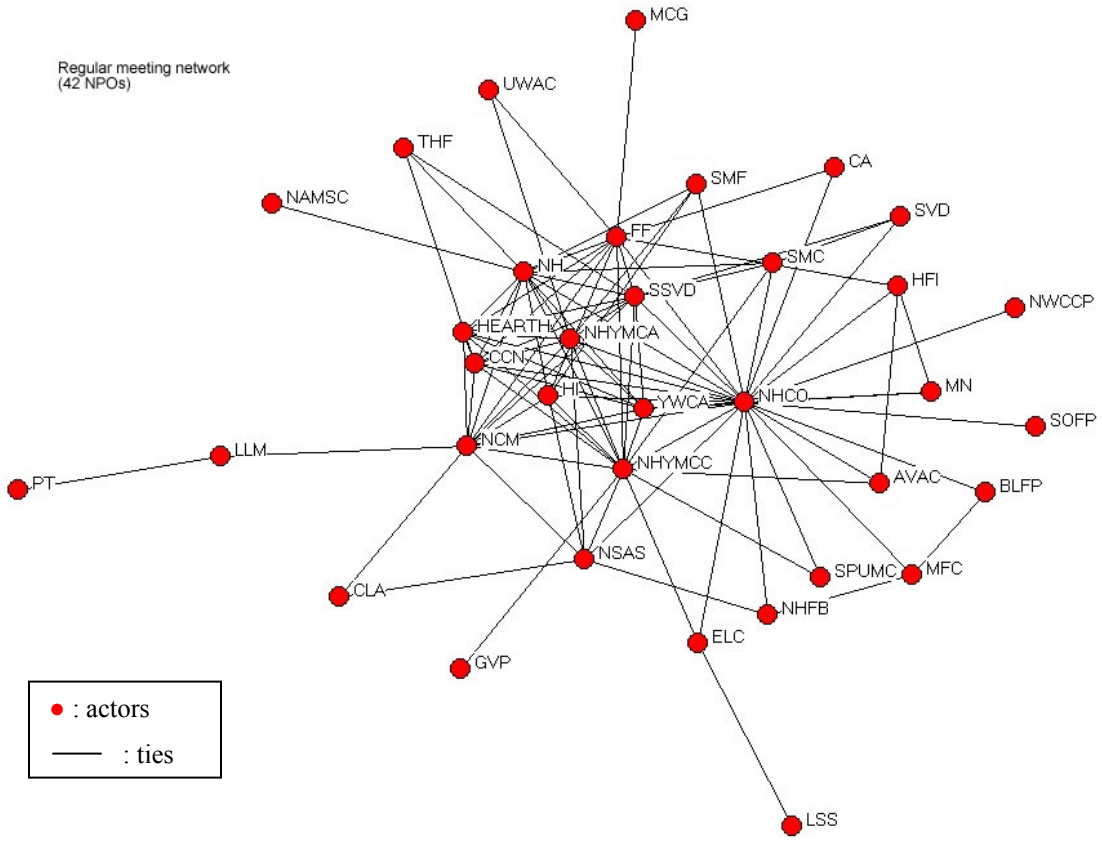


Figure IV-3) Regular meeting network sociogram

Table IV-6) Top five actors of various centralities in the regular meeting network

Rank	Degree centrality	Power centrality	Closeness centrality	Between-ness	Eigenvector centrality	Flow centrality
1	NHCO	NHCO	NHCO	NHCO	NHCO	NHCO
2	NHYMCC	NHYMCC	NHYMCC	NCM	NHYMCC	NCM
3	NH	NH	NH	NHYMCC	NH	NHYMCC
4	NCM	NCM	NCM	FF	NCM	FF
5	FF	FF	FF	NH	SSVD	NH

As Table IV-6 indicates, top centrality actors are composed of the Consortium members except for one nonprofit (FF). Among members of the Consortium, one nonprofit (NHCO) is dominant and others (NHYMCC, NH, and NCM) have the central position in the regular meeting network. Although FF is not a member of the Consortium, it has strong relationships with members of the Consortium and other nonprofits in the network. Since the geographical coverage of FF (Forbes Fund) is not limited to the northern part of Allegheny County but all regions of the County, FF may be a broker between nonprofits in the other regions of Allegheny

County and the North Hills. In sum, there are several dominant actors most of whom are members of the Consortium, but there is no strategically significant actor.

4.3.5 Resource sharing network

Figure IV-4 exhibits 34 nonprofits' resource sharing relationships. From the picture, three subgroups are roughly distinguished – two cohesive subgroups (one centered with NHCO located in upper right region of the network and the other centered with HI and NH located in lower right region) and one sparse subgroup which is a left side of the network (composed of NHYMCC, HFI, TKF, NCM, LLM and so forth).

From the central-periphery perspective, this network is roughly composed of several central actors and many peripheries that are directly attached to central actors. Centrality analysis supports results from the sociogram (Figure IV-4).

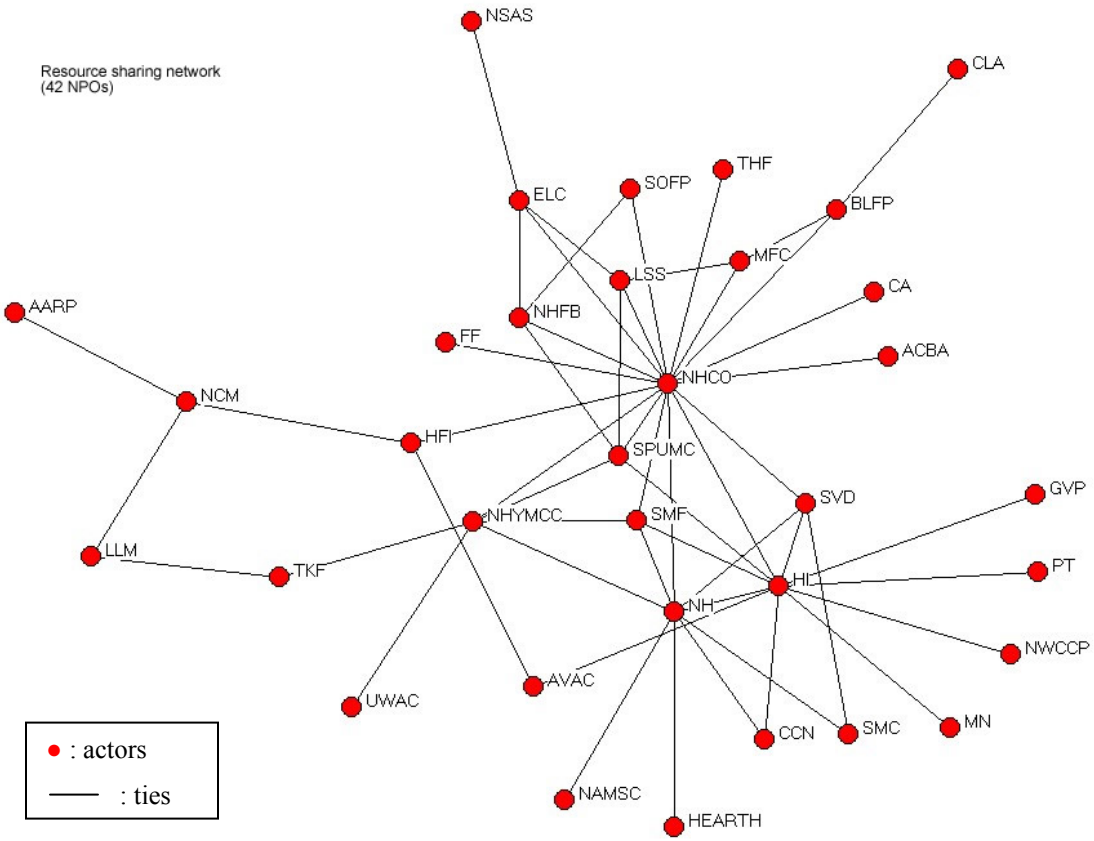


Figure IV-4) Resource sharing network sociogram

Table IV-7) Top five actors of various centralities in the resource sharing network

Rank	Degree centrality	Power centrality	Closeness centrality	Between-ness	Eigenvector centrality	Flow centrality
1	NHCO	NHCO	NHCO	NHCO	NHCO	NHCO
2	HI	HI	NH	HI	HI	HI
3	NH	NH	HI	NH	NH	NH
4	NHYMCC	NHYMCC	SMF	NHYMCC	SPUMC	NHYMCC
5	SPUMC	SPUMC	NHYMCC	HFI	SMF	NCM

Four nonprofits that are at the center of three subgroup – NHCO, HI, NH, and NHYMCC - rank within the top 5 in almost all types of centrality (Table IV-7). Four nonprofits are central and dominant in the network because they rank in high positions in all centrality measures. Another feature of this network is that there are two nonprofits (SMF and SPUMC) which occupy strategically significant positions. For example, SMF maintains only four relationships but these relations are connected to central actors in three different subgroups (NHCO, NH, HI and NHYMCC). With relatively small costs to maintain collaboration relations[38] (only four), SMF can efficiently[39] find partners for resource sharing in the network because it can reach the rest of actors in the shortest way. Finally, HFI which is not included in the power or influence centrality, ranks fifth in betweenness centrality. This means that HFI occupies a strategically significant position in which it acts as resource flow coordinator (i.e., broker) between two subgroups.

4.3.6 Formal contract network

Figure IV-5 shows formal contract relationships among 26 nonprofits. This network is noticeably sparser than the less intensive networks; the formal contract network does not show any sign of the spider-web shape[40]. It is clear that there are three branches (subgroups) from a center (FF). Another feature of the formal contract network is that this network is composed of three components, one main and two dyadic components. Most of ties in the formal contract are

[38] For example, compared to HI, SMF might spend one third (4/12) of costs to maintain formal contracts under the assumption that costs for maintaining one formal contract with an organization is the same as the cost of maintaining a formal contract with another organization

[39] An example of the advantage of this position is time-saving to search for appropriate counterpartners because the nonprofit can easily acquire information about other organizations in the network via its four central partners.

[40] Formal contract network is the sparsest network of 6 collaboration networks.

dyadic or triad (an 1:1, 1:2, or 1:1:1 relationship). These evidences indicate that nonprofits prefer one or two formal contract partner(s) rather than multiple partners.

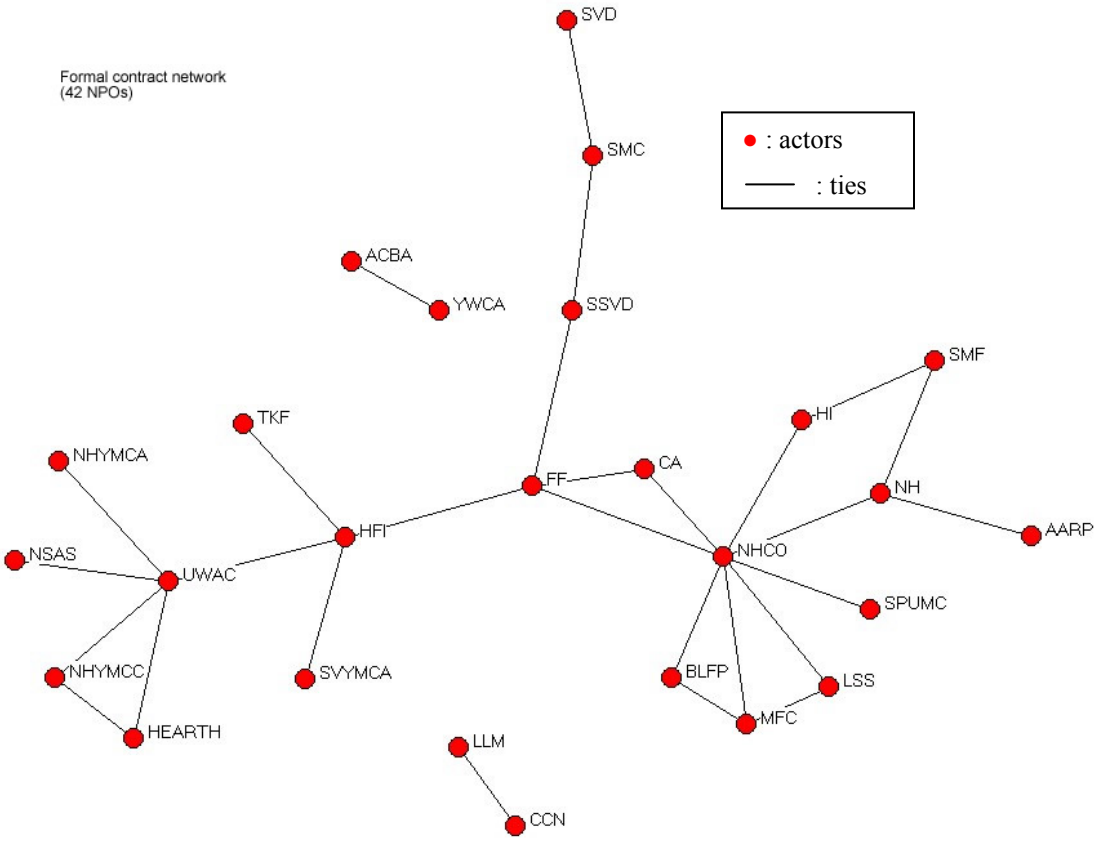


Figure IV-5) Formal contract network sociogram

Table IV-8) Top five ranks of various centralities in the formal contract network

Rank	Degree centrality	Power centrality	Closeness centrality	Between-ness	Eigenvector centrality	Flow centrality
1	NHCO	NHCO	FF	FF	NHCO	FF
2	UWAC	UWAC	NHCO	NHCO	MFC	NHCO
3	FF	HFI	HFI	HFI	FF	HFI
4	HFI	FF	CA	UWAC	BLFP	UWAC
5	MFC	NH	SSVD	SSVD	LSS	SSVD

Two nonprofits (FF and NHCO) are conspicuous in Table IV-8. FF is the most central in terms of betweenness and closeness while NHCO is the most central in degree and power centrality[41]. FF is strategically significant in terms of two typologies of a significant actor. First, from the efficiency point of view, FF occupies the number one position of closeness centrality

[41] The reasons NHCO has the largest eigenvector centrality are; that subgroups that are dependent on NHCO are largest; and that it is directly connected FF.

but is relatively less important in degree centrality. FF maintains formal contracts with three locally important nonprofits (NHCO, HFI, and SSVD). With these three relations, FF can reach the rest of nonprofits in the network in the shortest way. Second, as seen in Figure IV-5, FF is located at a center of the network and is number one in terms of betweenness centrality. At the same time, it is relatively low in power and eigenvector centrality. However, the meaning of high betweenness with low power and influence can be differently interpreted from other collaboration networks. Rather than a broker, FF, as one of the most influential foundation for social service nonprofits, seems to be the originator of major formal contracts. As stated above, FF maintains formal contract relations with three central actors in three branches of the network (again, NHCO, HFI, and SSVD). In turn, these nonprofits may have sub-contracted to other nonprofits within their subgroups.

There are two more nonprofits which occupy strategically significant position. First, UWAC proves to be a strategically significant nonprofit in terms of its broker role. Second, CA seems to be the most efficient in dealing with formal contract relations because it can reach all actors in the network in the shortest way (i.e., closeness centrality is high) with relatively small costs (only two relations with the most central actors, FF and NHCO).

4.3.7 Joint program network

Figure IV-6 represents 22 nonprofits' joint program relationships. The joint program network is a sparse network, similar to the formal contract network. The most peculiar feature that differentiates it from other types of collaboration is that the network is composed of two hubs (HI and NHCO), each of which is exceptionally predominant over the other nonprofits that are adjacent to them[42]. There are several paths between these two hubs including a direct path. Two hubs' relationships with their neighborhoods are different from each other. While nonprofits adjacent to HI have mostly a dyadic relationship with HI, neighborhood nonprofits adjacent to NHCO have triad or multiple relationships with NHCO. This difference comes from different philosophies for collaboration. As indicated in the previous chapter, one of the core philosophies of NHCO is to provide social services by extending "collaborative relationships" with others.

[42] These two nonprofits share about 40% of all relations in the joint program network. The rest of 20 nonprofits share about 60% of relations.

On the other hand, even though HI also prefers collaboration, it is cautious in making collaborative relationships (especially in the strategic collaboration) and selects partners only if they previously showed high performances[43].

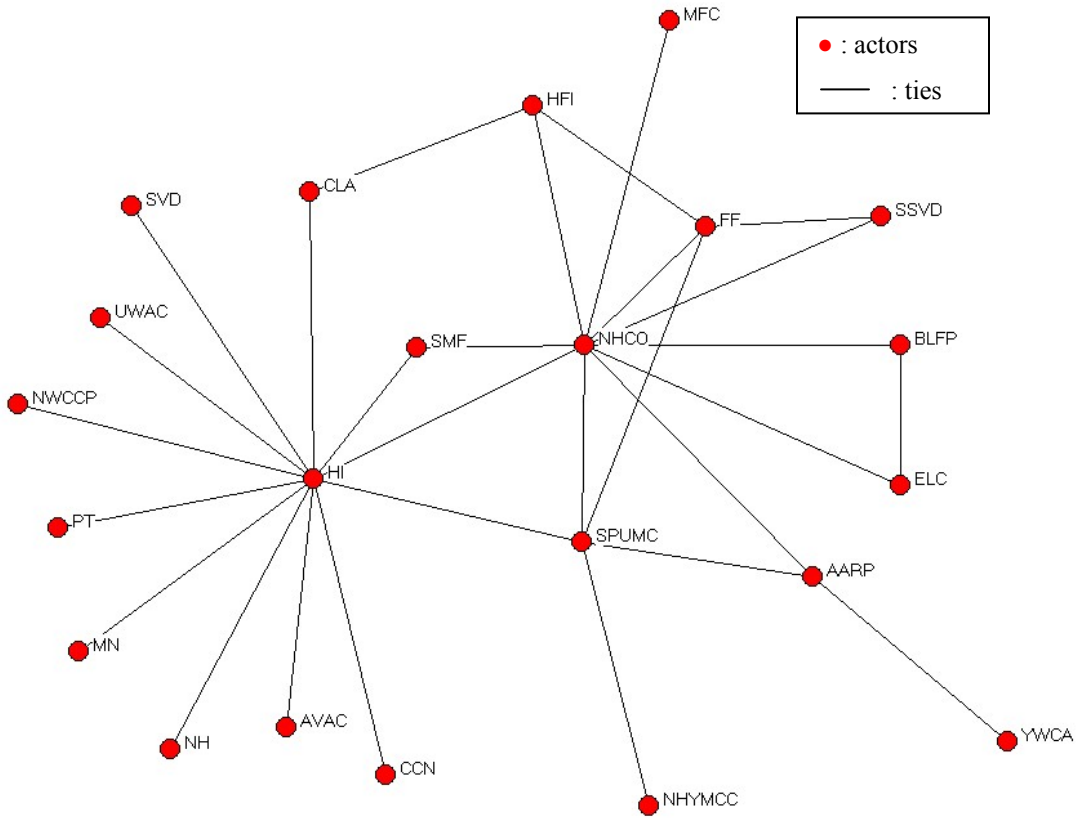


Figure IV-6) Joint program network sociogram

Table IV-9) Top five actors of various centralities in the joint program network

Rank	Degree centrality	Power centrality	Closeness centrality	Between-ness	Eigenvector centrality	Flow centrality
1	HI	HI	HI	HI	NHCO	HI
2	NHCO	NHCO	NHCO	NHCO	HI	NHCO
3	SPUMC	SPUMC	SPUMC	SPUMC	SPUMC	SPUMC
4	FF	FF	SMF	AARP	FF	AARP
5	AARP	AARP	FF	CLA, HFI	SMF	FF

HI and NHCO rank in the first and second position of all types of centrality (Table IV-9). Following them, SPUMC ranks third in all centralities. However, centralities of the third actor are far less important than the first and second. There is one organization that occupies a strategically significant position in the network. SMF locates between two dominant nonprofits.

[43] This is found from conversation with CEO of HI.

This nonprofit would be the most efficient in maintaining joint program relationships in the whole network because it can reach the rest of actors in the shortest way (i.e., high closeness centrality) with less costs (i.e., costs for maintaining only two relations).

4.4 NETWORK CENTRALIZATION ANALYSIS

In the previous section, descriptions of the collaboration networks were done mostly at the individual actor level. Using *network centralization index* (hereafter NCI), this section presents information on whether the collaboration networks are structurally unequal or hierarchical at the group level. Simply put, NCI is "the degree of inequality or variance in networks as a percentage of that of a perfect star network of the same size" (Hanneman, 2001, p.65). As a group-level centrality measure, NCI has the property that "the larger it is, the more likely it is that a single actor is quite central, with the remaining actors considerably less central" (Wasserman and Faust, 1994, p.176). In other words, the smaller NCI, the more homogeneous actors are likely to be. The formal definition of this index[44] is;

$$C_A \text{ (Network centralization index)} = \frac{\sum_{i=1}^{g}[C_A(n^*) - C_A(n_i)]}{\text{Max} \sum_{i=1}^{g}[C_A(n^*) - C_A(n_i)]} \qquad (0 \le C_A \le 1)$$

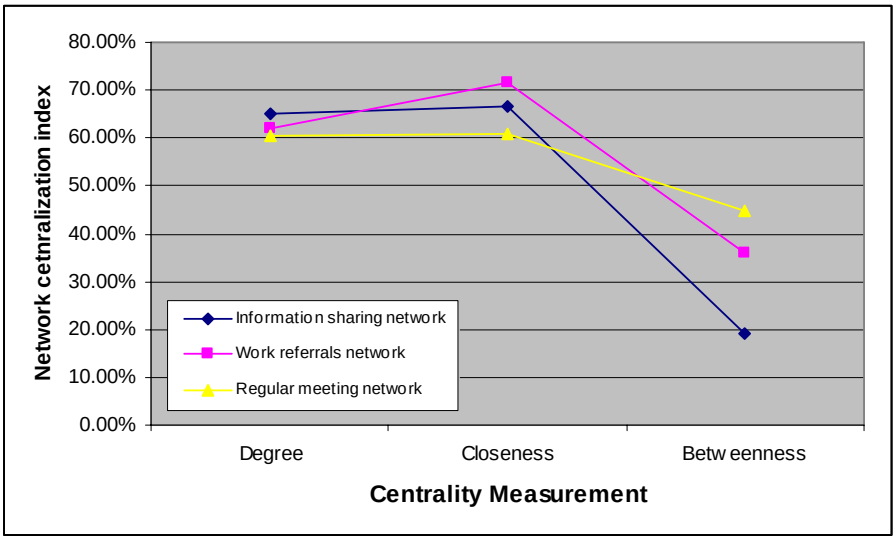


Figure IV-7) Patterns of NCI in less intensive collaborative relationships

[44] Refer to Wasserman and Faust (1994), pp 175 -177 for details of this equation.

Figure IV-7 illustrates the information sharing and tactical collaboration networks' NCI by three centrality measures. These networks show a hierarchy structure in degree and closeness centrality. First, high NCI in degree centrality implies that several central actors exclusively handle most of the collaborative relationship flows in the networks. These actors are called a "hub". Second, hubs are central in terms of reachability to the rest of actors in the networks. Second, a broker is less important in the networks of less intensive collaboration because NCI of betweenness centralities are small (Figure IV-7).

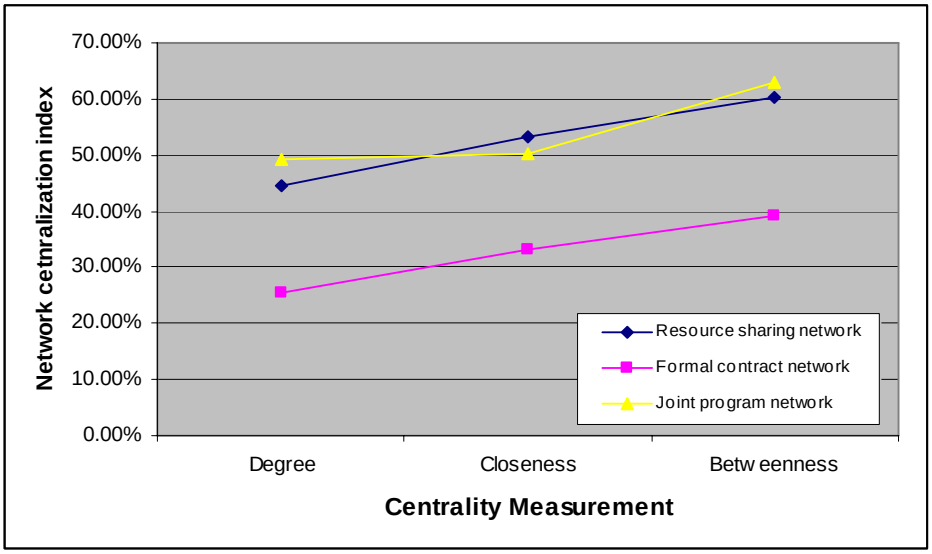


Figure IV-8) Patterns of NCI in strategic collaborative relationships

Patterns of strategic collaborations are completely different from less intensive collaborations (Figure IV-8). Low NCI of the degree centrality implies that the strategic collaboration networks are a horizontal or localized structure rather than a hierarchical structure. In addition, NCIs of the betweenness centrality are the highest among three centralities in all three strategic collaboration networks. This implies that the role of the broker is important in the strategic collaboration. As a coordinator who mediates flows of money, resources and so forth, the network broker is indispensable in the strategic collaboration networks.

NCIs of three centralities in the formal contract network are noticeably smaller than those of the resource sharing and joint program network. As there is a 25% of NCI in degree centrality, there is no hub in this network. Reachability among actor is also small. This indicates that the

formal contract relationships are the most localized among all types of the collaborative relationships.

In sum, the above two figures support findings in the previous section. There exist strategically significant actors in the strategic collaboration networks but it is hard to witness these types of actors in the less intensive collaboration network. In the strategic collaboration networks, the NCI of betweenness centrality is high, which means that the role of the broker is important in these networks whereas the role of the broker is not crucial in the less intensive collaboration networks because betweenness centrality NCI is low.

4.5 NETWORK ROBUSTNESS ANALYSIS

Network robustness is one of the important properties of a network because it recognizes how robust (or fragile) the network is. In the fast changing environment, it is very probable that an unpredictable event – such as sudden bankruptcy - can eliminate important actors from the network. When these actors are removed, it is important to see if the network is still working.

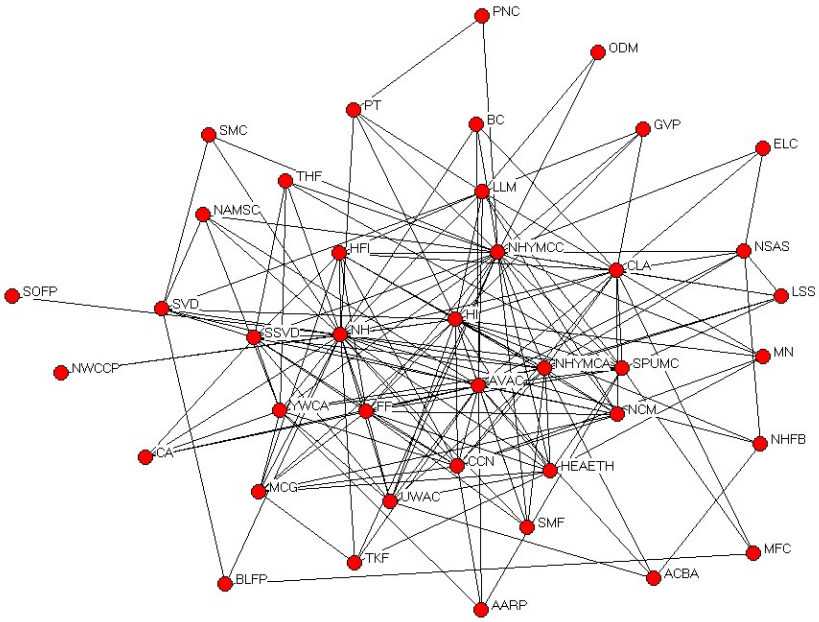


Figure IV-9) Information sharing network after removing two core actors

In order to see how robust a network is, this study removed two types of central actors in the network – *core actors*[45] and *1st of betweenness centrality* (See Appendix 7-2 for detailed results of elimination).

First, the information sharing and work referral network are not influenced by elimination of important actors (Figure IV-9 and IV-10). In the information network, when core nonprofits are eliminated, no isolation occurs and the main component remains completely connected among the rest of actors. Only one actor becomes isolated in the work referral network with the elimination of core actors. In sum, these two networks are very robust against the elimination of core actors in the network, which means the two networks are well connected among all members of the networks.

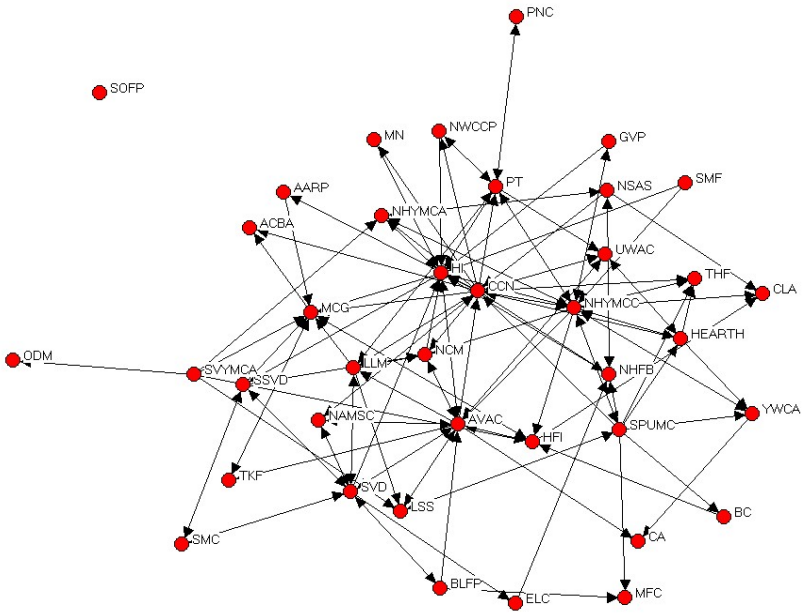


Figure IV-10) Work referral network after removing two core actors

After removing two core members, the regular meeting and resource sharing network are divided into two components and several isolated organizations. The regular meeting network is divided into a main component and a small component composed of dyadic relationship (Figure IV-11). The resource sharing network becomes a main component and a moderate size component composed of 8 actors (Figure IV-12). Similar percentages of actors become isolated when core actors are eliminated in the two networks: 11.4% and 11.8%, respectively.

[45] This study terms a core actor in network if it is involved in more than half of all possible cliques (a complete subgroup with the number of more than 3 actors). For example, NHCO and SVYMCA participate in 59 different cliques out of 100 possible cliques in the information sharing network.

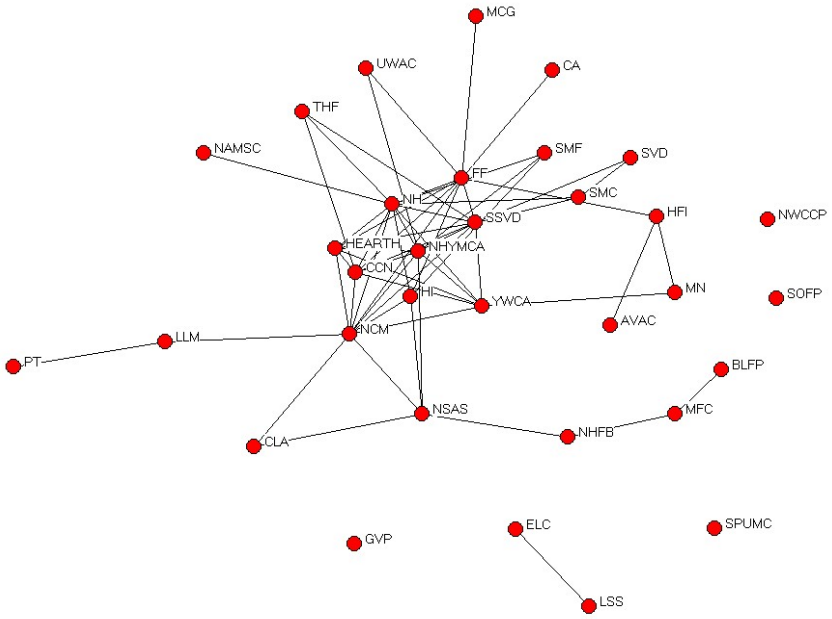


Figure IV-11) Regular meeting network after removing two core actors

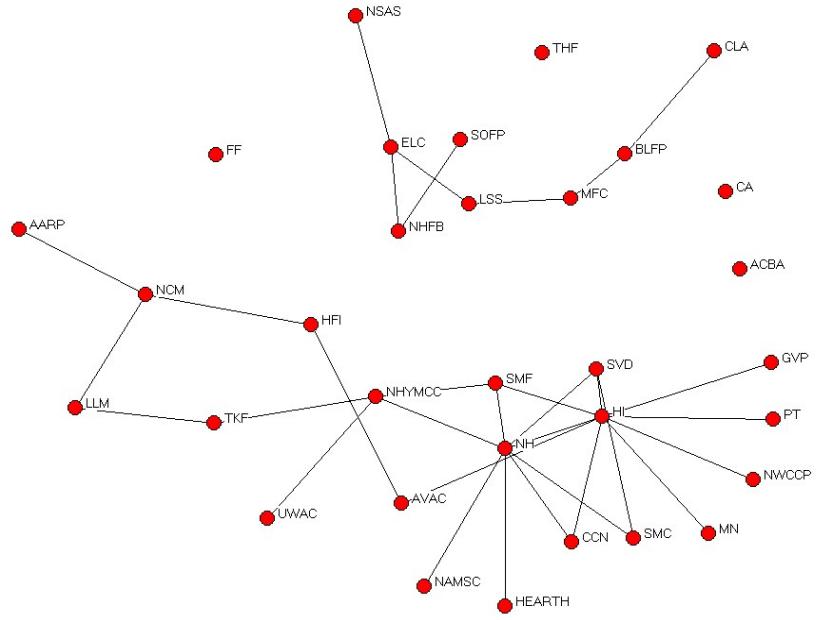


Figure IV-12) Resource sharing network after removing two core actors

The formal contract network is fragile in terms of the betweenness centrality. When the 1st betweenness centrality actor (FF) is removed, the network is divided into three subgroups which lose connections between each other (Figure IV-13). The joint program network also

proves to be fragile. When two core actors are removed, about a half of actors (45.5%) becomes isolated (Figure IV-14).

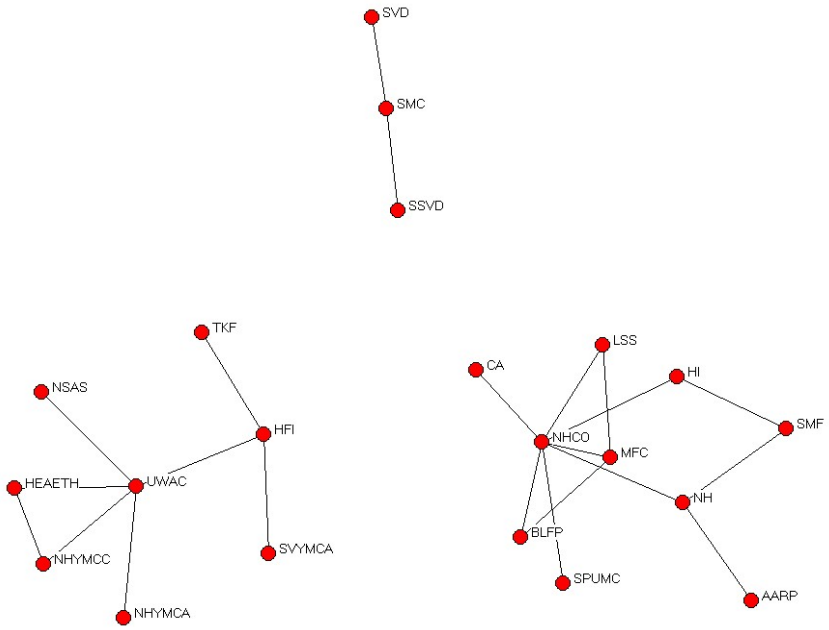


Figure IV-13) Formal contract network after removing 1st betweenness actor

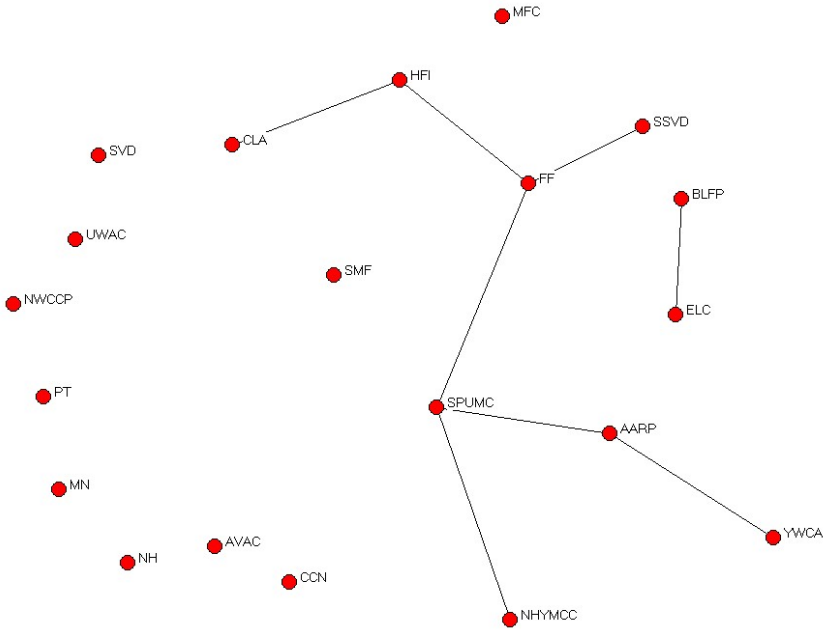


Figure IV-14) Joint program network after removing two core actors

In sum, robustness (or frangibility) of the collaboration networks is summarized as; the two strategic collaboration networks are the most fragile, resource sharing and regular meeting are modest, and finally information sharing and work referral networks are quite robust.

4.6 DISTANCE ANALYSIS OF SIX RELATIONSHIPS

In order to explore whether nonprofits are likely to collaborate with geographically close neighborhood nonprofits, this study applies two analyses – correlation and t-test. The correlation analysis looks at correlations between geographical and geodesic distances of actors. Geodesic means "a shortest path between two nodes" and "the geodesic distance or simply the distance between two nodes is defined as the length of a geodesic between them" (Wasserman and Faust, 1994, p.110). If nonprofits prefer geographically near neighborhoods for their collaboration partners, correlation coefficients between these two distances would be positively associated. Table IV-10 illustrates results of the correlation analysis.

Table IV-10) Correlation between geodesic distances and geographical distances

	N	Correlation between geodesic distance and physical distance
Information network	1722	-0.042 (0.726)
Work referrals network	1640	-0.033 (0.676)
Regular meeting network	1190	0.092 (0.533)
Resource Sharing network	1122	-0.044 (0.575)
Formal contract network	462	-0.057 (0.708)
Joint program network	462	-0.142 (0.283)

* Parenthesis is p-value.

All correlation coefficients indicate nearly negligible negative relationships (except regular meeting) between geographical distances and collaborative relationship distances, but they are statistically insignificant. However, even though statistically insignificant, there are two probable results to note. First, geographical distances are negatively correlated with the strategic collaborative relations. Most notably, the correlation coefficient of joint program is relatively high and its significance level (i.e., p-value) is relatively better than other measurements. Second, only the direction of regular meeting correlation is positive (although it is nearly negligible). This result implies that in collaborative relationships that requires face-face meeting, nonprofit managers prefer collaboration partners that are located nearby geographically. In order to confirm whether two notable findings are probable results, this study conducts t-test of differences in the means of linked and unlinked actors' geographical distances.

Results of the t-test positively confirm the plausible propositions from the correlation analysis (Table IV-11). First, average distances between nonprofits that are connected with joint program relations are 13.4 mile. At a statistically significant level, these distances are farther than distances between nonprofits that are not linked. Second, distances between nonprofits that regularly meet are smaller (8.8 mile) than distances between nonprofits that do not have regular meeting (10.3 mile) and this difference is statistically significant.

Table IV-11) T-test of differences in means of linked and unlinked actors' geographical distances

Relations	Group	N	Mean	S.D.	S.E of Mean	t	Sig.(2-tailed)
Information sharing	Linked	490	10.651	7.37	0.333	1.373	0.170
	Unlinked	1232	10.137	6.04	0.172		
Work Referrals	Linked	239	10.039	7.19	0.465	-0.632	0.528
	Unlinked	1483	10.323	6.32	0.164		
Regular meeting	Linked	198	8.805	6.71	0.477	-3.422	0.001*
	Unlinked	1524	10.475	6.39	0.164		
Resource sharing	Linked	106	9.913	8.51	0.827	-0.469	0.640
	Unlinked	1616	10.308	6.29	0.156		
Formal contract	Linked	56	8.898	6.70	0.895	-1.636	0.102
	Unlinked	1666	10.330	6.43	0.158		
Joint program	Linked	58	13.353	9.59	1.259	2.505	0.015**
	Unlinked	1664	10.178	6.26	0.154		

*significant at the level of 0.01 ** significant at the level of 0.05

On the basis of these results, this study proposes two hypotheses;

1) Nonprofits regard strategic fit in programs (i.e., programs with which both partners can make synergy effects or a program that one of partners has but the other needs) as more important factor than geographical distances when it comes to joint program relations.

2) Nonprofits prefer neighborhood organizations to distance organizations when characteristics of relationships require face to face relationships.

4.7 SUMMARY

This chapter has explored collaboration patterns within the nonprofit sector through various descriptions of the collaboration networks. Major findings in this chapter are;

● First, as the collaborative relationship intensifies, networks are sparser, more localized and more fragile.

● Second, through the work referral network system, nonprofits deliver social service efficiently.

● Third, there is no strategically significant actor in the less intensive collaboration networks, but there emerges strategically significant actors in the strategic collaboration. These findings give birth to a hypothesis; while a network coordinator is indispensable and plays a strategically significant role in the strategic collaboration networks, it is not as important in terms of strategic significance in the less intensive types of collaborations.

● Finally, nonprofits do not appear to care about geographical distances when they make collaborative relationships with other organizations. Nonprofits prefer relatively long-distance partners to near-distance partners in joint program relations. However, when face-face relations are an important factor in making collaborative relationships, nonprofits prefer partners which are located in their neighborhood.

V. DESCRIPTIONS OF COLLABORATION PATTERNS ACROSS THE SECTORS

5.1 INTRODUCTION

In the previous chapter, features of the collaboration networks within the nonprofits sector were discussed. This chapter extends the scope of analysis by including the business and public sector. In order to compare cross-sector networks with within-sector networks, the same analyses conducted in Chapter 4 are performed. From this analysis, this chapter concludes that; 1) when other sector organizations join collaboration networks, network structures change, especially in strategic collaboration networks, which become more localized and decentralized, 2) with the involvement of other sectors, a gate or bridge nonprofits emerges between the nonprofit and business/public sector, and 3) while businesses prefer popular nonprofits (i.e., high degree centrality nonprofits) as their strategic collaboration partners, pubic agencies do not show much preference for popular nonprofits.

5.2 NETWORK PROPERTIES (SIZE ANALYSIS)

Table V-1 and V-2 show that the total number of actors in both the business and public sector decrease as the collaboration relationships intensify. When businesses are included in collaboration networks, the size of the network (i.e., the number of actor) is twice as large as the nonprofit-only network in the information sharing, resource sharing and joint program. When businesses are introduced in the collaboration network, two strategic collaboration networks (i.e., resource sharing and formal contract) become more fragmented as shown in Table V-1. In particular, formal contract relationships become more localized and less centralized when

businesses join the network; the diameter[46] of the formal contract network increases from six to seven when businesses are introduced.

Table V-1) Descriptive statistics of networks when businesses are included

	Information sharing network	Work referrals network	Regular meeting network	Resource sharing network	Formal contract network	Joint program network
Total actors*	95	55	46	81	39	58
NPO	42	41	35	36	27	23
Business	53	14	11	45	12	35
Ties	618	262	222	198	80	130
Direction of ties	No	Yes	No	No	No	No
Component	1	1	1	2	4	1

* Isolates are excluded.

Compared to the collaboration network composed of nonprofits and businesses (Table V-1), nonprofits have relatively few collaborative relationships with public agencies, except for formal contract relations (Table V-2). Another distinction with the inclusion of public agencies is that the involvement of public agencies causes the joint program network to be more localized or fragmented. For example, the involvement of ten public agencies causes two small components to emerge. Also, the diameter of joint program increases from four to six. Thus, actors in the joint program network rely more on local relationships.

Table V-2) Descriptive statistics of networks when public agencies are included

	Information sharing network	Work referrals network	Regular meeting network	Resource sharing network	Formal contract network	Joint program network
Total actors*	60	54	37	38	39	35
NPO	42	41	35	35	28	25
Public agency	18	13	2	3	11	10
Ties	536	268	202	116	88	80
Direction of ties	No	Yes	No	No	No	No
Component	1	1	1	1	3	3

* Isolates are excluded.

In sum, the above simple descriptive statistics suggest that there are effects of the business and public sectors' inclusion in strategic collaboration networks; when other sector organizations join the strategic collaboration networks, the strategic collaboration networks

[46] Diameter is the length of the largest geodesic distance between any pair of nodes in a connected network (Wasserman and Faust, 1994).

become more localized. In addition, the number of nonprofits that make strategic collaboration increases when two sectors are introduced in the strategic collaboration networks. For example, when public agencies are introduced, the number of nonprofits that have joint programs increases by three (from 23 to 25).

5.3 NETWORK DESCRIPTIONS BY SOCIOGRAM AND ACTOR CENTRALITY

In this section, this study presents visual images of various collaboration networks when the business and public sector organizations are introduced into the nonprofit collaboration networks. In addition, this section describes characteristics of these networks using actor centralities.

5.3.1 Business and Nonprofit sector

Networks in this section are composed of organizations from the nonprofit and business sector. As shown in Figure V-1, ● represents businesses and ■ represents nonprofits.

5.3.1.1 Information sharing network

Figure V-1 represents the information sharing network among nonprofits and businesses. There are a total number of 95 organizations of which 53 are businesses. The absolute number of businesses in the information sharing network is larger than that of nonprofits. While most of businesses are periphery, most of nonprofits locate inside the network.

Information flows among nonprofits are quite dense. However, information flows between nonprofits and businesses are sparse. Most businesses are connected to nonprofits in a dyadic way but seven businesses have multiple connections with nonprofits for information sharing. Unlike other businesses, one business (OPCA) has multiple (four) information channels to nonprofits (NH, NHCO, SPUMC and SVYMCA) that are central in the network. This is evidence that businesses are becoming embedded in the nonprofit network. Another distinctive feature in this network is that several of nonprofits, such as HI, CCN and NHYMCC, represent most of intersectoral relations. This implies that certain organizations bridge the nonprofit and

business sector for information exchanges rather than all organizations bridging between the two sectors.

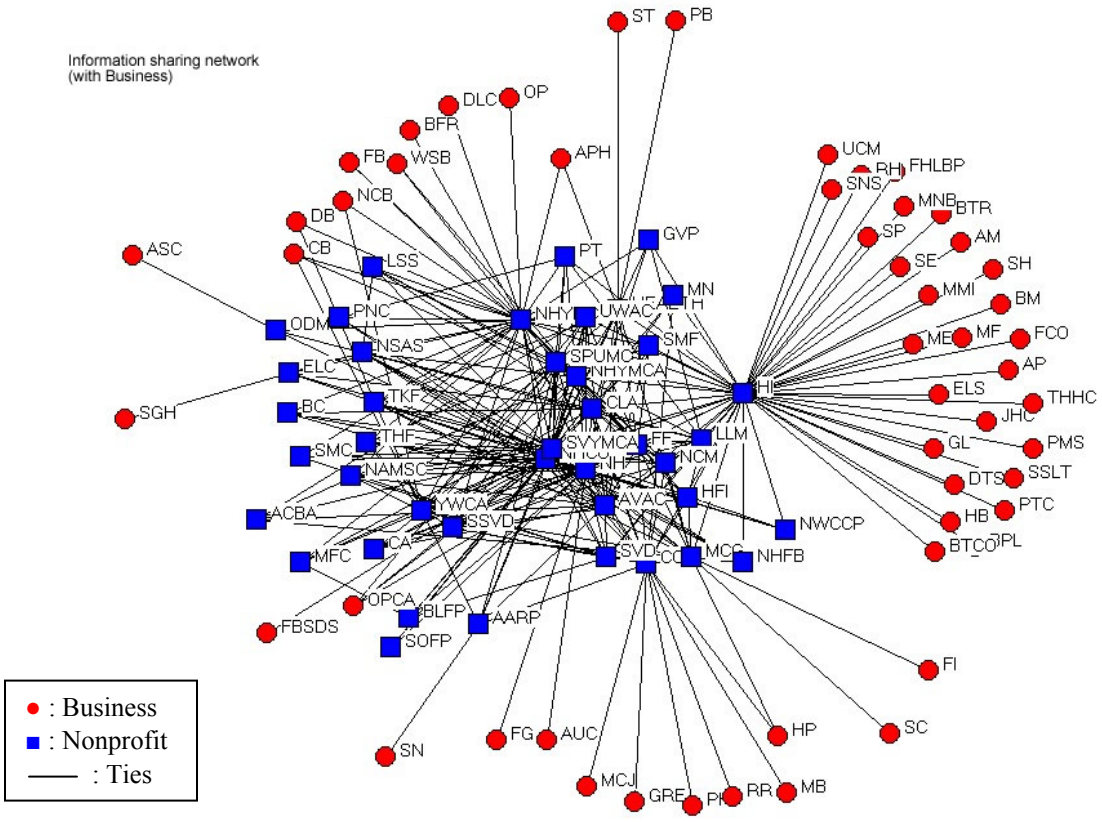


Figure V-1) Information sharing network with business sociogram

Table V-3) Top five actors of various centralities in the information sharing network

Rank	Degree centrality	Power centrality	Closeness centrality	Between-ness	Eigenvector centrality	Flow centrality
1	HI	NHYMCA	HI	HI	SVYMCA	HI
2	SVYMCA	FF	SVYMCA	NHYMCC	NHCO	CCN
3	NHCO	SVD	NHCO	CCN	NH	NHYMCC
4	NHYMCC	THF	NH	NHCO	HI	NH
5	NH	UWAC	NHYMCC	SVYMCA	NHYMCC	HEAETH

With the inclusion of businesses, several changes in centrality measures occur in the information sharing network as compared to the previous chapter. HI, which ranked in fifth in the network of nonprofits, becomes the first in centrality measures (especially in betweenness and flow centrality). This is because HI has extraordinarily connections with businesses. CCN becomes central in betweenness and flow centrality. This is also because CCN has many relationships with businesses. NHYMCC, another nonprofit which has many connections with

businesses, raises its ranks in the betweenness and flow centrality. This implies that those nonprofits that have many connections with businesses play an information intermediary role between the business and nonprofit sector. However, there is a difference in the structural property between CCN and the other two nonprofits (HI and NHYMCC). While HI and NHYMCC are globally dominant actors in the information network because they are central in almost all types of centrality measures, CCN is only central in the betweenness centrality. This implies that CCN is a strategically significant actor exclusively in the broker role.

5.3.1.2 Work referral network

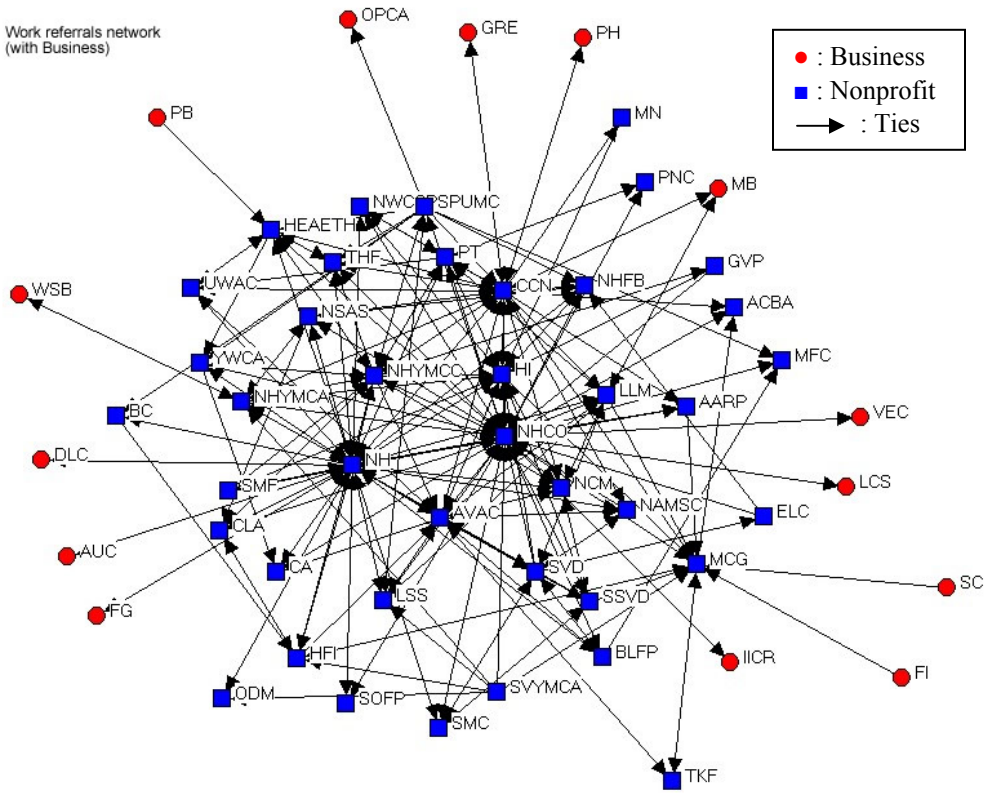


Figure V-2) Work referral network with business sociogram

Figure V-2 illustrates the work referral network when businesses participate. All businesses are positioned at the edge of the network, in a dyadic connection with nonprofits (except one business, MB). Most of businesses receive work referrals (79%) but only a few send referrals, which indicates that businesses play a service delivery role rather than a sending role.

While work referral relationships among nonprofits are reciprocal, most work referral relationships between nonprofits and businesses are not.

Table V-4) Top five actors of various centralities in the work referral network[47]

Rank	In-Degree centrality	Out-degree centrality	Power centrality	In-closeness centrality	Out-closeness centrality	Between-ness centrality	Eigen-vector centrality	Flow centrality
1	NH	NHCO	CCN	ACBA	SVYMCA	NHCO	NHCO	NH
2	NHCO	NH	LSS	LCS	NH	NH	NH	NHCO
3	CCN	HI	SVD	VEC	NHCO	CCN	CCN	CCN
4	NHYMCC	CCN	NHCO	NHCO	CCN	MCG	NHYMCC	AARP
5	AVAC	NHYMCC	HFI	DLC	NHYMCC	NHYMCC	HI	MCG

When businesses are introduced into the work referral network, small changes occur in the nonprofit work referral network. First, CCN, with two more out-degrees directing to businesses, becomes central in the out-degree centrality. CCN was a sender in the nonprofit work referral network, but it becomes a mediator as businesses are added. Second, one nonprofit (MCG), which was not a central actor in the nonprofit work referral network, now plays a broker role between businesses and nonprofits. Its broker role is possible through new work referral relations from two businesses.

5.3.1.3 Regular meeting network

Figure V-3 shows the regular meeting network when businesses are introduced. A relatively small number of businesses have regular meetings with nonprofits, and their relationships are mostly one to one tie (except one business, MB). Features of the regular meeting network among nonprofits remain the same. For example, the North Hills Nonprofit Consortium is still central and dense (spider-web region of center- right in Figure V-3).

[47] Here, the closeness centrality does not provide the correct measurement because the work referrals network is technically unconnected – some of actors have only in-degree or out-degree. Thus, as an alternative measure for closeness, eigenvector (i.e., Bonacich influence centrality) measures the closeness centrality more appropriately.

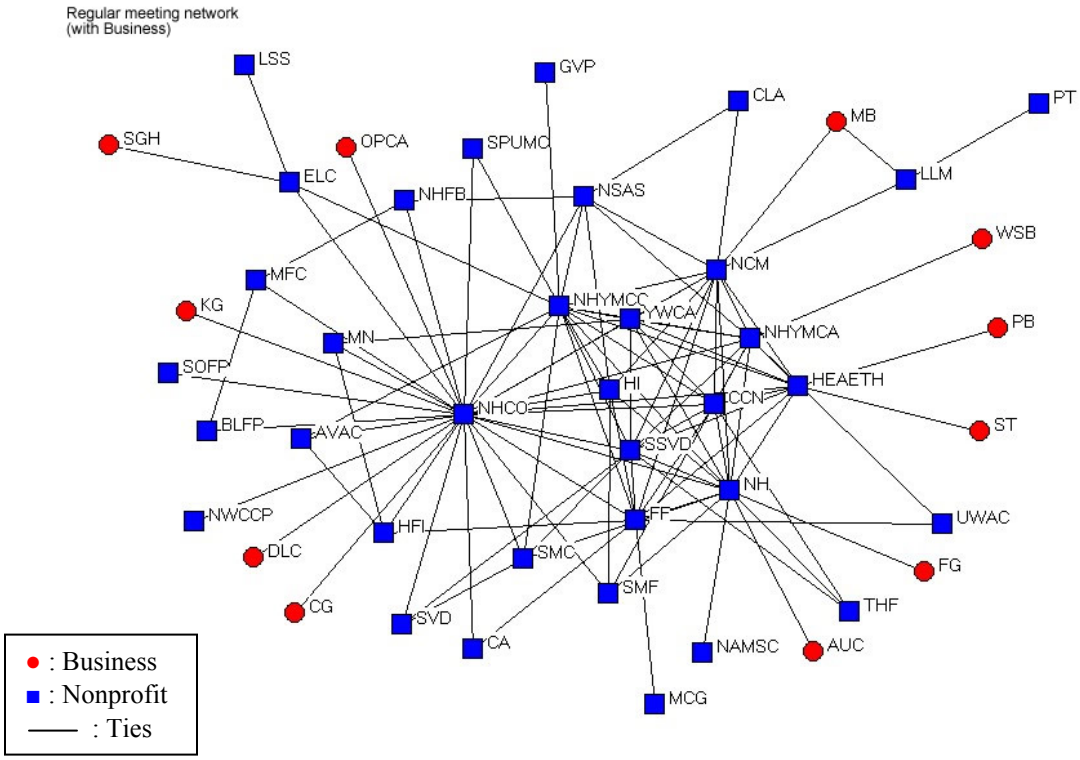


Figure V-3) Regular meeting network with business sociogram

Table V-5) Top five actors of various centralities in the regular meeting network

Rank	Degree centrality	Power centrality	Closeness centrality	Between-ness	Eigenvector centrality	Flow centrality
1	NHCO	NCM	NHCO	NHCO	NHCO	NHCO
2	NH	HEAETH	NHYMCC	NCM	NHYMCC	NCM
3	NHYMCC	HI	NH	NH	NH	NH
4	NCM	SMC	NCM	NHYMCC	NCM	HEARTH
5	FF	HFI	SSVD	HEARTH	SSVD	ELC

Despite the introduction of businesses, the top five actors are almost identical to the regular meeting of nonprofits (refer to 4.3.4 section of the previous chapter). However, there is a small change; one nonprofit (HEARTH) becomes more important in the betweenness centrality because it acquires two new connections from businesses. Thus, it can be said that HEARTH becomes a strategically significant actor (as a broker between nonprofits and businesses) when business sector organizations join the network.

5.3.1.4 Resource sharing network

Figure V-4 illustrates the resource sharing network with the inclusion of businesses. For resource sharing, more than half of business connections are concentrated on two nonprofits (HI and NHCO). It causes the network structure to change from a three-subgroup structure to a two-hub structure which is similar to the joint program network. Also, HI becomes conspicuous by being the number one in all centrality measures (Table V-6). On the other hand, with the introduction of businesses, the resource sharing network becomes more localized as two small components emerge and most of resource sharing relationships between businesses and nonprofits are dyadic.

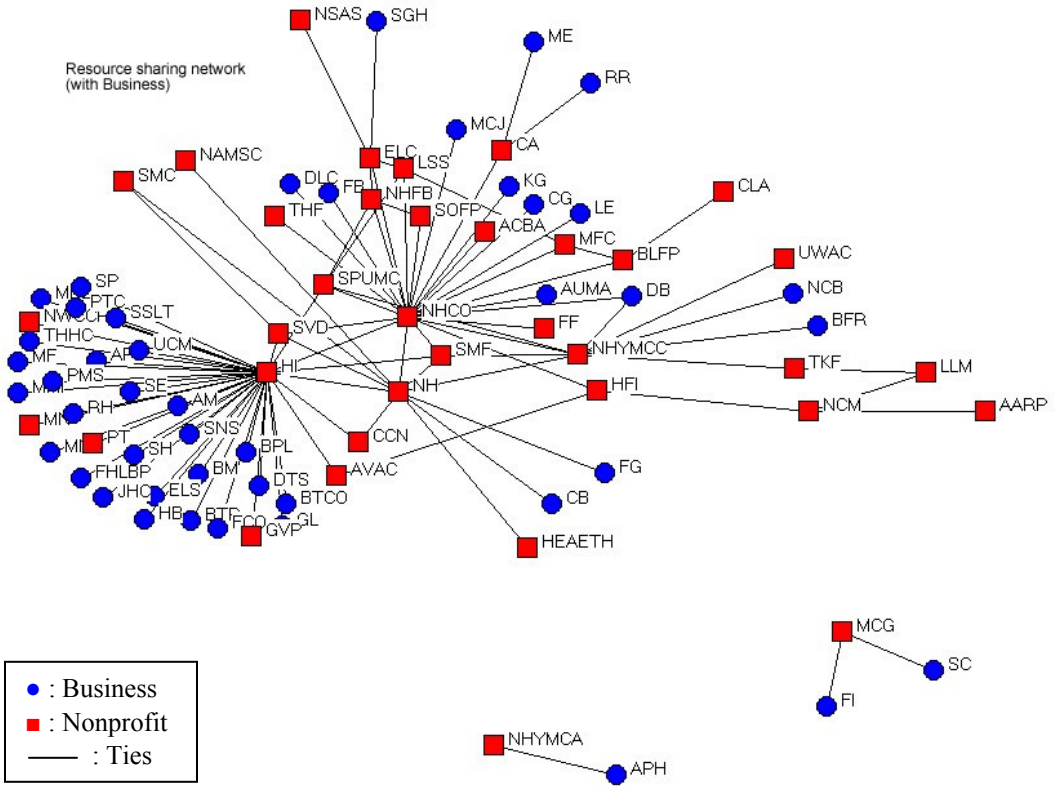


Figure V-4) Resource sharing network with business sociogram

The top ranking actors in centrality measures in the resource sharing do not change from the within sector network even though many businesses are introduced (Table V-6). This is because most of businesses are attached to HI and NHCO, which were already central. The four nonprofits that were identified as the center of three subgroups remain the most central in most of the centrality measures. SMF is still efficient in dealing with resource sharing relations.

Table V-6) Top five actors of various centralities in the resource sharing network

Rank	Degree centrality	Power centrality	Closeness centrality	Between-ness	Eigenvector centrality	Flow centrality
1	HI	HI	HI	HI	HI	HI
2	NHCO	NHCO	NHCO	NHCO	NHCO	NHCO
3	NH	NHYMCC	NH	NH	NH	NH
4	NHYMCC	NH	SMF	NHYMCC	SMF	NHYMCC
5	ELC,SPUMC	ELC	SPUMC	HFI	SPUMC	ELC

5.3.1.5 Formal contract network

The involvement of businesses makes the formal contract network more localized because 1) one more small component emerges, 2) formal contract relationships with businesses (in main component) only attach to three nonprofits in a peripheral way and 3) thus the diameter of the network gets longer (from six to seven) (Figure V-5). However, the addition of businesses does not bring dramatic change to formal contract network structure compared to the previous chapter because the three-subgroup structure remains.

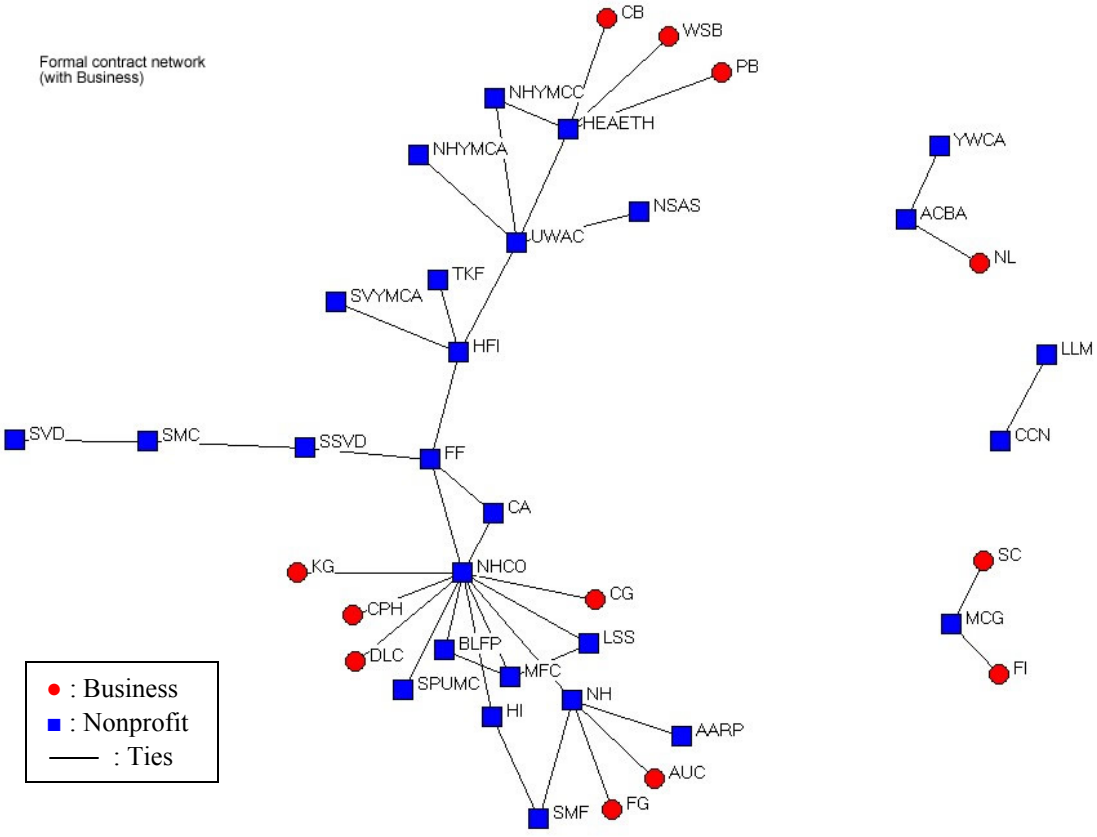


Figure V-5) Formal contract network with business sociogram

Table V-7) Top five actors of various centralities in the formal contract network

Rank	Degree centrality	Power centrality	Closeness centrality	Between-ness	Eigenvector centrality	Flow centrality
1	NHCO	NHCO	FF	NHCO	NHCO	NHCO
2	UWAC	HEARTH	NHCO	FF	MFC	FF
3	NH	UWAC	HFI	HFI	FF	HFI
4	HEARTH	NH	CA	UWAC	NH	UWAC
5	FF	HFI	NH	NH	BLFP	NH

Overall rankings in the six types of centrality remain the same as the formal contract network in the previous chapter. However, there are a few changes. NHCO becomes more dominant in terms of its centralities because it has four more formal contract relationships with businesses. Likewise, HEARTH becomes very powerful because it has three new contracts relationships with businesses. As in the formal contract network in the previous chapter, CA is still the most efficient organization in dealing with formal contracts in the network. At the same time, FF becomes more efficient in the formal contract network. FF also plays the same role – the origin of formal contracts – as in the nonprofit formal contract network.

5.3.1.6 Joint program network

Figure V-6 illustrates the joint program network when businesses join the network. The number of business (35) is larger than that of nonprofit (23), which means that businesses are interested in social service provisions through joint program with nonprofits. However, comparing to the nonprofit joint program, inclusion of businesses makes the two-hub network structure more apparent. All businesses (except one) connect to two central nonprofits – HI and NHCO – in the joint program network.

Of interest is that one nonprofit (NHYMCA), which was in isolation in the nonprofit joint program network, joins the network through a business (APH). As a broker, APH is embedded in the joint program network. In Table V-8, this fact is confirmed as well – APH ranks fifth in betweenness centrality. Coupled with a similar finding in the information sharing network, this provides a hint that businesses are embedded in the social service networks, although not extensively.

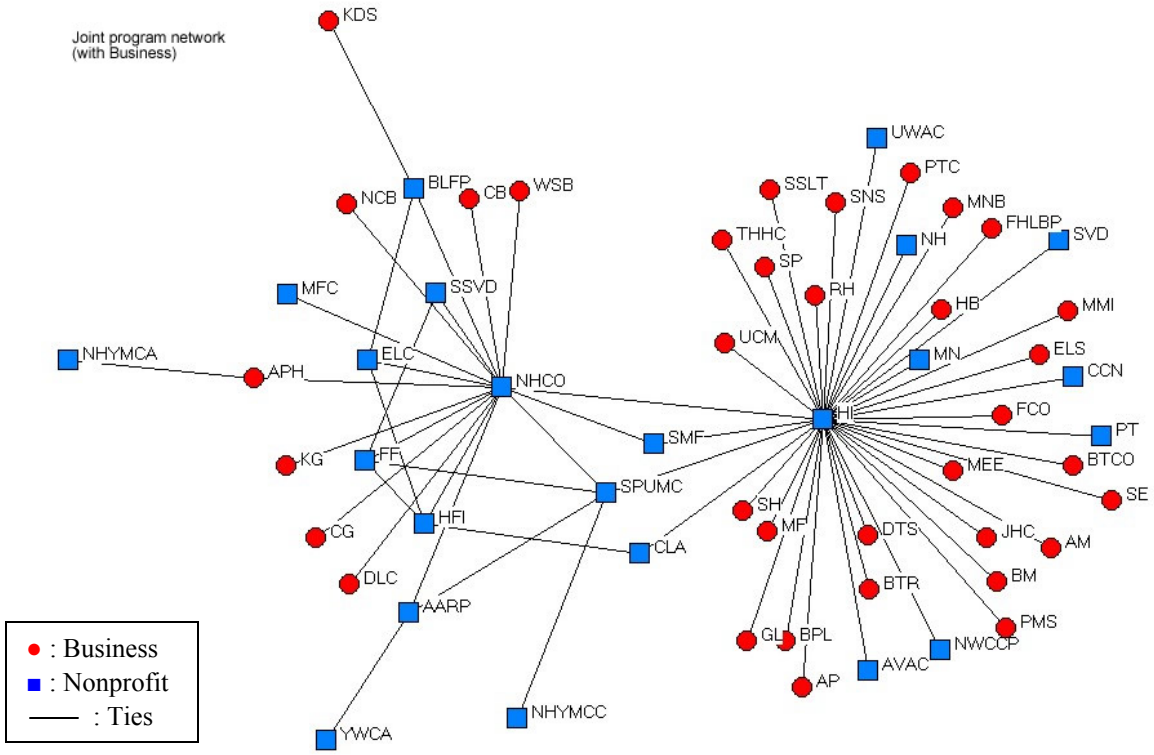


Figure V-6) Joint program network with business sociogram

Table V-8) Top five actors of various centralities in the joint program network

Rank	Degree centrality	Power centrality	Closeness centrality	Between-ness	Eigenvector centrality	Flow centrality
1	HI	HI	HI	HI	HI	HI
2	NHCO	NHCO	NHCO	NHCO	NHCO	NHCO
3	SPUMC	SPUMC	SPUMC	SPUMC	SPUMC	SPUMC
4	FF	FF	SMF	AARP	SMF	BLFP
5	HFI	BLFP	CLA	BLFP, APH	CLA	AARP

Table V-8 shows that the inclusion of businesses renders the two-hub structure of the joint program network more evidently (HI and NHCO are number one and two). As explained in the joint program network in the previous chapter, two nonprofits (SMF and CLA) are expected to be efficient when it comes to dealing with joint program relations.

5.3.2 Public and Nonprofit sector

This section presents visual illustrations of collaboration networks which are composed of the nonprofit and the public sector. As shown in Figure V-13, ● represents a public agency and ■ represents a nonprofit.

5.3.2.1 Information sharing network

Figure V-7 visualizes the information network when public agencies are included. Most public agencies are located in peripheral regions of the network except ACDHS.

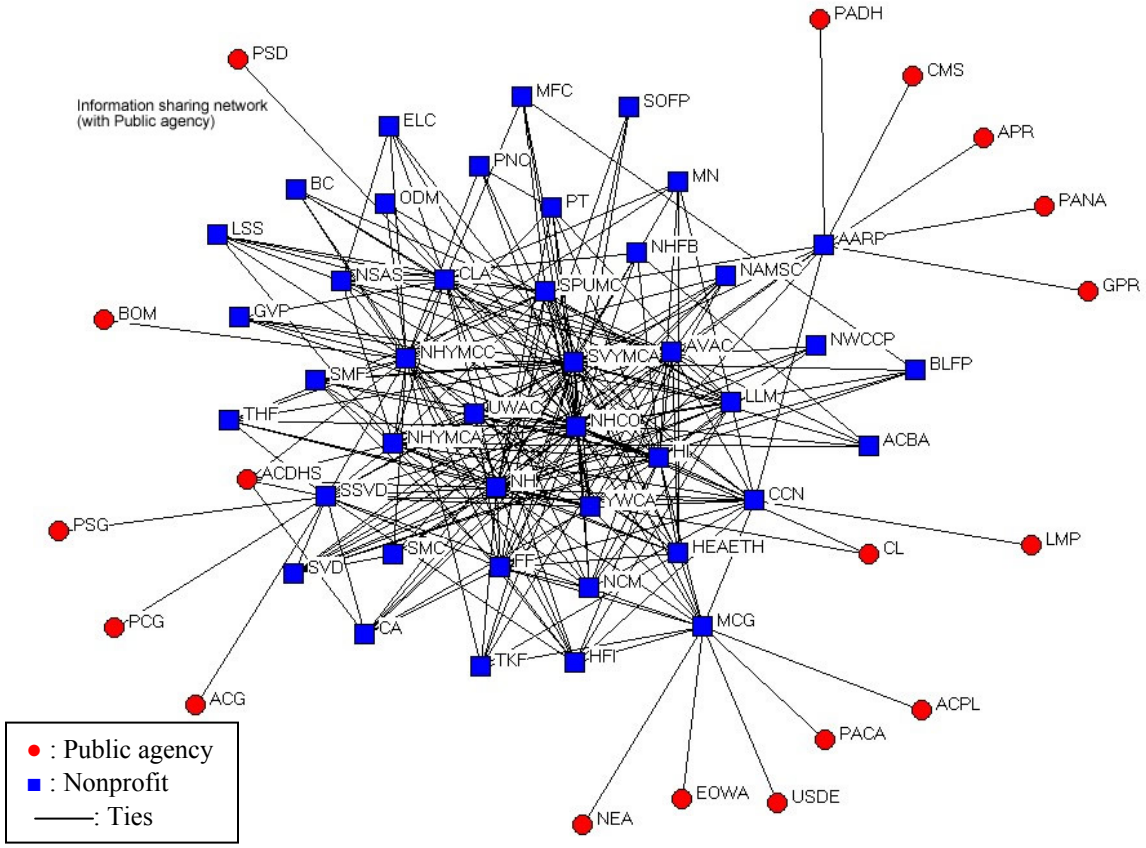


Figure V-7) Information sharing network with public sector sociogram

There are several features in this network. First, like the information sharing network with business, most of information exchanges with public agencies channel through a small number of nonprofits, such as AARP, SSVD and MCG. These nonprofits play a broker or gate role between the rest of nonprofits and public agencies. These three nonprofits do not overlap as

broker or gate nonprofits in the information network with businesses (i.e., CCN, HI, and NHYMCA in the section 5.3.1.1. in this chapter); Nonprofits that play a gate role with the business sector do not exchange information with the public sector organizations and vice versa. Second, ACDHS is embedded in the network because it shares information with multiple nonprofits (five) and through these multiple relations, it sends, receives, and intermediates information. However, the overall structure of the network is similar to the information network composed of the nonprofit and business sector.

Table V-9) Top five actors of various centralities in the information sharing network

Rank	Degree centrality	Power centrality	Closeness centrality	Between-ness	Eigenvector centrality	Flow centrality
1	SVYMCA	HI	SVYMCA	SVYMCA	SVYMCA	MCG
2	NHCO	CCN	NHCO	NHCO	NHCO	AARP
3	NH	TKF	NH	MCG	NH	SSVD
4	NHYMCC	NHYMCA	NHYMCC	AARP	NHYMCC	NHYMCC
5	HI	AVAC	HI	SSVD	HI	NHCO

Compared to Table IV-1 in Chapter 4, the top ranking nonprofits in centrality measures (Table V-9) do not change significantly. However, when comparing to the three information networks (i.e., the nonprofit, nonprofit plus business and nonprofit plus public agency networks), (locally) powerful actors (i.e., power centrality) are different. This implies that local power in the information sharing network is very sensitive to inclusions of other sector organizations.

5.3.2.2 Work referral network

Figure V-8 illustrates flows of work referral among nonprofits and public agencies. Most public agencies, except for two (ACDHS and CL), are positioned at the periphery of the network and their relationships are dyadic. The Addition of public agencies brings changes in work referral flows. All public agencies in the work referral network send work referrals, and less than half of them (46%) have reciprocal relationships with nonprofits. In other words, public agencies play a sender role in work referrals. Compared to the work referral network with businesses, we can see a clear difference between the two work referral networks; business mostly plays a receiver role and public agencies mostly play a sender role.

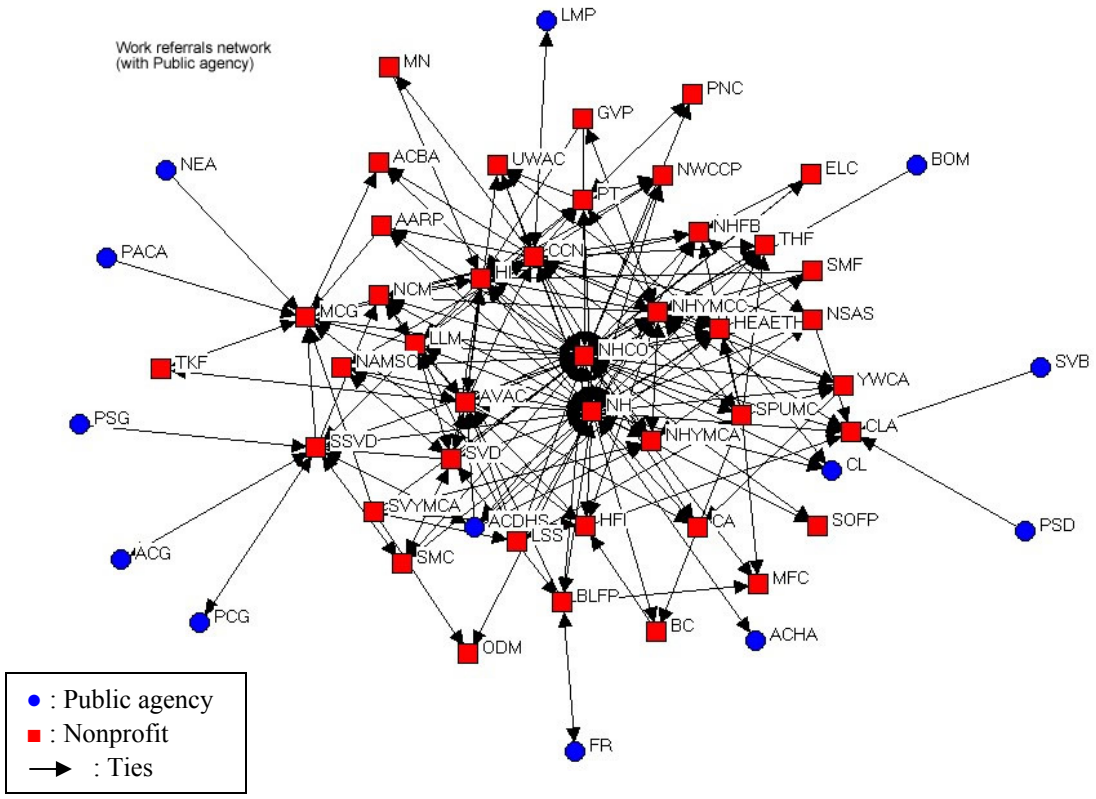


Figure V-8) Work referral network with public sector sociogram

Unlike other public agencies, two public agencies (ACDHS and CL) become embedded in the work referral network. ACDHS has connections with five nonprofits, of which four nonprofits (NH, NHYMCC, AVAC, and SSVD) are within the top five in centrality measures. CL has three relations with nonprofits, of which two nonprofits are in the top five (NH and NHCO). This implies that these two public agencies are influential over the whole network because they are efficient in reaching the rest of nonprofits through a few relationships with the most central actors that position high in the eigenvector centrality.

As shown in Table V-10, the top rank organizations are almost the same as the nonprofit work referral network. The top five organizations in the in-degree centrality are the same regardless of involvement of other sectors. Two dominant nonprofits (NH and NHCO) keep the number one and two positions, respectively, in most of the centralities regardless of inclusions of other sector organizations. These two actors are expected to play a service coordinating role

because they have a good knowledge about various types of social programs[48], and are located in central positions of degree, betweenness, and eigenvector centrality. This coordination of work referral flows is expected to help nonprofits provide social services in a timely manner.

Table V-10) Top five actors of various centralities in the work referral network[49]

Rank	In-Degree centrality	Out-degree centrality	Power centrality	In-closeness centrality	Out-closeness centrality	Between-ness centrality	Eigen-vector centrality	Flow centrality
1	NH	NHCO	SSVD	ACBA	SVYMCA	NHCO	NHCO	NH
2	NHCO	NH	CCN	NHCO	NH	NH	NH	NHCO
3	CCN	HI	NHYMCC	NH	NHCO	SSVD	CCN	AARP
4	NHYMCC	NHYMCC	NHFB	HI	BOM	CCN	NHYMCC	SSVD
5	AVAC	AVAC	LSS	MCG	CCN	NHYMCC	HI	MCG

Another feature is that one nonprofit (SSVD), which was outside the top ranks of centrality, now has high ranks in power, betweenness and flow centralities. Three public agencies connect to SSVD for work referrals (Figure V-8). With relatively many relations with public agencies, SSVD becomes not only locally powerful but also a strategically significant actor in terms of its broker position between public agencies and other nonprofits.

5.3.2.3 Regular meeting network

Figure V-9 shows the regular meeting network among nonprofits and businesses. In this network, the inclusion of the public sector does not change the network structure because only two public agencies are attached in the marginal region of the network.

[48] These two nonprofits also provide seven different types of social services in collaboration with other organizations. Compared to the mean number of programs that all nonprofits provide in collaboration with other organizations (2.8), these two nonprofits have significantly more collaborative relations.

[49] Here, closeness centrality does not provide the correct measurement because the work referrals network is technically unconnected – some of actors have only in-degree or out-degree. Thus, as an alternative measure for closeness, eigenvector (i.e., Bonacich influence centrality) measures the closeness centrality more appropriately.

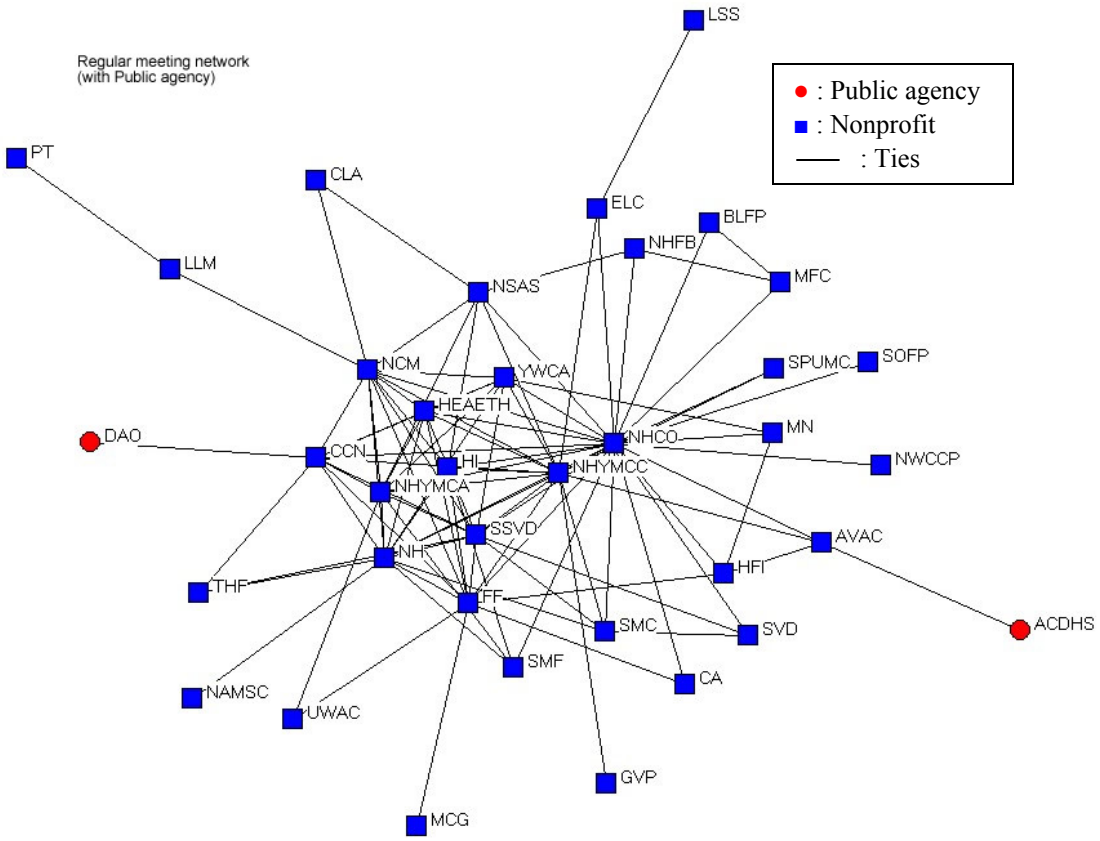


Figure V-9) Regular meeting network with public sector sociogram

Table V-11) Top five actors of various centralities in the regular meeting network

Rank	Degree centrality	Power centrality	Closeness centrality	Between-ness	Eigenvector centrality	Flow centrality
1	NHCO	NCM	NHCO	NHCO	NHCO	NHCO
2	NHYMCC	AVAC	NHYMCC	NHYMCC	NHYMCC	NCM
3	NH	MN	NCM	NCM	NH	NHYMCC
4	NCM	PT	NH	FF	NCM	FF
5	FF	NH	FF	NH	SSVD	NH

Except for power centrality, other centrality measures are the same as in the nonprofit regular meeting network (Table V-11). AVAC was not powerful in the nonprofit network but becomes the second most powerful due to its relationship with ACDHS. As in the previous chapter, the North Hills Nonprofit Consortium members are dominant in this network, and there is no strategically significant actor.

5.3.2.4 Resource sharing network

Because only three public agencies are added to the resource sharing network, the basic structure – the three-subgroup structure – remains the same (Figure V-10).

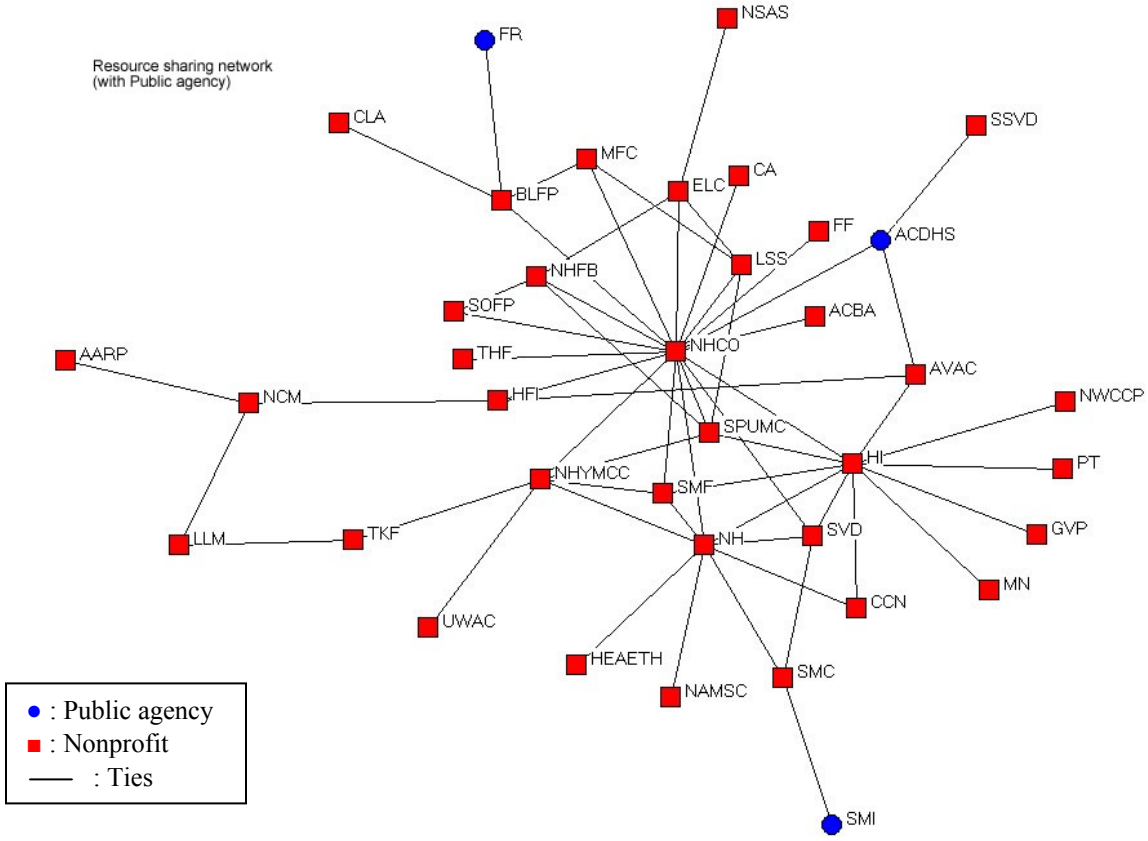


Figure V-10) Resource sharing network with public sector sociogram

Compared to the resource sharing network with businesses, the small number of public agency implies that nonprofits feel more comfortable sharing physical resources with businesses than with public agencies. One nonprofit (SSVD), which were an isolate in the nonprofit resource sharing network, becomes linked to the network through a public agency (ACDHS). This implies that the public sector becomes embedded in the resource sharing network.

The top ranking actors in the resource sharing network (Table V-12) remain the same as those in the nonprofit resource sharing network. Four nonprofits (NHCO, HI, NHYMCC, and NH), which were at the center of three respective subgroups, are again dominant in most of the centrality measures.

Table V-12) Top five actors of various centralities in the resource sharing network

Rank	Degree centrality	Power centrality	Closeness centrality	Between-ness	Eigenvector centrality	Flow centrality
1	NHCO	NHCO	NHCO	NHCO	NHCO	NHCO
2	HI	HI	NH	HI	HI	HI
3	NH	NH	HI	NH	NH	NH
4	NHYMCC	NCM	SMF	NHYMCC	SPUMC	BLFP
5	SPUMC	SMC	NHYMCC	HFI	SMF	NHYMCC

SMF and SPUMC still occupy a strategically significant position because they are efficient in dealing with resource sharing relations. HFI is also still strategically significant in terms of its intermediary role between two subgroups. However, there are slight changes in actor centrality with the inclusion of public agencies. First, one nonprofit (SMC) has a new tie with a public agency that raises its local power. Second, one nonprofit (BLFP) is higher in flow centrality when it connects to a public agency. Thus, BLFP turns out to be strategically significant in terms of its broker role between a public agency and other nonprofits.

5.3.2.5 Formal contract network

As shown in Figure V-11, many public agencies have formal contracts with nonprofits. Most public agencies locate at the edge of the network, but two public agencies locate at the center of the network. In particular, when public agencies are introduced, the formal contract network is structurally different from the network structure of the other two formal contract networks[50], which were the apparent three-subgroup structure where FF was the only connection between the three subgroups. The biggest structural change comes from inclusion of one public agency (ACDHS), as it connects to the three important actors in three subgroups (HFI, NHCO, and SSVD). Specifically, two nonprofits (ACBA and YWCA), which were isolated components in the nonprofit formal contract network (Figure IV-5), join the main component through two public agencies (ACDHS and ACG). AVAC links to the network through ACDHS and has formal contract with another public agency, ACDED. Another structural change is a new, small component; One nonprofit (MCG) is the center of this new component and has three formal contracts with public agencies.

[50] Refer to chapter 4 section 4.3.6 and this chapter section 5.3.1.5.

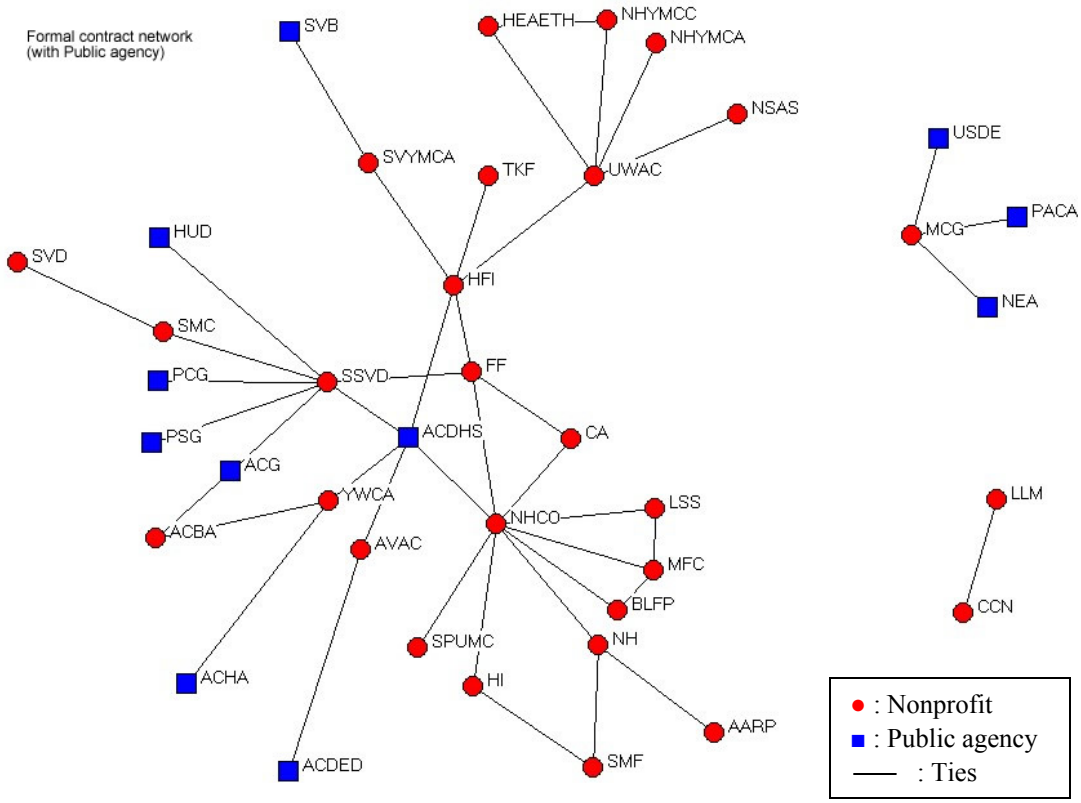


Figure V-11) Formal contract network with public sector sociogram

ACDHS and FF are the most efficient and the most central in terms of their betweenness centrality (Table V-13). These two organizations occupy both types of strategically significant position simultaneously.

Table V-13) Top five actors of various centralities in the formal contract network

Rank	Degree centrality	Power centrality	Closeness centrality	Between-ness	Eigenvector centrality	Flow centrality
1	NHCO	NHCO	ACDHS	ACDHS	NHCO	NHCO
2	SSVD	SSVD	FF	NHCO	FF	HFI
3	ACDHS	UWAC	NHCO	HFI	ACDHS	SSVD
4	HFI	HFI	HFI	SSVD	SSVD	UWAC
5	UWAC	MCG	SSVD	FF	MFC	ACDHS

ACDHS is strategically significant in terms of its betweenness (it is not central in the power centrality but central in the betweenness centrality) and its high reachability (efficiency to

reach others). FF is also strategically significant in terms of its reachability and a broker role because it is relatively high in the betweenness centrality but is not powerful[51].

5.3.2.6 Joint program network

The basic structure of the joint program – the two-subgroup structure – remains the same as the joint program network in Chapter 4 (Figure V-12). However, the joint program network becomes more localized and sparser with the inclusion of public agencies because 1) two small components emerge and most of public agencies attach to the edge of the network with a dyadic relation to nonprofits, and 2) the number of ties per actor is smallest among the three joint program networks. For example, the number of ties per actor is 3.1 and 2.2 when businesses and public agencies join the joint program network, respectively.

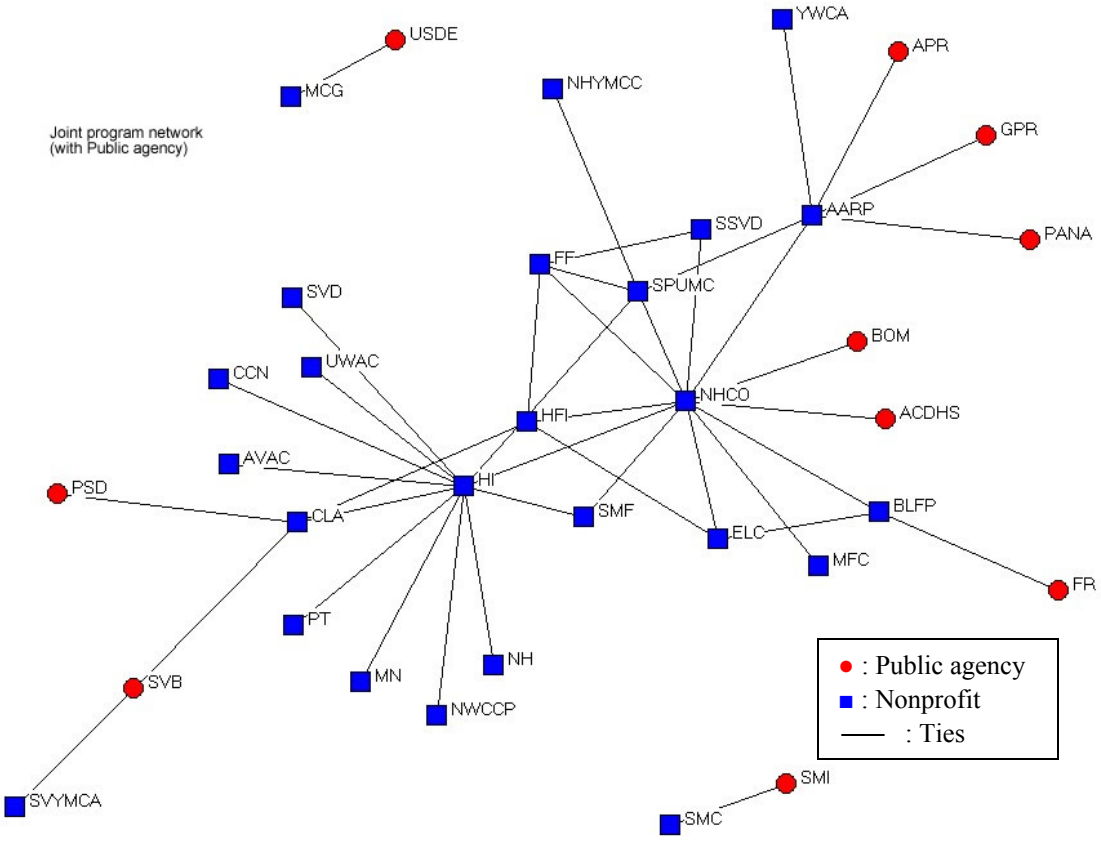


Figure V-12) Joint program network with public sector sociogram

[51] Detailed interpretation of these two strategically significant actors is the same as the formal contract network in the chapter 4.

Public agencies allow more nonprofits to participate in joint programs, as businesses did. The diameter of the network grows by one public agency (SVB) because one nonprofit (SVYMCA), which was in isolation in the nonprofit joint program network, links to the main component through SVB. This is an indication of embeddedness of public agencies in the joint program network.

Table V-14) Top five actors of various centralities in the joint program network

Rank	Degree centrality	Power centrality	Closeness centrality	Between-ness	Eigenvector centrality	Flow centrality
1	HI, NHCO	HI	NHCO	HI	NHCO	HI
2		NHCO	HI	NHCO	HI	NHCO
3	AARP	AARP	SPUMC	AARP	SPUMC	AARP
4	SPUMC	FF	SMF	CLA	FF	CLA
5	CLA	CLA	AARP	SPUMC	AARP	SPUMC

Just like the other two joint program networks discussed before, two nonprofits (HI and NHCO) are dominant in this network. SMF is still strategically significant in terms of its high reachability (with low costs to maintain relations) in respect to other organizations in the network. In the main component, most of joint program relationships with public agencies exclusively concentrate on three nonprofits (NHCO, AARP, and CLA). Therefore, these nonprofits are bridges between the nonprofit and public sector in the joint program relationships. In particular, two nonprofits (AARP and CLA) are strategically significant as gate player.

5.4 NETWORK CENTRALIZATION ANALYSIS

In order to observe the collaboration network at the group level, this section analyzes network centralization. As in the previous chapter, the NCI of three centralities are presented according to the intensity of collaborative relationships when the business and public sector join the collaboration networks. First, as the collaborative relationships intensify, the network structure becomes less hierarchical or decentralized (except for the joint program) because degree and closeness centrality NCIs show declining patterns (Figure V-13 and 14).

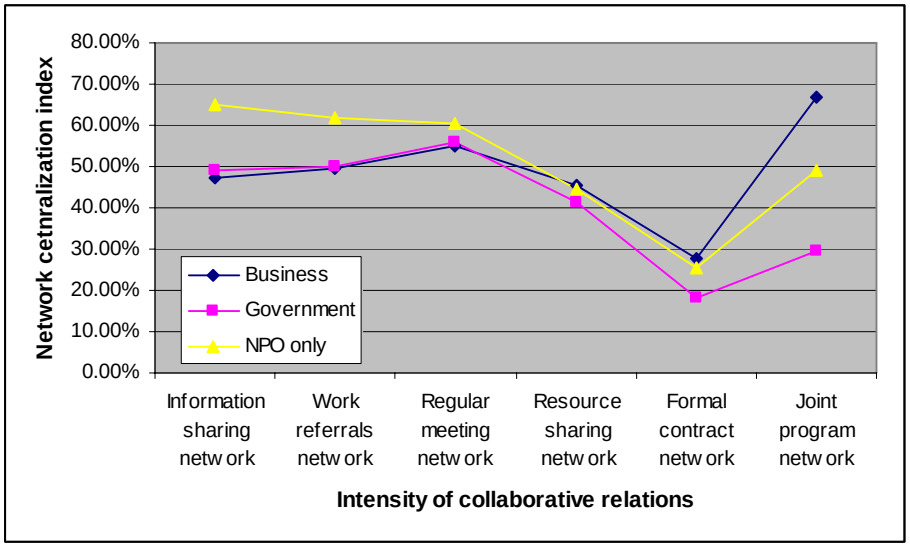


Figure V-13) NCI by collaboration relationships in degree centrality

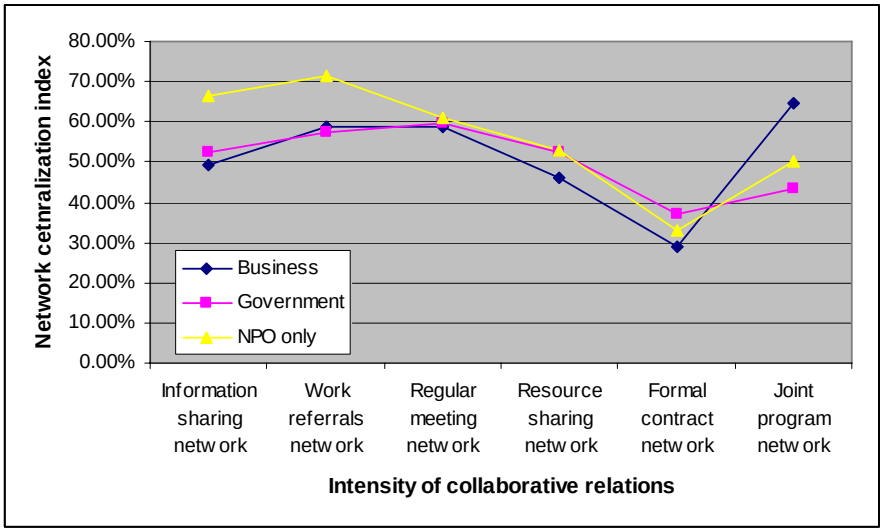


Figure V-14) NCI by collaboration relationships in closeness centrality

Second, the inclusion of the two sectors causes structural changes to networks in terms of decreasing NCIs of degree and closeness centrality in the information and tactical collaboration networks (Figure V-13 and 14); the business and/or public sector make networks less hierarchical – more structurally equal among network actors in the less intensive collaboration networks. This is because businesses or public agencies make connections with relatively less popular or less influential nonprofits when they choose their partners for information sharing or work referrals.

However, patterns are different in the strategic collaboration. With the inclusion of public agencies, the network structures become decentralized because NCIs of the public sector decline, except for the formal contract closeness centrality NCI[52] (Figure V-13 and 14). On the contrary, the inclusion of businesses renders the structure more centralized because the NCIs increase. This study develops this fact into a hypothesis; businesses are likely to make strategic collaboration with popular (i.e., high degree centrality) nonprofits while public agencies tend to make strategic collaboration relations with relatively less popular nonprofits. In particular, the joint program network becomes more hierarchical with the inclusion of businesses[53]; businesses exclusively prefer popular nonprofits as their joint program partners.

Third, Figure V-15 illustrates the NCI of the betweenness centrality. There are clearly different patterns between the NCI of the degree and the NCI of the closeness centrality. Networks become more hierarchical as the collaboration relationships become more intensive, except for formal contract relationships.

There are three interesting findings in Figure V-15. First, when nonprofits share information with businesses, the information flows becomes more hierarchical or centralized in terms of the betweenness centrality (i.e., NCI of betweenness centrality in information sharing is remarkably high when businesses are involved). About half the information in the network goes through a small number of gate or bridge role nonprofits that are located between the nonprofit and business sector. This confirms the findings described in the section 5.3.1.1 which state that a small number of nonprofits play a gate (or broker) role between nonprofits and businesses in information exchanges. Second, in the formal contract network, when public agencies are introduced into the network, NCI decreases 10% compared to the other two formal contract networks. This is because of ACDHS, which has the strongest betweenness centrality[54]. Third, two sectors (i.e., the business and public sector) show different patterns of making relationships in the joint program network. While most businesses attach to two hub nonprofits, most public agencies do not make joint program relations with these hubs, rather working with the other nonprofits.

[52] The high closeness centralilty NCI in the formal contract network is due to the fact that one public agency (ACDHS) occupies the number one position in the closeness centrality.
[53] When businesses are introduced, the degree centrality NCI increases almost by 20% (from 49% to 68%).
[54] In the other two formal contract networks, only one organization (FF) plays a dominant broker role. But when ACDHS becomes another dominant broker in the network, the NCI of betweenness centrality decreases.

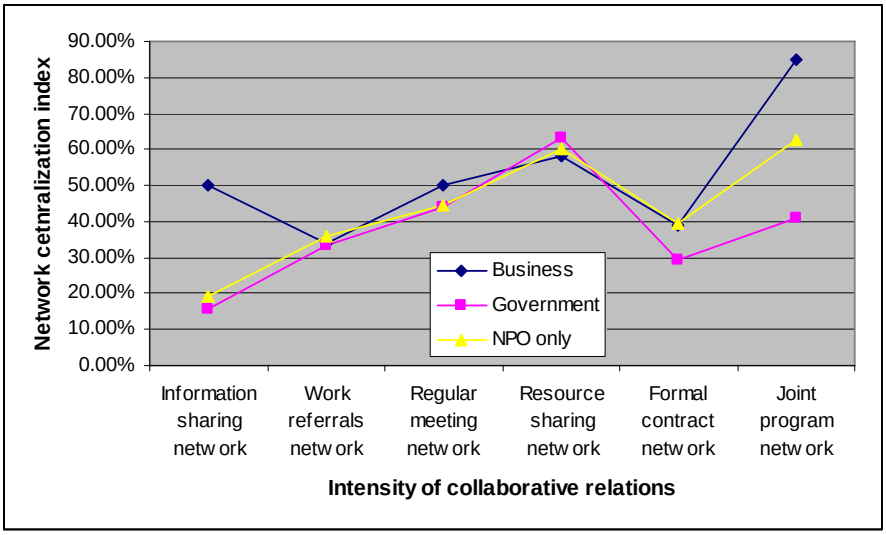


Figure V-15) NCI by collaboration relationships in betweenness centrality

In sum, there are two main findings in this section; 1) the collaboration network localizes as the intensity of collaboration becomes stronger: NCI of degree and closeness centrality decrease along with collaboration intensity. However, the role of the broker becomes more important as the networks are localized because cohesive subgroups do not have a direct connection to each other and therefore should depend on a broker to send or receive the strategic collaborations to and from other subgroups, and 2) the inclusion of other sector organizations brings structural changes to the collaboration networks. Among others, it is worthwhile to mention changes in the information or tactical collaboration network and joint program network. In the information or tactical collaboration network, the collaboration networks become more horizontal or localized when two other sector organizations are introduced in. In the joint program network, when businesses join the network, the network become more centralized in two hub nonprofits, but when pubic agencies are introduced, the network becomes more structurally equal or localized.

5.5 SUMMARY

The descriptive analyses in this chapter have demonstrated the general pictures of the collaboration networks when other sectors are introduced; the inclusion of other sector

organizations makes the collaboration networks less centralized or more localized in structure in most networks and more centralized in two networks (information and joint program networks with the inclusion of businesses). For example, in the information sharing network, we witnessed the emergence of information intermediaries between two sectors. In the work referral network, the inclusion of other sectors brings clear distinction in the three roles in referral flows – a sender, receiver, and broker. The public sector and business sector have unique roles – a sender and receiver, respectively.

At the individual actor level, there are hints of blurring boundaries: two cases of businesses' embeddedness in the social service collaboration network and five cases of public agencies' embeddedness in the collaboration networks. Most notably, except in the joint program network, ACDHS plays an important role in blurring boundaries between the nonprofit and public sector. Since these descriptive analyses do not reveal the systemic differences caused by other sector inclusion into the collaboration networks, a more sophisticated analysis is required to explore this in detail. In the next chapter, the effects of other sector involvement on blurring boundaries will be analyzed in a systemic way, using a more sophisticated analytic technique, blockmodel.

Finally, from the network centralization analysis, this study reveals how businesses or public agencies behave when they select collaboration partners. Businesses prefer popular nonprofits more when they make strategic collaborative relationships with nonprofits, but public agencies do not. However, public agencies prefer influential nonprofits in formal contracts.

VI. COLLABORATION PATTERNS IN BLURRING BOUNDARIES BETWEEN THE SECTORS: ON THE BASIS OF BY BLOCKMODELS

6.1 INTRODUCTION

This chapter aims to describe and uncover hidden collaboration patterns from a macro perspective by reducing the complex networks in the previous chapters into simple blockmodels. Blockmodeling provides two pieces of *empirical evidence for blurring boundaries between the nonprofit and business/public sector*; 1) when either business or public organizations are introduced in the collaboration networks, new network structures replace the network structures which were composed exclusively of nonprofits. However, structural changes resulting from the involvement of the business sector are different (but not always) from structural changes resulting from the public sector. For instance, in formal contract network, when public agencies are involved, the centralized hierarchy structure replaces the cohesive subgroup structure. However, the cohesive subgroup structure remains the same when businesses are introduced. 2) Some nonprofits show similar patterns of collaboration relationships with businesses and with public agencies.

Organizational attributes analysis of the strategically significant blocks in the nonprofit network uncovers three significant findings; 1) nonprofits with roughly a $1M budget size play a central and broker (but not always) role in all six types of networks. 2) The well-established (i.e., old and large) nonprofits prefer more formal types of strategic collaboration (i.e., formal contract or joint program) as compared to less formal collaboration (physical resource sharing). 3) Finally, strategically significant roles are uncovered according to types of collaboration networks. Details are fully explained in the following sections.

6.2 EVIDENCE FOR BLURRING BOUNDARIES

This study establishes a principle that will judge whether analysis results explain the seamless economy. The involvement of organizations from the business and public sectors in the nonprofit collaboration networks may cause network structures to change or to remain the same. This study focuses on changes in network structure because new structural patterns resulting from the synthesis of different collaboration patterns[55] are expected to emerge in the region of blurring boundaries

There are fundamentally different features between three sectors which cannot be the same across the sectors. First, the sources of revenues are different. Second, their respective bottom lines for operating organizations are different. Nonprofits manage organizations on the basis of the non-distribution voluntary principle. Businesses manage organizations on the basis of the redistribution principle and governments on the basis of break-even. This study assumes that these fundamental differences cause distinctive patterns of collaboration when each sector organizations collaborate between within-sector organizations, respectively. However, when it comes to the cross-sector collaboration with a shared goal, new collaboration patterns of the cross-sector collaboration replace patterns of within sector collaboration. Eventually integration between sectors happens in the blurring regions. The integration represents new network structures which are not the same as collaboration patterns of either sector. For this reason, the boundaries between the sectors do not exist anymore. If there is no or negligible change of network structure, this indicates that the inclusion of other sectors is a simple attachment to the existing structure, and it is not probable that there is integration between the sectors. In this case, it is difficult to support the claim of blurring boundaries between the sectors.

[55] This study assumes that collaboratin patterns of the nonprofit sector are different from the collaboration patterns of the other two sectors.

6.3 BLOCKMODELS OF THE NONPROFIT SECTOR COLLABORATION NETWORKS

6.3.1 Information sharing network blockmodel

The best blockmodel of the information sharing network (42 nonprofits) is composed of five blocks (For detailed results of blockmodeling, see Appendix 9-1 blocked adjacency matrix). Two blocks consists of medium to small number of actors (block 1 and 5), and three other blocks consist of medium to large number of actors (Block 2, 3 and 4) (Table VI-1).

Table VI-1) Block members of information sharing network

Block Member
1: NH NHCO NHYMC SVYMC (4)
2: BLFP GVP NWCCP ODM PNC PT SMC SMF SOFP (9)
3: AARP ACBA CA NAMSC NHFB NSAS SSVD SVD THF UWAC YWCA (11)
4: AVAC CCN CLA FF HEAET HFI HI LLM MCG NCM NHYMC SPUMC (12)
5: BC ELC LSS MFC MN TKF (6)

* Hereafter parenthesis in the block members table is the number of actor in the block

Descriptions of block positions

Table VI-2) Typology for structural positions for information sharing relations

	$(g_k-1)/(g-1)$	Within tie/ Between tie	$P(B_k)$	Position	
				Typology I	Typology III
Block 1	0.073	0.092	117.97	Primary	Central
Block 2	0.195	0.046	4.67	Broker	Periphery
Block 3	0.244	0.289	12.53	Primary	Intermediate
Block 4	0.268	0.476	24.24	Primary	Central-intermediate
Block 5	0.122	0	11.33	Broker (Transmitter)	Intermediate

* The median of $P(B_k)$ is 12.53. And mean is 34.15.

In the information sharing network, block 1 occupies the most important position in terms of two typologies. Block 1 occupies both a primary[56] and central position. This indicates that it is an information coordinator role in the whole network. Block 3, 4 and 5 are located in intermediate positions. The intermediate position means that the contributions of these three blocks are significant in terms of their relationships with other blocks, but they do not place on

[56] Usually, when a block is a cohesive subgroup (i.e., there is a within block tie), this block is identified as occupying a primary position. In other words, even though a block is not located at the center of a network, this block could be in a primary position. In this case, the block is primary only in terms of within block relations.

the center of the network. In particular, block 5 plays an information transmitter role between block 1 and 4. Block 2 locates in the periphery of the network. These interrelations between blocks are visually shown in Figure VI -1.

Descriptions of overall blockmodel

Table VI-3) Permuted image matrix of information sharing network

	1	4	3	5	2
1	1(SE)	1(SE)	1(SE)	1(RE)	1(SE)
4	1(SE)	1(RE)	1(RE)	1(RE)	0
3	1(SE)	1(RE)	1(RE)	0	0
5	1(RE)	1(RE)	0	0	0
2	1(SE)	0	0	0	0

- 1: One block
  - (SE): Structural Equivalent block (Within block density >0.75)
  - (RE): Regular Equivalent block (Within block density > overall network density plus at least row/column functional block)
- 0: Zero block

The image matrix in Table VI-3 represents a central-periphery system. Other feature is that three blocks (block 1, 3, and 4) are cohesive subgroups.

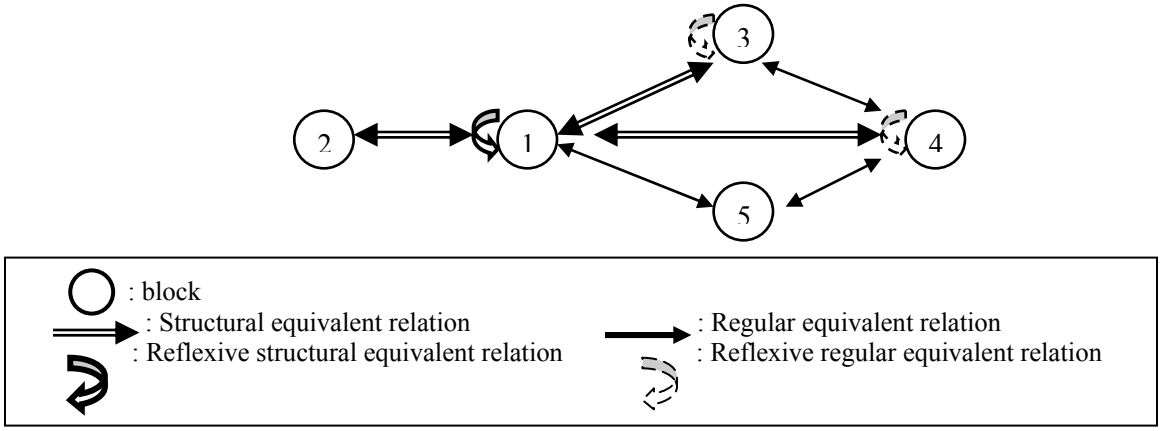


Figure VI-1) Reduced sociogram of information sharing network

The structure of the information sharing network is that of a cohesive network because 1) three blocks are internally cohesive and 2) four blocks are connected with structural equivalent relationships; as seen in Figure VI-1, block 1 has structural equivalent relationships with block 2, 3 and 4. Since there is information redundancy in the structural equivalent relationships, most information flows in this network are redundant. Because of information redundancy, the

information sharing network is not efficient. However, once new information enters into the network, the diffusion of new information is expected to be fast because the information network is very cohesive.

A sender, broker, and receiver of information are identified from power centrality (Appendix 9-2). Block 1 is a broker because it is dependent on block 3 (i.e., receives information from block 3), but block 4 and 5 are dependent on block 1 (i.e., block 1 sends information to block 4 and 5). The power centrality of block 1 is almost equal to that of block 2, which means that the two blocks are reciprocal in information exchanges. Block 3 is a sender. Block 4 and 5 are receivers for three reasons; they are dependent on block 1 and 3 for information, block 3 mostly sends information to block 1 and 4, and block 1 and 4 are dependent on block 3 for information.

6.3.2 Work referral network blockmodel

The best blockmodel of the work referral network (41 nonprofits) is composed of five blocks (Table VI-4). Two blocks consists of a medium to small number of actors (1 and 4), and three other blocks consist of medium to large number of actors (2, 3 and 5).

Table VI-4) Block members of work referral network

Block	Members
1:	ACBA BC HFI MN TKF (5)
2:	AVAC CCN MCG NH NHCO NHYMCC SPUMC SVD SVYMCA (9)
3:	HEARTH HI LLM NCM NHFB NSAS SMC SSVD UWAC (9)
4:	ELC GVP NHYMCA NWCCP PT SMF (6)
5:	AARP BLFP CA CLA LSS MFC NAMSC ODM PNC SOFP THF YWCA (12)

Descriptions of block positions

Table VI-5) Typology for structural positions for work referral relations

	$(g_k-1)/(g-1)$	Within choice/ Between choice	Choice received/ Choice sent	In-degree $P(B_k)$	Out-degree $P(B_k)$
Block 1	0.1	0.167	2.167	2.40	0
Block 2	0.2	0.244	0.794	24.00	44.00
Block 3	0.2	0.267	1.289	10.22	3.67
Block 4	0.125	0.077	0.769	3.00	8.00
Block 5	0.275	0.065	1.419	3.50	2.42

* In-degree $P(B_k)$: Median is 3.5 and mean is 8.62. ** Out-degree $P(B_k)$: Median is 3.67 and mean is 11.62.

	Position			
	Typology I	Typology II	Typology III (in)	Typology III (out)
Block 1	Primary	Receiver	Periphery	Isolate
Block 2	Primary	Carrier (Sender)	Central	Central
Block 3	Primary	Carrier (Receiver)	Central	Intermediate
Block 4	Broker	Carrier (Sender)	Intermediate	Central -intermediate
Block 5	Broker	Carrier (Receiver)	Intermediate	Periphery

Table VI-5 illustrates which blocks occupy what kinds of positions. First, block 2 and 3 are a primary and central block. They receive and send referrals within and across blocks. However, they are slightly different in terms of their role. While block 2 sends more referrals (0.8 in ratio of received and sent), block 2 receives more referrals than it sends (1.3). Block 1 is an isolate in terms of out-degree and plays a receiver role. Block 4 is a broker and sends more than receives. Block 5 is a receiver and is located in the periphery of the network.

Descriptions of overall blockmodels

Table VI-6) Permutated image matrix of work referral network

	2	3	4	5	1
2	1(RE)	1(RE)	1(RE)	1(RE)	1(RE)
3	1(RE)	1(RE)	0	0	0
4	1(RE)	1(RE)	0	0	0
5	1(RE)	0	0	0	0
1	0	0	0	0	0

Permuted image matrix table (Table VI-6) looks similar to a central-periphery system. However, this network should be carefully examined in order to find out the hidden patterns of network.

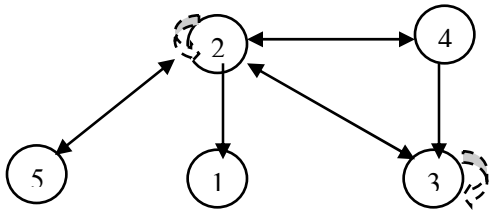


Figure VI-2) Reduced sociogram of work referral network

As described in Table VI-5, the work referral blockmodel is roughly composed of two senders and three receivers of referrals. Two sender blocks (2 and 4) are likely to be well known

or easily accessible nonprofits that many clients in need visit. Thus, these two blocks are expected to play an entrance role in the network. Block 2 also plays a strategically significant role in the network, as a service coordinator; block 2 not only is a carrier of service referrals but also is composed of high betweenness centrality nonprofits (See Appendix 9-7). In addition, as shown in the above picture, this block has relationships with all four other blocks. These indicate that most work referrals are concentrated in this block and, in turn, block 2 resends work referrals to nonprofits that have programs related to specific needs of clients. On the other hand, block 1, 3, and 5 play a service delivery role because they receive more referrals from block 2 or 4 than they send.

In sum, through blockmodeling, a hidden pattern of the work referral flows emerge. The work referral network is composed of three types of nonprofits - a sender, service coordinator, and receiver. On the basis of the direction of work flows, it is appropriate to interpret the work referral network as a hierarchical structure rather than a simple central-periphery system.

6.3.3 Regular meeting blockmodel

Through blockmodeling, this study identifies five blocks from the regular meeting network which is composed of 35 nonprofits. Two blocks (1 and 2) are relatively large and two blocks (3 and 5) are medium size. Block 4 consists of only two nonprofits.

Table VI-7) Block members of regular meeting network

Block	Members (35):
1:	CA CLA ELC GVP LLM MCG NAMSC NWCCP SOFP SPUMC THF UWAC (12)
2:	CCN FF NCM NH NHCO NHYMCA NHYMCC NSAS SSVD (9)
3:	HFI HI MFC SVD YWCA (5)
4:	LSS PT (2)
5:	AVAC BLFP HEARTH MN NHFB SMC SMF (7)

Descriptions of block positions

Block 1 is located on the periphery of the network, which confirms the fact that nonprofits in this block showed less inclination to collaborate (CRI is 0.98) (See Appendix 9-12). As a primary and central position occupant, block 2 coordinates flows of information or relevant issues of importance in the network because nonprofits in this block showed high betweenness centrality (See Appendix 9-12).

Table VI-8) Typology for structural positions for regular meeting relations

	$(g_k-1)/(g-1)$	Within tie/ Between tie	$P(B_k)$	Position	
				Typology I	Typology III
Block 1	0.3235	0	1.75	Broker	Periphery
Block 2	0.2353	0.517	19.33	Primary	Central
Block 3	0.1176	0	10.40	Broker	Central
Block 4	0.0294	0	0	Sycophant	Isolate
Block 5	0.1765	0	8.29	Broker	Intermediate-central

* The median of $P(B_k)$ is 8.29. And mean is 7.95.

Block 3 and 5 occupy a local broker position which is obvious in Figure VI-3. Finally, block 4 is of marginal inclusion in this network because it is isolated from other blocks.

Descriptions of overall blockmodels

Table VI-9) Permuted image matrix of regular meeting network

	2	3	5	1	4
2	1(SE)	1(RE)	1(RE)	1(RE)	0
3	1(RE)	0	1(RE)	0	0
5	1(RE)	1(RE)	0	0	0
1	1(RE)	0	0	0	0
4	0	0	0	0	0

Image matrix in Table VI-9 shows that structure of this network is a central-periphery system with one isolate block (block 4). Figure VI-3 illustrates the central-periphery system.

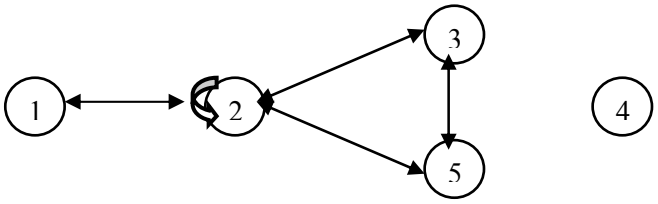


Figure VI-3) Reduced sociogram of regular meeting network

Block 2 is located at the center of the network and is a very cohesive subgroup (i.e., structural equivalence within a block). Most of nonprofits in this block are members of the North Hills Nonprofit Consortium. This documents that this Consortium coordinates issues or problems of North Hills nonprofits. When problems or issues arise from nonprofits in the network, these problems arrive immediately at the Consortium through the direct relations. Afterwards, these issues are discussed within block 2 and the results of this discussion are in turn

diffused to adjacent blocks. Finally, since block 4 is isolated from this network, nonprofits in this block do not enjoy the advantages of this coordinating structure.

In sum, the structure of the regular meeting network enables nonprofits in this network to coordinate and solve their problems in an efficient way. At the center of the network there is a well-established consortium which plays a strategically significant role.

6.3.4 Resource sharing network blockmodel

The resource sharing network is reduced through blockmodeling to four blocks. The size of two blocks (2 and 4) is medium to large and that of the other two (1 and 3) is medium to small.

Table VI-10) Block members of resource sharing network

Block Members (34)
1: ELC HI LSS NH NHCO NHFB SPUMC (7)
2: ACBA CA CCN FF GVP HEARTH MN NAMSC NWCCP PT THF (11)
3: AVAC CLA NCM SMC TKF UWAC (6)
4: AARP BLFP HFI LLM MFC NHYMCC NSAS SMF SOFP SVD (10)

Descriptions of block positions

Table VI-11) Typology for structural positions for resource sharing relations

	$(g_k-1)/(g-1)$	Within tie/ Between tie	$P(B_k)$	Position	
				Typology I	Typology III
Block 1	0.1818	0.4444	8.57	Primary	Central
Block 2	0.3030	0	1.09	Broker	Periphery
Block 3	0.1515	0	1.83	Broker	Periphery
Block 4	0.2727	0.1379	5.00	Broker	Central

* The median of $P(B_k)$ is 3.42. And mean is 4.12.

Block 1 occupies a central position in the network and plays a primary role (i.e. coordinating resource flows) in the network. Block 4 also occupies a central position but this block plays a local broker role between block 1 and 3. Block 2 and 3 are located at the edge of the network.

Descriptions of overall blockmodels

It is difficult to describe the exact type of network structure from the image matrix in Table VI-12. The structural type could be a central-periphery system in terms of three blocks

(block 1, 2, and 4), or be a hierarchy system. Thus, this study calls it as a mixture of central-periphery and hierarchy system.

Table VI-12) Permuted image matrix of resource sharing network

	1	4	2	3
1	1(RE)	1(RE)	1(RE)	0
4	1(RE)	0	0	1(RE)
2	1(RE)	0	0	0
3	0	1(RE)	0	0

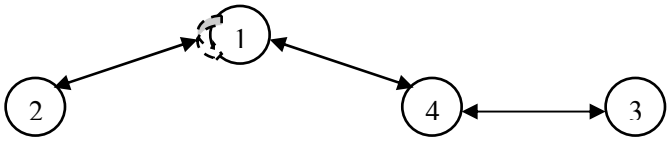


Figure VI-4) Reduced sociogram of resource sharing network

Block 1 is not only located in the central position but also is the most powerful in terms of resource flows, which means that other blocks are dependent on nonprofits in block 1 for physical resource sharing (See Appendix 9-17 for power centrality). One should be careful in interpreting these dependency relations because the power in this block does not mean that nonprofits in block 1 have extra physical resources to give[57]. Rather, these nonprofits would be willing to share their physical resources with other nonprofits because they like collaborating with other nonprofits or are less selfish in terms of sharing physical resources. Thus, this study suggests that the power centrality in the physical resource sharing network should be interpreted as related to their organizations' willingness (or unselfishness) to share.

The power relationships between block 1 and 4 could be interpreted in two ways. First, of course, block 1 and 4 share physical resources each other. Second, block 4 may have extra resources to provide to other nonprofits because this block is the biggest in terms of size ($3.8M). Block 4 asks block 1 to find nonprofits that want to share physical resources which it owns. In this relationship, block 1 plays a resource flow coordinator role at the center of the network. Block 4 also plays a local broker role between block 1 and 3. When block 4 does not have specific physical resources that block 3 wants, block 4 may send referrals to block 1 for block 1 having asked about sharing physical resources.

[57] Size of the block 1 ranks in the third ($1.2M) among four blocks.

In sum, this study uncovers a hidden pattern in the resource sharing network; physical resource flows are not dependent on wealthiness of resources but rather on their willingness to work together with other nonprofits.

6.3.5 Formal contract network blockmodel

The formal contract network, which is composed of 22 nonprofits (the main component), is reduced to 3 blocks as seen in Table VI-13. This reduction enables us to uncover hidden patterns of formal contract relations. The size of three blocks is large, medium, and small for block 3, 2 and 1 respectively.

Table VI-13) Block members of formal contract network

Block Members (22)
1: HFI SVYMCA TKF (3)
2: BLFP CA FF HI LSS MFC NHCO SPUMC (8)
3: AARP HEAETH NH NHYMCA NHYMCC NSAS SMC SMF SSVD SVD UWAC (11)

Descriptions of block positions

Table VI-14) Typology for structural positions for formal contract relations

	$(g_k-1)/(g-1)$	Within tie/ Between tie	$P(B_k)$	Position	
				Typology I	Typology III
Block 1	0.095	0.667	0	Primary	Isolate
Block 2	0.333	0.833	0	Primary	Isolate
Block 3	0.476	0.818	0	Primary	Isolate

The three blocks are all primary and isolate ($P(B_k)$ of all three blocks are zero). This means that nonprofits in each block primarily interact within the block and that the three blocks do not have external relationships between blocks.

Descriptions of overall blockmodels

Table VI-15) Image matrix of formal contract network

	1	2	3
1	1(RE)	0	0
2	0	1(RE)	0
3	0	0	1(RE)

The image matrix in Table VI-15 clearly illustrates that the structure of this network is a cohesive subgroups system. The three blocks only have within ties and do not have any external relationship with other blocks.

Figure VI-5) Reduced sociogram of formal contract network

Figure VI-5 is a visual presentation of the formal contract blockmodel. It is simple to understand but intuitively interesting. Formal contract relationships are completely localized and this localization is determined by the organizational characteristics; large nonprofits with high organizational capability collaborate between themselves; medium sized, younger nonprofits work together between themselves; and small-medium size nonprofits that have high interests in business methods collaborate between themselves (See Appendix 9-22). The power centrality also confirms the independent relationship among the three blocks. The respective power centralities of the three blocks are relatively high, which means they are independent of other blocks.

6.3.6 Joint program network blockmodel

Blockmodeling makes the joint program network, which is composed of 22 nonprofits, simpler to examine. The joint program blockmodel is composed of five blocks – one large block (4) and four small blocks (1, 2, 3 and 5).

Table VI-16) Block members of joint program network

Block	Members (22)
1:	FF HI NHCO (3)
2:	AARP SPUMC (2)
3:	BLFP CLA ELC HFI (4)
4:	AVAC CCN MFC MN NH NWCCP PT SMF SSVD SVD UWAC (11)
5:	NHYMCC YWCA (2)

Descriptions of block positions

The blockmodel of the joint program network is composed of three types of positions. First, block 1 occupies a central position and plays a primary role (coordinating the whole network). Block 2 and 3 are located in an intermediate position. The remaining blocks, block 4 and 5, are at the periphery of the network.

Table VI-17) Typology for structural positions for joint program relations

	$(g_k-1)/(g-1)$	Within tie/ Between tie	$P(B_k)$	Position	
				Typology I	Typology III
Block 1	0.095	0.155	22	Primary	Central
Block 2	0.048	0.250	6	Primary	Central-intermediate
Block 3	0.143	0.444	1.25	Primary	Intermediate
Block 4	0.476	0	1.18	Broker	Periphery
Block 5	0.048	0	1	Broker	Periphery

* The median of $P(B_k)$ is 1.25. And mean is 6.29.

Descriptions of overall blockmodels

Table VI-18) Image matrix of joint program network

	1	2	3	4	5
1	1(RE)	1(RE)	1(RE)	1(RE)	0
2	1(RE)	1(SE)	0	0	1(RE)
3	1(RE)	0	1(RE)	0	0
4	1(RE)	0	0	0	0
5	0	1(RE)	0	0	0

The structure of the image matrix in Table IV-18 is a variation of the central-periphery system, entitled as a central-intermediate-periphery system in this study. It contains a central block (1), two intermediate blocks (2 and 3) and two periphery blocks (4 and 5). Three blocks are cohesive subgroups (1, 2, and 3). The below Figure VI-6 visually illustrates the network structure.

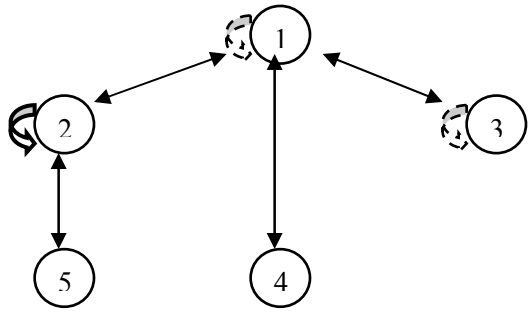


Figure VI-6) Reduced sociogram of joint program network

In Figure VI-6, two hub nonprofits in the joint program network (i.e., NHCO and HI) are included in the central block 1. Block 4 is directly connected to the central block in a peripheral way; as seen in the chapter 4 (refer to Figure IV-6), half of the actors in the network (11) are included in block 4 and are attached to the central actors in a peripheral way. Since the nonprofits in block 4 are small in size (See the Appendix 9-26), they want joint program with the distinguished (or central) actors in the network. On the other hand, the other periphery block (5) consists of large size nonprofits. Unlike nonprofits in block 4, they seem not to care about having direct relationships of joint program with the central nonprofits that already have many joint programs with small nonprofits (i.e., block 4). However, they are indirectly connected to the central block. As an intermediate position occupant, block 2 plays a broker role between the central and peripheral blocks. Two intermediate blocks (2 and 3) are composed of small number of nonprofits but are cohesive within their own blocks. For this reason, when compared with a periphery block 4, block 2 and 3 are more independent from the central block than block 4.

6.3.7 Organizational characteristics of the central block in the networks

The individual analysis of validation of the blockmodel using organizational attributes does not provide theoretically significant results, though those analyses will be valuable information to practitioners. Thus, this study provides a summary of the analysis results, which show some interesting findings (See Appendix 9 for individual analysis results of validation of a blockmodel using organizational attributes).

First, well-established (i.e., old and/or large size) nonprofits show low likelihood to share physical resources such as personnel or offices (See Appendix 9-17). It seems that well-established nonprofits do not need to collaborate with other nonprofits for physical resource sharing relationships because they already have enough physical capacity (i.e., personnel or offices) within their own organizations. Rather these large nonprofits are more active in other types of strategic collaborations (formal contract and joint program) (See Appendix9-17, 22 and 26).

Second, Table VI-19 summarizes organizational attributes of the central blocks (i.e., the whole network broker or coordinator role) in the six collaboration networks in order to see whether there are similar organizational characteristics in the strategically significant blocks

across the six types of the collaboration networks. Organizational characteristics of strategically significant blocks are fairly similar each other. Size (expenditure), years in operations and collaboration relation index are especially similar across five different blocks. Nonprofits that not only occupy the central position in the networks but also play a strategically significant role (i.e., a coordinator in the whole network) are generally of medium to small size (about $1.2M budget) and relatively younger than other nonprofits.

Table VI-19) Summary of organizational attributes of strategically significant blocks

	N	Revenue from commercial activity	Revenue from government	Expendi-ture	Years	Collaboration relation index
Average of total actors	42	18.41%	12.89%	$3.37M	46	66.4
Average of 6 blocks		15.65% (8.44)	8.36% (7.42)	$1.18M (0.21)	34.6 (12.58)	133.8 (34.49)
Information sharing	4	19.5%	3.75%	$1.3M	42.8	167.5
Work referral	9	11%	17.83%	$1.1M	40.8	110
Regular meeting	9	30.71%	17.91%	$0.9M	49	118
Resource sharing	7	7%	4%	$1.46M	36.7	121
Formal contract[58]	8	11.7%	2%	$1.3M	19.75	100.5
Joint program	3	14%	4.67%	$1M	18.67	186

On the basis of this evidence, this study proposes that; nonprofits that are of medium-size (around $1M) and young are not only the most passionate in collaborations for providing services, but also play strategically significant roles, such as coordinating flows of information, work referrals, resources, money and so forth.

6.4 BLOCKMODELS OF THE NONPROFIT AND BUSINESS SECTOR COLLABORATION NETWORK

6.4.1 Information sharing network blockmodel

When businesses are introduced in the information sharing network, the number of network members increases to 95 and the best grouping turns out to be 6 blocks. Block 3 is exceptionally

[58] Because there is no strategically significant block in the formal contract network, a block that is the most active in collaborations (block 2) are supplemented.

large compared to other blocks and most members of this block come from the business sector. Block 2 is composed of medium to large (20) organizations. Block 1 and 4 are composed of medium to small organizations. Block 5 and 6 are composed of a small number of organizations.

Table VI-20) Block members of information sharing network

Block Members (95)
1: CCN HEAETH HI MCG NH NHCO NHYMCC SVYMCA (8)
2: AVAC CA CLA FF GVP HFI LLM LSS MN NAMSC NCM NHYMCA NSAS PT SMF SPUMC SSVD THF UWAC YWCA (20)
3: AM AP APH AUC BFR BM BPL BTCO BTR DLC DTS ELS FBSDS FCO FG FHLBP FI GL GRE HB HP JHC MB MCJ MEE MF MMI MNB NWCCP OP PB PH PMS PTC RH RR SC SE SH SNS SOFP SP SSLT ST THHC UCM (46)
4: BC BLFP CB DB FB NCB NHFB OPCA PNC SMC TKF WSB (12)
5: AARP ACBA ELC MFC ODM SVD (6)
6: ASC SGH SN (3)

Descriptions of block positions

Table VI-21) Typology for structural positions for information sharing relations

	(g_k-1) /(g-1)	Within tie/ Between tie	$P(B_k)$	Position	
				Typology I	Typology III
Block 1	0.075	0.203	98.00	Primary	Central
Block 2	0.202	0.466	12.40	Primary	Central-intermediate
Block 3	0.479	0	1.15	Broker	Periphery
Block 4	0.117	0	3.92	Broker	Periphery
Block 5	0.053	0	18.50	Broker	Central-intermediate
Block 6	0.021	0	1.00	Broker	Periphery

* The median of $P(B_k)$ is 8.16. And mean is 22.49.

The information sharing network blockmodel is composed of two central and primary blocks (1 and 2), three periphery blocks (3, 4, and 6) and one central-intermediate and broker block (5) (Table VI-21). In particular, block 1 is classified as both central and primary block in the information network. This structure is clearly seen in the below Figure VI-7.

Descriptions of overall blockmodel

The image matrix in Table VI-22 does not exactly represent any type of the ideal image matrix. However, the overall shape of the matrix is similar to a central-periphery structure. Specifically, the structural type can be described as a central (1), intermediary (2 and 5) and periphery (3, 4 and 6) system.

Table VI-22) Image matrix of information sharing network

	1	2	3	4	5	6
1	1(SE)	1(RE)	1(RE)	1(RE)	1(RE)	0
2	1(RE)	1(RE)	0	0	1(RE)	0
3	1(RE)	0	0	0	0	0
4	1(RE)	0	0	0	0	0
5	1(RE)	1(RE)	0	0	0	1(RE)
6	0	0	0	0	1(RE)	0

In Figure VI-7, a legend for the collaboration networks with nonprofits and businesses is represented. There are five types of blocks – nonprofit block, nonprofit dominant block, business block, business dominant block and coexistence block. Definitions of each block are presented in the below box. Four types of equivalent relationships are presented – structural equivalence within and between blocks, and regular equivalence within and between blocks.

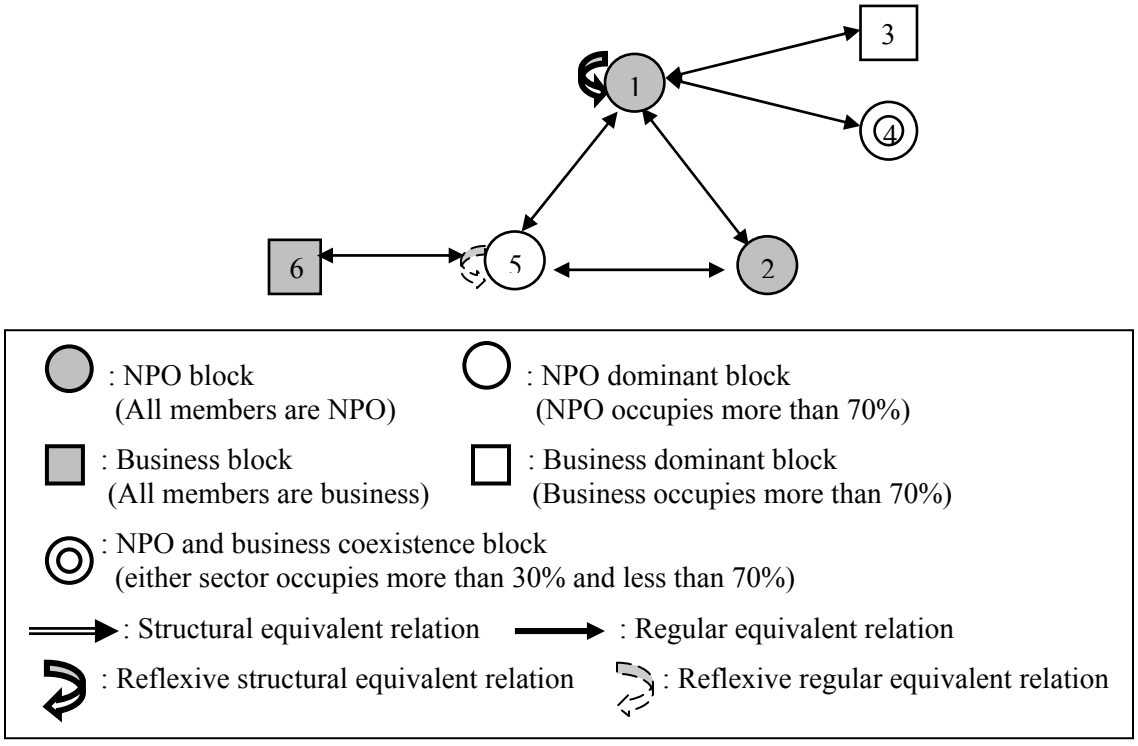


Figure VI-7) Reduced sociogram of information sharing network

The most visible feature in the above picture is that nonprofits and businesses are separately grouped in terms of their relational patterns. Specifically, while most of businesses are locating at the periphery of the network, most of nonprofits are located in central or central-intermediary positions. As seen in Figure VI-7, nonprofits are exclusively clustered together

within 1, 2, and 5 blocks, whereas businesses are within 3 and 6 blocks. Block 4 is a mixture of the two sectors, which is a part of the evidence of blurring boundaries.

Compared to the nonprofit information sharing blockmodel of the previous section, the network structure in this section changes in three ways. First, the type of equivalence between blocks changes from structural to regular equivalent relationships. This means that with the inclusion of businesses, information redundancy considerably decreases. This also indicates that the inclusion of businesses in the information network makes nonprofits more efficient in exchanging information. Second, strategically significant blocks play a gate role between the two sectors as the business sector is introduced. Block 1 and 5 plays this role. Third is a clear distinction between central and peripheral actors. The nonprofit information sharing network is cohesively connected among all blocks, but, the information sharing network in this section shows a central vs. peripheral structure.

Information flows can be deduced from power centrality (See Appendix 9-30). Block 1, which is central and a broker in the whole network, is dependent on its neighborhood blocks for information. In other words, adjacent blocks (2, 3, 4, and 5) provide block 1 with information, which means that block 1 is a place where various information is collected. Within members of block 1, information is evenly shared because they are structurally equivalent within the block. In turn, block 1 plays an information intermediary role, which means that block 1 is likely to resend information that is collected from its adjacent blocks. When these information flows continues, information is efficiently diffused, and eventually shared goals are likely to emerge through the coordinating role of block 1.

Two business blocks play different roles in terms of information flows. Block 3 usually sends its information to block 1, but block 6 mainly receives information from block 5 because block 6 is dependent on block 5 for information. Businesses are heterogeneous in terms of their roles in the information sharing network.

In sum, from the blockmodeling of the information sharing network, this study uncovers that when businesses are introduced, the network becomes more efficient in terms of information sharing as well as the coordination of information flows.

6.4.2 Work referral network blockmodel

In the work referral network, five distinctive blocks are identified through blockmodeling (Table VI-23). There are three medium-large blocks (2, 3, and 4), one medium size block (5), and one small size block (1).

Table VI-23) Block members of work referral network

Block Members (55)
1: CCN NH NHCO NHYMCC SPUMC (5)
2: AUC CA CLA ELC FG GRE IICR MFC ODM PH PNC SOFP THF YWCA (14)
3: ACBA BC DLC FI HFI LCS MN OPCA PB SC TKF VEC WSB (13)
4: AVAC BLFP HEAETH HI LLM LSS MCG NAMSC NCM NHYMCA NSAS SMC SVD UWAC (14)
5: AARP GVP MB NHFB NWCCP PT SMF SSVD SVYMCA (9)

Descriptions of block positions

Table VI-24 illustrates the positions and roles of the five blocks. Block 1 occupies a primary and central position in terms of sending work referrals. This block sends more work referrals than it receives (ratio of received and sent is 0.76 and out-degree $P(B_k)$ is almost twice the in-degree). Block 5 plays a broker role and sends more referrals than it receives.

Table VI-24) Typology for structural positions for work referral relations

	$(g_k-1)/(g-1)$	Within choice/ Between choice	Choice received/ Choice sent	In-degree $P(B_k)$	Out-degree $P(B_k)$
Block 1	0.074	0.155	0.755	39.60	74.40
Block 2	0.241	0.046	1.546	2.36	1.50
Block 3	0.222	0.100	1.800	1.31	0
Block 4	0.241	0.415	1.195	9.14	3.43
Block 5	0.148	0.053	0.763	3.00	8.00

* In-degree $P(B_k)$: Median is 3 and mean is 11.08. ** Out-degree $P(B_k)$: Median is 3.43 and mean is 17.47.

	Position			
	Typology I	Typology II	Typology III (in)	Typology III (out)
Block 1	Primary	Carrier (sender)	Central	Central
Block 2	Broker	Carrier (receiver)	Periphery	Periphery
Block 3	Broker	Receiver	Periphery	Isolate
Block 4	Primary	Carrier (receiver)	Central-intermediate	Intermediate
Block 5	Broker	Carrier (sender)	Intermediate	Central-intermediate

Block 4 has in a primary position in the network. Unlike block 1, this block is primary in terms of receiving referrals. Block 3 occupies a receiver position at the periphery of the network. Finally, block 2 is a receiver at the edge of the network.

Descriptions of overall blockmodel

The permuted image matrix in Table VI-25 is the same as the image matrix of the nonprofit work referral blockmodel (Table VI-6). However, this study regards these two as different structures because there are pieces of evidence of structural changes when businesses are introduced in the work referral network.

Table VI-25) Permuted image matrix of work referral network

	1	4	5	2	3
1	1(SE)	1(RE)	1(RE)	1(RE)	1(RE)
4	1(RE)	1(RE)	0	0	0
5	1(RE)	1(RE)	0	0	0
2	1(RE)	0	0	0	0
3	0	0	0	0	0

First, nonprofits and businesses show their distinctive roles; nonprofits play a sender and service coordinator role and businesses play a receiver or service delivery role. Second, in block 2, both sector organizations have the same pattern of relationships, which means that boundaries between the two sectors are blurring in the work referral network (See Appendix 9-34).

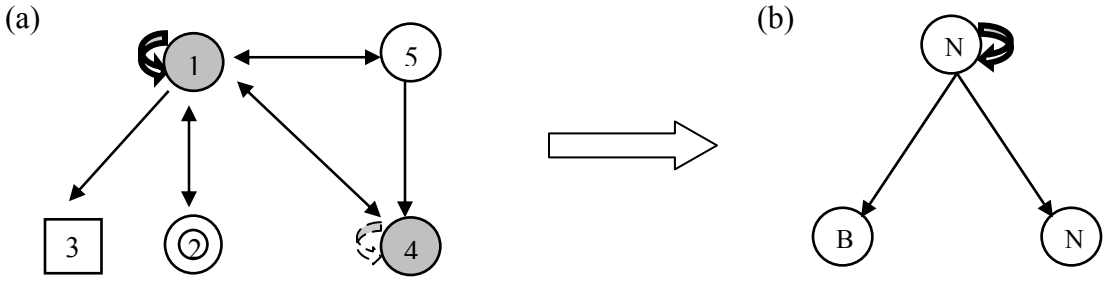


Figure VI-8) Reduced sociogram of work referral network

Specifically, block 1 occupies a strategically significant position because it is a service coordinator in the whole network. In addition, two business blocks (2 and 3) are exclusively connected to this block. This means that block 1 is a strategically important block in terms of its gate role between the two sectors. Two blocks, which include many businesses (2 and 3), mostly

play a receiver role at the periphery. In this sense, businesses are called social service delivery agents in the work referral network. Nonprofit block 4 mainly receives referrals but still retains relatively high betweenness centrality compared to business blocks (See Appendix 9-34). This indicates that the role of block 4 is not limited to service delivery but also exchanging referrals with many organizations. (b) in Figure VI-8 is a simplified form of blockmodel (a). Through this picture, it is clearer that there are role differences between two sectors.

In sum, even though the network structure looks the same regardless of the inclusion of businesses, it does not mean that businesses do not have an impact on the network structure. Rather, they are embedded into the work referral network as 1) players who occupy a particular position (i.e., work referral receivers, thus service delivery agent) and 2) players with the same (at least similar) relational patterns with nonprofits in block 2.

6.4.3 Regular meeting network blockmodel

With the inclusion of 11 businesses, the size of the regular meeting network grows. This network is reduced into 4 blocks through blockmodeling. Three blocks are of medium-large size (1, 2, and 3) and the other one is of small size (4).

Table VI-26) Block members of regular meeting network

Block Members (46)
1: CCN FF HEAETH HI NCM NH NHCO NHYMCA NHYMCC SSVD YWCA (11)
2: AUC CA CG DLC FG GVP KG MCG NAMSC NWCCP OPCA PB SMF SOFP SPUMC ST THF UWAC WSB (19)
3: AVAC BLFP CLA HFI LLM MB MFC MN NHFB NSAS SMC SVD (12)
4: ELC LSS PT SGH (4)

Descriptions of block positions

Table VI-27) Typology for structural positions for regular meeting relations

	$(g_k-1)/(g-1)$	Within tie/ Between tie	$P(B_k)$	Position	
				Typology I	Typology III
Block 1	0.222	0.649	9.45	Primary	Central
Block 2	0.400	0	1.42	Broker	Periphery
Block 3	0.244	0.400	4	Primary	Central-intermediate
Block 4	0.067	0.571	0	Broker	Isolate

* The median of $P(B_k)$ is 2.71. And mean is 3.71.

The four blocks occupy different positions in the network. Block 1 occupies a central and primary position in the network. This block is expected to play a primary role in mediating problems or issues in the network. Block 2 is connected to block 1 in a peripheral way. This means that block 2 is dependent on block 1. Since block 3 occupies a central-intermediate position, block 3 is less dependent on block 1 than is block 2. Finally, block 4 is an isolate.

Descriptions of overall blockmodel

Table VI-28) Image matrix of regular meeting

	1	2	3	4
1	1(SE)	1(RE)	1(RE)	0
2	1(RE)	0	0	0
3	1(RE)	0	1(RE)	0
4	0	0	0	1(RE)

This study interprets the structural type of image matrix in Table VI-28 as a mixture of central-periphery and cohesive subgroups. When the isolated block is not considered, block 1 is central and its neighborhood blocks (block 2 and 3) are periphery. At the same time, three blocks are internally cohesive. Figure VI-9 illustrates this network structure.

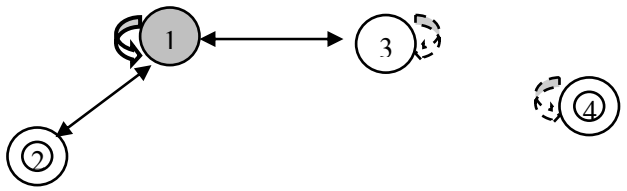


Figure VI-9) Reduced sociogram of regular meeting

The nonprofits in block 1 are members of the North Hills Nonprofit Consortium and are strongly interrelated with each other (i.e., structural equivalence within a block). Regular meeting relationships among the Consortium are so strong that the inclusion of business does not affect their dominance in the network. However, compared to the nonprofit regular meeting network, the regular meeting network becomes localized as block 3 reduces dependency on the central block through their within block meeting and block 4 has its own regular meeting within the block. Organizations in block 4 are not likely to care about the global issues in this community but make decision for local (i.e., within block) problems or issues independently

from the central block 1 because block 4 does not connect with any other block. Thus, conflicts between block 4 and the rest of blocks could arise.

Two coexistence blocks (2 and 4) indicates that nonprofits and businesses are well embedded in the regular meeting network (See Appendix 9-34); both sector organizations not only show the same patterns of relationships, but also cohesively interact within block (block 4).

6.4.4 Resource sharing network blockmodel

With the inclusion of 45 businesses, the size of the resource sharing network grows more than double. The network is reduced to five blocks via blockmodeling. As shown in Table VI-29, there is one exceptionally large size block (block 4) and two medium blocks (3 and 5). Block 2 is relatively small. Block 1 is very small, as there are only two nonprofits.

Table VI-29) Block members of resource sharing network

Block	Members (76)
1:	HI NHCO (2)
2:	ELC LSS NHFB NSAS SGH SOFP SPUMC (7)
3:	AVAC BLFP CA CCN DB HFI MFC NCM NH NHYMCC SMF SVD (12)
4:	ACBA AM AP AUMA BM BPL BTCO BTR CG DLC DTS ELS FB FCO FF FHLBP GL GVP HB JHC KG LE MCJ MEE MF MMI MN MNB NWCCP PMS PT PTC RH SE SH SNS SP SSLT THF THHC UCM (41)
5:	AARP BFR CB CLA FG HEAETH LLM ME NAMSC NCB RR SMC TKF UWAC (14)

Descriptions of block positions

Table VI-30) Typology for structural positions for resource sharing relations

	$(g_k-1)/(g-1)$	Within tie/ Between tie	$P(B_k)$	Position	
				Typology I	Typology III
Block 1	0.013	0.032	91.50	Primary	Central
Block 2	0.080	0.636	1.14	Primary	Intermediate
Block 3	0.147	0.367	5.17	Primary	Intermediate-central
Block 4	0.533	0	1	Broker	Periphery
Block 5	0.173	0.118	1.07	Broker	Intermediate

* The median of $P(B_k)$ is 1.14. And mean is 19.98.

Position analysis identifies three types of block positions. Block 1 occupies a central position and plays a primary role in terms of coordinating resource flows in the whole network. Two blocks, block 2 and 3, occupy an intermediate position and play a primary role. Unlike

block 1, these blocks do not play a network coordinator role. Block 2 is primary in terms of within block cohesiveness and direct connection with the central block. Block 3 is primary in terms of its intermediate role between block 1 and 5 and within block cohesiveness (Figure VI-11). Block 4 is at the periphery of the network. Finally, block 5 is not periphery but intermediate, even though it does not have a direct relationship with the center.

Descriptions of overall blockmodel

Table VI-31) Image matrix or resource sharing network

	1	2	3	4	5
1	1(SE)	1(RE)	1(RE)	1(RE)	0
2	1(RE)	1(RE)	0	0	0
3	1(RE)	0	1(RE)	0	1(RE)
4	1(RE)	0	0	0	0
5	0	0	1(RE)	0	0

The structure of the image matrix in Table VI-31 is similar to the image matrix of the nonprofit resource sharing network in Table VI-12; a mixture of central-periphery and hierarchy system. However, there is one difference between two image matrices; the above image matrix includes 3 cohesive subgroups.

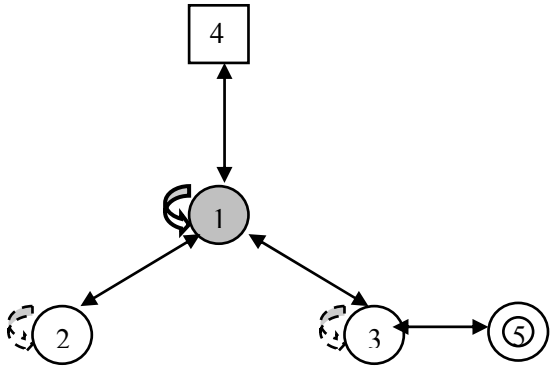


Figure VI-10) Reduced sociogram of resource sharing network

Block 1 is a cohesive subgroup comprised of two hub nonprofits (i.e., HI and NHCO). Business-dominant block 4 is attached to the central block 1, and two nonprofit-dominant peripheral blocks (2 and 3) are connected to block 1. In this connection, the direction of resource flows can be inferred from the power centrality (See Appendix 9-43). Block 4 is exclusively

dependent on block 1 for resource sharing relations. The dependency of block 4 on block 1 for resource sharing relation should be interpreted based on an assumption; businesses are more willing to provide physical resources rather than receive them. Thus, physical resources flow from businesses to two hub nonprofits. On the other hand, block 2 and 3 are dependent on block 1 for resource sharing. These blocks depend on the central block not because the central block has extra physical resources to share but because the central block can link nonprofits in block 2 and 3 with businesses in block 4. Thus, the role of central block 1 is important because it coordinates resource flows between businesses and other nonprofit blocks. Power centrality between block 3 and 5 indicates that these blocks are interdependent in sharing physical resources. Another feature of Figure VI-10 is that three cohesive subgroups emerge through the inclusion of businesses, which means that organizations cohesively interact within blocks.

Finally, there are two pieces of evidence of blurring boundaries between nonprofits and businesses in the resource sharing network. First, nonprofits and businesses in block 5 show same or similar relational patterns. Second, most businesses are embedded in the network with a help from the central block 1 as block 1 not only links two sectors but also plays a resource flow coordinating role.

6.4.5 Formal contract network blockmodel

Table VI-32 illustrates the results of blockmodeling of the formal contract network when businesses are introduced. The size of four blocks is similar - medium size.

Table VI-32) Block members of formal contract network

Block	Members (31)
1:	AARP BLFP CA FF MFC NH NHCO SMF (8)
2:	AUC CG CPH DLC FG HI KG LSS SPUMC (9)
3:	CB HEAETH NHYMCA NHYMCC NSAS PB UWAC WSB (8)
4:	HFI SMC SSVD SVD SVYMCA TKF (6)

Descriptions of block positions

Block 1 occupies a primary and central position but is only primary and central in terms of its relationship with block 2 because the two other blocks are isolated from block 1 and 2. Block 3 and 4 are primary in terms of within block relationships; these blocks are internally cohesive blocks but do not have an inter-block relation.

Table VI-33) Typology for structural positions for formal contract relations

	$(g_k-1)/(g-1)$	Within tie/ Between tie	$P(B_k)$	Position	
				Typology I	Typology III
Block 1	0.2333	0.5806	1.63	Primary	Central
Block 2	0.2667	0	1.22	Broker	Central
Block 3	0.2333	0.9412	0	Primary	Isolate
Block 4	0.1667	0.7273	0	Primary	Isolate

* The median of $P(B_k)$ is 0.61. And mean is 0.71.

Descriptions of overall blockmodel

Table VI-34) Image matrix of formal contract network

	1	2	3	4
1	1(RE)	1(RE)	0	0
2	1(RE)	0	0	0
3	0	0	1(RE)	0
4	0	0	0	1(RE)

The image matrix in Table VI-34 illustrates a cohesive subgroup structure; three blocks (1, 3, and 4) are independently cohesive within their own block. This structure is obvious when it is visually presented in Figure VI-11.

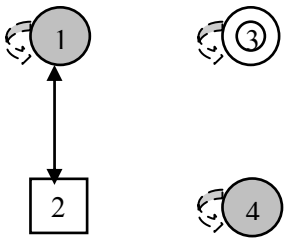


Figure VI-11) Reduced sociogram of formal contract network

The structure of the formal contract network with the inclusion of businesses is almost the same as the nonprofit formal contract network (Figure VI-11 and VI-5). The power centrality presents two interesting findings; 1) respective independency of three cohesive subgroups and 2) money flows between businesses block 2 and nonprofit block 1. Block 1 has high power centrality over block 2, which means that businesses in block 2 are dependent on nonprofits in block 1 for their formal contract relations (See Appendix 9-47). This dependency can be interpreted in two ways; 1) money from the business sector flows into nonprofits in block 1, and 2) as subcontractor from the public sector, money flows from nonprofits (block 1) to

businesses (block 2). Nonprofits in block 1 and 4 make formal contract relationships with nonprofits within their own block. Nonprofits and businesses in block 3 prefer making formal contracts with organizations within its own block. Block 3 is important because businesses and nonprofits are not only cohesively interwoven with each other within the block, but rather maintain the same patterns of relationships.

In sum, when businesses are involved in the formal contract network there is no fundamental change in network structure. Nonetheless, we can find pieces of evidence that indicates blurring boundaries (i.e., the coexistence block 3).

6.4.6 Joint program network blockmodel

With the inclusion of businesses, the joint program network grows because many businesses (35) participate in the joint program network for delivering social services. However, a blockmodel in this section is simpler than the nonprofit joint program network blockmodel in the previous section; blockmodeling reduces the network with 58 actors into 3 blocks. Block 1 is a very small block as it is composed of members of two hub nonprofits in the network. Block 2 is exceptionally large. Block 3 is of medium size.

Table VI-35) Block members of joint program network

Block	Members (58)
1:	HI NHCO (2)
2:	AM AP APH AVAC BM BPL BTCO BTR CB CCN CG DLC DTS ELS FCO FHLBP GL HB JHC KG MEE MF MFC MMI MN MNB NCB NH NHYMCA NWCCP PMS PT PTC RH SE SH SMF SNS SP SSLT SVD THHC UCM UWAC WSB (45)
3:	AARP BLFP CLA ELC FF HFI KDS NHYMCC SPUMC SSVD YWCA (11)

Descriptions of block positions

Table VI-36) Typology for structural positions for joint program relations

	$(g_k-1)/(g-1)$	Within tie/ Between tie	$P(B_k)$	Position	
				Typology I	Typology III
Block 1	0.018	0.036	54	Primary	Central
Block 2	0.772	0.043	1	Broker	Intermediate-periphery
Block 3	0.175	0.667	0.82	Primary	Periphery

* The median of $P(B_k)$ is 1. And mean is 18.61.

Block 1 occupies a central position and plays a primary role – coordinating the whole network. Block 2 and 3 are periphery in the network. This position analysis indicates that the involvement of businesses makes the two-hub structure more obvious.

Descriptions of overall blockmodel

Table VI-37) Image matrix of joint program network

	1	2	3
1	1(SE)	1(RE)	1(RE)
2	1(RE)	0	0
3	1(RE)	0	1(RE)

The structure of the image matrix in Table VI-37 is a centralized system with two cohesive subgroups. Figure VI-12 visually illustrates this structure.

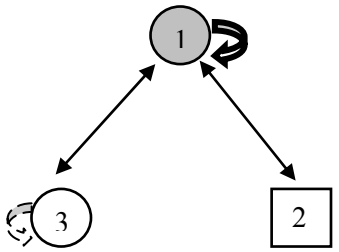


Figure VI-12) Reduced sociogram of joint program network

The joint program network in Figure VI-12 is a simple structure; a central and primary position occupant (block 1) and its peripheral organizations. Two primary and central nonprofits (HI and NHCO) in the nonprofit joint program network remain in the same position when businesses are introduced. This indicates that most businesses exclusively make relations with these two nonprofits. The primary role of this block is not only to perform joint programs with businesses and other nonprofits but also intermediate between other nonprofits and businesses between block 2 and 3.

Another feature is that as businesses join the network, nonprofits become cohesive among nonprofits. Block 3 in Figure VI-12 is composed of three blocks in Figure VI-6 (block 2, 3, and 5). These three blocks were separated in the nonprofit joint program network but, as businesses are introduced, they become one cohesive block (block 3 in Figure VI-6).

In sum, there is a change in the network structure compared to the joint program network blockmodel in Figure VI-6; the two-hub structure becomes more obvious. Through this change, nonprofits become more cohesive within the sector.

6.4.7 Organizational characteristics of blocks in the networks

There is an interesting finding from the analysis of the validation of blocks by organizational attributes. In the formal contract network, unlike other types of collaboration network blockmodels, CRIs of the business-dominant block (2) and the coexistence block (3) are quite high (See Appendix 9-47). This indicates that businesses are strongly interested in formal contracts with nonprofits. From this fact, this study induces that businesses prefer formal contract relationships with nonprofits to other types of collaboration. It is intuitively understandable because businesses naturally favor more professional type of relationships based on formal contracts.

6.5 BLOCKMODELS OF THE NONPROFIT AND PUBLIC SECTOR COLLABORATION NETWORK

6.5.1 Information sharing network blockmodel

Table VI-38) Block members of information sharing network

Block	Members (60)
1:	BLFP FF NSAS PT SPUMC SVYMCA THF (7)
2:	AARP AVAC CA CLA HI NHYMCA SSVD UWAC (8)
3:	ACPL BOM CL EOWA LMP NEA ODM PACA USDE (9)
4:	APR ACBA ACDHS ACG CMS GPR PADH PANA PCG PSD PSG (11)
5:	BC ELC GVP HFI LSS MFC MN NAMSC NCM NHFB NWCCP PNC SMC SMF SOFP TKF YWCA (17)
6:	CCN HEAETH LLM MCG NH NHCO NHYMCC SVD (8)

As public agencies participate in the information sharing network, the network grows in terms of the number of actor and information flows. Through blockmodeling, this study

identifies six blocks of members that show similar patterns of relationships (Table VI-38). One block (5) is of medium-large size. The rest of blocks are of medium-small size.

Descriptions of block positions

Table VI-39) Typology for structural positions for information sharing relations

	$(g_k-1)/(g-1)$	Within tie/ Between tie	$P(B_k)$	Position	
				Typology I	Typology III
Block 1	0.102	0.167	34.29	Primary	Central
Block 2	0.119	0.199	52.5	Primary	Central
Block 3	0.136	0	1.33	Broker	Periphery
Block 4	0.170	0	1.73	Broker	Periphery
Block 5	0.271	0.018	19.41	Broker	Intermediate-central
Block 6	0.119	0.205	66	Primary	Central

* The median of $P(B_k)$ is 26.85. And mean is 29.21.

As shown in Table VI-39, block 2 and 6 occupy a central and primary position. Besides these two blocks, block 1 also is a primary and central actor in the network. However, as $P(B_k)$ indicates, block 1 (34) has secondary position compared to block 2 (53) and 6 (66). Block 5 is identified as a broker with an intermediate-central position. These four blocks are nonprofit blocks and are all structurally cohesive with each other (Figure VI-13). On the other hand, two public blocks, block 3 and 4, are located at the periphery of the network.

Descriptions of overall blockmodel

Table VI-40) Permuted image matrix of information sharing network

	2	6	1	5	4	3
2	1(RE)	1(RE)	1(RE)	1(RE)	1(RE)	0
6	1(RE)	1(RE)	1(RE)	1(RE)	0	1(RE)
1	1(RE)	1(RE)	1(RE)	1(RE)	0	0
5	1(RE)	1(RE)	1(RE)	0	0	0
4	1(RE)	0	0	0	0	0
3	0	1(RE)	0	0	0	0

The image matrix in Table VI-40 shows similar patterns to a central-periphery system in the ideal type of image matrix. Specifically, the structure is a central (2 and 6 blocks) – intermediate (1 and 5 blocks) – periphery (3 and 4 blocks) system. There is no structural equivalent relationship, which means that information flows in this network are not redundant and thus efficient.

The legend in Figure VI-13 describes five different types of blocks and four different types of relationships for the reduced sociogram in this section. The definitions of them are explained in the box below.

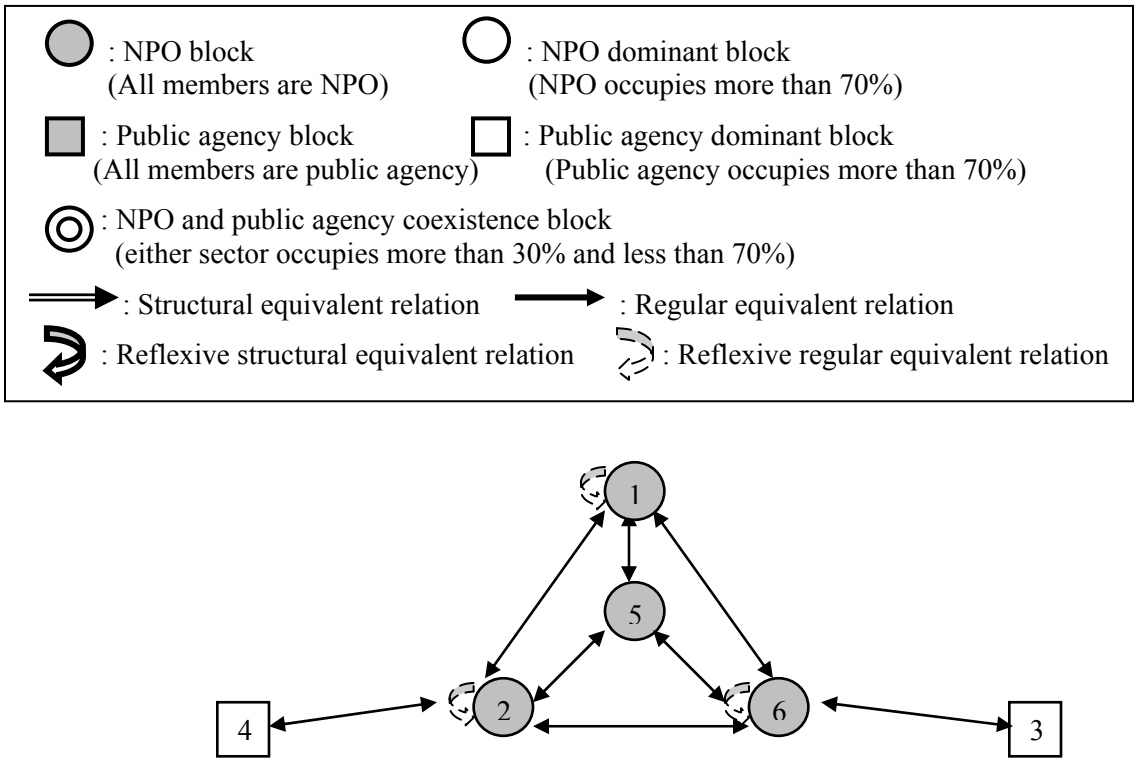


Figure VI-13) Reduced sociogram of information sharing network

Compared to the information sharing blockmodel with the inclusion of businesses, the blockmodel in this section represents two different structural patterns. First, there is no nonprofit that has the same patterns of information sharing relations as public agencies (i.e., no coexistence block). Second, two peripheral public agency blocks are simply attached to the nonprofit blocks, which are very cohesively connected each other (Figure VI-13). Among them, three blocks (1, 2 and 6) occupy central positions in the network and block 5 coordinates information among these three central blocks in the center. These cohesive relationships among nonprofit blocks are similar to the cohesive relationship in the nonprofit information sharing blockmodel. These results designate that the involvement of the public sector in the information sharing network makes marginal or no impact on the network structure. However, as in the information sharing

network with the introduction of the business sector, nonprofits that play a gate role between two sectors emerge.

In terms of power relationships, block 4 is dependent on block 2 and block 6 is dependent on block 3 (See Appendix 9-55). Two public sector blocks are different in terms of their roles in information flows. While block 4 receives information from nonprofits, block 3 sends information to nonprofits. Power centralities are similar among the three central and primary blocks, which means they are quite independent or interdependent. Block 5 is relatively low in power centrality, which indicates that block 5 may play an information coordinating role among nonprofit blocks because relatively more information is concentrated in this block.

In sum, there are marginal structural changes in the information sharing network because public agencies simply attach to the existing network structure. Just like when businesses are involved, public agencies are divided into two types of block - a receiver and sender of information.

6.5.2 Work referral network blockmodel

Table VI-41 represents blockmodel members of six distinctive blocks from the work referral network which is composed of nonprofits and public agencies. Two blocks (1 and 3) are small size and four other blocks (2, 4. 5 and 6) are medium size.

Table VI-41) Block members of work referral network

Block	Members (54)
1:	CCN NH NHCO (3)
2:	ACG BOM FR HFI MN NEA PACA PCG PSD PSG SVB TKF (12)
3:	CLA HI MCG NHYMCC SSVD (5)
4:	AARP GVP NCM NHFB NHYMCA NWCCP SMC SMF YWCA (9)
5:	ACDHS AVAC ELC HEAETH LLM NSAS PT SPUMC SVD SVYMCA (10)
6:	ACBA ACHA BC BLFP CA CL LMP LSS MFC NAMSC ODM PNC SOFP THF UWAC (15)

Descriptions of block positions

Block 1 and 3 occupy a primary and central position in the network. But their roles are different. While block 1 sends and receives referrals in a similar proportion, block 3 mostly receives rather than sends referrals. In addition, members in block 1 have exceptionally high betweenness centrality (See Appendix 9-60). Thus, the position of block 1 is at the center of the

network, and block 1 plays a service coordinating role in the network. On the other hand, block 3 is primary in terms of a service delivery. Block 4 transmits work referrals as an intermediary or broker. Block 2 and 5 are a sender of work referrals from the periphery of the network. Block 6 is located in the periphery of the network, mostly playing a receiver role because it receives more referrals than sends.

Table VI-42) Typology for structural positions for work referral relations

	$(g_k-1)/(g-1)$	Within choice/ Between choice	Choice received/ Choice sent	In-degree $P(B_k)$	Out-degree $P(B_k)$
Block 1	0.038	0.075	0.825	80	98.67
Block 2	0.208	0	0.786	0	1.167
Block 3	0.076	0.171	1.543	38.4	5.8
Block 4	0.151	0	1.121	8.22	7.33
Block 5	0.170	0.164	0.699	3.90	18.3
Block 6	0.264	0.031	1.500	3.13	2.07

* In-degree $P(B_k)$: Median is 6.06 and mean is 22.28. ** Out-degree $P(B_k)$: Median 6.57 is and mean is 22.22.

	Position			
	Typology I	Typology II	Typology III (in)	Typology III (out)
Block 1	Primary	Carrier	Central	Central
Block 2	Broker	Carrier (sender)	Isolate	Periphery
Block 3	Primary	Carrier (receiver)	Central	Periphery
Block 4	Broker	Carrier	Intermediate	Intermediate
Block 5	Broker	Carrier (sender)	Periphery	Central-intermediate
Block 6	Broker	Carrier	Periphery	Periphery

Descriptions of overall blockmodel

Table VI-43) Permuted image matrix of work referral network

	1	3	4	5	6	2
1	1(SE)	1(SE)	1(RE)	1(RE)	1(RE)	0
3	1(RE)	1(RE)	0	0	0	0
4	1(RE)	1(RE)	0	0	0	0
5	1(RE)	1(RE)	1(RE)	0	0	0
6	1(RE)	0	0	0	0	0
2	0	1(RE)	0	0	0	0

The structure of the work referral network with the inclusion of public agencies is different from the previous two work referral networks. The image matrix in Table VI-43 looks similar to a central-periphery system, but it is hard to tell the exact type of structure with the image matrix. When using the reduced sociogram in Figure VI-14, the structure becomes clearer.

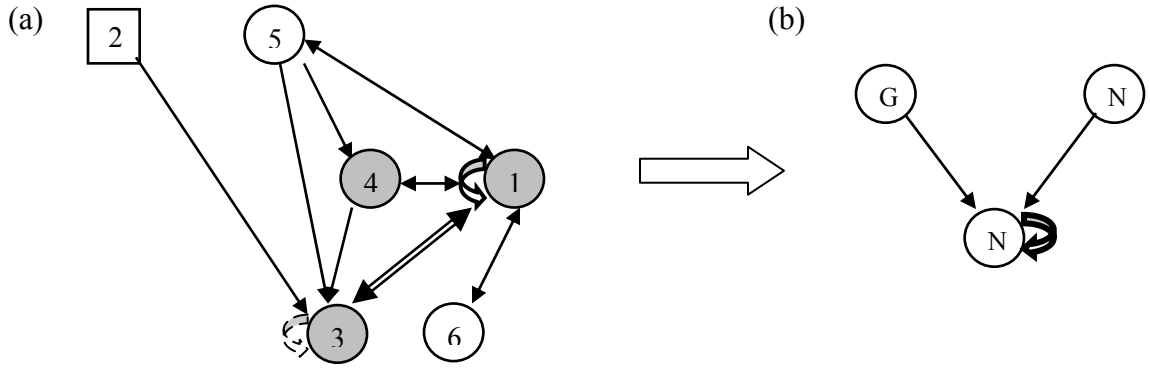


Figure VI-14) Reduced sociogram of work referral network

Figure VI-14 (a) shows work referral flows. On the top of the picture a), there are two sender blocks (2 and 5). In the middle, there are two coordinator blocks (4 and 1). At the bottom, there are two receivers (3 and 6). Among blocks, block 1 occupies a strategically significant position because it not only maintains many relations with other organizations for work referrals but also has high capability in the coordination of flows of social services (the betweenness centrality is the highest among six blocks). Block 3 is also important in the network because most of work referrals from the public sector arrive at this block. This exclusive relationship with public agencies indicates that nonprofits in block 3 seem to have a good reputation for high-quality performances or durable relationships with the public sector.

The picture (b) illustrates the abstracted version of the picture (a). When the above abstracted version (b) is combined with the abstracted version of nonprofit and business work referral reduced graph, we can clearly see the patterns of work referral flows among three sectors. This study calls this as *a social service system* and Figure VI-15 visually represents the system.

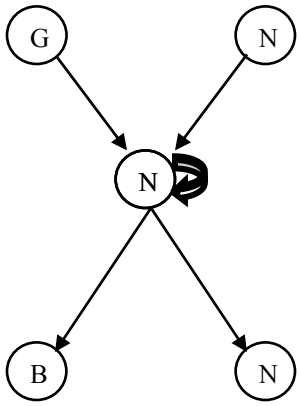


Figure VI-15) Work referral flow system among three sectors

In this system, there are three types of actor roles and/or positions – a referral sender, service coordinators, and service provider. Public agencies or some nonprofits send work referrals to nonprofits, which in turn coordinates these referrals and direct referrals to businesses or other nonprofits[59] that are specialized in service delivery. In sum, nonprofits play all three roles but businesses and public agencies play only one role - receiver and sender, respectively.

6.5.3 Regular meeting network blockmodel

The regular meeting network with the inclusion of public agencies is best reduced into 5 blocks (Table VI-44). Three blocks are of medium size (1, 3 and 4) and one block is of small size (6). Block 5 is composed of one nonprofit whose patterns of relations are quite different from any other organizations in the network. Since this block is nearly negligible, it will not be considered as an independent block in this section.

Table VI-44) Block members of work regular meeting network

Block Members (37)
1: CCN FF HEAETH NCM NH NHCO NHYMCA NHYMCC SSVD (9)
2: CLA HI LLM NSAS PT SMF (6)
3: ACDHS AVAC BLFP HFI MFC MN NHFB SMC SVD YWCA (10)
4: CA DAO ELC GVP MCG NAMSC NWCCP SOFP SPUMC THF UWAC (11)
5: LSS (1)

Descriptions of block positions

Table VI-45) Typology for structural positions for regular meeting relations

	$(g_k-1)/(g-1)$	Within tie/ Between tie	$P(B_k)$	Position	
				Typology I	Typology III
Block 1	0.229	0.569	17.67	Primary	Central
Block 2	0.143	0.348	2.50	Primary	Intermediate
Block 3	0.257	0.378	2.30	Primary	Intermediate
Block 4	0.286	0	1.55	Broker	Periphery

* The median of $P(B_k)$ is 2.4. And mean is 6.

[59] Of course, there could be a direct referral sending from the public sector to the business sector, but this relationship is not the topic in this study. Moreover, even if this relationship exists, the unique role of the business and public sector remain the same.

Block 1 occupies a primary and central position in the network. Following block 1, block 2 and block 3 occupy intermediate positions in the network and are also primary when it comes to discussing current problems or issues within the block. Finally, block 4 is located at the periphery of the network and is dependent on the central block (block 1).

Descriptions of overall blockmodel

Table VI-46) Image matrix of regular meeting network[60]

	1	2	3	4
1	1(SE)	1(RE)	1(RE)	1(RE)
2	1(RE)	1(RE)	0	0
3	1(RE)	0	1(RE)	0
4	1(RE)	0	0	0

Basically, the structure of the image matrix in Table VI-46 is a central-periphery system. However, there are three cohesive subgroups as well. Thus, this study names this network as a central-periphery with cohesive subgroup structure. This structure looks similar to the network structure in the regular meeting blockmodel image matrix when businesses are included. However, there is one significant difference between two network structures; in this blockmodel, there is no isolate – all organizations can reach any other organization in the network.

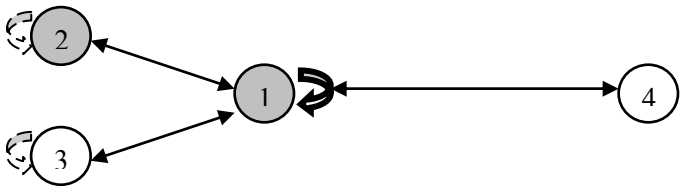


Figure VI-16) Reduced sociogram of regular meeting network

Just like the previous two regular meeting networks, the North Hills Nonprofit Consortium members (block 1 in Figure VI-16) are dominant in the network. However, there is a marginal structural change from the nonprofit regular meeting network. Dependency of adjacent blocks on the central block declines because two peripheral blocks (2 and 3) have within block relationships.

[60] Since block 5 is composed of only one outlier organization, this study excludes it from the image matrix and the reduced sociogram.

In sum, the involvement of two sectors in the nonprofit regular meeting network causes small structural changes. The effects of the involvement of public agencies are similar to those of the inclusion of businesses because the network structure becomes localized as there is coordination by the same central block actors (i.e., the North Hills Nonprofit Consortium). However, the major difference is that while the inclusion of businesses brings one internally cohesive isolate block, the involvement of public agencies makes all organizations (i.e., all blocks) completely connected, except one outlier nonprofit block.

6.5.4 Resource sharing network blockmodel

Only three public agencies participate in the resource sharing network. Table VI-47 illustrates the result of blockmodeling when public agencies are introduced. There are three medium-large blocks (2 and 3), two medium-small blocks (4 and 5), and one small block (1).

Table VI-47) Block members of resource sharing network

Block Members (38):
1: HI NH NHCO (3)
2: ACBA CA CCN FF GVP HEAETH MN NAMSC NWCCP PT THF (11)
3: AARP ACDHS BLFP ELC HFI LLM NHYMCC SMC SOFP SPUMC (10)
4: CLA FR NCM NSAS SMI SSVD TKF UWAC (8)
5: AVAC LSS MFC NHFB SMF SVD (6)

Descriptions of block positions

Table VI-48) Typology for structural positions for resource sharing relations

	$(g_k-1)/(g-1)$	Within tie/ Between tie	$P(B_k)$	Position	
				Typology I	Typology III
Block 1	0.054	0.158	32.00	Primary	Central
Block 2	0.270	0	1.09	Broker	Periphery
Block 3	0.243	0.061	9.30	Broker	Intermediate-central
Block 4	0.189	0	1.38	Broker	Periphery
Block 5	0.135	0.091	6.67	Broker	Intermediate

* The median of $P(B_k)$ is 6.67. And mean is 10.08.

Block 1 occupies a central position and plays a primary role – coordinating resource flows in the network. Block 3 and 5 play an intermediate role in the network. Finally, block 2 and 4 are located at the edge of the network.

Descriptions of overall blockmodel

Table VI-49) Permuted image matrix of resource sharing network

	1	3	5	2	4
1	1(SE)	1(RE)	1(RE)	1(RE)	0
3	1(RE)	0	1(RE)	0	1(RE)
5	1(RE)	1(RE)	0	0	0
2	1(RE)	0	0	0	0
4	0	1(RE)	0	0	0

It is hard to distinguish an exact type of network structure from the image matrix in Table VI-49. However, on the basis of position analysis, this study identifies the structure of this network as a central-intermediary-periphery system. Figure VI-17 visually illustrates the network structure. When public agencies join the resource sharing network, there are two changes in the network structure; 1) the resource sharing network becomes more cohesive as compared to the nonprofit resource sharing network (Figure VI-4), and 2) the structural type changes from a mixture of central-periphery and hierarchy to a central-intermediate-periphery system.

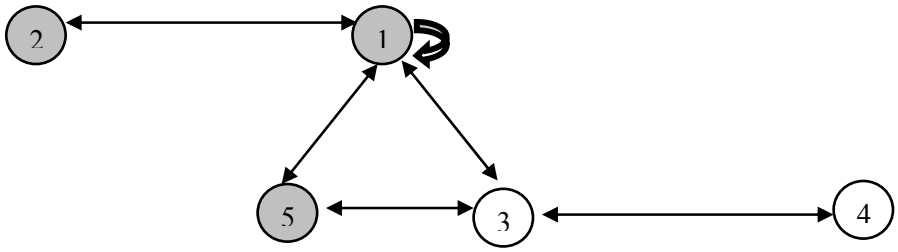


Figure VI-17) Reduced sociogram of resource sharing network

Through power centrality, resource flows can be induced (See Appendix 9-69). Since block 1 is the most powerful in this network, adjacent blocks (2, 3, and 5) are dependent on block 1 for resource sharing. Practically, the three nonprofits in block 1 are not expected to have enough physical resources to share with organizations in block 2, 3, and 5. Rather, this block plays a coordinating role that links nonprofits that need to share physical resources with other organizations that are looking to share resources. Block 3 is also dependent on block 4 for resource sharing.

In sum, when other sector organizations are introduced in the resource sharing network, the network structure changes. First, when businesses are involved, the network structure

becomes a two-hub network structure. In addition, the hierarchy structure becomes more apparent and the central block's coordinating role becomes more important. Second, with the inclusion of public agencies, the network structure changes to a central-intermediate-periphery system. The cohesiveness of the network also changes. When businesses are included, within block cohesive subgroups emerge, but when public agencies are introduced, the inter-block cohesiveness becomes stronger.

6.5.5 Formal contract network blockmodel

Blockmodeling reduces 25 nonprofits and 8 public agencies in the formal contract network into five distinctive blocks (Table VI-50). Two blocks (1 and 4) are medium size and three blocks (2, 3 and 5) are small size.

Table VI-50) Block members of formal contract network

Block Members (33)
1: ACDED ACDHS ACHA CA FF HUD PCG PSG SPUMC (9)
2: HI NH SMC SVYMCA TKF UWAC (6)
3: AVAC HFI NHCO SSVD YWCA (5)
4: AARP HEAETH NHYMCA NHYMCC NSAS SMF SVB SVD (8)
5: ACBA ACG BLFP LSS MFC (5)

Descriptions of block positions

Table VI-51) Typology for structural positions for formal contract relations

	$(g_k-1)/(g-1)$	Within tie/ Between tie	$P(B_k)$	Position	
				Typology I	Typology III
Block 1	0.250	0.118	1.67	Broker	Intermediate
Block 2	0.156	0	5	Broker	Intermediate-central
Block 3	0.125	0	15.60	Broker	Central
Block 4	0.219	0.182	1.13	Broker	Periphery
Block 5	0.125	0.546	1	Primary	Periphery

* The median of $P(B_k)$ is 1.67. And mean is 4.88.

Although block 3 occupies a central position, it does not play a primary. Rather it plays a broker role in the network because this block is not a cohesive subgroup. This block is both a local and whole network broker. Block 1 and 2 are located in an intermediate position. They are

intermediate because contributions of these two blocks are significant but the blocks are not placed at the center of the network. In particular, block 2 plays a local broker role between central block 3 and periphery block 4. Block 4 and 5 occupy a periphery position in the network. Block 5 is a cohesive subgroup.

Descriptions of overall blockmodel

Table VI-52) Permuted image matrix of formal contract network

	1	3	2	4	5
1	0	1(RE)	0	0	0
3	1(RE)	0	1(RE)	0	1(RE)
2	0	1(RE)	0	1(RE)	0
4	0	0	1(RE)	0	0
5	0	1(RE)	0	0	1(RE)

There is a hint of a hierarchy structure in the permuted image matrix in Table VI-52. The hierarchy structure becomes obvious in Figure VI-18.

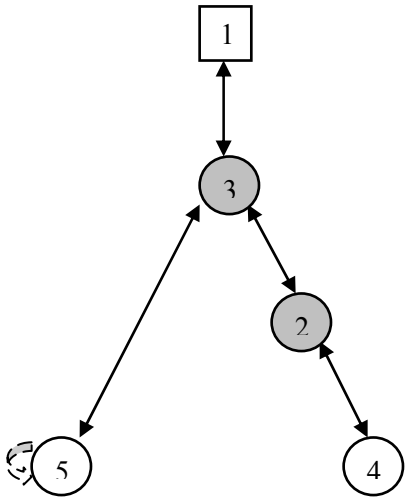


Figure VI-18) Reduced sociogram of formal contract network

Block 3 is exceptionally powerful (See Appendix 9-74), which means that most of organizations in this network depends on this block for formal contract relations. Block 1 and 2 are not weak in terms of the power centrality but are dependent on their relationship with block 3 because the power centrality of block 3 is so predominantly strong. From these dependency relationships, we can infer money flows. First, public agency-dominant block 1 is dependent on

block 3 for formal contract relationships. This indicates that public agencies grant money through formal contracts to block 3. In turn, nonprofits in block 3 would subcontract or make another contract with other nonprofits in block 2 or 5. In turn, nonprofits in block 2 play the same role as block 1 with block 4. Thus, flows of (government) money begin from the top of Figure VI-18, channel through a coordinating blocks, and finally arrive at periphery blocks. In addition, a reflexive tie in block 5 indicates that nonprofits in block 5 make formal contract with a public agency in block 5.

Compared to the two formal contract networks in the previous sections, the network structure in Figure VI-18 is totally different from the structures, which were a cohesive subgroup structure. As discussed in the earlier section, while businesses prefer formal contracts in their collaborative relationships with nonprofits, their involvement does not bring much structural change. However, as seen above, public agencies cause a fundamental change in the formal contract network, shifting the network from a cohesive subgroup structure to a hierarchy system. On the basis of results from three formal contract blockmodels, this study proposes a hypothesis that organizational homophily (for example, homophily of organizational culture, previous trust-building, organizational capacity, size and so forth) plays as a significant factor in making formal contracts among nonprofits or between nonprofits and businesses. However, organizational homophily is the second or third consideration when nonprofits and public agencies make formal contracts.

6.5.6 Joint program network blockmodel

The joint program network with the involvement of public agencies is best reduced into five blocks through blockmodeling. Block 5 is of medium-large size. Block 2 is of medium size and the rest of three blocks (1, 3 and 4) are of small size.

Table VI-53) Block members of work referrals network

Block	Members (31)
1:	ELC FR NHYMCC SVYMCA (4)
2:	AVAC BOM CCN GPR MN PANA PSD SSVD (8)
3:	AARP CLA FF HI NHCO (5)
4:	BLFP SPUMC SVB (3)
5:	APR ACDHS HFI MFC NH NWCCP PT SMF SVD UWAC YWCA (11)

Descriptions of block positions

The joint program blockmodel is composed of two types of positions – central and periphery. Block 3 occupies a central position and plays a primary (i.e., network coordination) role. As public agencies join the network, the size of the central and primary block becomes bigger (5 nonprofits) as compared to the nonprofit joint program network (3 nonprofits) or the joint program network with businesses (2 nonprofits). This relates to structural changes from the reduced dominance of the two hub nonprofits. While businesses make most of their connections with the two hub nonprofits, public agencies have joint program relationships with other nonprofits besides the two hubs; only 25% (2/8) of ties from public agencies are with the two hub nonprofits, while 75% (6/8) of ties from public agencies are with the other nonprofits. Block 4 also occupies a central position and plays a broker role. Block 1, 2 and 5 are identified as periphery position occupants.

Table VI-54) Typology for structural positions for joint program relations

	$(g_k-1)/(g-1)$	Within tie/ Between tie	$P(B_k)$	Position	
				Typology I	Typology III
Block 1	0.1	0	1.25	Broker	Intermediate-periphery
Block 2	0.2333	0	1.125	Broker	Periphery
Block 3	0.1333	0.1429	18	Primary	Central
Block 4	0.0667	0	6.67	Broker	Central
Block 5	0.3333	0	1.27	Broker	Intermediate-periphery

* The median of $P(B_k)$ is 1.27. And mean is 5.66.

Descriptions of overall blockmodel

Table VI-55) Permuted image matrix of joint program network

	3	5	2	4	1
3	1(RE)	1(RE)	1(RE)	1(RE)	0
5	1(RE)	0	0	0	0
2	1(RE)	0	0	0	0
4	1(RE)	0	0	0	1(RE)
1	0	0	0	1(RE)	0

The image matrix in Table VI-55 is almost the same as that of the nonprofit joint program image matrix (Table VI-18). However, there are two differences in structures. First, as discussed above, the network structure is a central-periphery system, not a central-intermediate-periphery system, which is the network structure of the joint program network comprised of

nonprofits. Second, peripheral blocks are more dependent on the central block because peripheral blocks (1, 2 and 5) are not internally cohesive. Only central block 3 is a cohesive subgroup. Therefore, even though the image matrix is the same or at least similar, interpretation of the network structure should be different. For this reason, the sociogram should be drawn differently. Figure VI-19 illustrates the joint program network when public agencies are introduced (compare this figure with Figure VI-6).

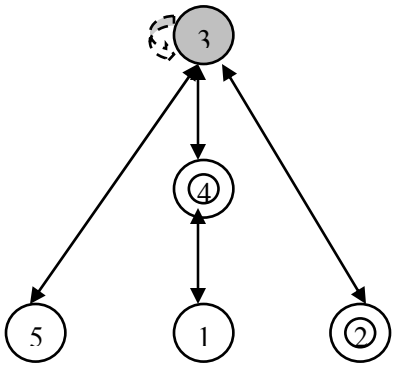


Figure VI-19) Reduced sociogram of joint program network

Block 4 plays a local broker role between a central block 3 and a periphery block 1[61]. Block 3 is strategically significant in this network because it coordinates or mediates the joint program relationship of all organizations in this network.

In sum, the effects of public agencies' involvement are different from those of businesses' involvement. While the latter makes the network simpler and brings a slight change in the network structure, the former causes more changes in the network structure, which indicates that public agencies are embedded in the joint program network. Finally, the phenomenon of the seamless economy is again evidenced through the same or similar collaboration patterns of nonprofits and public agencies; the coexistence of block 2 and 4 provide evidence for blurring boundaries between the nonprofit and public sector.

[61] Though block 4 is visually below block 3, this is because it plays a broker role, not because it occupies an intermediate or periphery position in the network.

6.6 SUMMARY: COMPARISONS OF BLOCKMODELS

This chapter has described the reduced model of collaboration networks in three separated sections. This final section summarizes analysis results of blockmodeling from a comparative perspective; comparing structural properties of 'blockmodels composed of nonprofits' with 'blockmodels when other sectors are introduced.' The comparisons provide more evidence of blurring boundaries. In order to examine whether the involvement of other sectors has impacts on blurring boundaries, this study first summarizes the structural changes when two sectors are introduced in the nonprofit collaboration networks (Table VI-56). Then, this study applies another comparison using cohesiveness of within block and whole blockmodel (Table VI-57 and 58). It is expected that multiple approaches can clarify the effects of the involvement of the business and public sectors more clearly.

Table VI-56) Summary of changes in network structure

	42 NPOs	NPO and business (1)	NPO and government (2)	Structural change	No change
Information sharing network	Central-periphery	Central-intermediary-periphery system	Central-periphery	(1)	(2)
Work referrals network	Mixture of a centralized and hierarchy	Mixture of a centralized and hierarchy	Mixture of a centralized and hierarchy		(1), (2)
Regular meeting network	Central-periphery with one isolate	Mixture of central-periphery and cohesive subgroup	Central-periphery	(1)	(2)
Resource sharing network	Central-periphery	Mixture of central-periphery and hierarchy	Central-intermediary-periphery	(1), (2)	
Formal contract network	Cohesive subgroup	Cohesive subgroup	Hierarchy	(2)	(1)
Joint program network	Central-intermediate-periphery	Centralized system	Central-periphery	(1), (2)	

Table VI-56 examines if there is evidence of blurring boundaries caused by the introduction of the business or public sector. From a structural perspective, two types of less intensive collaboration network show that there are negligible changes in the network structure when the business and public sectors are introduced; the central-periphery structure in the

information sharing network and the sender-broker-receiver structure in the work referral network remain. However, the information sharing network is structurally changed when businesses participate; the network changes from a central-periphery to central-intermediary-periphery system. Although the work referral network does not change structurally, the network shows a division of labor when two sectors are involved in the work referral network. The public (and nonprofit) sector is a sender, the nonprofit sector is a service coordinator and the business (and nonprofit) sector is a service deliverer. This system is not the traditional hierarchical command and order system but rather a voluntarily organized system composed of voluntary participation and coordination of organizations by several nonprofits. In the previous two chapters, this system is called the social service system or value chain system and is evidenced to be efficient in delivering social services. In the regular meeting network, when businesses are involved, the network structure changes from a central-periphery to a mixture of central-periphery and cohesive subgroup system. When public agencies are involved, the network structures of the strategic collaboration networks change from a mixture of central-periphery and hierarchy to a central-intermediary-periphery system in the resource sharing network, from a cohesive subgroup system to a hierarchy system in the formal contract network, and from a central-intermediate-periphery system to a central-periphery system in the joint program network.

In sum, while the impact of the introduction of the business sector is conspicuous in the less intensive networks (i.e., information sharing and regular meeting network), the impact of the public sector is obvious in the strategic collaboration networks. This indicates that blurring effects are noticeable in 1) the less intensive collaboration networks when the business sector participates and 2) in the strategic collaboration networks when the public sector participates.

The blurring boundaries between the sectors can also be examined by looking at the local and whole blockmodel cohesiveness of blockmodels. Local cohesiveness is measured by the number of cohesive subgroups in a blockmodel. When actors in a block cohesively are connected within their subgroup, this block is locally, within a subgroup, cohesive. Whole blockmodel cohesiveness is measured by blockmodel density[62]. Blockmodel density is useful in understanding how blocks in a blockmodel are well (or poorly) connected. The high density of a blockmodel indicates that blocks in the blockmodel are strongly connected to each other. In this

[62] Blockmodel density is 'the proportion of all inter-block ties that could be present that actually are.' This is also expressed in terms of an equation; $d_B = g/[n*(n-1)]$, where g = ties that are present, n = the number of block.

sense, the degree of block density shows how cohesively blocks interact across the whole network. Table VI-57 and 58 illustrate changes of local and the whole blockmodel cohesiveness according to the involvement of two sectors.

Table VI-57) Comparison of local cohesiveness (cohesive subgroup)

	Number of cohesive subgroup					
	NPO	%*	NPO and business	%*	NPO and government	%*
Information sharing network	3	60%	2	33.3%	3	50%
Work referrals network	2	40%	2	40%	2	33.3%
Regular meeting network	1	20%	3	75%	3	75%
Resource sharing network	1	25%	3	60%	1	20%
Formal contract network	3	100%	3	75%	1	20%
Joint program network	3	60%	2	66.7%	1	20%

* %: the number of cohesive subgroup block divided by the total number of block times 100

Table VI-58) Comparison of the whole blockmodel cohesiveness (blockmodel density)

	Blockmodel density		
	42 NPOs	NPO and business	NPO and government
Information sharing network	60%	40%	53.3%
Work referrals network	40%	40%	40%
Regular meeting network	40%	33.3%	58.3%
Resource sharing network	50%	40%	50%
Formal contract network	0%	16.7%	40%
Joint program network	40%	67.7%	40%

Four networks reveal significant changes of local and whole network cohesiveness. First, when public agencies are introduced in the regular meeting network, both local and whole network cohesiveness increases. The same pattern happens when businesses join the joint program network. Increases of both local and whole network cohesiveness indicate connectedness of within subgroups. Simultaneously, inter-blocks become stronger. These simultaneous increases of two types of cohesiveness are expected to bring synergistic effects to

network connectedness. The synergistic effects in turn will result in network solidarity. Second, when public agencies are introduced in the formal contract network, local cohesiveness significantly declines but whole network cohesiveness considerably increases. When actors in the same block do not have connections, they depend on actors outside their block for their relationships. For this reason, centralization of the network happens when within block cohesiveness decreases and inter-block relations increase. In this case, as seen in the formal contract network, the network structure changes to a hierarchy or centralized system. Third, when businesses are introduced in the regular meeting and resource sharing network, local cohesiveness significantly increases but whole network cohesiveness decreases. When local cohesiveness increases and whole blockmodel cohesiveness decreases simultaneously, the network becomes more localized. This is because within block relationships become more cohesive and inter-block relationships become less connected. Fourth, when businesses participate in the information sharing network, both types of cohesiveness notably decrease. When both types of cohesiveness decrease, the actors in the network become more fragmentized, which is intuitively understandable.

In sum, more than half of the nonprofit collaboration networks prove to be structurally changed when business and public sector organizations are introduced. This implies that structural integration happens when other sectors join the nonprofit network, which is empirical evidence for blurring boundary.

VII. COLLABORATION PATTERNS BY ORGANIZATIONAL CHARACTERISTICS

7.1 INTRODUCTION

The previous three chapters dealt with nonprofit collaboration patterns within the nonprofit sector and across the business and public sectors from the perspective of network analysis. While network analysis is very useful in uncovering collaboration patterns through the external features (i.e., relations) of organizations, it has limitations in investigating the impact on internal characteristics of organization. In order to be counter this weakness in network analysis, this chapter conducts two types of regression analysis; multiple regression and logistic regression. There are two major findings resulting from this analysis. First, nonprofits that run social enterprise and/or have diverse revenue sources are highly likely to collaborate with others. Large size nonprofits that have high organizational capability show low likelihood of collaborating with other nonprofits. Second, nonprofits that prefer businesses as strategic collaboration partners and nonprofits that prefer public agencies as strategic collaboration partners show contradictory characteristics. Nonprofits that favor businesses as their strategic collaboration partners are relatively younger, have diverse programs, and are more likely to make high commercial revenues; nonprofits that choose public agencies are relatively old, have a small number of programs, and are negatively associated with commercial activities.

7.2 DESCRIPTIVE STATISTICS

This section describes the statistical distribution of the organizational attributes of the 33 nonprofit organizations which responded to the survey. If the purpose of this study were to

prove or test any hypothesis or theory, it would not be appropriate to interpret results from statistical analysis with 33 cases. However, this study explores or predicts plausible collaboration patterns through relationships among variables through statistical methods. One should be extremely cautious in interpreting results in this chapter because results may be biased due to small sample size (even though statistical significance is high).

Table VII-1) Descriptive statistics of attribute variables

	N	Scale	Minimum	Maximum	Mean	Std. Deviation
Strategic collaboration with Business	33	Dummy	0	1	.36	.489
Strategic collaboration with Government	33	Dummy	0	1	.36	.489
Collaboration Relationship Index	33	Ratio	6	307	66.42	58.055
Proportion of board member from business	29	Ratio(%)	0	100	43.61	36.94032
Proportion of revenue source from government	31	Ratio(%)	0	95	12.89	25.94207
Proportion of revenue source from commercial activity	31	Ratio(%)	0	95	18.41	27.89273
Total annual expenditure	32	Ratio($)	2,000.00	53,987,589.0	3,366,523.09	10,618,918.95
Proportion of administrative expenditure	31	Ratio(%)	0	62.60	18.40	16.64572
Years in operation	33	Ratio	1	151	46.61	44.73669
Revenue diversity	31	Ratio	1	7	4.23	1.82043
Program diversity	32	Ratio	1	13	5.03	3.69380
Government revenue dummy	31	Dummy	0	1	.355	.48637
social enterprise revenue dummy	31	Dummy	0	1	.161	.37388

Most of responded surveys provided many kinds of organizational data. However, some organizations did not answer certain types of questions because they did not have the exact information for these questions[63]. This study uses a total of 13 variables for two regression analyses[64] (Table VII-1). Among them, there are four dummy variables and the other variables are ratio-scale variables. Two dummy variables (government revenue and social enterprise revenue) are used in multiple regression and the other two (strategic collaboration with business and strategic collaboration with government) are used in logistic regression. Nine ratio-scale

[63] For example, an associate director of one nonprofit emailed the author that she could not provide information regarding budgets because the nonprofit is a branch of a nation-wide nonprofit, and she does not have the information about the budget geographically limited to Pittsburgh region (she told the author that she only has Pennsylvania state level information).

[64] The definitions of variables will be presented in the next two sections.

variables are used in both regression models. Table VII-2 represents correlations between nine organizational attributes, of which scale is ratio-level.

The correlation analysis illustrates a couple of interesting findings. First, a nonprofit that is active in collaboration has relatively diverse revenue sources, as well as various programs. As the proportion of board members affiliated with the business sector increases, the nonprofit may be more active in collaboration[65]. It cannot be said that other organizational attributes have any association with nonprofits' efforts to make collaboration because they are not strongly statistically significant.

Second, the more money a nonprofit receives from the public sector, the more programs and revenue sources it has. In particular, nonprofits' dependency on government for revenue source and the size of budget (total annual expenditure) are strongly correlated with each other (the correlation coefficient is about 0.7 at 0.01 significant level). This implies that increased funds from governments increase nonprofit size. These two variables are not included in the same regression model because of multicollinearity problem.

Third, nonprofits that are more oriented to commercial activities for their revenue generation show different patterns. According to Table VII-2, these nonprofits spend more on administrative expenditures than other nonprofits that have relatively less commercial activities. Besides, as nonprofits become more interested in business methods, they are likely to reduce their revenue from public agencies. Also, the older a nonprofit is, the more commercial activities it has. Following sections will provide more refined statistical analysis to explore the effects of organizational attributes on the behavior of nonprofits when they collaborate within and across the sectors.

[65] P-value of correlation coefficient between these two variables is 0.13, which indicates that there may be some correlations between the two variables, even though statistically insignificant. Likewise, this study assumes that there may be correlations if the p-value is under 0.2 because a p-value of 0.2 means that the possibility of correlation between variable A and B is more than 80%.

Table VII-2) Pearson correlation between organizational attributes

	Collaboration Relationship Index	Proportion of board member from business	Revenue from commercial activity	Total annual expenditure	Proportion of administrative expenditure	Years in operation	Revenue diversity	Program diversity	Proportion of revenue from government
Collaboration Relationship Index	1 . 33	.288 .130 29	-.076 .686 31	-.025 .893 32	-.119 .524 31	-.143 .428 33	**.507(**)** .004 31	**.308(***)** .087 32	.053 .776 31
Proportion of board member from business	.288 .130 29	1 . 29	.079 .694 27	.308 .110 28	-.255 .199 27	**.345(***)** .066 29	**.470(*)** .013 27	.245 .208 28	.307 .119 27
Proportion of revenue from commercial activity	-.076 .686 31	.079 .694 27	1 . 31	-.035 .853 31	**.357(***)** .052 30	**.398(*)** .027 31	.141 .450 31	-.290 .120 30	-.239 .194 31
Total annual expenditure	-.025 .893 32	.308 .110 28	-.035 .853 31	1 . 32	-.064 .732 31	**.485(**)** .005 32	.246 .183 31	.111 .553 31	**.673(**)** .000 31
Proportion of administrative expenditure	-.119 .524 31	-.255 .199 27	**.357(***)** .052 30	-.064 .732 31	1 . 31	.088 .636 31	.126 .508 30	.046 .811 30	-.022 .907 30
Years in operation	-.143 .428 33	**.345(***)** .066 29	**.398(*)** .027 31	**.485(**)** .005 32	.088 .636 31	1 . 33	.262 .155 31	.171 .351 32	.214 .248 31
Revenue diversity	**.507(**)** .004 31	**.470(*)** .013 27	.141 .450 31	.246 .183 31	.126 .508 30	.262 .155 31	1 . 31	.251 .181 30	**.332(***)** .068 31
Program diversity	**.308(***)** .087 32	.245 .208 28	-.290 .120 30	.111 .553 31	.046 .811 30	.171 .351 32	.251 .181 30	1 . 32	**.321(***)** .084 30
Proportion of revenue from government	.053 .776 31	.307 .119 27	-.239 .194 31	**.673(**)** .000 31	-.022 .907 30	.214 .248 31	**.332(***)** .068 31	**.321(***)** .084 30	1 . 31

*** Correlation is significant at the 0.1 level (2-tailed). ** Correlation is significant at the 0.01 level (2-tailed). * Correlation is significant at the 0.05 level (2-tailed).

7.3 MULTIPLE REGRESSION MODEL

Though the simple descriptive statistics in the previous section revealed some interesting findings, they are not complete. For more thorough examination, this chapter conducts regression analysis.

7.3.1 Model description

The objective of the multiple regression model is to explore the following questions; what kind of organizational factors affect nonprofit collaborative behaviors? How much can independent variables - nonprofit entrepreneurial efforts, nonprofit dependency on government, size, and so forth - explain nonprofit exertion to collaborate with other nonprofits? In order to answer the questions, this study builds a multiple regression model.

The dependent variable is CRI (collaborative relationships index). The bigger the dependent variable is, the stronger the nonprofit maintains collaborative relationships with other organizations. Thus, the dependent variable represents a 'tendency to collaborate with others.' There are six independent variables.

- GR (Government revenue dummy): if a nonprofit generates revenues from government. If it does, the nonprofit is assigned a value of one, if not, zero.
- SE (Social enterprise revenue dummy): if a nonprofit generates revenues from social enterprise. If it does, the nonprofit is assigned a value of one, if not, zero.
- RD (Revenue diversity): how many sources a nonprofit has for generating its revenues. Revenue diversity ranges from zero to eleven.
- PD (Program diversity): how many social service programs a nonprofit provides. The range of program diversity is from zero to thirteen.
- TAE : total annual expenditure in the most recent fiscal year.
- YEAR: the number of years since the nonprofit was founded.

7.3.2 Model specification

In order to specify the most suitable multiple regression model, this study conducts three analyses. First, this study attempts to identify if there are interaction effects between the two dummy variables. The two variables do not have interactive effects because two profiles do not cross each other (See Appendix 10-1). The two variables have mutually exclusive effect on CRI.

Second, this study tries to identify interaction effects between dummy variables and other independent variables. The social enterprise revenue dummy variable does not have any interactive effect with the other four ratio-scale independent variables (See Appendix 10-2 and 3). However, government revenue dummy variable seems to have interactive effects with revenue diversity (See Appendix 10-4 and 5). For this reason, if revenue diversity is not controlled, the effect of the two-way interaction will bias the multiple regression results. This study treated this problem by adding one more variable, which is an interactive term (revenue diversity × government revenue dummy).

Finally, this study checked for multicollinearity among the four ratio scale independent variables using correlation tables (refer to Table VII-2). Overall, most of the independent variables do not strongly associate with each other because the correlation coefficients between them are relatively small.

7.3.3 Analysis results

First, in order to document overall impacts[66] of organizational characteristics on collaboration efforts, this study presents results of multiple regression analysis without specifying a statistically best-fit model. For the whole model significance, this multiple regression model is significant at 0.01 level (See Appendix 10-7). And the model's ability to explain the variance of the dependent variable is quite good (R-square is 0.63).

[66] This study calls this "overall patterns of collaboration" because the dependent variable in the this section, CRI, covers from the least intensive type of collaboration to the most intensive type of collaboration.

Table VII-3) Regression coefficients of multiple regression model

	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
(Constant)	-11.158	24.713		-.452	.656
SE**	65.396	26.595	.376	2.459	.022
RD*	19.108	6.439	.586	2.968	.007
YEAR	-.362	.218	-.276	-1.659	.111
TAE	-8.192E-07	.000	-.149	-.839	.411
PD***	4.354	2.285	.269	1.906	.070
GR	-90.610	72.443	-.738	-1.251	.224
Interaction term: GR times RD	11.415	13.234	.549	.863	.398

* significant at 0.01 level ** significant at 0.05 level *** significant at 0.1 level

Table VII-3 illustrates regression results. For the convenience of presenting regression results, this study rebuilds the results into an equation below.

● Whole model of multiple regression

$$Y = -11.158 + 65.396SE + 19.108RD - 0.362YEAR - 0.000000819TAE + 4.354PD - 90.61GR + 11.415INT$$

Three variables - social enterprise, revenue diversity, and program diversity - are found to be statistically significant. First, social enterprise is positively associated with the dependent variable, which means that nonprofits that generate revenue from social enterprise have strong collaboration relationships with other nonprofits. On the other hand, when nonprofits receive money from government, their tendency to collaborate with others appears to decrease. Second, nonprofits that have diverse sources and/or that provide various programs have stronger collaborative relations with other nonprofits. However, year[67] is negatively associated with CRI. This implies that as nonprofits age, they become self-sufficient and their tendency to collaborate

[67] P-value of the regression coefficient is 0.11, which indicates that this variable is able to explain a certain portion of the dependent variable, even though it is slightly statistically insignificant. In the following section, this study assumes that a regression coefficient has ability to explain the dependent variable if the p-value is under 0.2.

with other nonprofits reduces. Finally, it is difficult to tell if the two variables (TAE and INT) are able to explain the dependent variable.

In order to present more probable hypotheses, this study specifies a statistically best-fit regression model. For a method to specify model, this study applies a stepwise regression approach. Compared to the above regression model, the specified model is statistically more significant because the p-value of the F-test slightly improves (0.008 to 0.000). However, the ability to explain the variances of the dependent variable reduces slightly, from 0.63 to 0.52. This decrease is due to the omission of four independent variables. Considering that four out of seven variables are removed, the decrease span of 0.1 is comparatively small. Therefore, although R-square decreases to 0.52, this value is still enough to explain the variance of the dependent variable.

Table VII-4) Regression coefficients of the best-fit model

	Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Collinearity Statistics	
	B	Std. Error	Beta			Tolerance	VIF
(Constant)	-7.623	20.364		-.374	.711		
RD*	17.070	4.589	.523	3.719	.001	.930	1.076
SE*	88.685	25.617	.509	3.462	.002	.850	1.176
TAE**	-1.964E-06	.000	-.357	-2.384	.025	.821	1.218

* significant at 0.01 level. ** significant at 0.05 level.

Table VII-4 represents the best-fit model and is rephrased into the equation form below. Since the tolerances of the three variables are high, it can be said that there is only a negligible amount of multicollinearity in the best-fit model.

● Best-fit model

$$Y = -7.623 + 88.685SE + 17.07RD – 0.000001964TAE$$

Before completing interpretations of the above model, this study conducted a post-examination of the regression model (i.e., residual analysis) to see if the model violated assumptions of regression model. The best-fit multiple regression model does not violate basic assumptions of regression because 1) residuals are normally distributed, which is confirmed by

residual analysis. A residual histogram is normally distributed and patterns of residuals in the p-p plot are located along the diagonal (See Appendix 10-10 and 11). And 2) the model appears to keep the heteroscedasticity assumption because it is difficult to detect certain patterns of residuals in the scatterplots (See Appendix 10-12 to 15). Because the best-fit model is quite robust in terms of statistical properties, this study can propose hypotheses from this model.

As shown in the whole regression model, revenue diversity and social enterprise variables have a significant ability to explain the dependent variable - the strength of the collaboration. For example, if a nonprofit generates revenues from social enterprise activity, this nonprofit maintains stronger collaborative relationships (i.e., 89 CRI points more) than other nonprofits that do not. In addition, the size of nonprofits (i.e., total expenditure) is negatively associated with the strength of collaboration. This indicates that if the size increases by $1M, the strength of collaboration would decrease by about 20 points in the CRI. One should be careful in interpreting these results. Considering results from blockmodeling (refer to Chapter 6 section 6.3.7), it would be reasonable to state that this negative association does not apply to nonprofits whose size is below $1M. On the basis of these results, this study suggests three hypotheses.

1) A nonprofit which is active or interested in entrepreneurial management is likely to make significantly stronger collaborative relationships with other nonprofits.

2) A nonprofit which has diverse revenue sources is likely to make significantly stronger collaborative relationships with other nonprofits.

3) As the size of a nonprofit increases, the tendency to provide social services in collaboration with other nonprofits reduces significantly.

7.4 LOGISTIC REGRESSION MODEL

The previous section explored nonprofit within sector collaboration patterns by looking at the impacts of organizational characteristics on nonprofits CRI. In this section, this study focuses on the cross-sector collaboration patterns of strategic collaboration. By doing this, the study tries to answer the following question; what kinds of nonprofits' characteristics affect choice of businesses or public agencies with which to partner. Specifically, this study explores the effects of the same organizational factors that were discussed in the previous section but in the context

of strategic collaboration with either of the business or public sector. For example, commercial activity of nonprofits could be positively related to strategic collaborative relationships with businesses, but the same factor would inversely affect or have no association with strategic collaboration with the public sector. In sum, the two purposes in this section are: 1) to identify which organizational attributes contribute to the choice of strategic collaboration with the business or public sector, and 2) to compare directions (i.e. positive or negative) of attributes on the choice of strategic collaboration with the two different sectors.

Logistic regression is well suited to these purposes. Logistic regression is not only designed to deal with binary dependent variable (the choice of businesses or public agencies for strategic collaboration partners), but also allows interpretation and explanation of the coefficients of various independent variables on the basis of a logistic cumulative probability curve. A logistic cumulative probability curve approximates a normal curve but its tails are flatter than a normal curve[68] (Gujarati, 1995). The below Equation 1 is a logistic distribution function. Using odds ratio and natural log, a logistic regression model can be drawn as in an Equation 2.

$$\mathbf{P(Y) = (1 + e^{-Yi})^{-1}} \text{ ---------- Equation 1}$$

Where, $Y_i = \beta_0 + \sum \beta_i X_i$

$$\boldsymbol{L_i = \ln(P_i/1\text{-}P_i) = Y_i = \beta_0 + \sum \beta_i X_i} \text{ ---------- Equation 2}$$

This study proposes two logistic models because it explores patterns of nonprofit collaboration with two different sectors. Each model has a different dependent variable but the same independent variables. These models are described in the below Table VII-5. The two dependent variables are if a nonprofit has a strategic collaboration with businesses and if a nonprofit has a strategic collaboration with public agencies.

[68] Thus, logistic regression does not make any assumptions of normality, linearity, and homogeneity of variance for the independent variables.

Table VII-5) Variables in two logistic regression models

Dependent variable
- Model 1: $Y_B = 1$ if strategic collaborative relationships with business, 0 otherwise
- Model 2: $Y_P = 1$ if strategic collaborative relationships with public sector, 0 otherwise

Independent variables
- BUSBOARD: Proportion of board member from business.
- GOVREVEN: Proportion of revenue source from government
- COMREVEN: Proportion of revenue source from commercial activity
- REVDIVER: Revenue diversity
- PROGDIVE: Program diversity
- YEAR: Years in operation
- ADMNEXP: Proportion of administrative expenditure in the total expenditure

Two models share the same seven independent variables as shown in Table VII-5. There are two variables concerned with the business-oriented behaviors of nonprofits (BUSBOARD and COMREVEN). These variables are expected to be positively associated with the dependent variable in the Model 1, but negatively associated in Model 2. On the other hand, the GOVREVEN variable describes a nonprofits preference for the public sector. It is expected to be positively associated with the dependent variable in Model 2, but negatively associated in Model 1. Three variables (ADMNEXP, REVDIVER, and PROGDIVE) represent managerial capacity of nonprofits. The direction of these variables is not clear a priori. Finally, a variable for the size (total expenditure) is not included in the model because it is too strongly correlated with the GOVREVEN variable (refer to the section 7.2). Instead, this study includes the YEAR variable because it is strongly correlated with expenditure variable but does not show any correlations with the GOVREVEN variable.

Model 1: Y_B = strategic collaborative relations with business

Table VII-6 illustrates analysis results when Y_B is one or a nonprofit has strategic collaborative relationships with business. This table includes two analysis results; the whole model and best-fit model. The whole model takes into account all seven independent variables, regardless of their statistical significances. The whole model attempts to describe general inclinations of various organizational characteristics. The best-fit model enables one to produce plausible hypotheses because the model is more reliable (i.e., it is statistically significant).

Table VII-6) Variables in the first logistic regression model

		B	S.E.	Wald	df	Sig.	Exp(B)
Whole model	BUSBOARD	.032	.027	1.395	1	.238	1.032
	COMREVEN	.106	.061	3.029	1	.082	1.112
	ADMNEXP	-.196	.110	3.167	1	.075	.822
	YEAR	-.047	.032	2.203	1	.138	.954
	REVDIVER	-.310	.411	.570	1	.450	.733
	PROGDIVE	.765	.415	3.398	1	.065	2.149
	GOVREVEN	-.006	.039	.026	1	.872	.994
	Constant	-.252	2.047	.015	1	.902	.777
Best-fit model	COMREVEN*	.108	.053	4.152	1	.042	1.114
	ADMNEXP*	-.166	.078	4.583	1	.032	.847
	YEAR	-.036	.022	2.673	1	.102	.964
	PROGDIVE*	.622	.280	4.926	1	.026	1.863
	Constant	-.725	1.207	.361	1	.548	.484

* significant at 0.05 level.

● Whole model

$$Y_B = -0.252 - 0.31\text{REVDIVER} + 0.756\text{PROGDIVE} + 0.106\text{COMREVEN} + 0.032\text{BUSBOARD} - 0.047\text{YEAR} - 0.196\text{ADMNEXP} - 0.006\text{GOVREVEN}$$

As expected, the two variables that represent business-oriented behaviors of nonprofits (revenue from commercial activities and proportion of board members from the business sector) are positively associated with strategic collaboration with businesses. The direction of the BUSBOARD variable confirms the preceding research by Wellman (1988). Board members' affiliation with the business sector provides managers in the nonprofit sector with more chances or easy access to a number of trusted business firms, with which nonprofits can make strategic collaborative relationships. According to Wellman (1988), these links through board members enable nonprofits to acquire inside information about activities of business firms. Thus, nonprofits with more information about the business sector are more likely to have strategic collaborations with the business sector. A nonprofit's dependence on government for revenue is negatively correlated with this dependent variable. However, we cannot tell that this is correct because the coefficient is statistically insignificant. In order to generate more probable propositions, this study conducts model specification, which is a backward stepwise approach. It is necessary to check -2 log-likelihood statistic when building a model through backward

stepwise because -2 log-likelihood statistic can be used for assessing the significance of logistic regression model. -2 log-likelihood improves from 17.898 to 19.863 when three variables are removed.

● Best fit model[69]

$$Y_B = -0.725 + 0.662PROGDIVE + 0.108COMREVEN - 0.036YEAR - 0.166ADMNEXP$$

From the above best-fit model, this study induces the two results. First, a nonprofit's choice of businesses as a strategic collaboration partner is positively associated with commercial activity and program diversity. Second, the dependent variable is negatively associated with years in operation and administrative expenditures. On the basis of these results, this study proposes the following hypotheses;

1) Nonprofits which provide diverse programs show a significantly higher likelihood of making strategic collaboration with businesses.

2) Nonprofits that operate more commercial activities for their revenue generation show a significantly higher likelihood of making strategic collaboration with businesses.

3) The younger nonprofits are, the more active they are in making strategic collaborations with businesses. The reason for this tendency will be discussed in Model 2.

4) Strategic collaboration with businesses is likely to bring positive consequences to nonprofits in terms of efficient operation of the organization because there is a significantly lower likelihood of administrative expenditure.

Model 2: Y_P = strategic collaborative relations with public sector

Table VII-7 represents results of the second model – when nonprofits have strategic collaboration with public agencies.

[69] In the best-fit model, one regression coefficient (YEAR) is a little over the statistical significance level. This study interprets this coefficient as a plausible effect on the dependent variable because 1) this study is not designed to test statistical significance, 2) the significance level is close to the 0.1, and 3) increases in significance of the model are very marginal when these variables are removed (See the Appendix). Thus, it is not unrealistic to assume that this variable has impacts on the dependent variable.

Table VII-7) Variables in the second logistic regression model

		B	S.E.	Wald	df	Sig.	Exp(B)
Whole model	BUSBOARD	-.008	.017	.241	1	.624	.992
	COMREVEN	-.043	.042	1.062	1	.303	.958
	ADMNEXP	-.010	.036	.074	1	.785	.990
	YEAR	.035	.022	2.490	1	.115	1.036
	REVDIVER	.678	.431	2.471	1	.116	1.970
	PROGDIVE	-.373	.227	2.698	1	.100	.689
	GOVREVEN	.029	.030	.929	1	.335	1.030
	Constant	-2.306	1.876	1.512	1	.219	.100
Best-fit model	COMREVEN	-.055	.035	2.488	1	.115	.947
	YEAR*	.036	.020	3.286	1	.070	1.037
	REVDIVER*	.700	.402	3.029	1	.082	2.015
	PROGDIVE*	-.350	.192	3.311	1	.069	.705
	Constant	-2.595	1.71	2.307	1	.129	.075

* significant at 0.1 level.

● Whole model

$$Y_P = -2.306 + 0.678\text{REVDIVER} - 0.373\text{PROGDIVE} - 0.043\text{COMREVEN} - 0.008\text{BUSBOARD} + 0.035\text{YEAR} - 0.01\text{ADMNEXP}$$

As shown in the whole model equation above, when nonprofits make strategic collaboration with public agencies, they may generate more revenue from government sources. Though the statistical significance is not that high (p-value is 0.33), it is not negligible when one considers its substantial significance – for example, formal contracts with governments usually mean revenue flows from governments to nonprofits. On the other hand, business-oriented behaviors are negatively associated with a nonprofit's choice of public agencies as strategic collaboration partners. However, we cannot tell whether the BUSBOARD variable has any ability to explain the dependent variable because it is not statistical significance. Other variables related to organizational management reveal interesting results. Revenue diversity and years in operation are positively associated with nonprofit choice of public agencies for strategic collaboration partners. Program diversity and administrative expenditure turn out to be negatively associated with the dependent variable. The effects of administrative expenditure cannot be reported as a plausible result because its statistical significance is too low. In order to produce plausible hypotheses, this study conducts model specification. The below equation illustrates the result.

● Best fit model[70]

$$Y_P = -2.595 + 0.7\text{REVDIVER} - 0.35\text{PROGDIVE} - 0.055\text{COMREVE} + 0.036\text{YEAR}$$

-2 log-likelihood, which is a statistic for assessing goodness of fit in logistic regression model, shows slight increases (from 23.86 to 24.91) when three variables are eliminated. From this model, this study suggests the following four hypotheses;

1) Nonprofits which maintain diverse sources of revenues are highly likely to make strategic collaboration with public agencies.

2) There is a significantly lower likelihood of commercial activities when nonprofits have strategic collaboration with public agencies.

3) The well established nonprofits, in terms of its years in operation, show a significantly higher tendency to make strategic collaboration with public agencies. This result implies that nonprofits that maintained relationships with government before the government's shrink periods of social service expenditures (i.e., 1980's) still maintain relationships with governments based on the trust built in their long-term relationships. On the contrary, nonprofits which established within about 30 years have not depended much on governments because 1) when they launched nonprofits, competition for government funds was already severe and 2) they did not have enough time to build trust with government. Therefore, these nonprofits took another direction for sustaining an organization – adopting business-skills and social enterprises for their revenue generation.

4) When nonprofits provide various types of programs, they show a significantly lower likelihood of making strategic collaboration with public agencies. When the government offers grants or contracts with nonprofits, government usually requires the nonprofit to provide a specific type of social service rather than offering money for unspecified programs.

When we compare the two best-fit models, there emerges an interesting finding: the two models share three independent variables (program diversity, commercial activity and years in operation) and each of their directions is opposite. Since the same organizational characteristics work oppositely when nonprofits try to make strategic collaboration with the different sectors,

[70] In the best fit model, one regression coefficient (COMREVEN) is slightly over the statistical significance level. This study interpret this coefficient as having plausible effects on the dependent variable because 1) this study is not designed to test statistical significance, 2) the significance level is close to the 0.1, and 3) increases of significance in the model are very marginal when these variables are removed (See the Appendix). Thus, it is not unrealistic to assume this variable has impacts on the dependent variable.

nonprofits should be careful when they consider strategic collaboration partners. When nonprofits plan to make strategic collaboration across sectors, managers in those nonprofits should begin by assessing their organization. If the organization is relatively young, provides many programs, and uses business skills for revenue generation, the nonprofit is better choosing businesses as a strategic collaboration partner. When a nonprofit retains diverse sources of revenue and organizational characteristics are contrary to the above case, the nonprofit should select public agencies as strategic collaboration partners.

7.5 SUMMARY

This chapter has explored how organizational attributes contribute to a nonprofit's collaboration patterns through the use of statistical analytic methods. This chapter uncovered several distinctive collaboration patterns of nonprofits.

First, nonprofits which strive to enhance their organizational capacities through the adoption of business skills (i.e., social enterprise) and the diversification of their revenue sources are significantly more likely to collaborate with other organizations. Second, when nonprofits make strategic collaboration across the sectors, organizational characteristics turn out to be different according to sector collaboration. Nonprofits that prefer businesses as their strategic collaboration partners over public agencies will have organizational characteristics such as a high proportion of revenue from commercial activities, delivery of diverse social service programs, relatively younger years in operation, and efficiency in the administration. On the contrary, nonprofits that prefer public agencies as their strategic collaboration partners will have organizational characteristics such as a detachment from business-oriented behaviors, diverse revenue sources, a small number of service programs and more years in operations.

VIII. POLICY IMPLICATION AND CONCLUSION

8.1 INTRODUCTION

During the last decades, the nonprofit, business and public sectors have endeavored to establish a new governance system (Salamon, 2002) whose phenomenon is expressed as a seamless economy or blurring boundaries. By uncovering hidden patterns of collaboration between the sectors, this study has revealed evidence that progresses toward the seamless economy. This chapter summarizes the theoretical contributions of this study. On the basis of the findings, policy implications are drawn. Finally, suggestions for future study are explicated based on the theoretical and methodological limitations of this study.

8.2 SUMMARY OF FINDINGS: THEORETICAL CONTRIBUTIONS

This study contributes to the general understanding of patterns of collaboration and distinctive features of collaborations involving the business or public sector in the nonprofit collaboration networks. In the body of the report, many characteristics of collaboration patterns are uncovered and many hypotheses are proposed on the basis of these findings. Some of the findings are relevant only to the context of interorganizational relationships in North Hills Community in Allegheny County while others are able to be extended to broader theoretical significance. Below are the key findings that are central to the theoretical contribution of this study to the body of the existing literature.

8.2.1 Patterns of collaboration networks

This study emphasized that the collaboration is not a static but rather a dynamic concept that embraces diverse aspects of collaborative efforts according to the intensity of collaboration. The empirical analyses of collaboration networks showed that different patterns of relationships surface according to the intensity of the collaborative relationships. Network structures of less intensive collaboration networks, such as the information sharing and work referral network, showed dense and robust network structure. On the other hand, strategic collaboration networks, such as the formal contract and joint program network. showed sparse and fragile network structures. Strategically significant actors (i.e., a network coordinator who occupies a broker position) are crucial in strategic collaboration network because if they are removed from the network, the network becomes separated into several components and/or many isolated actors.

Geographical proximity plays a significant role in nonprofit behavior in making collaboration with other nonprofits. While nonprofits prefer neighborhood nonprofits as their face-face meeting partners, they do not consider the geographical distances when it comes to collaborative relationships that require professional aspects, such as the joint program.

Finally, businesses favor popular or influential nonprofits as their strategic collaboration partners while public agencies do not show any preference for popular nonprofits. Rather, public agencies choose less popular nonprofits as their collaboration partners in the joint program network.

8.2.2 Evidence for the seamless economy

The most significant finding in this study is the empirical evidence of blurring boundaries or the phenomenon of "the seamless economy". This was shown through the analysis of collaboration patterns between the sectors from the comparative perspective – comparison of 'within the nonprofits sector collaboration patterns' and 'cross sector collaboration patterns'. The visual presentations of actual network structures (sociograms in Chapter 4 and 5) as well as the reduced network structures (reduced sociograms in Chapter 6) provide valuable evidence to witness structural changes. Specifically, the phenomenon of blurring boundaries is documented in two ways. First, more than half of the collaboration networks are structurally changed when

businesses or public agencies are introduced into the nonprofit collaboration networks. The structural changes indicate that the phenomenon of blurring boundaries occurs because the lack of change in the network structure would mean that the involvement of businesses (or public agencies) was negligible to the existing structure. However, this study shows that, for example, when public agencies are introduced in the formal contract network, network structure dramatically changed from the cohesive subgroup structure to the hierarchy structure.

Second, this study showed that nonprofits and other sector organizations maintain similar or same patterns of collaborative relationships (i.e., coexistence blocks). However, as discussed in Chapter 6 and 7, structural changes caused by the business and public sector are different; the impact of businesses on the network structure is more conspicuous in the less intensive collaboration networks and the influence of public agencies is more prominent in the strategic collaboration networks.

8.2.3 Social service system: a new governance system

This study uncovered characteristics of this new governance system through the analysis of the flow of work referrals between three sectors. A unique social service system surfaces when structural patterns of three sectors were combined. The most important property of this system is service integration. Each sector's organizations are interdependent of each other in achieving one purpose – enhancing the quality of life in the community by efficient delivery of social services. Since human problems are quite complex, it is difficult for one organization to satisfy clients whose problems are complex and diverse. Accordingly, in a community-based human service system, it is not possible for a single agency to fulfill complex demands of human services, because human services consist of multiple arrays of services (Provan and Milward, 1991, 1995). Structured around human problems within a community, "service integration has emerged as communities have attempted to respond to social problems that are beyond any jurisdiction or organization" (Argranoff, 1991, p.538). In addition, service integration throughout a collaboration system (i.e., a social service system or the work referral collaboration network) is positively related to the effectiveness of service delivery to clients (Milward and Provan, 1998).

In this system, each sector has a unique role in social service provision. Public agencies and some nonprofits send work referrals (i.e., clients) to other nonprofits. These nonprofits in turn play a service coordinating role. These nonprofits coordinate referrals and resend them to business sector organizations or other nonprofits that have the appropriate program. This system is similar to a division of labor system in its appearance but is different in its context in that this system delivers social services in collaboration with others on the basis of voluntarism, not the command and order.

8.2.4 The importance of strategically significant roles/positions

This study empirically documented that there are not only various types of strategically significant roles in the collaboration networks, but that these roles work differently according to the different types of networks and sectoral differences.

This study witnessed strategically significant organizations both at the individual (e.g., efficient actors who can reach all the other actors in a shortest way with less costs and brokers in Chapter 4 and 5) and group level (i.e., a broker block or a gate role block in Chapter 6). Specifically, broker roles are different according to the type of collaboration networks, such as information intermediaries in the information sharing network, service coordinators in the work referral network, conflicts mediators in the regular meeting network, resource brokers in the resource sharing network, and money broker (redistributors) in the formal contract network. The role of strategically significant actors is more important in the strategic collaboration than in the less intensive collaboration networks. The inclusion of other sector organizations makes strategically significant actors more important in terms of flows or exchanges of information, work referrals, resources, money, and so forth.

In addition, when other sector organizations are introduced, a new type of strategically significant role surfaces, that of a gate or bridge role between two sectors. There are several nonprofits that maintain especially strong relationships with the business or public sector. Interestingly, nonprofits that maintain many relationships exclusively with businesses do not have relationships with pubic agencies and vice versa. This indicates that there exists a gate role nonprofit that specializes the collaborative relationships with the business sector and the public sector.

8.2.5 Cohesiveness: a parameter to check structural changes

By analyzing two types of cohesiveness, this study found how nonprofit collaboration networks structurally change when other sector organizations are introduced (Chapter 6). On the basis of these findings, this study proposes a general model of structural changes in a network when new actors are introduced or eliminated from the network. Two types of cohesiveness, local cohesiveness (i.e., within a subgroup cohesiveness) and global cohesiveness (i.e., cohesiveness between subgroups) are used to develop the model.

As shown in Table VIII-1, this study suggests four types of possible structural changes in a network based on changes of network actor memberships.

Table VIII-1) Typology of structural changes by the local and global cohesiveness

		Local network cohesiveness	
		Increase	Decrease
Global network cohesiveness	Increase	Solidarity network	Centralization network
	Decrease	Localization network	Fragmentization network

When both types of cohesiveness increases through the involvement of new actors and/or the exclusion of existing actors, the network becomes more united and harmonious as within and outside subgroup heterogeneity declines. This study calls this a *solidarity network*. This is empirically shown when public agencies join the regular meeting network. On the contrary, when both types of cohesiveness decrease simultaneously, the network becomes more fragmented as both connections (within a subgroup and across subgroups) become sparse. This study calls this type of structural change a *fragmentization network*. This case is empirically shown when businesses join the information sharing network.

When global cohesiveness increases and local cohesiveness decreases with the inclusion of new actors and/or the elimination of existing actors, the network becomes more centralized. When connections between actors in a subgroup decrease, the homogeneity among actors within the subgroup weakens. At the same time, external homogeneity becomes strong as actors in the subgroup make connections with other actors outside their subgroups. These external connections usually concentrate in one or two powerful /popular subgroup actors. This study labels this type of structural change a *centralized network*. This structural change is empirically

witnessed when public agencies join the formal contract network and the network structure becomes centralized or hierarchical. Finally, when global cohesiveness decreases and local cohesiveness increases, the network becomes more localized as homogeneity within a subgroup strengthens while inter-subgroup homogeneity weakens. This study names this type of structural change a *localization network*. This structural change is evidenced when businesses are introduced in the resource sharing and regular meeting networks.

8.2.6 Impacts of organizational attributes on collaboration

If the study of collaboration focused only on exploring structures of a network, it would be difficult to grasp the whole picture of the collaboration patterns of nonprofits because the internal characteristics of organizations also influence behaviors in collaboration. Through three approaches, this study uncovers the following three findings.

First, nonprofits whose size is around $1 million are the most active in delivering social services in collaboration with other organizations. When the size of a nonprofit drops below $1 M or enlarges over $1M, its tendency to collaborate with others declines. This is also confirmed in the multiple regression model.

Second, when nonprofits have within sector collaborations, nonprofits with revenues from social enterprise and various streams of sources show significantly higher likelihood of providing social services in collaboration with other nonprofits.

Third, when it comes to the strategic collaboration with other sectors, organizational characteristics of nonprofits work in different ways. Nonprofits that have strategic collaborations with the business sector are positively associated with organizational attributes such as revenue from commercial activities, program diversity and administrative efficiency, and also negatively associated with years in operation. It is intuitively understandable that nonprofits that generate revenues from commercial activities prefer businesses as their strategic collaboration partners.

On the contrary, nonprofits that prefer public agencies as their strategic collaboration partners are not only negatively associated with revenue from commercial activities, revenue diversity and program diversity, but rather are positively associated with years in operation. Nonprofits that make strategic collaboration with public agencies not only generate most of their

revenue from public agencies, but also have maintained a long-term relationship with the public agencies. This long-term relationship is likely to be concentrated in a specific social service program; nonprofits deliver a specific type of social program which the public agency explicitly designates. In sum, this contradictory result indicates that organizational properties of nonprofits are totally different when joining strategic collaborations with businesses and public agencies.

8.3 POLICY IMPLICATIONS

On the basis of the theoretical findings above, this study proposes six policy implications which will be useful to practitioners.

8.3.1 Strategic importance of the collaboration network

On the basis of analysis results, this study argues that the collaboration network is *an incubator for building entrepreneurship* because participating in collaboration networks can make nonprofits enhance organizational capability *with resources at hand*. This is done by creatively combining resources at hand with resources from other organizations. When wisely used, the collaboration network enables nonprofits to make strategic decisions in selecting their partners and eventually achieve high performance with resources at hand.

Commonly, nonprofits are regarded as a place where those in need can acquire help. In order to do this, nonprofits should redirect their attention on the management of external relationships with different types of organizations (i.e., collaboration). In order to make the most out of collaboration networks, nonprofits should prepare before plunging into collaboration. First, nonprofits should recognize exactly what they currently have, what they do not have, and what they want to improve. On the basis of this recognition, nonprofits should make an effort to appreciate what kind of partners will meet their strategic fit. Nonprofits should search for partners which are suitable to them. At this point, the collaboration network is useful because it provides a map with which nonprofits can find where they fit and who are the significant actors in their network. Once nonprofits are connected to strategically significant actors in the network,

they can reduce time and energy in searching for the right partner. This is especially important for small nonprofits because they do not have enough resources to search for their strategic fit by themselves. In sum, the collaboration network will help nonprofits enhance entrepreneurship by guiding them to select partners who have strategic fit and fulfill necessary resources without sacrificing their core mission.

8.3.2 Catalyst for cross-sector collaboration

The collaboration network is important in that it catalyzes nonprofits to make the cross-sector collaboration. For example, when nonprofits with little experience with cross-sector collaboration want to make connections with other sector organizations, it would be reasonable to search for gate role playing nonprofits. By contacting gate nonprofits, nonprofits can save time and money because gate nonprofits have diverse and extensive connections with businesses or public agencies. This study also suggests that when nonprofits consider cross-sector strategic collaborations, they should remember that while the business sector organizations favor central or popular nonprofits as their strategic collaboration partners, the public sector agencies prefer rather less popular nonprofits.

Finally, the collaboration network analysis provides another piece of information. Since organizational characteristics work differently when it comes to strategic collaboration with either the public or business sector, nonprofits can predict which sector is more suitable to their organizations on the basis of organizational attributes. For instance, if a nonprofit has a high proportion of revenue sources from commercial activities, delivers diverse social service programs and is efficient in the administration, it is advisable to select business sector organizations as strategic collaboration partners.

8.3.3 The role of the nonprofit sector

This study found that the collaboration network is a place where the new governance system is developed and realized. In the new governance system, blurring boundaries are a fundamental feature and the seamless economy can be realized and facilitated through the strategically significant role of nonprofits. Another feature of the new governance system is that nonprofit,

business and public sector organizations voluntarily participate in collaboration networks based upon their needs. For example, some businesses (public agencies) participate in networks because they want information from the nonprofit sector, while others want to provide information to nonprofits. Since participation in collaboration networks is voluntary, the intermediary role of the nonprofits is very important. The nonprofit sector is central and important in this new system because nonprofits not only play an intermediary role between the sectors to stimulate fluent exchanges of various valuable resources, such as information, work referrals, physical resources or money, but also redistribute these resources in a timely manner. For example, this study showed that the coordinating role of the nonprofits sector is very important in the work referral network. Nonprofit managers should keep in mind that when businesses or public agencies are introduced, the information sharing among them are more efficient because the information redundancy declines. In this sense, the information intermediaries in the cross-sector information sharing networks are expected to have high social capital.

8.3.4 A mechanism to achieve a democratic system

As stated in the section above, nonprofits not only share information cohesively, but also become efficient in exchanging information when other sector organizations are introduced into the network. In particular, as the communication costs drop considerably by the introduction of low-cost cutting-edge information technology such as email, computer programs or cell phone, nonprofits that maintain good intention in sharing but have a limited budget can use technology to exchange information more fluently. As a result, information, knowledge or innovation can be diffused more evenly and efficiently in the collaboration network. These wide-spread and efficient information sharing indicates a fact that collaboration networks are democratic systems where all members in the network share the same information evenly.

8.3.5 Efficiency in conflicts solving

Collaboration networks are expected to solve conflicts efficiently. As shown in the regular meeting network in North Hills Community, establishing regular meetings among community

leader nonprofits is strongly recommended. This cohesive regular meeting is expected to play a coordinating role in the community by finding potential problems, solving conflicts in the community, preventing service duplication and so forth. Intensive exchange of information, coupled with well-coordinated leader groups in the network (as seen in the regular meeting network), is likely to prevent potential conflicts among nonprofits.

8.3.6 Organizational learning through collaboration networks

In complex and rapid changing environments, managers see what they expect to see on the basis of their own perceptual framework (Bolman and Deal, 2003). These parochial perspectives usually lead their organizations into troubles in the long run. In order to prevent this, this study recommends participating in collaboration networks such as the information sharing and regular meeting network, because through the extensive and enduring exchanges of information and discussions, nonprofit managers can cluster fragmented bits of information into meaningful and comprehensive sets of information. The accumulation of these efforts, in the long run, becomes organizational learning, which will in turn enhance organizational capacity.

8.4 SUGGESTIONS FOR FUTURE STUDIES

The main purpose of this study is to explore the patterns of collaboration within and across sectors. On the basis of the findings, this study has proposed many issue-specific and plausible hypotheses for future studies. Since major findings summarized in the above section are not generalized theory, these findings should also be re-researched in future studies to check applicability to other settings and places. In this sense, future studies should test the generability and applicability of plausible findings uncovered in this study. In order to do it, this study makes three suggestions which come from methodological limitations of this study. First, future studies should collect time-series data of collaboration relationships. This study used a cross-sectional data set for analysis. The cross-sectional data analysis has weaknesses in that it cannot provide information about time-serial dynamics of network structures. Even though this study simulated

the network robust test in order to compensate for this weakness, this simulation does not provide enough information to confirm the structural changes by the time series. Thus, future studies should collect time-series data of collaborative relationships to explore the dynamic features of the collaboration networks.

Second, future studies should collect data on the basis of a large number of population. With a large population - at least several hundreds organizations, - future studies will be able to test many hypotheses and findings. Finally, future studies should conduct a comparative study in terms of geographical comparisons. Since this study chose only one geographical place (the North Hills Community in Allegheny County, Pittsburgh), it is hard to determine its applicability over other geographical areas. Comparative studies with different geographical locations will enlarge the scope of available knowledge.

8.5 CONCLUSION

This chapter has summarized major findings and policy implications. Most of the findings in this study are only plausible suggestions for the future study, not confirmed or tested findings for generalization. In this sense, this study has raised many new questions, some of which are partially answered but most of which have to be researched in depth in the future. Most of all, this study provides a firm cornerstone for future studies of collaboration patterns across sectors.

APPENDIX

APPENDIX 1 DEFINITIONS OF COLLABORATION FROM THE LITERATURE

• Bardach (1998): "Any Joint Activity by two or more agencies that is intended to increase public value by their working together rather than separately" (p.8)

• Gray (1989): "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" (p.5)

• Hilmmelman (1996): "Organizational collaboration is defined as a process in which organizations exchange information, alter activities, share resources, and enhance each other's capacity for mutual benefit and a common purpose by sharing risks, responsibilities and rewards" (p.22)

• Kraus (1984): "A cooperative venture based on shared power and authority. It is nonhierarchical in nature. It assumes power based on a knowledge or expertise as opposed to power based on role or role function" (p.19)

• Mattessich, Murray-Close, and Monsey (2001): "Collaboration is a mutually beneficial and well-defined relationship entered into by two or more organizations to achieve common goals" (p.4)

• Murray (1999): "A process in which organizations with a stake in a problem seek a mutually determined solution by which they seek to accomplish objectives they could not achieve working alone" (p.1188)

• Wood and Gray (1999): "Collaboration occurs when a group of autonomous stakeholders of problem domain engage in an interactive process, using shared rules, norms, and structures, to act or decide on issues related to that domain" (p.146)

APPENDIX 2 THE COLLABORATION CONTINUUM

- Arsenault (1998): consolidation continuum: Joint venture or partnership – management service organization – parent corporation – merger

- Austin (2000): Philanthropic stage – transactional stage – integrative stage

- Huxham (1996): very comprehensive and considering various dimensions. Identifying and sharing problems, setting meta strategy, and maintaining and adjusting networks

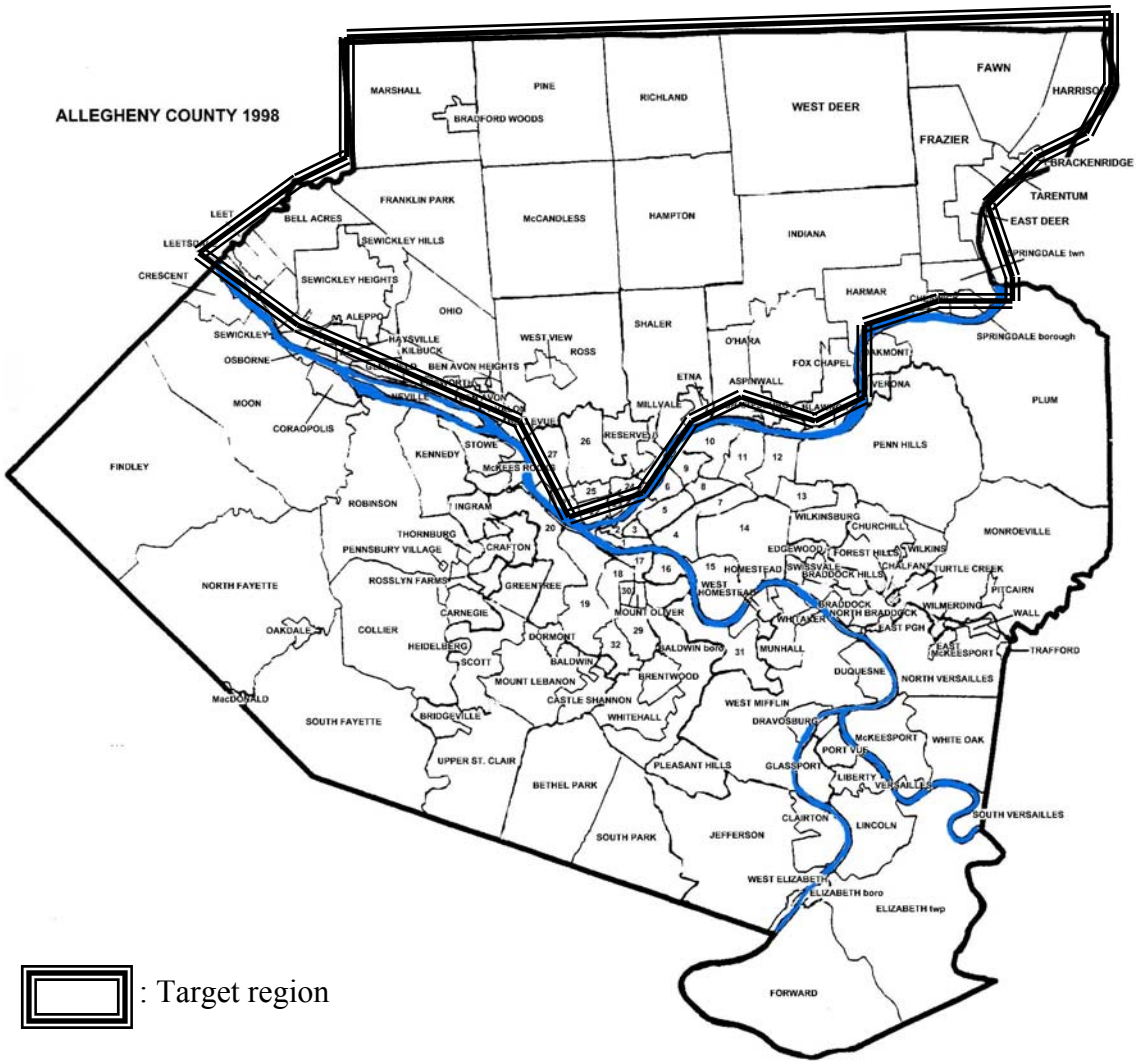
- Kanter (1994): mutual service consortia – joint venture – value chain partnership

- Kearns (2000): Resource sharing – joint venture – strategic alliance

- La Piana (2001): collaboration – strategic alliance – merger

- Murray (1999): according to the degree of interdependence between the parties. Information sharing – joint efforts (i.e. fund raising) – joint delivery of program – rationalization of existing services – mergers

APPENDIX 3 GEOGRAPHICAL BOUNDARY



: Target region

APPENIX 4 SURVEY QUESTIONNAIRE

Identification No.

Survey of Interorganizational Relationships

Name of Person Completing the Survey:_____

Phone: _____ Fax: _____Email:_____

Position/title in the organization: _____

Address: _____

City _____ State _____ Zip code:_____

All of the information you provide on this survey will remain strictly **confidential.** Neither your nor your organization will be identified with the data you provide. The information above is requested so that we may contact with you if we need to clarify information. Also, we need to know that you have completed survey so that we do not contact you again.

QUESTIONS ABOUT YOUR ORGANIZATION

1. What is your organization's primary mission? Describe it within two lines.

_____

_____

2. What year was your organization founded? _____Year

3. What programs does your organization provide either alone or in collaboration with others? (Check all that apply) (Note that the term *collaboration* includes both formal relations (such as joint venture or formal contracts) as well as informal relations (such as information exchange or work referrals).)

We provide the following program(s) on our own	We provide the following program(s) in collaboration with other organizations	Programs
____	____	**Children and youth services** (e.g., Adoption, foster care, or child daily care)
____	____	**Family services** (e.g., Single parent services, family violence shelters, or family counseling)
____	____	**Personal social services** (e.g., Financial counseling, transportation services, or gift distribution)
____	____	**Emergency Assistance** (e.g., Food, clothing, and/or cash for traveler or victims)
____	____	**Residential, custodial care** (e.g., Group home, hospice, or senior care communities)
____	____	**Services to promote the independence of specific population** (Seniors, disabled, homeless, blind, or deaf)
____	____	**Mental health, crisis intervention** (mental health treatment, alcohol or drug abuse, hot lines for rape etc.)
____	____	**Employment assistance, job training, vocational rehabilitation**
____	____	**Food Service, Free Food Distribution Programs**
____	____	**Housing development/Home repairs, rent assistance**
____	____	**Crime prevention/ legal services** (e.g., Delinquency or drunk driving prevention, protection of neglect, abuse)
____	____	**Recreation, sports, leisure, and athletics** (e.g., Recreational facilities, social club, amateur sports club)
____	____	Others (Please specify:_____)

4. Approximately how many of your current board members come from the following types of organizations respectively?

_____ Federal government
_____ County government
_____ Private business
_____ Congregation
_____ State government
_____ Municipal government
_____ Nonprofit organization
_____ Others

5. For the most recent completed fiscal year, approximately what percentage of your revenues came from the following sources?

_____ % Individual donation
_____ % Private corporation donation
_____ % United Way
_____ % Membership dues
_____ % Government contract or grant
_____ % Foundation grants
_____ % Congregation/denomination contributions
_____ % Social enterprise
_____ % Other earned income related to your mission
_____ % Earned income unrelated to your mission
_____ % Others

6. Roughly how many people work in your organization?

_____ Paid (Full-time equivalents: at least 40 hours per week)
_____ Volunteers (who work 10 or more hours per week)

7. For the most recently completed fiscal year, what was your organization's total expenditure?

$_____ Total Expenditure

The sum of a) and b) should be 100%.

a) Roughly what percentage of total expenditures were devoted to *administrative expenses* (i.e., overhead and expenses for management and fund-raising)?

_____ % (Administrative Expenditure)

b) Roughly what percentage of total expenditures were devoted to *program expenses*?

_____ % (Program Expenditure)

8. For the most recently completed fiscal year, what were your organization's total revenues from all sources?

$_____ Total Revenue

QUESTIONS ABOUT INTERORGANIZATIONAL RELATIONSHIPS

This part consists of two parts. First, tables 10 to 12 provide a list of nonprofit organizations that are located in Northern Allegheny County. I would like to know if your organization is engaged in any type of relationships with one or more of these organizations listed *during the past year*.

Second, for questions 13 to 15, I would like you to list a name(s) of organizations with which your organization is engaged in any type of relationships not listed in the tables 10 to 12. Please follow the instruction below.

Instructions

Please don't be intimidated by the size of tables in the following pages. Completing the tables will take only a few minutes, if you follow the instructions. Please complete all 6 tables.

1) Please read carefully the definitions of interorganizational relationships below.
2) Look through the first column of the table, which is a list of organizations by alphabetical order, and make a '√' if your organization has a relationship with the organizations named in the first column.
3) For each organization selected by you, please check across all relationships with the selected organization(s) by marking a '√' in all appropriate boxes provided in the tables.

Definition of interorganizational relationships

· **Irregular information exchange**: Your organization has informal and/or irregular contacts such as exchanges of information or advice with the organization listed.

· **Referrals received**: Your organization receives client referrals with some regularity from the organization listed.

· **Referrals sent**: Your organization refers clients with some regularity to the organization listed.

· **Regular meeting**: Your organization meets regularly (at least quarterly) to discuss problems or to share knowledge with the organization listed.

· **Physical resource sharing**: Your organization shares personnel and/or physical resources such as offices with the organization listed.

· **Formal contract**: Your organization has a contract with the organization listed to perform or jointly perform services.

· **Joint programming**: Your organization undertakes joint activity such as joint programs or joint venture with the organization listed.

Part I: Please first select organizations with which your organization is/was linked during the past year. Then, check all relationships that apply (with the checked organizations) across each row.

Irregular/ informal contacts for information exchange or advice

Receiving client referrals /referring clients

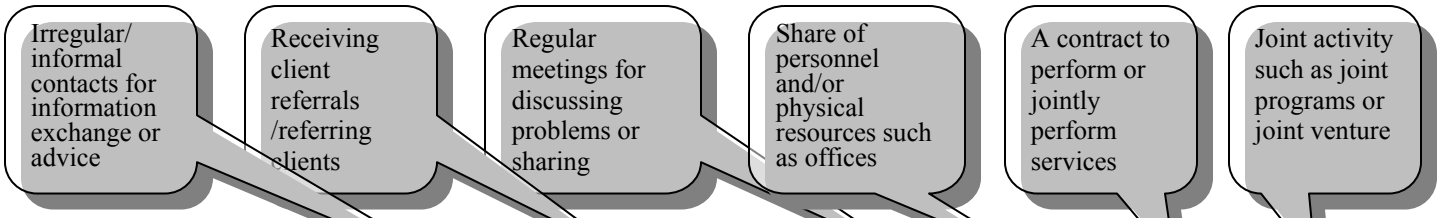
Regular meetings for discussing problems or sharing

Share of personnel and/or physical resources such as offices

A contract to perform or jointly perform services

Joint activity such as joint programs or joint venture

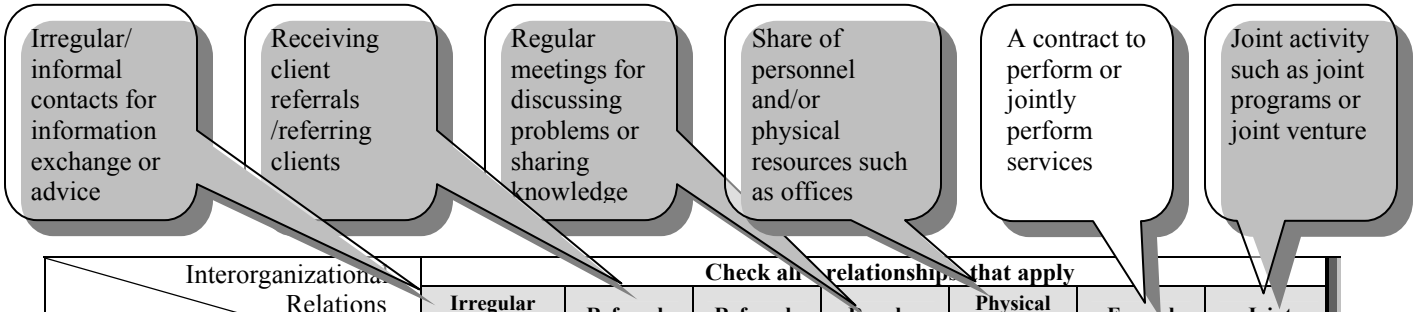
√	Interorganizational Relations / Organizations	Check all relationships that apply						
		Irregular information exchange	Referrals received	Referrals Sent	Regular meeting	Physical resource sharing	Formal contract	Joint programs
	AARP (American Association of Retired Person)	____	____	____	____	____	____	____
	Allegheny County Bar Association	____	____	____	____	____	____	____
	Allegheny Valley Association of Churches	____	____	____	____	____	____	____
	Allegheny Valley Employment	____	____	____	____	____	____	____
	Bradley Center	____	____	____	____	____	____	____
	Bread of Life Food Pantry	____	____	____	____	____	____	____
	Christian Literacy Associates	____	____	____	____	____	____	____
	Community Auto	____	____	____	____	____	____	____
	Crisis Center North	____	____	____	____	____	____	____
	Emanuel Lutheran Church	____	____	____	____	____	____	____
	Forbes Funds	____	____	____	____	____	____	____
	Glenshaw Valley Presbyterian	____	____	____	____	____	____	____
	HEARTH	____	____	____	____	____	____	____
	Holy Family Institute	____	____	____	____	____	____	____
	Hosanna Industries	____	____	____	____	____	____	____
	Light of Life Ministries	____	____	____	____	____	____	____
	Lutheran Service Society	____	____	____	____	____	____	____
	Manchester Craftsmen's Guild	____	____	____	____	____	____	____
	Millvale Food Cupboard	____	____	____	____	____	____	____
	Mt. Nazareth	____	____	____	____	____	____	____
	Network of Hope	____	____	____	____	____	____	____
	North Hills Community Outreach	____	____	____	____	____	____	____



√	Interorganizational Relations / Organizations	Check all relations that apply						
		Irregular information exchange	Referrals received	Referrals Sent	Regular meeting	Physical resource sharing	Formal contract	Joint programs
	North Hills Food Bank	___	___	___	___	___	___	___
	North Hills YMCA	___	___	___	___	___	___	___
	North Hills Youth Ministry Counseling Center	___	___	___	___	___	___	___
	North Suburban Adult Services	___	___	___	___	___	___	___
	North Way Christian Community Pantry	___	___	___	___	___	___	___
	Northern Area Multi Service Center	___	___	___	___	___	___	___
	Northside Common Ministries	___	___	___	___	___	___	___
	Open Door Ministries	___	___	___	___	___	___	___
	Orion Personal Care	___	___	___	___	___	___	___
	Papen-North Chapter	___	___	___	___	___	___	___
	Priority Two	___	___	___	___	___	___	___
	Sewickley Valley YMCA	___	___	___	___	___	___	___
	Share One Food Pantry	___	___	___	___	___	___	___
	Sharpsburg/ St. Vincent DePaul	___	___	___	___	___	___	___
	Society of St. Vincent DePaul, Council of Pittsburgh	___	___	___	___	___	___	___
	St. Margaret Foundation	___	___	___	___	___	___	___
	St. Mary's Church	___	___	___	___	___	___	___
	St. Paul's United Methodist Church	___	___	___	___	___	___	___
	Tickets for Kids Foundation	___	___	___	___	___	___	___
	Treasure House Fashions	___	___	___	___	___	___	___
	United Way of Allegheny County	___	___	___	___	___	___	___
	YWCA of Greater Pittsburgh Center for Race Relations	___	___	___	___	___	___	___

Part II: Please list nonprofit, business, and public organizations with which your organization is/was linked during the past year and whose activities are related to your social service mission and location is Allegheny County.

9. If your organization engaged in any interorganizational relationship described below with any other nonprofit organizations **not listed** in the above tables, please list these at the below table

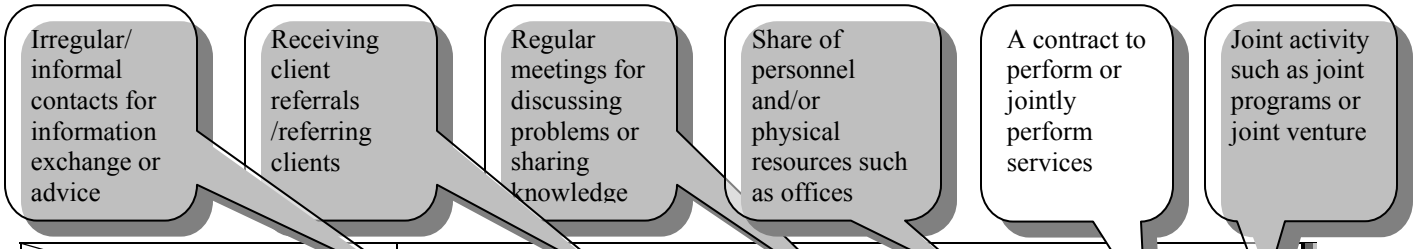


Interorganizational Relations / Organizations		Check all relationships that apply						
		Irregular Information exchange	**Referrals received**	**Referrals Sent**	**Regular meeting**	**Physical resource sharing**	**Formal contract**	**Joint programs**
Secular Non-Profit		____	____	____	____	____	____	____
		____	____	____	____	____	____	____
Faith-Based Non-Profit		____	____	____	____	____	____	____
		____	____	____	____	____	____	____

10. If your organization engaged in any interorganizational relationship described below with **business(es)**, please list these at the below table.

Interorganizational Relations / Organizations		Check all relationships that apply						
		Irregular Information exchange	**Referrals received**	**Referrals Sent**	**Regular meeting**	**Physical resource sharing**	**Formal contract**	**Joint programs**
Business		____	____	____	____	____	____	____
		____	____	____	____	____	____	____
		____	____	____	____	____	____	____
		____	____	____	____	____	____	____
		____	____	____	____	____	____	____

11. If your organization engaged in any interorganizational relationship described below with **public agencies**, please list these at the below table. Please list only organizations whose activities are related to your social service mission and location is Allegheny County.



Interorganizational Relations / Organizations		Check all relationships that apply						
		Irregular Information exchange	**Referrals received**	**Referrals Sent**	**Regular meeting**	**Physical resource sharing**	**Formal contract**	**Joint programs**
Public agency		____	____	____	____	____	____	____
		____	____	____	____	____	____	____
		____	____	____	____	____	____	____
		____	____	____	____	____	____	____
		____	____	____	____	____	____	____

12. Based on your experiences, what are the positive and negative aspects of collaboration with other organizations?

a) Positive aspects:

_____

_____

b) Negative aspects

_____

_____

Thank you very much!

APPENDIX 5 LIST OF BUSINESS ORGANIZATION[71]

Number	Name of Business	Abbreviation
1	A Second Chance	ASC
2	Alicia Photography	APH
3	All of Us Care	AUC
4	AUMA Actuators, Inc. USA	AUMA
5	Baierl Form of Relationships	BFR
6	Citizens Bank	CB
7	Columbia Gas	CG
8	Csazar Plumbing and Heating	CPH
9	Dollar Bank	DB
10	Duquesne Light Company	DLC
11	Family Guidance	FG
12	Fidelity Bank	FB
13	Franhin Interiors	FI
14	Freestyle Body & Soul Day Spa	FBSDS
15	Gateway Rehab	GRE
16	H.P.	HP
17	INCH's Infants and Children's Resale	IICR
18	Keygroup	KG
19	Kohl's Department Store	KDS
20	Lenscrafters	LCS
21	Lincoln Enterprise	LE
22	Marton Electric	ME
23	Mercy Behavioral	MB
24	Mick's Crysler Jeep	MCJ
25	National City Bank	NCB
26	Nexis/Lexis	NL
27	Orion Personal Care	OPCA
28	Outlook Pointe	OP
29	Parkvale Bank	PB
30	Pyramid Health	PH
31	Richnar Rotary	RR
32	Splendid Thread	ST
33	Steelcase Corp.	SC
34	Suburban General Hospital	SGH
35	Vitelli Eye Care	VEC
36	Westview Savings Bank	WSB
37	FHL Bank of Pittsburgh	FHLBP
38	Mars national bank	MNB
39	Amcthis merit	AM
40	Mcdonald Furniture	MF
41	Shop'n'Save	SNS

[71] With deep investigation of the list, four organizations in this list are suspicious of misclassification. However, this study included them in this list because; 1) survey respondents classified them as the business sector and 2) when suspicious organizations are classified as other sector organizations, the analysis results are the same as before.

42	SSL tools	SSLT
43	Bar Tools Co.	BTCO
44	Anderson paving	AP
45	Blair manoring	BM
46	Brothers plumbing	BPL
47	Brown trucking	BTR
48	Dice tree service	DTS
49	Evans Landscape supply	ELS
50	Frankenstein concrete	FCO
51	Gumto landscaping	GL
52	Hamburg block	HB
53	McMeekin Inc.	MMI
54	Melooing Electric	MEE
55	Parker trucks co.	PTC
56	Park moving and storage	PMS
57	Saver heating	SH
58	Shield paving	SP
59	Shomp engineering	SE
60	T&S Harper concrete	THHC
61	Uncir chell mattress	UCM
62	John Henry Chair	JHC
63	Rossan Housing	RH
64	Senior news	SN

APPENDIX 6 LIST OF PUBLIC AGENCIES

Number	Name of public agency	Abbreviation
1	Allegheny County Department of Economic Development	ACDED
2	Allegheny County Department of Human Services	ACDHS
3	Allegheny County government	ACG
4	Allegheny County Housing Authority	ACHA
5	Allegheny County Public Library	ACPL
6	Borough of Milvale	BOM
7	Career Link	CL
8	District Attorney's Office	DAO
9	Employment Office Western & Allegheny	EOWA
10	Flood Relief	FR
11	HUD	HUD
12	Local Magistrate & Police	LMP
13	National Endowment for the Art	NEA
14	PA Council of the Art	PACA
15	Pennsylvania State Government	PSG
16	Pittsburgh City government	PCG
17	Public School District	PSD
18	Sewickley Valley Borough	SVB
19	Street Ministry	SMI
20	US Department of Education	USDE
21	CMS	CMS
22	PA department of health	PADH
23	Apprise program	APR
24	Grubudsman program	GPR
25	PANA	PANA

APPENDIX 7 TABLES AND FIGURES FOR CHAPTER 4

Appendix 7-1) Network centralization index of three centrality measures

	Information sharing network	Work referrals network	Regular meeting network	Resource sharing network	Formal contract network	Joint program network
Degree	65.1%	61.9%	60.3%	44.7%	25.3%	49.1%
Closeness	66.6%	71.5%	60.9%	53.1%	33.2%	50.2%
Betweenness	19.0%	36.1%	44.7%	60.3%	39.3%	62.8%

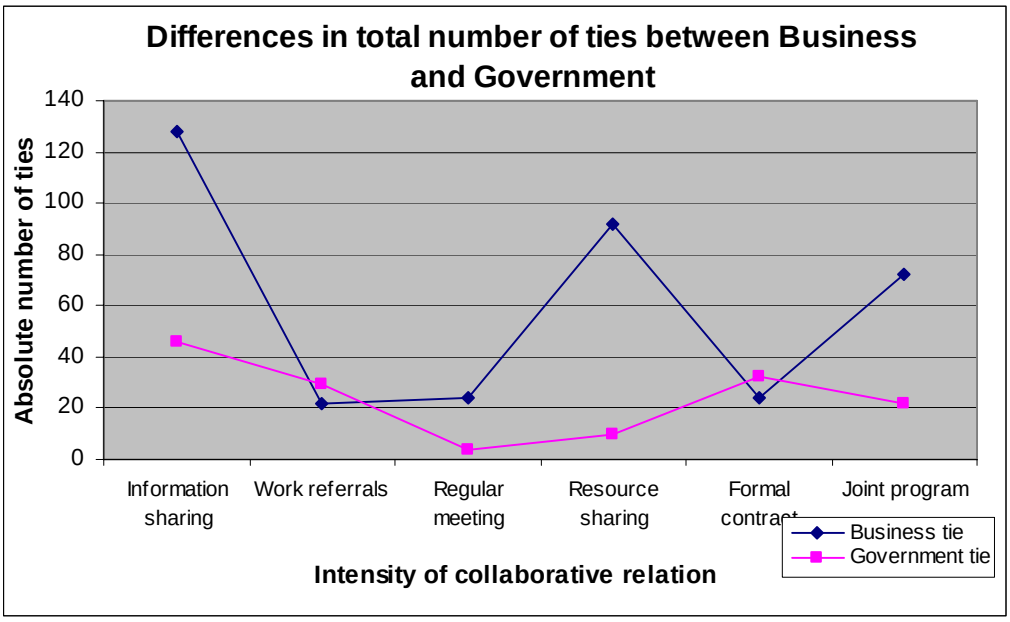
Appendix 7-2) Results of network robustness analysis

	N		Member	Number of components	Number of isolates	%***
Information sharing network*	42	Core group	NHCO, SVYMCA	1	0	
Work referral network*	41	Core group	NH, NHCO	1	1	2.4
Regular meeting network*	35	Core group	NHCO NHYMCC	2	4	11.4
Resource sharing network*	34	Core group	NHCO SPUMC	2	4	11.8
Formal contract network**	22	Core group	MFC NHCO	2	3	13.6
		Betweenness	FF	3	0	
Joint program network	22	Core group	FF NHCO	2	10	45.5
		Betweenness	HI	1	8	36.4

* The number one actor of betweenness centrality is also a member of core group.
** Only main components
*** % of individually isolated actors due to removing important actor(s)

APPENIX 8 TABLES AND FIGURES FOR CHAPTER 5

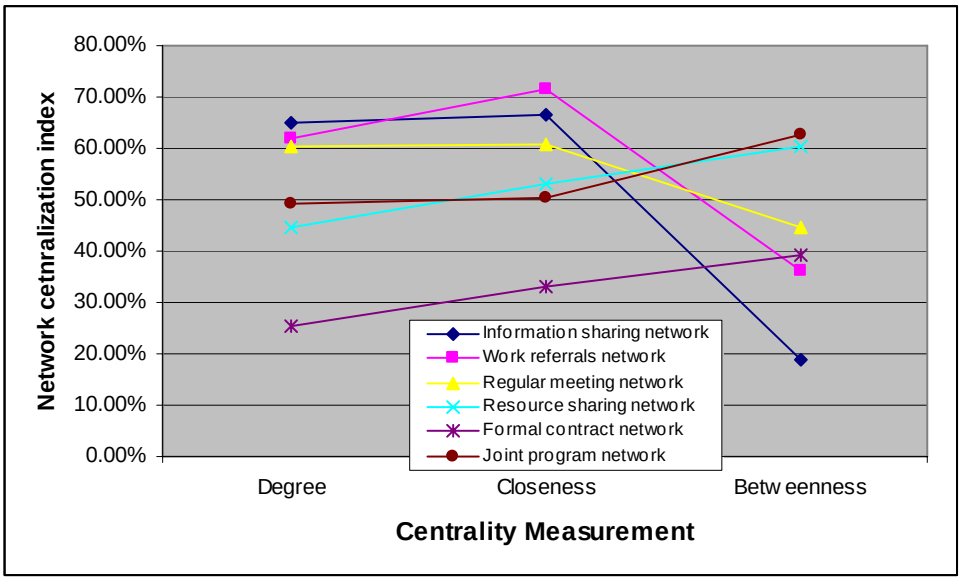
Appendix 8-1) Differences in total number of ties between business and public agency



Appendix 8-2) Network centralization index

		Information sharing network	Work referrals network	Regular meeting network	Resource sharing network	Formal contract network	Joint program network
Business	Degree	47.27%	49.5%	54.96%	45.57%	27.60%	66.73%
	Closeness	49.04%	58.64%	58.84%	45.95%	28.88%	64.79%
	Betweenness	49.91%	34.1%	49.90%	58.07%	39.13%	85.15%
Public agency	Degree	49.21%	50.09%	55.79%	41.49%	18.21%	29.41%
	Closeness	52.48%	57.54%	59.47%	52.32%	36.97%	43.25%
	Betweenness	15.70%	33.24%	44.05%	63.01%	29.33%	40.71%

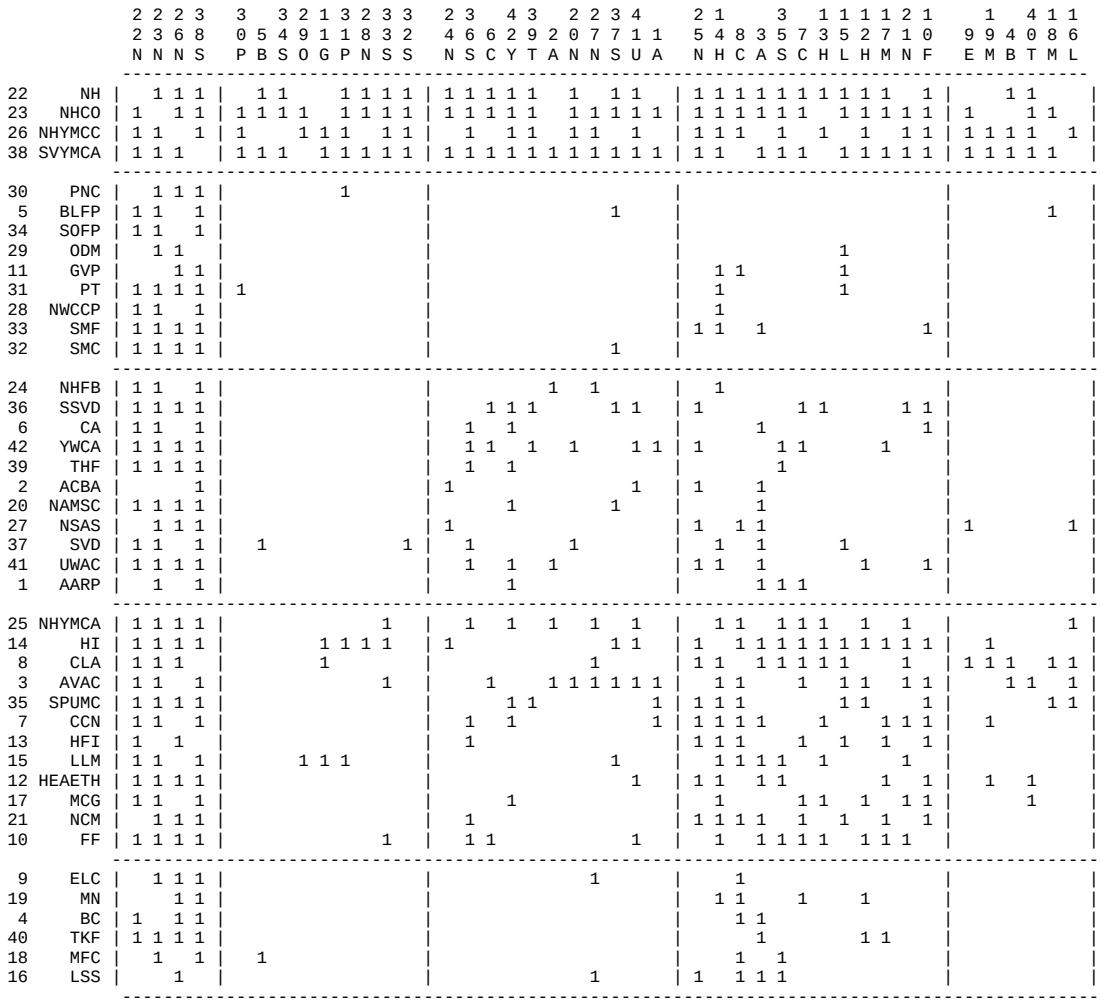
Appendix 8-3) Comparisons of collaborative relationships by network centralization index and three centrality measurements



APPENDIX 9 TALBES AND FIGURES FOR CHAPTER 6 (BLOCKMODEL)

42 NPO networks

Appendix 9-1) Blocked adjacency matrix for information sharing network



Appendix 9-2) Means of variables within positions for information sharing network

	Position									
	n	Block 1	n	Block 2	n	Block 3	n	Block 4	n	Block 5
Commercial revenue	4	19.75% (19.60)	6	1.55% (3.80)	8	42.43% (39.53)	11	12.99% (19.61)	2	0 (0)
Revenue(Go-vernment)	4	3.75% (6.85)	6	0 (0)	8	13.53% (33.11)	11	25.12% (30.11)	2	0 (0)
Size (expen-diture)	4	$1,334,942 (1,647,540.94)	7	$194,103.4 (458,313.74)	9	$7,328,764 (17,621,671.73)	12	$3,506,006 (8,327,510.53)	6	$4,271,837 (6,316,202.77)
Years in operation	4	42.75 (47.83)	7	20.43 (16.06)	10	58.5 (53.38)	12	46 (41.25)	6	57.5 (45.05)
CRI	4	167.5 (107.83)	9	28.11 (18.27)	11	42.45 (19.01)	12	72.83 (34.10)	6	31 (15.10)
Power centrality	4	3.08 (17.76)	9	3.69 (11.39)	11	5.60 (15.37)	12	-0.139 (19.22)	6	-0.414 (14.29)
Betweennes s centrality	4	13.32 (5.04)	9	0.028 (0.038)	11	0.298 (0.297)	12	1.56 (1.39)	6	0.042 (0.03)

** Hereafter all parentheses in means of variables table include standard deviation.

Appendix 9-3) Frequency of choices within and between blocks for information sharing relations

	Block1	Block 2	Block 3	Block 4	Block 5	Total
Block 1	12	28	35	40	15	130
Block 2	28	2	2	11	1	44
Block 3	35	2	28	30	2	97
Block 4	40	11	30	88	16	185
Block 5	15	1	2	16	0	34
Total	130	44	97	185	34	490

Appendix 9-4) Reduced block density matrix for information sharing

```
      1     2     3     4     5
   ----- ----- ----- ----- -----
1  1.000 0.778 0.795 0.833 0.625
2  0.778 0.028 0.020 0.102 0.019
3  0.795 0.020 0.255 0.227 0.030
4  0.833 0.102 0.227 0.667 0.222
5  0.625 0.019 0.030 0.222 0.000
```

Appendix 9-5) Image Matrix

```
    1      2      3      4      5
   ----- ----- ----- ----- -----
1  1(SE) 1(SE) 1(SE) 1(SE) 1(RE)
2  1(SE) 0     0     0     0
3  1(SE) 0     1(RE) 1(RE) 0
4  1(SE) 0     1(RE) 1(RE) 1(RE)
5  1(RE) 0     0     1(RE) 0
```

Appendix 9-6) Blocked adjacency matrix for work referral network

	1 8 M	1 2 A	1 4 H	3 9 B	1 6 M	2 1 N	3 5 A	7 N	3 6 C	3 4 S	7 S	2 S	2 N	1 3 H	2 0 N	3 5 S	1 1 H	4 3 L	2 1 N	3 0 S	4 6 U	1 0 S	2 4 U	1 2 N	1 0 G	2 7 N	9 4 E	3 0 N	2 2 P	3 3 S	8 1 C	8 3 A	2 3 O	2 9 S	5 P	6 B	1 3 C	7 8 M	9 T	5 N	1 4 L	1 Y
18 MN														1																												
2 ACBA																																										
12 HFI					1		1																								1										
4 BC			1																																						
39 TKF					1																																				
16 MCG		1	1	1									1																												
21 NH			1	1			1	1	1	1			1	1	1	1	1	1	1	1	1	1	1	1		1		1	1	1	1	1	1	1		1	1		1	1	1	1
3 AVAC				1				1	1				1	1	1		1		1			1														1		1	1			
25 NHYMCC			1			1	1		1		1		1	1	1		1								1			1	1		1						1			1		1
7 CCN	1	1			1	1		1					1	1	1		1	1	1			1				1		1	1		1						1	1			
36 SVD						1	1						1	1		1		1		1						1								1				1			
34 SPUMC				1				1	1				1				1		1															1	1			1	1		
37 SVYMCA			1		1								1														1					1						1			
22 NHCO		1			1	1	1	1	1		1			1	1	1	1	1	1	1	1					1					1	1		1	1	1	1	1	1		1	
13 HI					1	1	1						1			1																									
20 NCM						1	1							1			1																								
35 SSVD					1	1			1				1		1				1			1																			
11 HEARTH						1		1	1				1										1															1			1
14 LLM					1	1				1			1		1												1											1		
23 NHFB													1	1									1																	
31 SMC						1				1			1					1																							
40 UWAC						1	1		1								1																								
26 NSAS								1					1						1								1				1										
10 GVP							1						1	1																											
27 NWCCP						1							1	1														1													
9 ELC													1						1																					
24 NHYMCA						1	1						1	1									1																	
30 PT						1	1						1	1			1		1						1															
32 SMF						1	1						1	1																											
8 CLA							1						1																											
1 AARP					1								1																											
28 ODM						1																																	
33 SOFP						1							1																											
29 PNC													1															1												
5 BLFP						1	1		1				1																							1					
6 CA						1																																	
17 MFC													1																											
38 THF						1		1																															
19 NAMSC						1	1		1	1			1																											
15 LSS						1	1				1		1																											
41 YWCA						1		1					1																							1					

Appendix 9-7) Means of variables within positions for work referral network

	Position									
	n	Block 1	n	Block 2	n	Block 3	n	Block 4	n	Block 5
Commercial revenue	2	51.95% (34.01)	9	11% (15.91)	7	23.1% (32.94)	4	15% (30.0)	8	14.5% (33.26)
Revenue (government)	2	27.9% (39.46)	9	17.83% (28.29)	7	12.6% (21.69)	4	0 (0)	8	11.86% (33.59)
Size (expenditure)	5	$10,532,172.80 (12,442,485.18)	9	$1,087,147 (1,197,418.09)	8	$929,950.3 (1,041,465.98)	5	$606,787.60 (751562.92)	10	$6,629,860 (16,826,559.69)
Years in operation	5	80.4 (51.04)	9	40.78 (30.09)	8	42.25 (37.12)	5	66.6 (63.47)	11	30.27 (38.50)
CRI	5	28.2 (24.25)	9	110 (87.24)	9	68.22 (38.45)	6	39.33 (19.38	12	31.75 (16.13)
Betweenness centrality	5	0.57 (1.24)	9	10.54 (13.42)	9	0.73 (1.16)	6	0.25 (0.44)	12	0.21 (0.34)

Appendix 9-8) Frequency of choices within and between blocks for Work referrals relations

	Block 1	Block 2	Block 3	Block 4	Block 5	Total
Block 1	1	3	1	0	1	6
Block 2	12	32	36	15	36	131
Block 3	0	27	12	2	4	45
Block 4	0	14	9	2	1	26
Block 5	0	28	0	1	2	31
Total	13	104	58	20	44	239

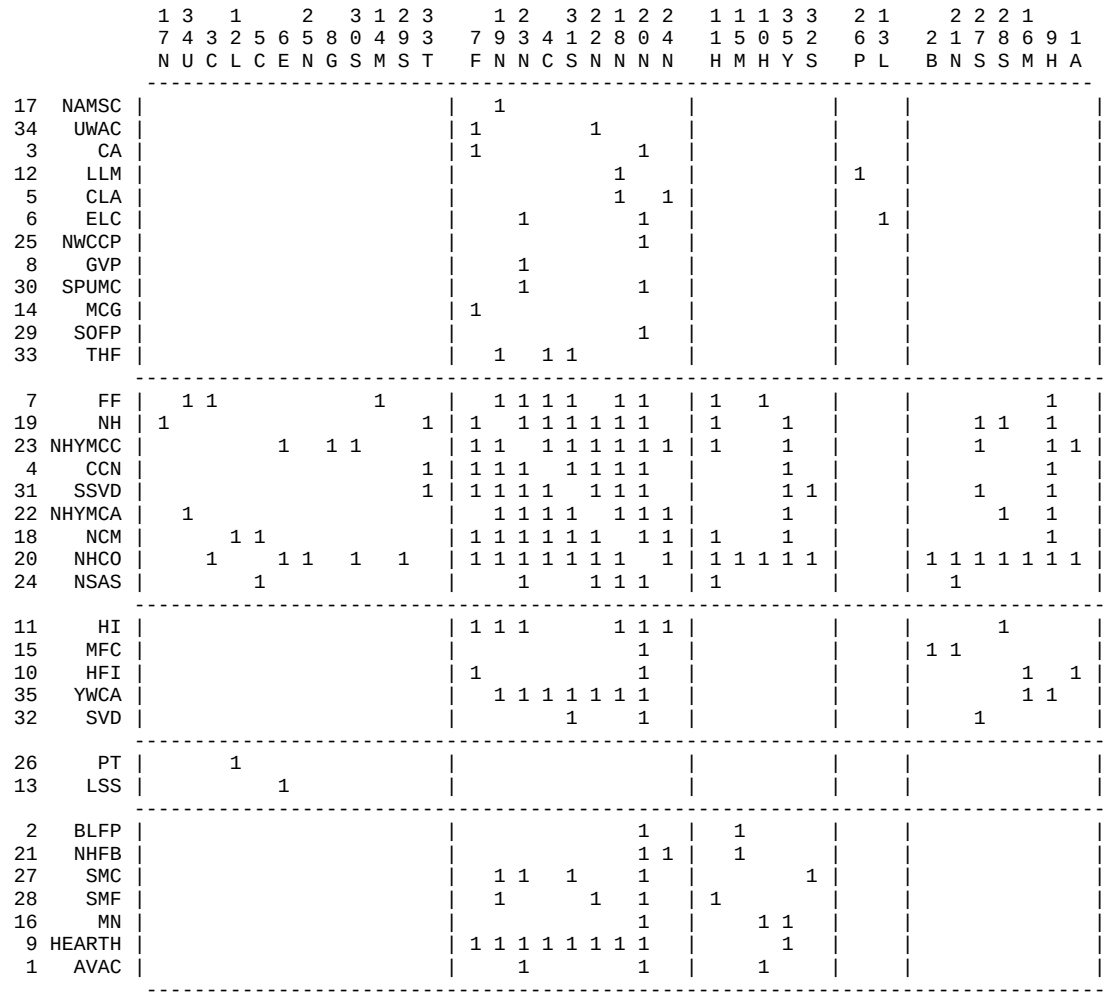
Appendix 9-9) Reduced Block density Matrix for work referrals

	1	2	3	4	5
1	0.050	0.067	0.022	0.000	0.017
2	0.267	0.444	0.444	0.278	0.333
3	0.000	0.333	0.167	0.037	0.037
4	0.000	0.259	0.167	0.067	0.014
5	0.000	0.259	0.000	0.014	0.015

Appendix 9-10) Image Matrix

	1	2	3	4	5
1	0	0	0	0	0
2	1(RE)	1(RE)	1(RE)	1(RE)	1(RE)
3	0	1(RE)	1(RE)	0	0
4	0	1(RE)	1(RE)	0	0
5	0	1(RE)	0	0	0

Appendix 9-11) Blocked adjacency matrix for regular meeting network



Appendix 9-12) Means of variables within positions for regular meeting network

	Position									
	n	Block 1	n	Block 2	n	Block 3	n	Block 4	n	Block 5
Commercial revenue	9	15% (31.23)	9	30.71% (31.35)	5	6.78% (11.99)	1	0	4	4.83% (5.58)
Revenue (government)	9	5.94% (13.18)	9	17.91% (31.57)	5	30.16% (43.56)	1	0	4	8.25% (10.90)
Size (expenditure)	10	$1,235,608 (1,906,110.74)	9	$896,862 (718,903.81)	5	$17,012,182.8 (24,289,201.91)	2	$3,117,620 (4,324,126.97)	7	$439,940.3 (504,893.56)
Years in operation	10	34.7 (33.48)	9	49 (52.28)	5	65 (53.03)	2	33.5 (14.85)	7	31 (21.06)
Collaborative relation index	12	35.58 (17.89)	9	118.44 (81.07)	5	79.8 (47.87)	2	38.5 (7.78)	7	49 (14.27)
Betweenness centrality	12	0.98 (2.29)	9	12.03 (14.07)	5	0.471 (0.47)	2	0 (0)	7	0.10 (0.078)

Appendix 9-13) Frequency of choices within and between blocks for regular meeting relations

	Block1	Block 2	Block 3	Block 4	Block 5	Total
Block 1	0	19	0	2	0	21
Block 2	19	62	18	0	21	120
Block 3	0	18	0	0	8	26
Block 4	2	0	0	0	0	2
Block 5	0	21	8	0	0	29
Total	21	120	26	2	29	198

Appendix 9-14) Reduced Block density Matrix for regular meeting

	1	2	3	4	5
1	0.000	0.176	0.000	0.083	0.000
2	0.176	0.861	0.400	0.000	0.333
3	0.000	0.400	0.000	0.000	0.229
4	0.083	0.000	0.000	0.000	0.000
5	0.000	0.333	0.229	0.000	0.000

Appendix 9-15) Image matrix

	1	2	3	4	5
1	0	1(RE)	0	0	0
2	1(RE)	1(SE)	1(RE)	0	1(RE)
3	0	1(RE)	0	0	1(RE)
4	0	0	0	0	0
5	0	1(RE)	1(RE)	0	0

Appendix 9-16) Blocked adjacency matrix for resource sharing network

		2 3 2 2 1 1		1 1 1 3	1 2 2	1 3 2 3	1 2 2 2 1 3 2 1
		2 0 0 1 3 8 5	2 8 0 1 2 9 6 7 6 5 5	7 3 9 3 7 4	4 2 3 8 9 4 1 4 6 1		
		N S N N H E L	A N G H T F C M P N C	C A N T S U	B H N S S L S N M A		
22	NHFB	1 1 1			1		
30	SPUMC	1 1 1 1			1		
20	NH	1 1	1 1 1	1	1 1 1		
21	NHCO	1 1 1 1 1 1	1 1 1 1		1 1 1 1 1 1 1		
13	HI	1 1 1	1 1 1 1	1	1 1 1		
8	ELC	1 1 1			1 1		
15	LSS	1 1 1			1 1		
2	ACBA	1					
18	NAMSC	1					
10	GVP	1					
11	HEARTH	1					
32	THF	1					
9	FF	1					
6	CCN	1 1					
17	MN	1					
26	PT	1					
25	NWCCP	1					
5	CA	1					
7	CLA					1	
3	AVAC	1				1	
19	NCM					1 1 1	
33	TKF					1 1	
27	SMC	1				1	
34	UWAC					1	
4	BLFP	1		1			1
12	HFI	1		1 1			
23	NHYMCC	1 1 1		1 1	1		
28	SMF	1 1 1			1		
29	SOFP	1 1					
14	LLM			1 1			
31	SVD	1 1 1		1			
24	NSAS	1					
16	MFC	1 1				1	
1	AARP			1			

Appendix 9-17) Means of variables within positions for resource sharing network

	Position							
	n	Block 1	n	Block 2	n	Block 3	n	Block 4
Commercial revenue	6	7% (7.4833)	7	31.57% (38.9951)	4	2.33% (4.65)	8	15.16% (21.8605)
Revenue from government	6	4% (6.3245)	7	12% (31.7490)	4	20.75% (28.3240)	8	8.85% (19.6834)
Size (expenditure)	7	$1,463,673 (2,142,942.55)	10	$1,255,794.9 (1,949,898.67)	5	$663,743.4 (775,428.44)	9	$3,788,637.67 (9,809,789.49)
Years in operation	7	36.86 (38.6152)	10	34.1 (38.96)	5	28.6 (19.7307)	10	39 (28.1741)
Collaborative relation index	7	121.57 (100.2644)	11	39.64 (27.5255)	6	50.67 (18.4463)	10	56.2 (32.6149)
Power centrality	7	7.57 (4.911)	11	1.04 (0.295)	6	1.8 (0.748)	10	2.82 (1.48)
Betweenness centrality	7	17.34 (23.0608)	11	0 (0)	6	2.33 (2.2647)	10	3.88 (5.7822)

Appendix 9-18) Frequency of choices within and between blocks for resource sharing relations

	Block1	Block 2	Block 3	Block 4	Total
Block 1	24	12	2	16	54
Block 2	12	0	0	0	12
Block 3	2	0	0	9	11
Block 4	16	0	9	4	29
Total	54	12	11	29	106

Appendix 9-19) Reduced Block density Matrix for resource sharing

	1	2	3	4
1	0.571	0.156	0.048	0.229
2	0.156	0.000	0.000	0.000
3	0.048	0.000	0.000	0.150
4	0.229	0.000	0.150	0.044

Appendix 9-20) Image matrix

	1	2	3	4
1	1(RE)	1(RE)	0	1(RE)
2	1(RE)	0	0	0
3	0	0	0	1(RE)
4	1(RE)	0	1(RE)	0

Appendix 9-21) Blocked adjacency matrix for formal contract network

		6 H	0 S	1 T	2 B	3 C	1 N	7 H	8 L	4 F	9 M	7 S	1 A	3 N	4 N	5 H	6 S	2 N	8 S	9 S	5 S	0 N	2 U
6	HFI		1	1					1														1
20	SVYMCA	1																					
21	TKF	1																					
2	BLFP					1				1													
3	CA					1			1														
11	NHCO				1	1		1	1	1	1	1									1		
7	HI					1											1						
8	LSS					1				1													
4	FF	1			1	1												1					
9	MFC				1		1		1														
17	SPUMC					1																	
1	AARP																				1		
13	NHYMCC															1						1	
14	NSAS																					1	
5	HEAETH													1								1	
16	SMF						1														1		
12	NHYMCA																					1	
18	SSVD									1										1			
19	SVD																			1			
15	SMC																		1	1			
10	NH					1							1			1							
22	UWAC	1												1	1	1		1					

Appendix 9-22) Means of variables within positions for formal contract network

	Position					
	n	Block 1	n	Block 2	n	Block 3
Revenue from commercial activity	2	28.95%	7	11.71%	7	35.53%
Revenue from government	2	28.4% (38.75)	7	2% (5.29)	7	0.46% (1.21)
Size (expenditure)	3	$11,864,099 (15,601,078.31)	8	$1,336,561.75 (2,043,898.05)	9	$729,649.67 (833,743.96)
Years in operation	3	73 (60.70)	8	19.75 (14.75)	10	53.2 (18.17)
Collaborative relation index	3	46.33 (24.01)	8	100.5 (93.60)	11	74.73 (43.82)
Power centrality	3	1.99 (1.73)	8	2.98 (2.20)	11	1.99 (1.18)
Betweenness centrality	3	12.11 (20.98)	8	11.17 (19.74)	11	4.88 (7.93)

Appendix 9-23) Frequency of choices within and between blocks for formal contract relations

	Block1	Block 2	Block 3	Total
Block 1	4	1	1	6
Block 2	1	20	3	24
Block 3	1	3	18	22
Total	6	24	22	52

Appendix 9-24) Reduced Block density Matrix for formal contract

	1	2	3
1	0.667	0.042	0.030
2	0.042	0.357	0.034
3	0.030	0.034	0.164

Appendix 9-25) Blocked adjacency matrix for joint program network

		1 7 F	3 N	9 H	1 A	8 S	6 E	5 C	3 B	8 H	1 0 M	4 C	2 N	1 M	9 S	5 N	6 P	7 S	2 A	1 U	0 S	4 N	2 Y
7	FF		1			1				1					1								
13	NHCO	1		1	1	1	1		1	1	1				1			1					
9	HI		1			1		1				1	1	1		1	1	1	1	1	1		
1	AARP		1			1																	1
18	SPUMC	1	1	1	1																	1	
6	ELC		1						1														
5	CLA			1						1													
3	BLFP		1				1																
8	HFI	1	1					1															
10	MFC		1																				
4	CCN			1																			
12	NH			1																			
11	MN			1																			
19	SSVD	1	1																				
15	NWCCP			1																			
16	PT			1																			
17	SMF		1	1																			
2	AVAC			1																			
21	UWAC			1																			
20	SVD			1																			
14	NHYMCC					1																	
22	YWCA				1																		

Appendix 9-26) Means of variables within positions for joint program network

	Position									
	N	Block 1	n	Block 2	n	Block 3	n	Block 4	n	Block 5
Commercial revenue	3	14% (13.89)	1	20%	4	6.98% (13.95)	8	10.75% (30.41)	2	21.5% (28.99)
Revenue from government	3	4.67% (8.08)	1	0	4	13.95% (27.90)	8	13.78% (29.46)	2	47.5% (67.18)
Size (expenditure)	3	$992,633.33 (311,221.27)	1	$1,500,000	4	$7,538,747.5 (14,872,184.54)	10	$621,424.4 (762,238.19)	2	$27,171,294.5 (37,923,967.37)
Years in operation	3	18.67 (4.04)	2	41 (8.49)	4	61.5 (59.05)	10	39.6 (35.13)	2	87 (67.88)
Collaborative relation index	3	186.33 (111.20)	2	54.5 (33.23)	4	50.25 (13.40)	11	64.45 (42.67)	2	98 (57.98)
Betweenness centrality	3	38.25 (33.43)	2	13.14 (5.11)	4	1.05 (1.21)	11	0 (0)	2	0 (0)

Appendix 9-27) Frequency of choices within and between blocks for joint program relations

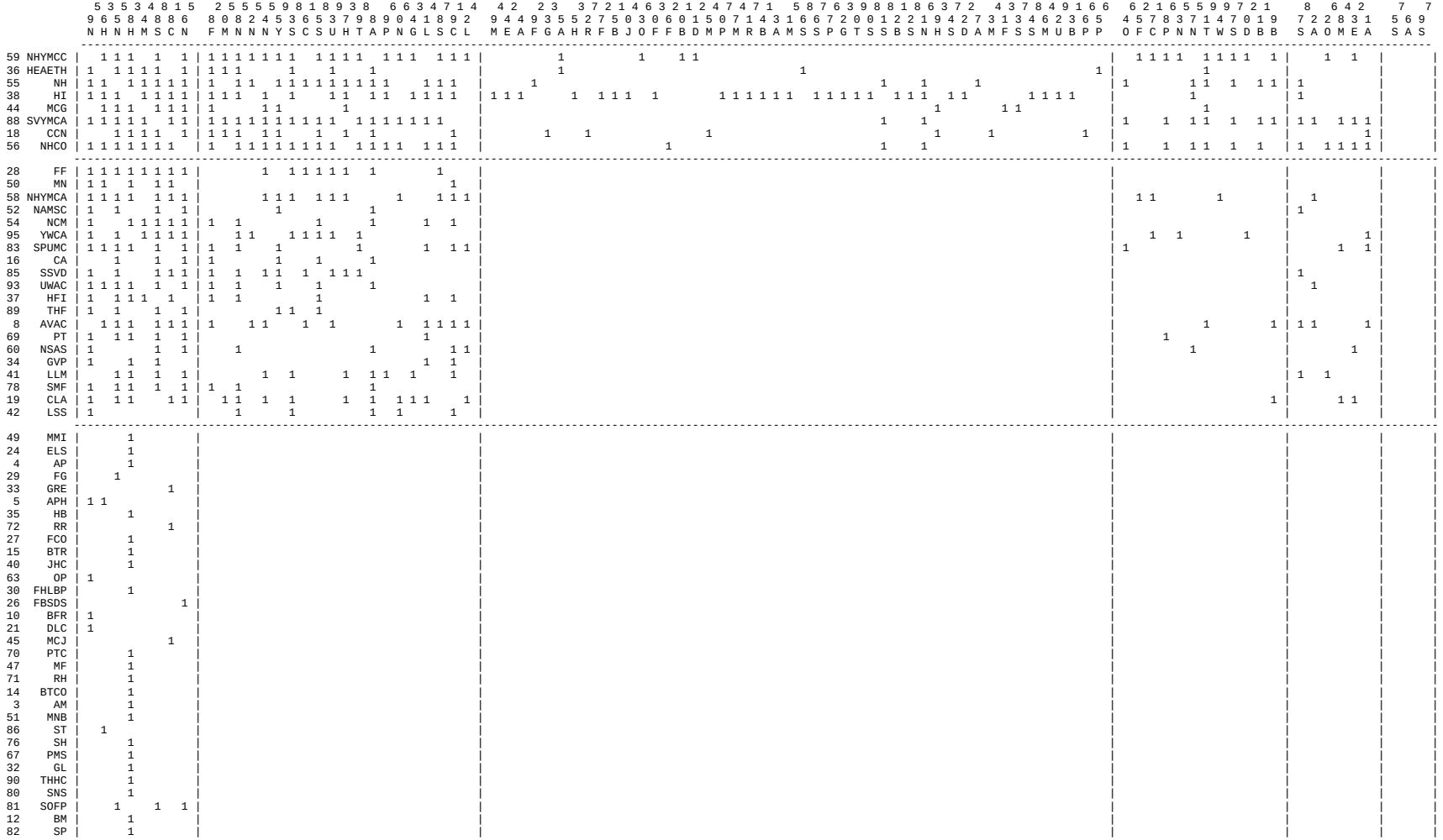
	Block1	Block 2	Block 3	Block 4	Block 5	Total
Block 1	4	4	5	13	0	26
Block 2	4	2	0	0	2	8
Block 3	5	0	4	0	0	9
Block 4	13	0	0	0	0	13
Block 5	0	2	0	0	0	2
Total	26	8	9	13	2	58

Appendix 9-28) Reduced Block density Matrix for joint program

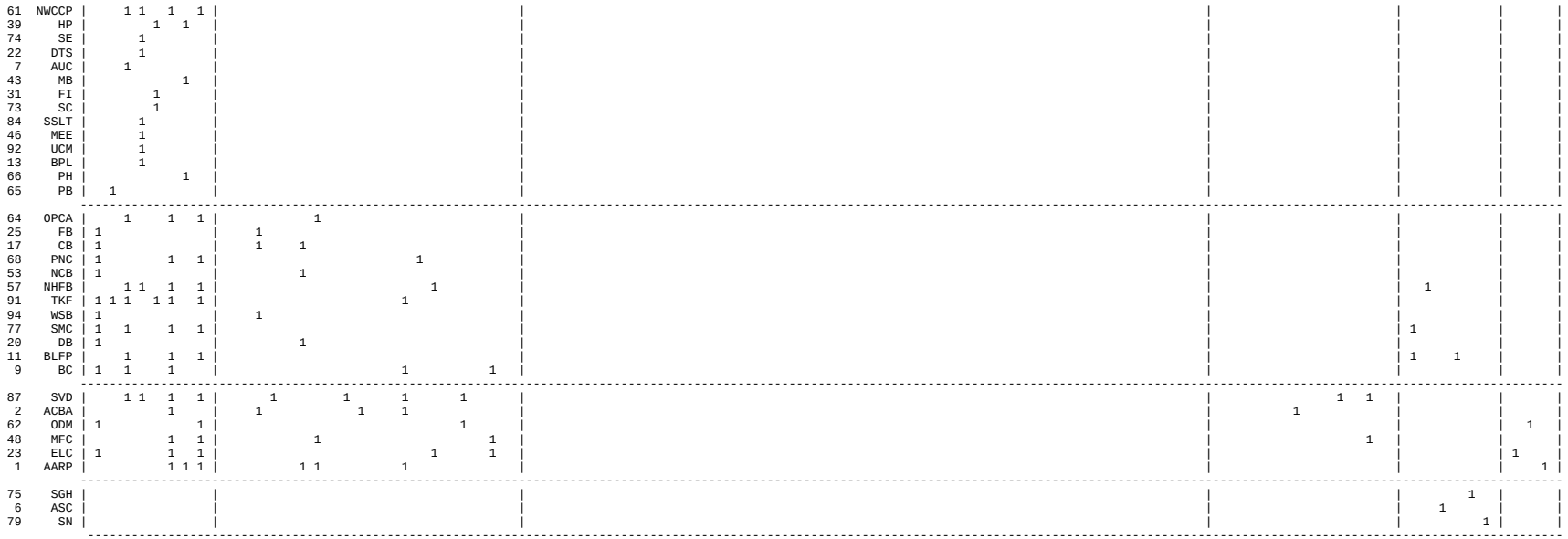
```
      1     2     3     4     5
   ----- ----- ----- ----- -----
1  0.667 0.667 0.417 0.394 0.000
2  0.667 1.000 0.000 0.000 0.500
3  0.417 0.000 0.333 0.000 0.000
4  0.394 0.000 0.000 0.000 0.000
5  0.000 0.500 0.000 0.000 0.000
```

NPO and business networks blockmodel

Appendix 9-29) Blocked adjacency matrix for information sharing network (NPO and business)



Appendix 9-29) Blocked adjacency matrix for information sharing network (NPO and business) (Continued)



Appendix 9-30) Means of variables within positions for information sharing network

	Position											
	n	Block 1	n	Block 2	n	Block 3	n	Block 4	n	Block 5	n	Block 6
Proportion of business sector	8	0%	20	0%	46	95.65%	12	50%	6	16.67%	3	100%
Collaborative relation index	8	182.25 (146.80)	20	52.95 (21.83)	46	8.87 (3.92)	12	19.83 (16.15)	6	35.83 (20.16)	3	3.33 (4.04)
Power centrality	8	-1.29 (8.29)	20	4.24 (12.14)	46	2.32 (1.50)	12	2.78 (5.45)	6	5.19 (11.54)	3	-1.51 (1.46)
Betweenness centrality	8	15.14 (14.99)	20	0.76 (1.05)	46	0 (0)	12	0.032 (0.08)	6	1.16 (1.07)	3	0 (0)

Appendix 9-31) Frequency of choices within and between blocks for information sharing relations

	Block1	Block2	Block3	Block4	Block5	Block6	Total
Block1	50	97	53	31	15	0	246
Block2	97	108	0	12	15	0	232
Block3	53	0	0	0	0	0	53
Block4	31	12	0	0	4	0	47
Block5	15	15	0	4	0	3	37
Block6	0	0	0	0	3	0	3
Total	246	232	53	47	37	3	618

Appendix 9-32) Reduced Block density Matrix for information sharing

```
      1     2     3     4     5     6
   ----- ----- ----- ----- ----- -----
1  0.893 0.606 0.144 0.323 0.313 0.000
2  0.606 0.284 0.000 0.050 0.125 0.000
3  0.144 0.000 0.000 0.000 0.000 0.000
4  0.323 0.050 0.000 0.000 0.056 0.000
5  0.313 0.125 0.000 0.056 0.000 0.167
6  0.000 0.000 0.000 0.000 0.167 0.000
```

Appendix 9-33) Blocked adjacency matrix for work referral network

		4 6 S	2 9 N	3 0 N	8 C	3 N	3 5 A	5 5 Y	4 9 S	5 0 C	1 1 T	1 2 E	7 F	4 C	0 G	6 P	5 O	9 M	9 I	3 P	4 2 S	5 B	4 2 W	1 3 A	7 T	0 F	7 H	3 L	5 O	1 V	3 D	0 P	8 M	6	2 2 L	2 8 N	1 6 H	4 A	3 S	2 N	1 L	4 N	8 S	8 H	6 B	7 N	4 M	2 U	4 S	1 G	3 N	2 M	3 N	4 S	4 S	4 P	1 A
46	SPUMC			1	1	1		1			1							1				1						1								1		1																						
29	NH			1	1	1	1	1	1	1	1	1	1		1		1					1					1			1					1	1	1	1	1	1	1	1	1	1	1	1	1		1		1		1	1	1			
30	NHCO	1	1		1	1		1	1	1		1		1		1		1	1				1			1		1						1	1	1	1	1	1	1	1		1	1		1			1			1	1	1			
8	CCN		1	1		1				1				1			1			1			1										1			1	1			1		1	1	1							1	1	1		1	1	
33	NHYMCC	1	1	1	1		1		1	1													1												1	1	1		1			1														1			1	
3	AUC		1																																																							
55	YWCA		1	1		1								1																																											
45	SOFP		1	1																																																					
9	CLA			1		1																																																				
50	THF		1		1																																																				
11	ELC			1																																																					
12	FG		1																																																					
7	CA		1																																																					
14	GRE				1																																																				
40	PNC			1																																																					
36	ODM		1																																																					
25	MFC			1																																																				
19	IICR			1																																																				
39	PH				1																																																				
42	SC																																																									
5	BC																							1																																	
54	WSB																										1																												
2	ACBA																																																							
51	TKF																																																							
13	FI																																																						
17	HFI								1																1																														
20	LCS																																																						
37	OPCA																																																						
53	VEC																																																						
10	DLC																																																						
38	PB																																																						
26	MN																																																						
22	LSS	1	1	1																																																			
28	NCM		1																																																				
16	HEAETH		1	1	1	1		1		1																																													
4	AVAC			1	1							1												1											1	1				1		1	1		1		1								
43	SMC		1	1																																																		

Appendix 9-33) Blocked adjacency matrix for work referral network (Continued)

```
32 NHYMCA |   1 1   1 |                             |     1                     |               1   1         |                   |
21    LLM |   1 1     |                             |                           | 1 1             1       1   |       1       1   |
34   NSAS |     1 1   |       1                     |                           |           1                 |     1             |
48    SVD |   1 1     |           1                 |                           |       1 1   1     1 1 1     |             1     |
18     HI |   1 1     |                             |                           |       1                 1   |             1     |
 6   BLFP |   1 1     |                       1     |                           |       1         1           |                   |
27  NAMSC |   1 1 1   |                             |                           |       1         1           |                   |
24    MCG |     1     |                             |       1 1   1             |                             |                   |
52   UWAC |   1   1   |                             |                           |     1 1                     |                   |
          -------------------------------------------------------------------------------------------------------------------------
44    SMF |   1 1   1 |                             |                           |                   1         |                   |
15    GVP |     1   1 |                             |                           |                   1         |                   |
31   NHFB |     1     |                             |                           |               1   1         |                   |
23     MB |       1   |                             |                           |             1               |                   |
35  NWCCP |   1 1     |                             |                           |                   1         |               1   |
49 SVYMCA |     1     |                     1       |             1             | 1         1             1   |                   |
47   SSVD |   1 1     |                             |                           |   1     1       1       1   |                   |
41     PT |   1 1   1 |                   1         |                           |             1     1       1 |         1         |
 1   AARP |     1     |                             |                           |                         1   |                   |
          -------------------------------------------------------------------------------------------------------------------------
```

Appendix 9-34) Means of variables within positions for work referral network

	Position									
	n	Block 1	n	Block 2	N	Block 3	n	Block 4	n	Block 5
Proportion of business	5	0%	14	35.71%	13	69.23%	14	0%	9	22.22%
Collaborative relation index	5	189.6 (128.15)	14	23.43 (19.94)	13	16.62 (17.67)	14	81.64 (95.18)	9	37.44 (21.19)
Betweenness centrality	5	16.70 (14.53)	14	0.074 (0.21)	13	0.16 (0.56)	14	1.84 (2.03)	9	0.14 (0.26)

Appendix 9-35) Frequency of choices within and between blocks for work referral relations

	Block1	Block 2	Block 3	Block 4	Block 5	Total
Block 1	17	24	11	39	19	110
Block 2	19	1	0	0	2	22
Block 3	0	1	1	8	0	10
Block 4	31	6	5	34	6	82
Block 5	16	2	1	17	2	38
Total	83	34	18	98	29	262

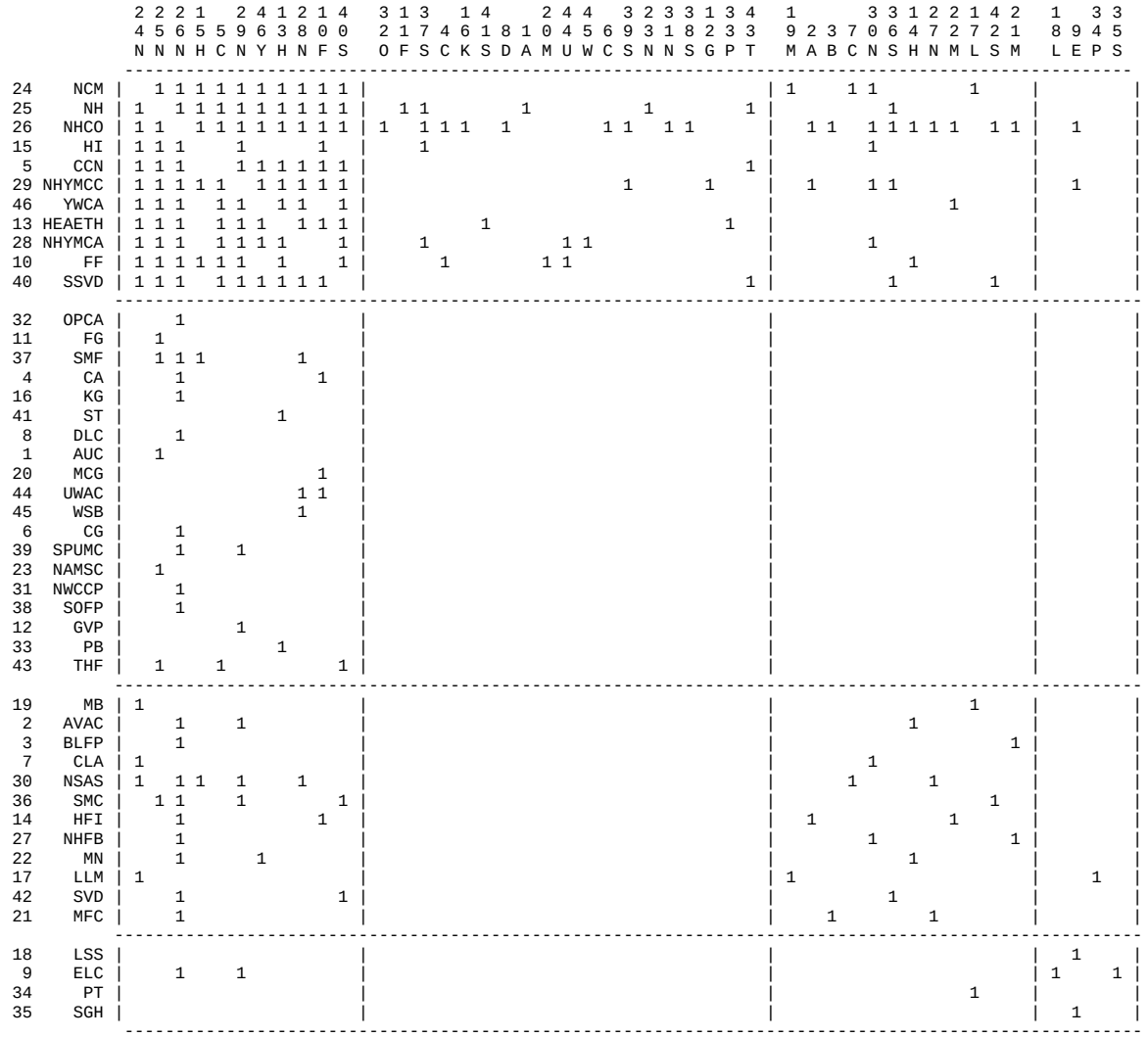
Appendix 9-36) Reduced Block density Matrix for work referrals

```
      1     2     3     4     5
   ----- ----- ----- ----- -----
1  0.850 0.343 0.169 0.557 0.422
2  0.271 0.005 0.000 0.000 0.016
3  0.000 0.005 0.006 0.044 0.000
4  0.443 0.031 0.027 0.187 0.048
5  0.356 0.016 0.009 0.135 0.028
```

Appendix 9-37) Image matrix

```
   1     2     3     4     5
   ----- ----- ----- ----- -----
1  1(SE) 1(RE) 1(RE) 1(RE) 1(RE)
2  1(RE) 0     0     0     0
3  0     0     0     0     0
4  1(RE) 0     0     1(RE) 0
5  1(RE) 0     0     1(RE) 0
```

Appendix 9-38) Blocked adjacency matrix for regular meeting network



Appendix 9-39) Means of variables within positions for regular meeting network

	Position							
	n	Block 1	n	Block 2	n	Block 3	n	Block 4
Proportion of business sector	11	0%	19	47.37%	12	16.67%	4	25%
Collaborative relation index	11	158.91 (128.38)	19	25.89 (20.38)	12	46.17 (16.26)	4	33.25 (17.99)
Betweenness centrality	11	11.37 (14.55)	19	0.005 (0.014)	12	0.58 (1.32)	4	2.19 (4.39)

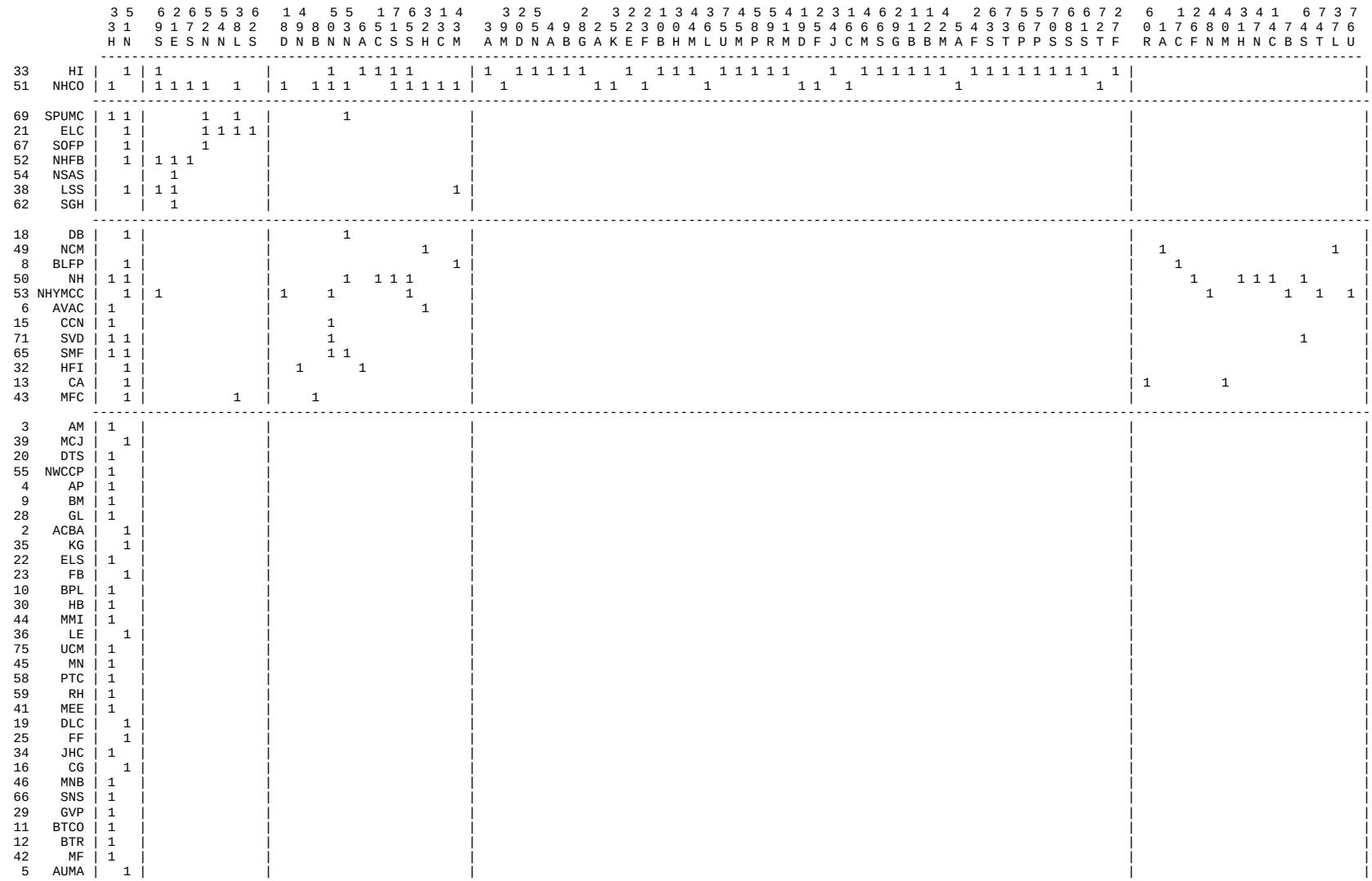
Appendix 9-40) Frequency of choices within and between blocks for regular meeting relations

	Block1	Block 2	Block 3	Block 4	Total
Block 1	96	27	23	2	148
Block 2	27	0	0	0	27
Block 3	23	0	16	1	40
Block 4	2	0	1	4	7
Total	148	27	40	7	222

Appendix 9-41) Reduced block density matrix for regular meeting

```
        1     2     3     4
    ----- ----- ----- -----
1   0.873 0.129 0.174 0.045
2   0.129 0.000 0.000 0.000
3   0.174 0.000 0.121 0.021
4   0.045 0.000 0.021 0.333
```

Appendix 9-42) Blocked adjacency matrix for resource sharing network



Appendix 9-42) Blocked adjacency matrix for resource sharing network (Continued)

```
24    FCO | 1   |               |                         |                                                                                   |                             |
63     SH | 1   |               |                         |                                                                                   |                             |
73   THHC | 1   |               |                         |                                                                                   |                             |
56    PMS | 1   |               |                         |                                                                                   |                             |
57     PT | 1   |               |                         |                                                                                   |                             |
70   SSLT | 1   |               |                         |                                                                                   |                             |
68     SP | 1   |               |                         |                                                                                   |                             |
61     SE | 1   |               |                         |                                                                                   |                             |
72    THF |   1 |               |                         |                                                                                   |                             |
27  FHLBP | 1   |               |                         |                                                                                   |                             |
          -------------------------------------------------------------------------------------------------------------------------------------------------------------------
60     RR |     |               |                     1   |                                                                                   |                             |
 1   AARP |     |               |   1                     |                                                                                   |                             |
17    CLA |     |               |     1                   |                                                                                   |                             |
26     FG |     |               |       1                 |                                                                                   |                             |
48    NCB |     |               |         1               |                                                                                   |                             |
40     ME |     |               |                     1   |                                                                                   |                             |
31 HEAETH |     |               |       1                 |                                                                                   |                             |
47  NAMSC |     |               |       1                 |                                                                                   |                             |
14     CB |     |               |       1                 |                                                                                   |                             |
 7    BFR |     |               |         1               |                                                                                   |                             |
64    SMC |     |               |       1       1         |                                                                                   |                             |
74    TKF |     |               |         1               |                                                                                   |                         1   |
37    LLM |     |               |   1                     |                                                                                   |                       1     |
76   UWAC |     |               |         1               |                                                                                   |                             |
           ------------------------------------------------------------------------------------------------------------------------------------------------------------------
```

Appendix 9-43) Means of variables within positions for resource sharing network

	Position									
	N	Block 1	n	Block 2	N	Block 3	n	Block 4	n	Block 5
Proportion of business sector	2	0%	7	14.29%	12	8.33%	41	82.93%	14	42.86%
Collaborative relation index	2	404 (4.24)	7	40.71 (23.21)	12	78.58 (54.49)	41	13.22 (13.47)	14	29.29 (24.15)
Power centrality	2	29.83 (12.26)	7	1.65 (1.12)	12	1.91 (2.62)	41	-0.95 (0.43)	14	0.9 (0.41)
Betweenness centrality	2	61.12 (9.09)	7	1.23 (2.13)	12	4.08 (4.74)	41	0 (0)	14	0.15 (0.50)

Appendix 9-44) Frequency of choices within and between blocks for resource sharing relations

	Block1	Block 2	Block 3	Block 4	Block 5	Total
Block 1	2	6	14	41	0	63
Block 2	6	14	2	0	0	22
Block 3	14	2	18	0	15	49
Block 4	41	0	0	0	0	41
Block 5	0	0	15	0	2	17
Total	63	22	49	41	17	192

Appendix 9-45) Reduced Block density Matrix for resource sharing

```
      1     2     3     4     5
   ----- ----- ----- ----- -----
1  1.000 0.429 0.583 0.500 0.000
2  0.429 0.333 0.024 0.000 0.000
3  0.583 0.024 0.136 0.000 0.089
4  0.500 0.000 0.000 0.000 0.000
5  0.000 0.000 0.089 0.000 0.011
```

Appendix 9-46) Blocked adjacency matrix for formal contract network

		1		1		2	1				1	1		1	2	1				2	2	1	1	3	2	3		2	2	1	2	2	2
		1	7	3	4	8	9	4	6		8	6	4	5	7	0	5	3	2		5	2	0	9	1	0	1	1		6	7	2	9	3	8
		A	N	B	C	N	F	S	M		D	C	K	L	C	F	S	H	A		C	P	N	N	H	U	N	W		S	S	H	T	S	S
1	AARP		1																																
17	NH	1				1		1								1			1																
3	BLFP					1			1																										
4	CA					1	1																												
18	NHCO		1	1	1		1		1		1	1	1	1	1		1	1																	
9	FF				1	1																								1		1			
24	SMF		1															1																	
16	MFC			1		1								1																					
8	DLC					1																													
6	CG					1																													
14	KG					1																													
15	LSS					1			1																										
7	CPH					1																													
10	FG		1																																
25	SPUMC					1																													
13	HI					1		1																											
2	AUC		1																																
5	CB																							1											
22	PB																							1											
20	NHYMCC																							1	1										
19	NHYMCA																								1										
11	HEAETH																				1	1	1			1		1							
30	UWAC																						1	1	1		1					1			
21	NSAS																									1									
31	WSB																									1									
26	SSVD						1																									1			
27	SVD																															1			
12	HFI						1																		1								1		1
29	TKF																														1				
23	SMC																													1	1				
28	SVYMCA																															1			

Appendix 9-47) Means of variables within positions for formal contract network

	Position							
	n	Block 1	n	Block 2	n	Block 3	n	Block 4
Proportion of business sector	8	0%	9	66.67%	8	37.5%	6	0%
Collaborative relation index	8	115 (128.75)	9	67.33 (129.53)	8	58.62 (50.49)	6	54.17 (20.18)
Power centrality	8	2.78 (3.47)	9	0.24 (0.4187)	8	1.55 (1.63)	6	1.46 (0.99)
Betweenness centrality	8	18.84 (28.99)	9	0.32 (0.96)	8	7.36 (14.65)	6	11.57 (19.47)

Appendix 9-48) Frequency of choices within and between blocks for formal contract relations

	Block1	Block 2	Block 3	Block 4	Total
Block 1	18	11	0	2	31
Block 2	11	0	0	0	11
Block 3	0	0	16	1	17
Block 4	2	0	1	8	11
Total	31	11	17	11	70

Appendix 9-49) Reduced block density matrix for formal contract

```
        1     2     3     4
    ----- ----- ----- -----
1   0.321 0.153 0.000 0.042
2   0.153 0.000 0.000 0.000
3   0.000 0.000 0.286 0.021
4   0.042 0.000 0.021 0.267
```

Appendix 9-50) Blocked adjacency matrix for joint program network

	37 N	25 H	2 A	3 A	5 A	35 N	7 B	30 M	9 B	10 B	4 A	12 C	13 C	43 P	15 D	16 D	46 S	18 E	19 F	49 S	21 F	22 G	23 H	53 S	11 C	26 J	56 U	28 K	29 M	44 R	31 M	32 M	33 M	34 M	42 P	36 N	8 B	38 N	45 S	40 N	41 P	48 S	57 W	51 S	54 T	55 U	47 S	39 N	17 E	50 S	6 B	20 F	24 H	1 A	52 S	27 K	14 C	58 Y
37 NHCO		1				1					1		1		1										1			1			1												1				1		1	1	1	1	1	1	1			
25 HI	1		1	1	1		1	1	1	1		1		1		1	1	1	1	1	1	1	1	1		1	1		1	1		1	1	1	1	1	1		1	1	1	1		1	1	1	1			1							1	
2 AM		1																																																								
3 AP		1																																																								
5 AVAC		1																																																								
35 NCB	1																																																									
7 BM		1																																																								
30 MF		1																																																								
9 BTCO		1																																																								
10 BTR		1																																																								
4 APH	1																																					1																				
12 CCN		1																																																								
13 CG	1																																																									
43 PTC		1																																																								
15 DLC	1																																																									
16 DTS		1																																																								
46 SH		1																																																								
18 ELS		1																																																								
19 FCO		1																																																								
49 SP		1																																																								
21 FHLBP		1																																																								
22 GL		1																																																								
23 HB		1																																																								
53 SVD		1																																																								
11 CB	1																																																									
26 JHC		1																																																								
56 UWAC		1																																																								
28 KG	1																																																									
29 MEE		1																																																								
44 RH		1																																																								
31 MFC	1																																																									
32 MMI		1																																																								
33 MN		1																																																								
34 MNB		1																																																								
42 PT		1																																																								
36 NH		1																																																								
8 BPL		1																																																								
38 NHYMCA											1																																															
45 SE		1																																																								

Appendix 9-50) Blocked adjacency matrix for joint program network (Continued)

```
40  NWCCP |   1 |                                                                                           |                       |
41    PMS |   1 |                                                                                           |                       |
48    SNS |   1 |                                                                                           |                       |
57    WSB | 1   |                                                                                           |                       |
51   SSLT |   1 |                                                                                           |                       |
54   THHC |   1 |                                                                                           |                       |
55    UCM |   1 |                                                                                           |                       |
47    SMF | 1 1 |                                                                                           |                       |
          ---------------------------------------------------------------------------------------------------------------------------
39 NHYMCC |     |                                                                                           |     1                 |
17    ELC | 1   |                                                                                           |       1               |
50  SPUMC | 1 1 |                                                                                           | 1       1   1         |
 6   BLFP | 1   |                                                                                           |   1             1     |
20     FF | 1   |                                                                                           |     1     1   1       |
24    HFI | 1   |                                                                                           |         1         1   |
 1   AARP | 1   |                                                                                           |     1               1 |
52   SSVD | 1   |                                                                                           |         1             |
27    KDS |     |                                                                                           |       1               |
14    CLA |   1 |                                                                                           |           1           |
58   YWCA |     |                                                                                           |             1         |
           --------------------------------------------------------------------------------------------------------------------------
```

Appendix 9-51) Means of variables within positions for joint program network

	Position					
	n	Block 1	n	Block 2	n	Block 3
Proportion of business sector	2	0%	45	77.78%	11	9.09%
Collaborative relation index	2	404 (4.24)	45	24.42 (35.40)	11	64.82 (39.48)
Betweenness centrality	2	65.87 (28.87)	45	0.078 (0.52)	11	1.44 (2.29)

Appendix 9-52) Frequency of choices within and between blocks for joint program relations

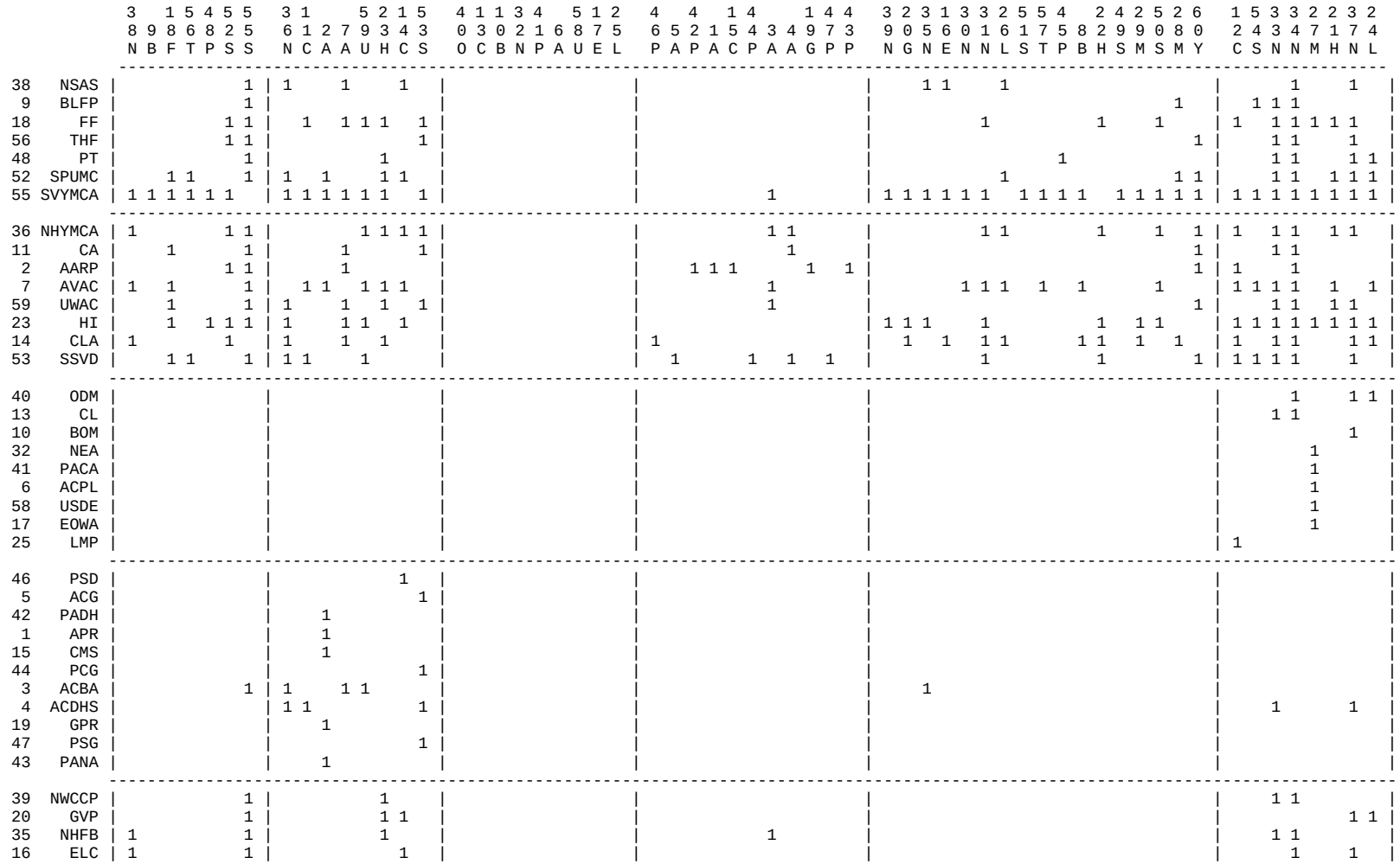
	Block1	Block 2	Block 3	Total
Block 1	2	45	9	56
Block 2	45	2	0	47
Block 3	9	0	18	27
Total	56	47	27	130

Appendix 9-53) Reduced block density matrix for joint program

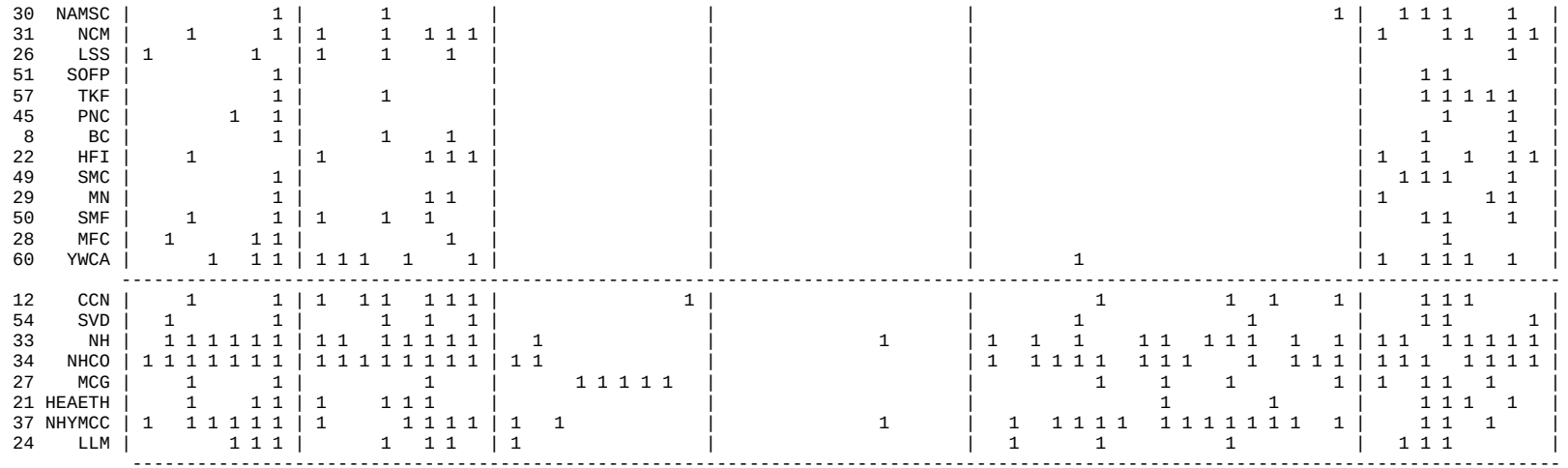
```
        1     2     3
    ----- ----- -----
1   1.000 0.500 0.409
2   0.500 0.001 0.000
3   0.409 0.000 0.164
```

NPO and public agency networks blockmodels

Appendix 9-54) Blocked adjacency matrix for information sharing network



Appendix 9-54) Blocked adjacency matrix for information sharing network (Continued)



Appendix 9-55) Means of variables within positions for information sharing network (with public agencies)

	Position											
	N	Block 1	n	Block 2	n	Block 3	n	Block 4	n	Block 5	n	Block 6
Proportion of public sector	7	0%	8	0%	9	88.89%	11	90.91%	17	0%	8	0%
Collaborative relation index	7	55.14 (21.98)	8	76.63 (42.97)	9	4.78 (2.64)	11	11 (14.87)	17	37.53 (21.84)	8	121.98 (95.41)
Power centrality	7	3.39 (1.87)	8	3.75 (4.81)	9	3.53 (2.73)	11	0.44 (2.19)	17	2.60 (2.98)	8	-0.81 (5.32)
Betweenness centrality	7	2.99 (6.47)	8	5.21 (5.60)	9	0.001 (0.004)	11	0.006 (0.013)	17	0.27 (0.64)	8	7.63 (6.92)

Appendix 9-56) Frequency of choices within and between blocks for information sharing relations

	Block1	Block2	Block3	Block4	Block5	Block6	Total
Block1	16	21	0	1	27	31	96
Block2	21	26	0	15	32	37	131
Block3	0	0	0	0	0	12	12
Block4	1	15	0	0	1	2	19
Block5	27	32	0	1	2	50	112
Block6	31	37	12	2	50	34	166
Total	96	131	12	19	112	166	536

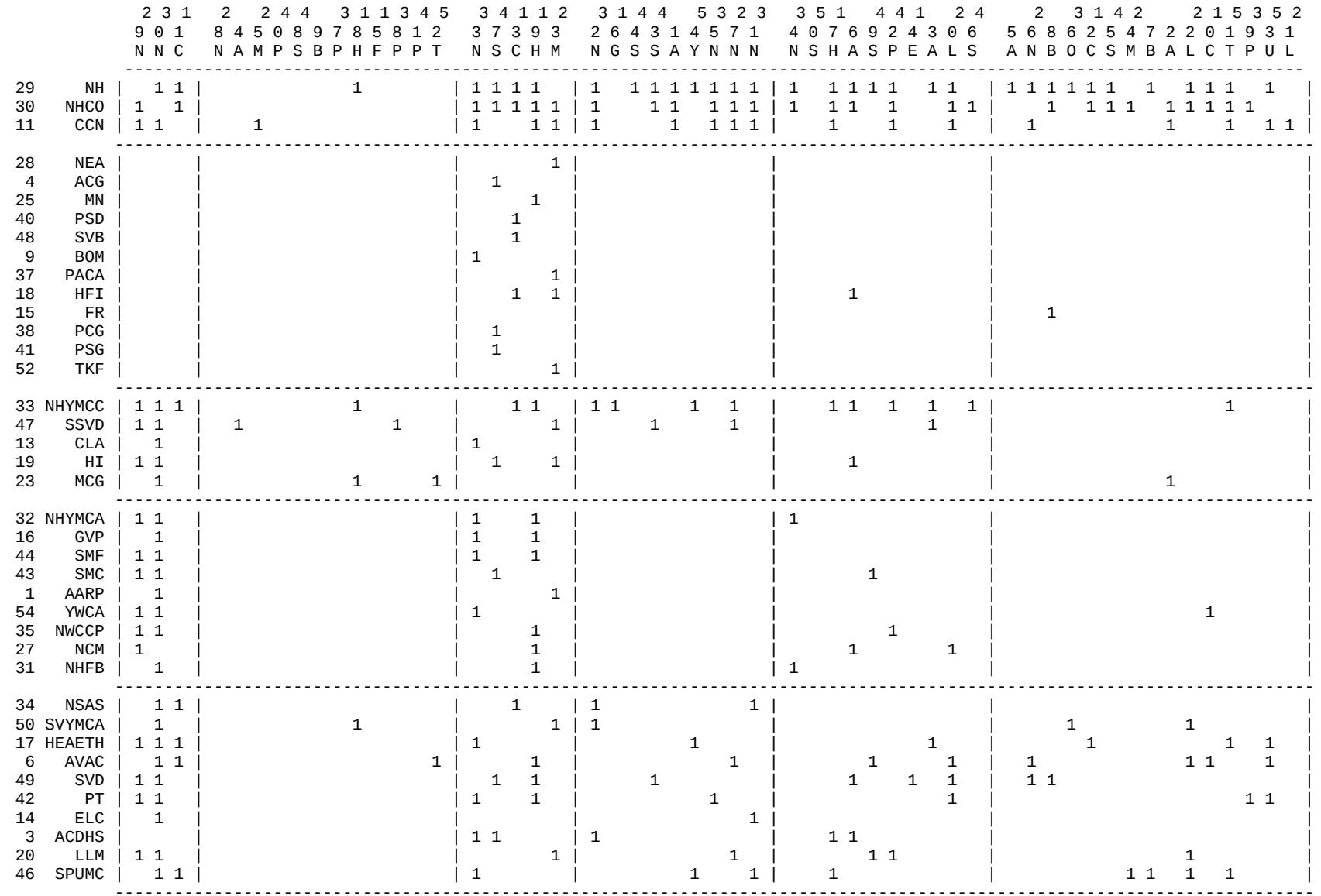
Appendix 9-57) Reduced Block density Matrix for information sharing

```
        1     2     3     4     5     6
    ----- ----- ----- ----- ----- -----
1   0.381 0.375 0.000 0.013 0.227 0.554
2   0.375 0.464 0.000 0.170 0.235 0.578
3   0.000 0.000 0.000 0.000 0.000 0.167
4   0.013 0.170 0.000 0.000 0.005 0.023
5   0.227 0.235 0.000 0.005 0.007 0.368
6   0.554 0.578 0.167 0.023 0.368 0.607
```

Appendix 9-58) Image matrix

```
    1      2      3      4      5      6
    ------ ------ ------ ------ ------ ------
1   1(RE)  1(RE)  0      0      1(RE)  1(RE)
2   1(RE)  1(RE)  0      1(RE)  1(RE)  1(RE)
3   0      0      0      0      0      1(RE)
4   0      1(RE)  0      0      0      0
5   1(RE)  1(RE)  0      0      0      1(RE)
6   1(RE)  1(RE)  1(RE)  0      1(RE)  1(RE)
```

Appendix 9-59) Blocked adjacency matrix for work referrals network



```
 5   ACHA | 1     |                         |           |                   |                     |                               |
26  NAMSC | 1 1 1 |                         |           |                   |       1 1           |                               |
 8   BLFP | 1 1   |                 1       |           |                   |       1 1           |             1                 |
36    ODM | 1     |                         |           |                   |                     |                               |
12     CL |   1   |                         |           |                   |                     |                               |
45   SOFP | 1 1   |                         |           |                   |                     |                               |
24    MFC |   1   |                         |           |                   |                     |                               |
 7     BC |       |               1         |           |                   |                     |                               |
 2   ACBA |       |                         |           |                   |                     |                               |
22    LSS | 1 1   |                         |           |                   |       1           1 |                               |
10     CA | 1     |                         |           |                   |                     |                               |
51    THF | 1   1 |                         |           |                   |                     |                               |
39    PNC |   1   |                         |           |                   |           1         |                               |
53   UWAC | 1   1 |                         |           |                   |     1 1             |                               |
21    LMP |     1 |                         |           |                   |                     |                               |
           ------------------------------------------------------------------------------------------------------------------------
```

Appendix 9-60) Means of variables within positions for work referral network

	Position											
	n	Block 1	n	Block 2	n	Block 3	n	Block 4	n	Block 5	n	Block 6
Proportion of public sector	3	0%	1 2	83.33%	5	0%	9	0%	10	10%	15	20%
Collaborative relation index	3	201 (116.05)	1 2	16.08 (19.34)	5	104.8 (51.51)	9	49.44 (20.06)	10	56.2 (15.65)	15	23.87 (18.92)
Betweenness centrality	3	23.12 (13.84)	1 2	0.17 (0.57)	5	6.01 (2.50)	9	0.13 (0.17)	10	1.11 (1.59)	15	0.31 (0.97)

Appendix 9-61) Frequency of choices within and between blocks for work referrals relations

	Block1	Block2	Block3	Block4	Block5	Block6	Total
Block1	6	2	12	19	16	25	80
Block2	0	0	12	0	1	1	14
Block3	9	5	6	6	7	2	35
Block4	14	0	12	0	6	1	33
Block5	17	2	12	12	12	18	73
Block6	20	2	0	0	9	1	32
Total	66	11	54	37	51	48	267

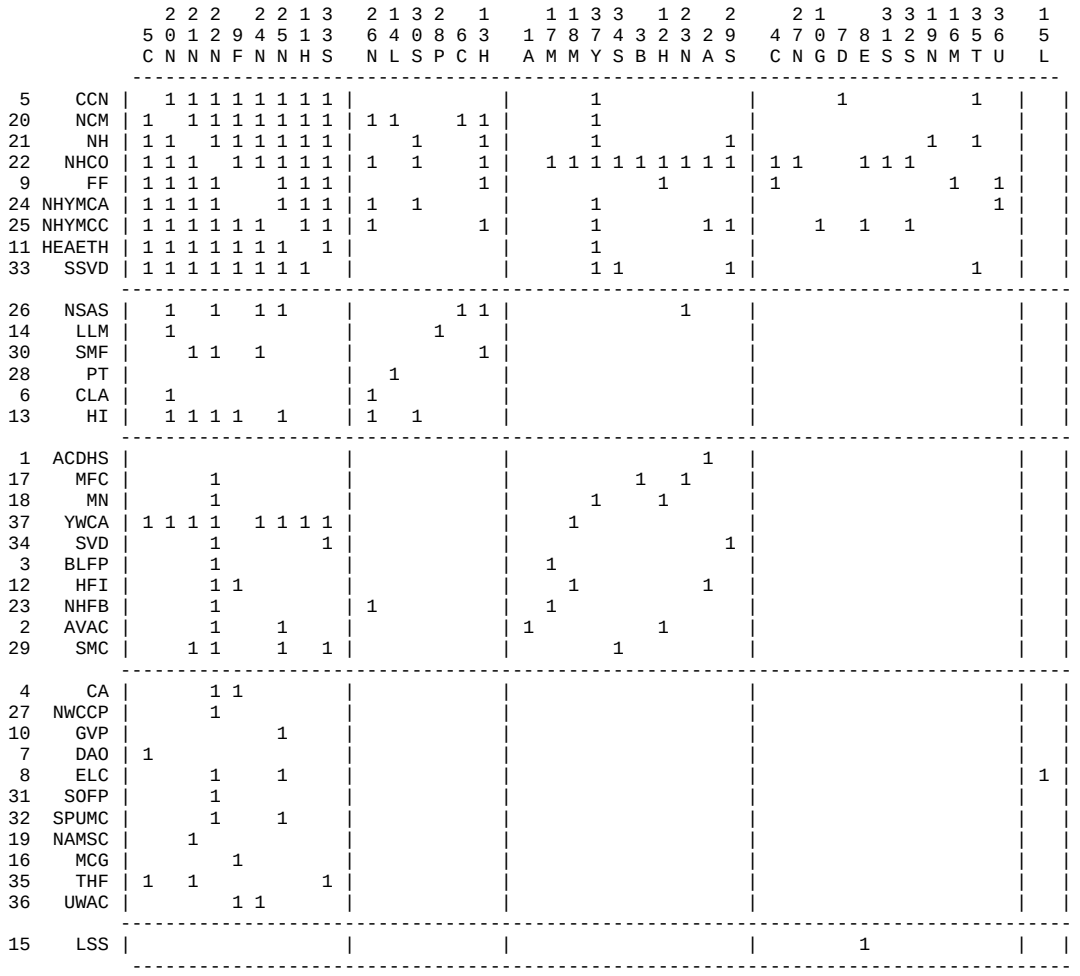
Appendix 9-62) Reduced block density matrix for work referrals

	1	2	3	4	5	6
1	1.000	0.056	0.800	0.704	0.533	0.556
2	0.000	0.000	0.200	0.000	0.008	0.006
3	0.600	0.083	0.300	0.133	0.140	0.027
4	0.519	0.000	0.267	0.000	0.067	0.007
5	0.567	0.017	0.240	0.133	0.133	0.120
6	0.444	0.011	0.000	0.000	0.060	0.005

Appendix 9-63) Image matrix

	1	2	3	4	5	6
1	1(SE)	0	1(SE)	1(RE)	1(RE)	1(RE)
2	0	0	1(RE)	0	0	0
3	1(RE)	0	1(RE)	0	0	0
4	1(RE)	0	1(RE)	0	0	0
5	1(RE)	0	1(RE)	1(RE)	0	0
6	1(RE)	0	0	0	0	0

Appendix 9-64) Blocked adjacency matrix for regular meeting network



Appendix 9-65) Means of variables within positions for regular meeting network

	Position									
	n	Block 1	n	Block 2	N	Block 3	n	Block 4	n	Block 5
Proportion of public sector	9	0%	6	0%	10	10%	11	9.09%	1	0%
Collaborative relation index	9	128.67 (82.899)	6	66.67 (48.4094)	10	55.5 (16.1606)	11	33.27 (21.22)	1	-
Betweenness centrality	9	12.16 (13.81)	6	1.41 (2.22)	10	0.79 (1.75)	11	0.51 (1.67)	1	-

Appendix 9-66) Frequency of choices within and between blocks for regular meeting relations

	Block1	Block 2	Block 3	Block 4	Total
Block 1	70	14	22	17	123
Block 2	14	8	1	0	23
Block 3	22	1	14	0	37
Block 4	17	0	0	0	17
Total	123	23	37	17	200

Appendix 9-67) Reduced Block density Matrix for regular meeting

	1	2	3	4	5
1	0.972	0.259	0.244	0.172	0.000
2	0.259	0.267	0.017	0.000	0.000
3	0.244	0.017	0.156	0.000	0.000
4	0.172	0.000	0.000	0.000	0.091
5	0.000	0.000	0.000	0.091	

Appendix 9-68) Blocked adjacency matrix for resource sharing network

		2 1 2 2 5 3 N H N	2 2 0 8 N P	2 7 A C	2 1 1 7 3 0 N H F C	1 3 1 6 2 6 9 G T M	1 1 4 6 H L	5 3 B A	2 2 3 3 1 9 5 3 2 9 A S N S S E	2 3 1 7 N T	8 6 C N	2 1 3 3 3 4 1 8 F S S U	2 4 A	3 1 1 3 4 5 7 8 0 S L M S
22	NH	1 1	1	1	1				1 1					1 1
15	HI	1 1	1	1 1		1 1			1				1 1	1
23	NHCO	1 1	1		1 1	1	1	1	1 1 1 1				1	1 1 1 1
20	NAMSC	1												
28	PT	1												
2	ACBA	1												
7	CCN	1 1												
27	NWCCP	1												
13	HEAETH	1												
10	FF	1												
6	CA	1												
12	GVP	1												
36	THF	1												
19	MN	1												
14	HFI	1								1			1	
16	LLM									1 1				
5	BLFP	1									1	1		1
3	ACDHS	1										1	1	
1	AARP									1				
29	SMC	1										1	1	
25	NHYMCC	1	1					1		1		1		1
33	SPUMC	1 1						1					1	1
32	SOFP	1											1	
9	ELC	1									1		1	1
21	NCM						1 1		1					
37	TKF						1		1					
8	CLA							1						
26	NSAS								1					
11	FR							1						
34	SSVD							1						
31	SMI								1					
38	UWAC								1					
24	NHFB	1							1 1 1					
4	AVAC	1					1	1						
35	SVD	1 1 1						1						
17	LSS	1							1 1				1	
18	MFC	1					1						1	
30	SMF	1 1 1							1					

Appendix 9-69) Means of variables within positions for resource sharing network

	Position									
	n	Block 1	n	Block 2	N	Block 3	n	Block 4	n	Block 5
Proportion of public sector	3	0%	11	0%	10	10%	8	25%	6	0%
Collaborative relation index	3	224 (87.98)	11	40.91 (28.56)	10	61 (33.33)	8	48 (35.38)	6	54.83 (14.86)
Power centrality	3	10.33 (8.34)	11	-1.15 (1.34)	10	-0.047 (1.54)	8	1.25 (0.79)	6	-0.35 (1.86)
Betweenness centrality	3	37.07 (25.46)	11	0 (0)	10	5.56 (5.01)	8	1.36 (2.71)	6	1.39 (1.56)

Appendix 9-70) Frequency of choices within and between blocks for resource sharing relations

	Block1	Block 2	Block 3	Block 4	Block 5	Total
Block 1	6	12	10	0	10	38
Block 2	12	0	0	0	0	12
Block 3	10	0	2	11	10	33
Block 4	0	0	11	0	0	11
Block 5	10	0	10	0	2	22
Total	38	12	33	11	22	116

Appendix 9-71) Reduced block density matrix for resource sharing

```
        1     2     3     4     5
    ----- ----- ----- ----- -----
1   1.000 0.364 0.333 0.000 0.556
2   0.364 0.000 0.000 0.000 0.000
3   0.333 0.000 0.022 0.138 0.167
4   0.000 0.000 0.138 0.000 0.000
5   0.556 0.000 0.167 0.000 0.067
```

Appendix 9-72) Image matrix

```
    1      2      3      4      5
    ------ ------ ------ ------ ------
1   1(SE)  1(RE)  1(RE)  0      1(RE)
2   1(RE)  0      0      0      0
3   1(RE)  0      0      1(RE)  1(RE)
4   0      0      1(RE)  0      0
5   1(RE)  0      1(RE)  0      0
```

Appendix 9-73) Blocked adjacency matrix for formal contract network

	1 9 C	0 F	3 A	4 A	2 3 P	6 A	6 S	4 H	2 P	1 3 H	1 7 N	3 T	2 1 S	3 4 U	3 0 S	3 3 Y	2 7 S	1 7 A	2 2 H	1 8 N	2 1 N	2 9 S	2 9 N	2 0 N	2 5 S	1 8 S	1 1 H	1 1 A	8 B	2 2 A	5 L	6 M	5 A
9 CA		1																		1													
10 FF	1															1		1	1	1													
3 ACDED																	1																
4 ACDHS																1	1	1	1	1													
23 PSG																1																	
6 ACHA																1																	
26 SPUMC																				1													
14 HUD																1																	
22 PCG																1																	
13 HI																				1				1									
17 NH																				1				1		1							
31 TKF																			1														
24 SMC																1					1												
32 UWAC																			1		1		1	1			1						
30 SVYMCA																			1						1								
33 YWCA				1		1																							1				
27 SSVD		1		1	1			1	1			1																				1	
7 AVAC			1	1																													
12 HFI		1		1							1		1	1																			
18 NHCO	1	1		1			1			1	1																		1		1	1	
21 NSAS													1																				
29 SVD												1																					
19 NHYMCA													1																				
20 NHYMCC													1											1									
25 SMF										1	1																						
28 SVB														1																			
11 HEAETH													1									1											
1 AARP										1																							
8 BLFP																				1												1	
2 ACBA																1																	1
15 LSS																				1												1	
16 MFC																				1									1		1		
5 ACG																1														1			

Apeendix 9-74) Means of variables within positions for formal contract network

	Position									
	n	Block 1	n	Block 2	N	Block 3	n	Block 4	n	Block 5
Proportion of public sector	9	66.67%	6	0%	5	0%	8	12.5%	5	20%
Collaborative relation index	9	30.89 (33.87)	6	88.67 (67.17)	5	131.4 (109.73)	8	63.25 (36.78)	5	35.6 (19.27)
Power centrality	9	0.95 (0.85)	6	1.75 (1.27)	5	4.34 (2.51)	8	1.02 (0.43)	5	1.35 (0.44)
Betweenness centrality	9	7.93 (16..75)	6	8.03 (8.25)	5	27.58 (17.96)	8	0.025 (0.07)	5	0.403 (0.64)

Appendix 9-75) Frequency of choices within and between blocks for formal contract relations

	Block1	Block 2	Block 3	Block 4	Block 5	Total
Block 1	2	0	15	0	0	17
Block 2	0	0	6	9	0	15
Block 3	15	6	0	0	5	26
Block 4	0	9	0	2	0	11
Block 5	0	0	5	0	6	11
Total	17	15	26	11	11	80

Appendix 9-76) Reduced Block density Matrix for formal contract

	1	2	3	4	5
1	0.028	0.000	0.333	0.000	0.000
2	0.000	0.000	0.200	0.188	0.000
3	0.333	0.200	0.000	0.000	0.200
4	0.000	0.188	0.000	0.036	0.000
5	0.000	0.000	0.200	0.000	0.300

Appendix 9-77) Image matrix

	1	2	3	4	5
1	0	0	1(RE)	0	0
2	0	0	1(RE)	1(RE)	0
3	1(RE)	1(RE)	0	0	1(RE)
4	0	1(RE)	0	0	0
5	0	0	1(RE)	0	1(RE)

Appendix 9-78) Blocked adjacency matrix for joint program network

		1 9 N	9 E	2 9 S	1 1 F	6 B	4 A	6 M	2 G	1 P	6 S	2 P	7 C	8 N	0 F	2 A	4 H	8 C	5 B	7 S	5 S	7 N	1 A	3 H	4 S	3 A	3 P	0 N	8 S	5 M	1 U	3 1 Y
19	NHYMCC																				1											
9	ELC													1					1													
29	SVYMCA																			1												
11	FR																		1													
6	BOM													1																		
4	AVAC																1															
16	MN																1															
12	GPR															1																
21	PANA															1																
26	SSVD													1	1																	
22	PSD																	1														
7	CCN																1															
18	NHCO		1			1					1					1	1	1	1		1				1	1	1			1		
10	FF										1			1							1				1							
2	AARP							1	1					1							1		1								1	
14	HI				1	1							1	1				1			1		1		1		1	1	1		1	
8	CLA									1							1			1				1							
5	BLFP		1		1									1																		
27	SVB			1														1														
25	SPUMC	1												1	1	1	1															
17	NH																1															
1	APR															1																
13	HFI													1	1			1														
24	SMF													1			1															
3	ACDHS													1																		
23	PT																1															
20	NWCCP																1															
28	SVD																1															
15	MFC													1																		
30	UWAC																1															
31	YWCA															1																

Appendix 9-79) Means of variables within positions for joint program network

	Position									
	n	Block 1	n	Block 2	N	Block 3	n	Block 4	n	Block 5
Proportion of public sector	4	25%	8	50%	5	0%	3	33.33%	11	18.18%
Collaborative relation index	4	62.25 (57.02)	8	41.88 (46.16)	5	135.8 (115.41)	3	49.33 (33.17)	11	59.64 (45.56)
Betweenness centrality	4	0 (0)	8	0 (0)	5	31.43 (23.73)	3	9.44 (4.80)	11	0.57 (1.89)

Appendix 9-80) Frequency of choices within and between blocks for joint program relations

	Block1	Block 2	Block 3	Block 4	Block 5	Total
Block 1	0	0	1	4	0	5
Block 2	0	0	9	0	0	9
Block 3	1	9	5	6	14	35
Block 4	4	0	6	0	0	10
Block 5	0	0	14	0	0	14
Total	5	9	35	10	14	73

Appendix 9-81) Reduced Block density Matrix for joint program

	1	2	3	4	5
1	0.000	0.000	0.050	0.333	0.000
2	0.000	0.000	0.225	0.000	0.000
3	0.050	0.225	0.400	0.400	0.255
4	0.333	0.000	0.400	0.000	0.000
5	0.000	0.000	0.255	0.000	0.000

Appendix 9-82) Image matrix

	1	2	3	4	5
1	0	0	0	1(RE)	0
2	0	0	1(RE)	0	0
3	0	1(RE)	1(RE)	1(RE)	1(RE)
4	1(RE)	0	1(RE)	0	0
5	0	0	1(RE)	0	0

APPENDIX 10 TALBE AND FIGURES FOR CHPATER7

Appendix 10-1) Profile descriptive statistics: Dependent variable: CRI

		n	mean	SD
Social enterprise revenue	Government	2	182	176.78
	No government	3	74	77.95
No social enterprise revenue	Government	9	59.44	20.57
	No government	17	57.35	44.08

Appendix 10-2) Simple t-test by social enterprise revenue source dummy variable

Group Statistics

	social enterprise revenue dummy	N	Mean	Std. Deviation	Std. Error Mean
Total annual expenditure	.00	26	1982695.4231	5794694.26760	1136433.04407
	1.00	5	11171731.6000	23939848.72913	10706225.82588
Years in operation	.00	26	50.1154	44.35072	8.69789
	1.00	5	34.4000	56.71684	25.36454
Revenue diversity	.00	26	4.0769	1.80938	.35485
	1.00	5	5.0000	1.87083	.83666
Program diversity	.00	26	4.6154	3.74248	.73396
	1.00	4	6.2500	3.77492	1.88746

Appendix 10-3) Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
									Lower	Upper
Total annual expenditure	Equal variances assumed	17.328	.000	-1.811	29	.081	-9189036.1769	5074765.98021	-19568097.98653	1190025.63268
	Equal variances not assumed			-.853	4.091	.440	-9189036.1769	10766371.32456	-38822077.53009	20444005.17625
Years in operation	Equal variances assumed	.168	.685	.696	29	.492	15.7154	22.58669	-30.47958	61.91035
	Equal variances not assumed			.586	4.985	.583	15.7154	26.81442	-53.27568	84.70645
Revenue diversity	Equal variances assumed	.282	.599	-1.040	29	.307	-.9231	.88776	-2.73876	.89260
	Equal variances not assumed			-1.016	5.540	.352	-.9231	.90880	-3.19239	1.34623
Program diversity	Equal variances assumed	.055	.817	-.812	28	.423	-1.6346	2.01191	-5.75582	2.48659
	Equal variances not assumed			-.807	3.965	.465	-1.6346	2.02514	-7.27694	4.00771

Appendix 10-4) Simple t-test by government revenue source dummy variable

Group Statistics

	Government revenue dummy	N	Mean	Std. Deviation	Std. Error Mean
Total annual expenditure	.00	20	519475.60	885297.36	197958.51
	1.00	11	8819929.73	17268996.42	5206798.33
Years in operation	.00	20	38.4000	44.43967	9.93701
	1.00	11	64.2727	45.61160	13.75242
Revenue diversity	.00	20	3.4000	1.56945	.35094
	1.00	11	5.7273	1.19087	.35906
Program diversity	.00	19	4.0000	3.84419	.88192
	1.00	11	6.2727	3.16515	.95433

Appendix 10-5) Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
									Lower	Upper
Total annual expenditure	Equal variances assumed	19.158	.000	-2.175	29	.038	-8300454.1273	3816095.33111	-16105245.41567	-495662.83888
	Equal variances not assumed			-1.593	10.029	.142	-8300454.1273	5210560.08849	-19905769.22899	3304860.97444
Years in operation	Equal variances assumed	.763	.390	-1.537	29	.135	-25.8727	16.83470	-60.30355	8.55809
	Equal variances not assumed			-1.525	20.261	.143	-25.8727	16.96682	-61.23569	9.49024
Revenue diversity	Equal variances assumed	1.513	.229	-4.275	29	.000**	-2.3273	.54434	-3.44057	-1.21397
	Equal variances not assumed			-4.635	25.827	.000	-2.3273	.50208	-3.35965	-1.29490
Program diversity	Equal variances assumed	.755	.392	-1.659	28	.108	-2.2727	1.37011	-5.07928	.53383
	Equal variances not assumed			-1.749	24.462	.093	-2.2727	1.29943	-4.95194	.40649

* Correlation is significant at the 0.1 level
** Correlation is significant at the 0.01 level

Appendix 10-6) Model Summary of the multiple regression model

R	R Square	Adjusted R Square	Std. Error of the Estimate
.793(a)	.629	.511	42.101

a Predictors: (Constant), Interaction term: government revenue times revenue diversity, social enterprise revenue dummy, Program diversity, Years in operation, Total annual expenditure, Revenue diversity, Government revenue dummy

Appendix 10-7) ANOVA(b) for multiple regression model using all independent variables

	Sum of Squares	df	Mean Square	F	Sig.
Regression	69509.133	9	7723.237	4.084	.008(a)
Residual	28368.867	15	1891.258		
Total	97878.000	24			

a Predictors: (Constant), Proportion of board member from business, Program diversity, Proportion of administrative expenditure, Total annual expenditure, Revenue diversity, Years in operation, social enterprise revenue dummy, Government revenue dummy, Interaction term: government revenue times revenue diversity
b Dependent Variable: Collaboration Relationship Index

Appendix 10-8) Model summary of the best-fit regression model

R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
.722(c)	.521	.466	43.984	1.777

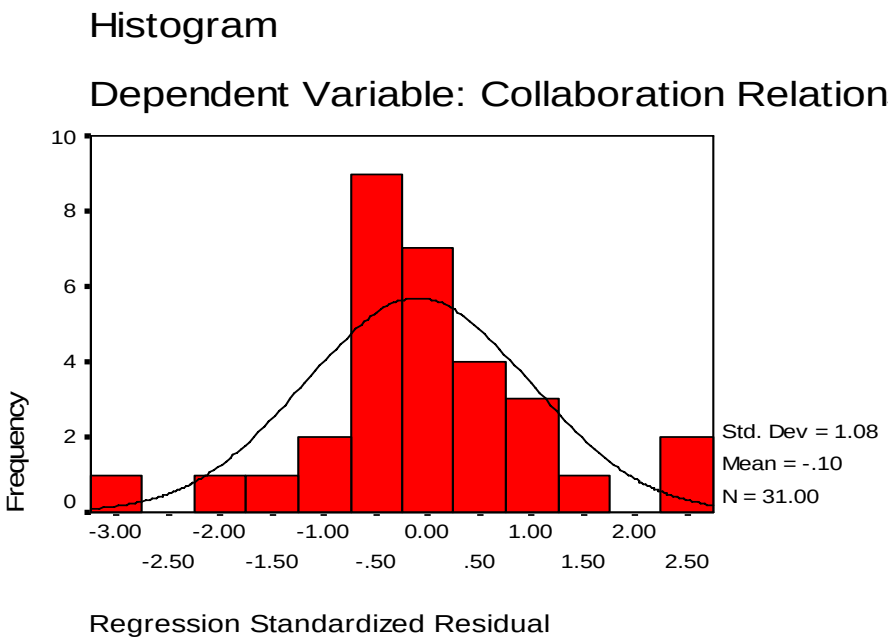
c Predictors: (Constant), Revenue diversity, social enterprise revenue dummy, Total annual expenditure

Appendix 10-9) ANOVA(b) for the best-fit multiple regression model

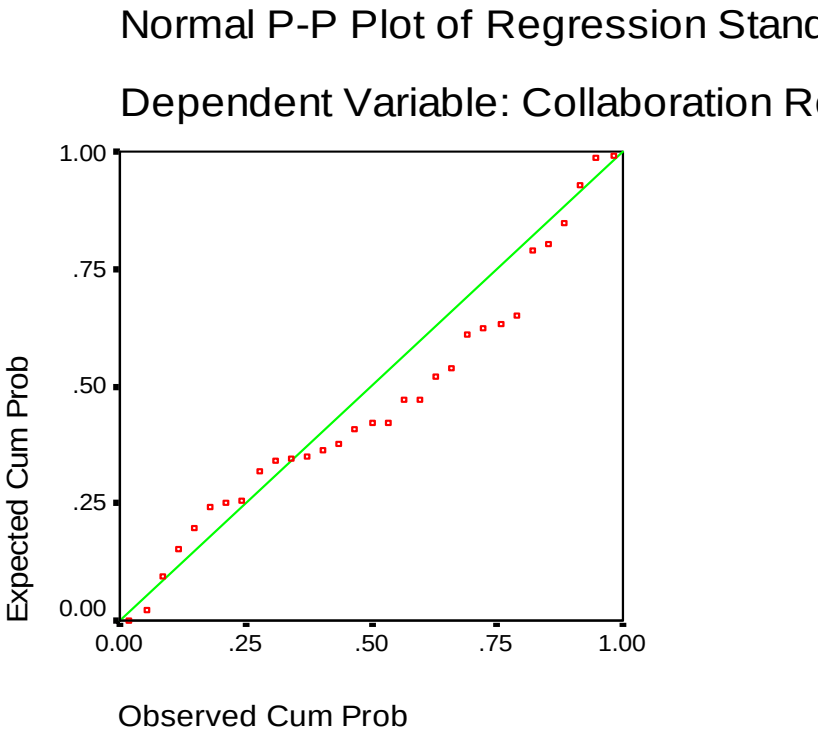
	Sum of Squares	df	Mean Square	F	Sig.
Regression	54790.348	3	18263.449	9.441	.000(c)
Residual	50299.119	26	1934.582		
Total	105089.467	29			

c Predictors: (Constant), Revenue diversity, social enterprise revenue dummy, Total annual expenditure
d Dependent Variable: Collaboration Relationship Index

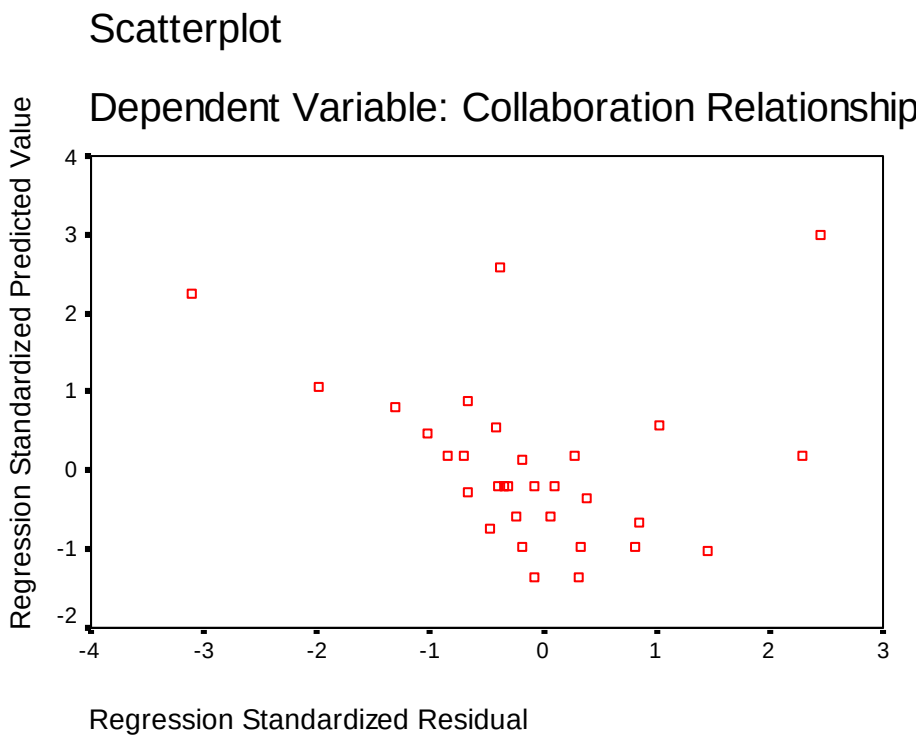
Appendix 10-10)



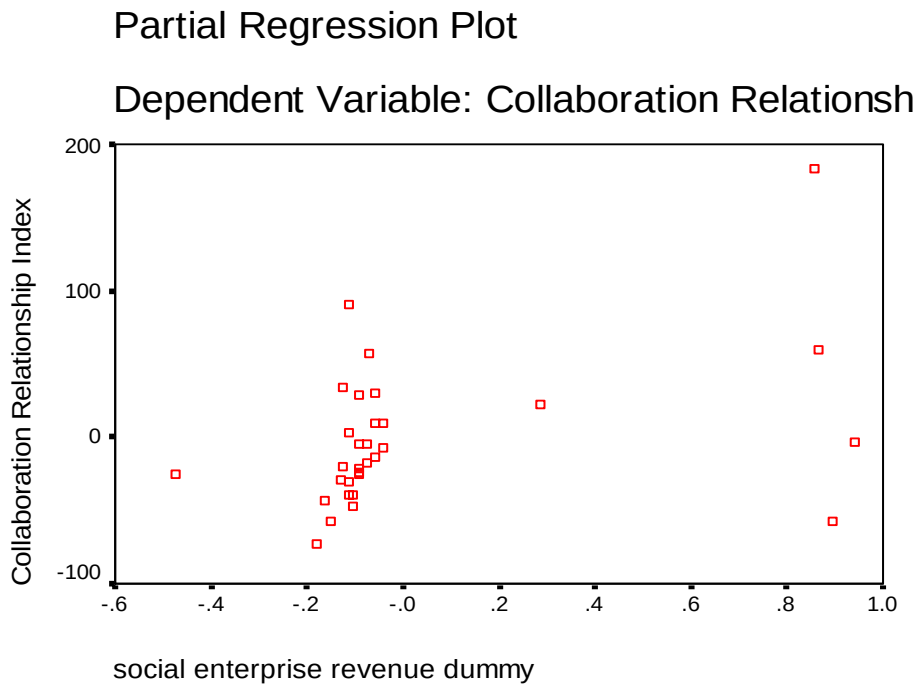
Appendix 10-11)



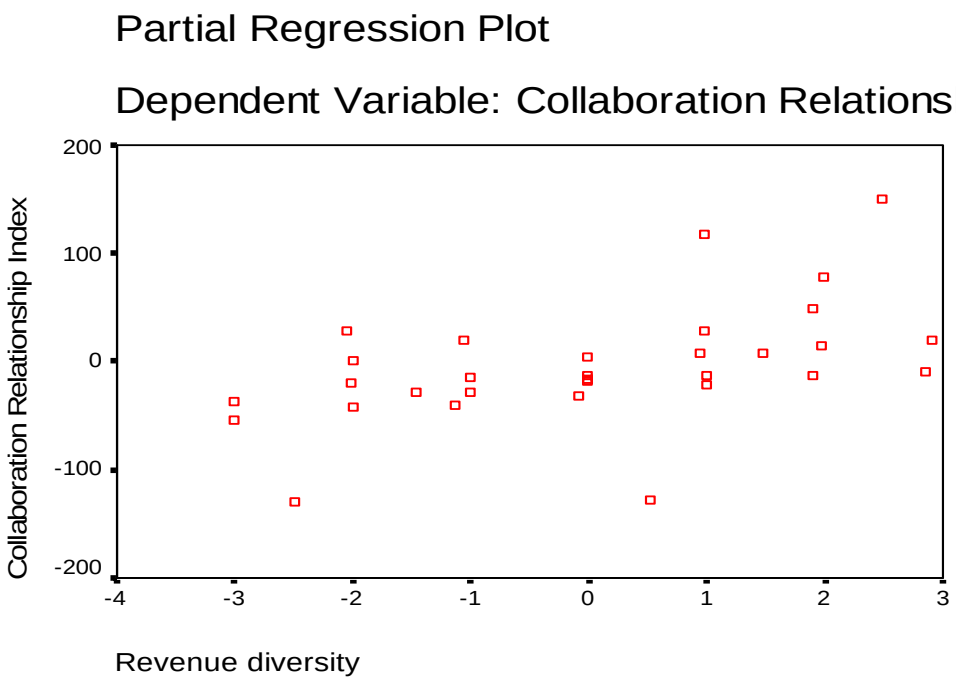
Appendix 10-12)



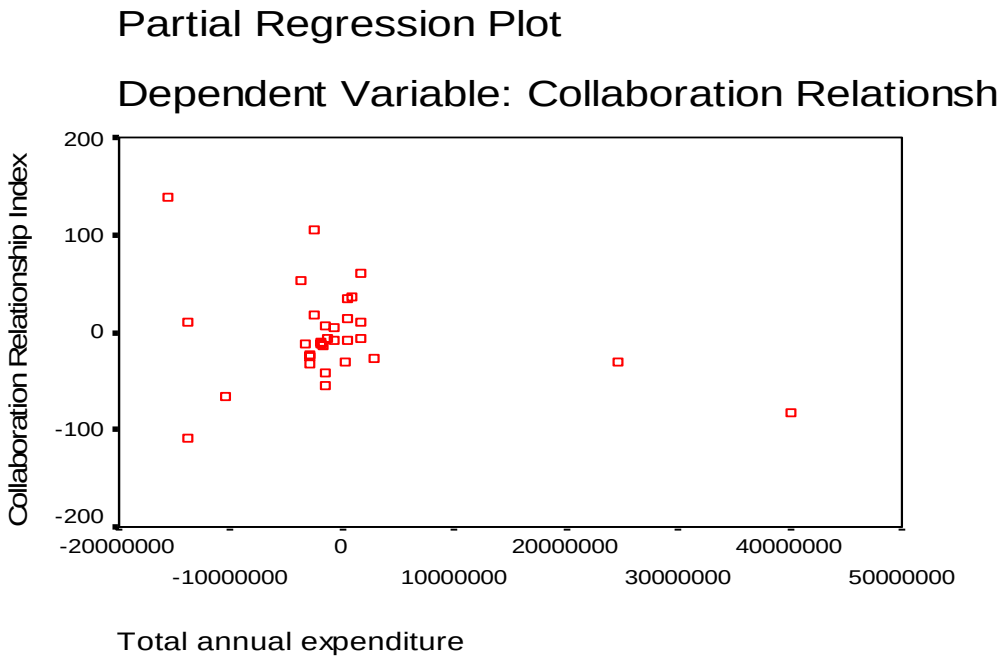
Appendix 10-13)



Appendix 10-14)



Appendix 10-15)



Appendix 10-16) Strategic collaborative relations with business model if Term Removed(a)

Variable		Model Log Likelihood	Change in -2 Log Likelihood	df	Sig. of the Change
Whole model	BUSBOARD	-10.041	2.183	1	.140
	COMREVEN	-11.981	6.064	1	.014
	ADMNEXP	-15.315	12.732	1	.000
	YEAR	-11.762	5.626	1	.018
	REVDIVER	-9.256	.613	1	.434
	PROGDIVE	-16.201	14.503	1	.000
	GOVREVEN	-8.962	.026	1	.871
Best-fit model	COMREVEN	-13.811	7.759	1	.005
	ADMNEXP	-15.537	11.211	1	.001
	YEAR	-12.078	4.294	1	.038
	PROGDIVE	-15.112	10.361	1	.001

a Based on conditional parameter estimates

Appendix 10-17) Strategic collaborative relations with public agency model if Term Removed(a)

Variable		Model Log Likelihood	Change in -2 Log Likelihood	df	Sig. of the Change
Whole model	BUSBOARD	-12.051	.245	1	.620
	COMREVEN	-12.520	1.183	1	.277
	ADMNEXP	-11.966	.076	1	.783
	YEAR	-13.820	3.783	1	.052
	REVDIVER	-13.639	3.421	1	.064
	PROGDIVE	-14.003	4.151	1	.042
	GOVREVEN	-12.437	1.018	1	.313
Best-fit model	COMREVEN	-14.221	3.528	1	.060
	YEAR	-15.241	5.568	1	.018
	REVDIVER	-14.608	4.303	1	.038
	PROGDIVE	-14.829	4.744	1	.029

a Based on conditional parameter estimates

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