

# Collaborative Network Structure for Information Exchange\*,\*\*

- Focusing on 'Settlement Support Program' for North Korean Defectors -

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본 연구에서는 협력 네트워크 차원에서의 북한이탈주민의 정착 지원 프로그램 구조를 살펴보기 위한 연구이다. 북한이탈주민의 누적 인구분포가 지속적으로 증가함에 따라 이를 수용할 수 있는 시설과 프로그램의 필요성이 제기되고 있다. 각 지방정부들은 지역 설정에 맞는 서비스를 제공하기 위해 지역별 사회복지단체와 연대하여 북한이탈주민들의 서비스를 제공하고자 노력하고 있다. 따라서 본 연구에서는 각 협력기관들간의 북한이탈주민들의 정착지원과 관련된 정보교환망의 협력 네트워크 구조를 살펴봄과 동시에 이들의 연계패턴을 분석하고자 한다. 이를 측정하기 위해 네트워크 속성, 네트워크 결속, 중앙성(centrality), 결집집단(cohesion), 구조적 등위성(CONCOR) 등을 살펴보았다. 연구 결과 향후 정보교류 및 제공의 차원에서 보다 나은 서비스 제공을 위해서는 이들의 관계를 재조정할 필요가 있고, 이에 이를 조정할 수 있는 책임있는 기관 및 중재자가 요청됨을 발견하였다. 따라서, 중앙정부, 지방정부, 민간단체, 지역기업 및 사회적 기업 간의 협력 네트워크에 있어 사회통합 모니터링 센터를 중심으로 소통영역, 신뢰영역, 협력영역, 기회 영역별로 정보교환을 원활하게 할 수 있게 구축되어야 한다. 향후에는 정부주도 민간 보조형으로 사회 정착 지원에 상당한 역할을 보완할 필요가 있음을 확인하였다. 따라서 이러한 밀도, 중앙성, 응집성, 구조적 등위성 등을 분석함으로써 북한이탈주민의 정착지원의 네트워크의 중심과 협력성에 대한 정책적 시사점을 도출 및 제안하였다.

**주제어:** 사회연결망분석, 북한이탈주민 정착지원 프로그램, 협력 네트워크

## I. Introduction

By July 2010, accumulated population of North Korean defectors reached 19,391: 6,057 men and 13,294 women(Ministry of Unification, 2011). In 2002, approximately total number of 20,000 North

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Korean defectors is estimated. In 1993, the Act on the Protection and Settlement Support for North Korean Defectors was enacted and it regulated social welfare and settlement support service(establishment of policy goal for North Korean defector's independence). This became the foundation of support for a variety of programs from government and private sector(Ahn, 2010: 14; Kim, 2008: 222; Lee, 2009: 107). Yet, most of North Korean defectors exposed problems with social adjustment (social exclusion and discrimination) due to cultural differences and negative perception of North Korean defectors(Kim, 2003: 64; Park, 2009: 5; Seo, 2009: 77). And it raises the need of settlement support system in order to resolve those issues(J.G Kim and M.J Kim, 1996: 28, Yoon: 2001: 226; Yoon: 2003: 176). Particularly, acceleration of decentralization spurs the collaborative network between central and local government(Kim, 2009: 339). Each local government seeks to collaborate with local welfare center in order to provide the service suitable for the region. The transition from public sector to network entails the discussion over collaborative network and it includes actors from various fields including government throughout the problem solving process.

This study has the following objectives. First, it seeks to identify and analyze the patterns of collaborative network structure for information exchange among the organizations providing settlement support for North Korean defectors. It would be helpful for identifying core organizations with high level of information dissemination capability by empirically verifying the collaborative network system for settlement support model which would facilitate social cohesion. Second, it analyzes the collaboration between central and local government, and government and private sector to illustrate the utility and applicability of collaborative network, using Social Network Analysis(SNA). Third, it would measure density, centrality and cohesion and structural equivalence, and compare it with actual practice. The settlement support system should be improved in order to encourage government taking the initiative and private sector providing assistance. By analyzing density, centrality and cohesion, it would draw policy implications on collaboration and core of network for settlement support of North Korean defectors. To achieve this, this study is composed of three parts.

First, it identifies implications, social cohesion and collaboration network on information exchange after literature review. Second, it reviews the legitimacy of collaborative network structure. Third, summarizing the theoretical implications of collaborative network drawn from the analysis, it addresses the policy implications and its limitations. Social Network Analysis is an emerging research method for identifying connectivity of collaboration network<sup>1)</sup>.

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1) Core of Social Network Analysis is at finding the pattern of relationship and recognizing the implications

## II. Theoretical Review

### 1. Meaning of North Korean defectors in terms of social cohesion

Social cohesion(See Appendix 1) means the integration process of separate groups of individuals as they make an attempt to adjust to each other(Choi, 2010: 104). That is, the task of social cohesion has something in common with social polarization and reduction of poverty. One of the groups experiencing social discrimination or exclusion such as social polarization and poverty is North Korean defectors. As they are exposed to lack of institutional support, disadvantages in job, discrimination, prejudice, and inconsistency between behavior patterns, they became subjects in one of the core project required for social cohesion<sup>2)</sup>. North Korean defectors emerge as an important minority group<sup>3)</sup> in Korea(Kim, 2003: 65). Under Article 2.1 of the Act on the Protection and Settlement Support for North Korean Defectors(Enforcement on 2010. 3. 26, Law No. 10188; Partial revision on 2010. 3. 26), “North Korean defectors” indicate the person who has home, immediate family, spouse and work in North of Military Demarcation Line(North Korea) and has not acquired foreign citizenship after they had left North Korea. Since rapid increase of North Korean defectors in mid 1990’s, China’s strict guard and repatriation, and North Korea’s punishment and inhibitive policy have resulted in the decline of defectors(Yoon, 2003: 66). Yet, massive escape from North Korea is expected due to Korean government’s engagement policy for North Korean defectors, China’s respect for international convention, North Korea’s unstable regime and change in North Korean’s view(Yoon, 2003: 69). Based on such evidences, the number of North Korean defectors are estimated.

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of the pattern since the understanding of embedded behavioral pattern within the relationship among others is needed to comprehend social actors(Faust and Wasserman, 1994).

- 2) Concept of social exclusion was first mentioned at European Social Charter in 1989. In 1997, Amsterdam treaty lists it as one of goals which EU should pursue. Now, policy debate on poverty and inequality is replaced with social inclusion(Lee and Yoon, 2006: 46).
- 3) Minority means the people subject to discrimination and prejudice because of gender, age, physical and mental disabilities, race and ethnicity, religion, ideology, financial means, sexual orientation, religion and any other criteria and values. Minority is inferior in political, economic, and social power(Lee and Yoon, 2006: 44).

&lt;Table 1&gt; Expected number of refugees in case of massive escape from North Korea

Researcher and organization	Expected number	Source	Remark
Jeong woo Lee (Korea Institute for Health and Social Affairs)	2 million	Unification. 97.7.	At the time of unification
Guseop Kim (Korea Institute for Defense Analyses)	4.5 million	Chosunllbo, 97. 1.1	Collapse of North Korea regime
Bundesnachrichtendienst (BND)	6.5 million	Seoul Shinmun, 96. 11. 23	Escape to China
Korea Development Institute	2million	Joongangllbo, 96. 3. 15	After unification
Han seung Sun (Korea Labor Institute)	2 million	Joongangllbo, 95. 7. 6	Lack of institutional suppression
Woo ik Ryu	3 million	Jeong woo Lee's thesis	2-3 years after unification
M.Noland (Institute for International Economy)	9.6 million	Jeong woo Lee's thesis	For 25 years after unification, 40% of North Korean
Korean Government (internal data)	5 million	-	Influx of refugees

※ Source: Yoon, 2003: 69.

## 2. Collaborative Network

The biggest current issue in governance is 'network governance' and it can be found from numerous discussions of scholars. Rhodes describe it as 'New Governance or self organizing networks'(Rhodes, 1997: 51), Thompson defines it as 'management of social coordination and connections within organizations'(Thompson, 1991: 14 24), and Larson illustrates network governance as 'network form of governance' which includes 'prestige, trust, reciprocity and mutual dependence'(Larson, 1992: 76 78). Network governance is an alternative to market and hierarchy, and is a type of governing which provides high quality public service through interactions beyond public, private, and nonprofit organizations. However, there is no empirical evidence although the network type of governance is described as typical and general(Parker, 2007: 113). And lack of empirical and case study makes proper matching with theory difficult despite a number of theoretical discussions. Therefore, application of network to practice is less likely to succeed if a wide range of studies are not accumulated.

Most conspicuous discussions in social science are transition from hierarchy to network(Blatter, 2003: 503), and this pattern appears to contain various actors<sup>4)</sup> formation and management of

4) Laurence mentioned the various actors include local public servants, nonprofit organizations and private corporations.

complex network through collaboration, network and partnership. It is mostly found in social welfare service(Heinrich, Hill, and Laurence, 2001: 1). Hence, social welfare centers seek to collaborate with local corporations or entrepreneurs in order to enhance service delivery and resolve financial issues. This is public service delivery through network among local level of public, private and nonprofit organizations and it can effectively satisfy local citizen's expectations. Government's management scheme is a form of network and multiple levels of actors are required. However, network cannot simply be regarded as a form and structure when it is viewed as coordination mechanism. In this case, horizontal coordination and opinion exchange among partners are required. This coordination mechanism is necessary for process of decision making<sup>5)</sup> and it is a significant element of governance. Still, the study on network coordination is still scarce and it cannot help resolve network management issue in the working level. Social welfare service includes different elements and these elements appear to be intertwined altogether when the service is delivered. Particularly, social welfare service for North Korean defectors entails issues such as education, environment, personality and disease and these require expertise knowledge.

Apparently, these problems cannot be handled respectively, and fundamental service for North Korean defectors can be delivered when school, hospital and cultural space are provided as welfare service. Therefore, government in hierarchical form is less likely to deliver complex social welfare service successfully. When social welfare centers, hospitals, and government agencies appear to be in network form, issues of complexity and variety are likely to be resolved.

### 3. Settlement Support Program for North Korean Defectors

North Korean defectors are included in Korea's administration system as they enter Korea. Support for North Korean defectors is provided by central and local governments. Religious groups, citizens, local welfare centers and group of expertise around the defector's residence would assist government providing settlement support(Yoon, 2003: 75-76). Especially, 'Local committee for supporting North Korean defectors' is established by participation of expertise group and it creates detailed plan for North Korean defectors' settlement in local community. That is, central government takes initiative in overall support from North Korean defectors. Local government provides assistance for central government's activity and supports local welfare center. And its

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5) G. Stoker(1993) mentioned in his article that governance bring changes in existing rule and guides group actions to right directions(Stoker, 1998: 17), and it also implies that it is important to bring changes in coordination mechanism.

relation triggers private support. There are three steps in administrative support for North Korean defectors: Entry to South Korea → Protection by facilities → Protection of residence and post care.

<Table 2> Administrative support steps for North Korean defectors: Settlement Support Program<sup>6)</sup>

Classification	Organization	Detail
Entry to South Korea	Diplomatic offices → Ministry of Unification → Ministry of Unification, National Intelligence Service → Ministry of Unification, National Intelligence Service	- Diplomatic offices: Protection request for recipients - Ministry of Unification: Report - Ministry of Unification, National Intelligence Service: Temporary protection measures, fact relevance study, protection decision
Protection by facilities	<p>■ Supporting Entity</p> <ul style="list-style-type: none"> <li>- Ministry of Unification (Hanawon)</li> <li>- Ministry of National Defense (DaesungGongsa)</li> <li>- Vounteering organizations DaesungGongsa→Hanawon (Social adjustment program for North Korean defectors: 2 months)</li> </ul>	<ul style="list-style-type: none"> <li>- DaesungGongsa: Examination of identity of North Korean defectors and motivation for escape from North Korea</li> <li>- Hanawon(focusing on early settlement support): Hanawon social adjustment training(12 weeks)                             <ul style="list-style-type: none"> <li>① Counseling, social adjustment training, job training, social transition and stabilization support(employment and ID card)</li> <li>② Settlement support fund, housing, fundamental information for health insurance registration, recognition of academic background</li> </ul> </li> </ul>
Protection of residence and post-care	<p>■ Supporting Entity</p> <ul style="list-style-type: none"> <li>- General Administration: Ministry of Unification</li> <li>- Partial assistance in residence: Local governments</li> <li>- Private participation: North Korean Refugees Foundation, Korean Educational Development Institute Network, Rainbow Youth Center, Gayang7 Welfare Center, Galsan Welfare Center, Gaegeum Welfare Center, Gongneung Welfare Center, Education &amp;Welfare Institute, Gunja Welfare Center, Ggumsari Community, Naresha, Together Korea, Daegu KYC, Daegu YWCA, The Republic of Korea National Red Cross Seoul chapter, Dukyu Welfare Center,</li> </ul>	<p>■ Policy Support</p> <ul style="list-style-type: none"> <li>① Residence: Early settlement support(financial support, housing, partnership, recognition of academic background, entering school, and acknowledgment of qualifications and experiences)</li> <li>② Supporting entity: Ministry of Unification, Supporting committee, Private organizations</li> </ul>

6) General task is conducted by the Ministry of Unification, and this 3 step classification is created to clarify scope of work and responsibility. Concrete program details are designated for Hanawon which was founded in July, 1999.

&lt;Table 2&gt; Administrative support steps for North Korean defectors: Settlement Support Program(continue)

Classification	Organization	Detail
Protection of residence and post-care	Northeast Asia Peace Movement, Durihana, Madeul Welfare Center, Myunglyoon Welfare Center, Mokpo Welfare Center, Molundae Welfare Center, Banghwa6 Welfare Center, Bubdong Welfare Center, Busan YWCA, Busan Social Welfare Center, Network for North Korean Democracy and Human Rights, Citizens' Alliance for North Korean Human Rights, Database Center for North Korean Human Rights, Sangli Social Welfare Center, Gathering for one and new country, SaemaulUndong Branch for North Korea 5 provinces, Ssangyong Welfare Center, Saengmyeong Welfare Center, SeoseoulLifeLine, The Republic of Korea National Red Cross Volunteer's Association, The Republic of Korea National Red Cross Volunteer's Association - Jeju chapter, The Republic of Korea National Red Cross Gyeongnam chapter, Jeonju YWCA, The Republic of Korea National Red Cross Chungbuk chapter, Urim Welfare Foundation, Pyeongtaek Youth Community Center, Gyeongbuk Immigrants Center, Gangwon Branch of Korea Freedom Federation, Donghae region self-support center, Institute of Counseling for Youth and Family in Korea, Center for North Korean Defectors, Ulsan Jung-gu Welfare Center, North Korea Refugee Youth Center, Multicultural Youth Center, Ministry of Gender Equality and Family, National Youth Center of Korea, Pyeongchang National Youth Center, Korea Youth Counseling Institute, The National Council of Youth Organization in Korea, The Korea Association of Youth Center (Total 55 organizations)	<p>③ Residential protection: Self-establishment support(financial aid, job training, educational support(tuition fee, tax)), medical care, job support, protection of identity and residence Supporting entity: Ministry of Unification, Officer for residential protection, Ministry of Labor, Police, and local organizations</p> <p>④ Post-care: Prevention of maladjustment and support for resocialization (changes examined, cope with claims, aid through supporting committees and private organization (counseling, foundation of business, partnership etc.), partnership, scholarship, counseling support Supporting Entity: Officer for residential area, North Korean Refugees Foundation, Private organizations committee etc.</p> <p>■ Private Participation (Partnership with supporting committee and private organizations):            - Settlement Assistance: partnership with volunteers            - Support via North Korean Refugees Foundation and private organizations</p>

※ Source: Lee, 2009: 1155; Yoon, 2003: 74 75; Yoon, 2009: 63

### III. Research Design

#### 1. Analytical Method: Social Network Analysis(SNA)

Network Analysis is utilized in a number of academic fields including social science, natural

science such as physics and biology, and biological science such as medical science(Kim, 2009). As information society emerges, accumulation of electronic information has been accelerated and it sparked dissemination of information. Yet, velocity and dissemination effect vary by relationship. Network analysis pays attention to linkages of social entities and implications of the linkages. Social entities are generally mentioned as actor, and it can be classified individual, corporate or collective social units.<sup>7)</sup> The biggest advantage of network analysis is that it enables modeling of integrated units of actors as relations(Faust and Wasserman, 1994: 3-4).<sup>8)</sup>

Hence, network analysis is useful for analyzing government service and public private collaboration service. Recently, it has been applied to analyze public service delivery by co production and contracts between local governments, relationship between nonprofit organization and government and network among local childcare center(Kim et al., 2007; Park, 2006; Park, 2009). Therefore, patterns shown in social network indicates the relationship that has been formed. In such case, density, centrality and cohesion of the network can be identified.<sup>9)</sup>

## 2. Research Objects and Data Collection

There are ego centric network and full network design for estimating the scope of related data for network analysis(Hannerman and Riddle, 2005; Park, 2009: 15). Full network has advantage of perfect mutual relationship of all organizations. However, it can make research difficult in case of studying webpage link since the number of organizations connected may be unlimited. Ego centric network measures relationship only so that it is appropriate for analyzing and studying links.

This study first examines the three major organizations (North Korean Refugees Foundation,

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7)For instance, person within the organization, department within corporate, public agencies within city or individual country within international organizations. The term “actor” does not mean the one who has capability or will to act. Moreover, most of social network application focuses on the collection of similar type of actors. It is called one mode networks. However, other methods enable analysis in different levels or types by different sets.

8) Wasserman and Faust(1994: 4) mentions relationship among systems of actors and defines system as ties among classified actors.

9) Density implies the level of connectedness among network actors, and describes the number of relationship which all members within network has formed. Perfect density means that all nodes are mutually connected to one another(Chae, 2009: 152). That is, level of density is determined by the number of links connected to nodes. Centrality of network implies that the node locating at the center is more likely to exhibit high level of participation in network(Leavitt, 1951). It indicates that the network at the center shall be influential to other actors. Cohesion describes the nodes with high level of mutual connections.

Korean Educational Development Institute Network, and Rainbow Youth Center) responsible for welfare service of North Korean defectors. Second, it searched for other organizations which have relationship with the ones linked to three major organizations. Total 55 organizations are found after two steps of organization review.

That is, this study explored web links appeared in the webpage of North Korean Refugees Foundation, Korean Educational Development Institute Network, and Rainbow Youth Center. It means that data unit is organization and the organization for the study is limited to the ones directly and indirectly related to three major organizations(on the web). There is no change in unit of analysis from January, 2010 to early October, 2010. Data had been collected from September 25, 2010 to October 15, 2010.

**<Table 3> Organizations to be analyzed: Total 55 organizations participating in information exchange for 'settlement support system'**

Main Organizations (Core)	List of Organizations (Total 55)
North Korean Refugees Foundation, Korean Educational Development Institute Network, and Rainbow Youth Center (Public / Private / Research institute)	North Korean Refugees Foundation, Korean Educational Development Institute Network, Rainbow Youth Center, Gayang7 Welfare Center, Galsan Welfare Center, Gaegeum Welfare Center, Gongneung Welfare Center, Education &Welfare Institute, Gunja Welfare Center, Ggumsari Community, Naresha, Together Korea, Daegu KYC, Daegu YWCA, The Republic of Korea National Red Cross Seoul chapter, Dukyu Welfare Center, Northeast Asia Peace Movement, Durihana, Madeul Welfare Center, Myunglyoon Welfare Center, Mokpo Welfare Center, Molundae Welfare Center, Banghwa6 Welfare Center, Bubdong Welfare Center, Busan YWCA, Busan Social Welfare Center, Network for North Korean Democracy and Human Rights, Citizens' Alliance for North Korean Human Rights, Database Center for North Korean Human Rights, Sangli Social Welfare Center, Gathering for one and new country, SaemaulUndong Branch for North Korea 5 provinces, Ssangyong Welfare Center, Saengmyeong Welfare Center, Seoseoul LifeLine, The Republic of Korea National Red Cross Volunteer's Association, The Republic of Korea National Red Cross Volunteer's Association - Jeju chapter, The Republic of Korea National Red Cross Gyeongnam chapter, Jeonju YWCA, The Republic of Korea National Red Cross Chungbuk chapter, Urim Welfare Foundation, Pyeongtaek Youth Community Center, Gyeongbuk Immigrants Center, Gangwon Branch of Korea Freedom Federation, Donghae region self-support center, Institute of Counseling for Youth and Family in Korea, Center for North Korean Defectors, Ulsan Jung-gu Welfare Center, North Korea Refugee Youth Center, Multicultural Youth Center, Ministry of Gender Equality and Family, National Youth Center of Korea, Pyeongchang National Youth Center, Korea Youth Counseling Institute, The National Council of Youth Organization in Korea, The Korea Association of Youth Center (Total 55 organizations)

### 3. Data Analysis and Estimation of Network(Indicators)

In this study, it seeks to estimate unity<sup>10)</sup> of full network, centrality, cohesion and structural equivalence. Degree, inclusiveness and density are used to estimate unity of network. Degree is defined as the number of other nodes which one node is connected to. If an organization has links with multiple organizations, it is high in degree. This type of organizations has better accessibility to resources and plays a significant role in information flow.

First, inclusiveness is the rate of the number of linked nodes to total number of nodes. In this research, all the nodes are connected within network which means that inclusiveness is 1 for all. Hence, it will not be used for analysis at this time. Density means the rate of the number of relationships formed to the number of all possible relationships. As network expands, nodes that are not linked are likely to increase. That is, density is inversely proportional to the numbers of organizations in the network.

Second, closeness centrality is defined as minimum combination of links in order to reach other nodes from one node in network. Closeness is low as the nodes are located at the center of network. In this study, centrality is estimated by taking a look at closeness centrality and betweenness centrality. Closeness centrality considers both direct and indirect connections with other actors in the network. The actor with high closeness centrality means that it is located the closest to all other actors(Park, 2006: 708; Wasserman and Faust, 1994).

Third, betweenness centrality indicates the specific actor's level of mediator or bridge of information dissemination among other actors in the network(Son, 2005). It means that the actor may work as a mediator since it is a medium of information dissemination in the network. Betweenness centrality helps identify the actor in charge of conflict management or arbitration among organizations.<sup>11)</sup>

Fourth, equivalence is to analyze correlation in order to draw inter organizational pattern. Organizations with high correlation can be grouped together, and the organizations in the same

10) Most renowned indicators for network unity is density, degree, and inclusiveness, etc(Kim, 2007: 37).

11) Kim(2007: 42-43) mentioned that multiple geodesic paths can exist in betweenness centrality.  $\sum_i^N \sum_j^N g_{ij}$

indicates the number of geodesic path linking the node i and j. Node m represent the probability of lying on the geodesic path between i and j. If there are multiple geodesic path linking i and j and they are indiscriminate, probability of paths to be used is the same. So, the probability of using path where m appeared is  $1/g_{ij}$ . Denominator,  $\frac{1}{(N^2 - 3N + 2)/2}$  is divided by the maximum value of numerator in

order to normalize the indicator.

group can be interpreted as structurally equivalent.

Fifth, cohesion demonstrates how organizations are separated and connected. That is, it gives clues on identifying the features of network structure as it shows the number of groups in the full network, redundancy among organizations and size of groups.

There are several methods to bind members into subgroups depending on whether they have formed relationship or not. However, the organizations with direct and indirect path to others indicate high cohesion. <Table 4> shows estimation objects and indicators used in this study.

<Table 4> Estimation Objects and Indicators for Network

Estimation Objects	Estimation Indicators
Link Structure Analysis	Degree, Density
Centrality Analysis	Closeness Centrality, Betweenness Centrality
Role Structure Analysis	Structural Equivalence
Cohesion Analysis	Component

## IV. Analysis Outcome

### 1. Network Unity: Degree Analysis

<Table 5> shows the result of estimating network unity. Among 55 organizations, the most popular organization is the National Council of Youth Organization in Korea. Although it did not have any links with others, there are 5 organizations which desire to form relationship with this organization. It means that it has great potential to draw influences within network. The organization with high in-degree and out-degree was North Korean Refugees Foundation which also had the biggest ego network. North Korean Refugees Foundation seems to maintain mutual links with other organizations quite well.

<Table 5> Rank by in-degree and out-degree

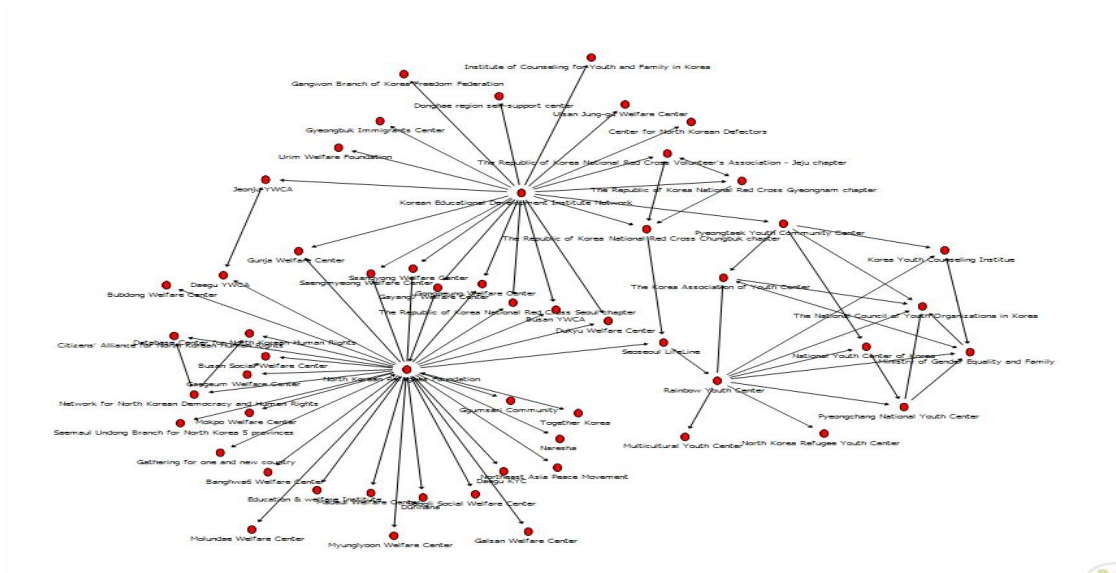
Organization	In-Degree	Organization	Out-Degree
National Council of Youth Organization in Korea	5	North Korean Refugees Foundation	32
North Korean Refugees Foundation	4	Korean Educational Development Institute Network	20
Ministry of Gender Equality and Family	3	Rainbow Youth Center	8
The Republic of Korea National Red Cross Volunteer's Association - Jeju chapter	3	Pyeongtaek Youth Community Center	4

<Table 5> Rank by in-degree and out-degree(continue)

Organization	In-Degree	Organization	Out-Degree
The Republic of Korea National Red Cross Chungbuk chapter	3	Ministry of Gender Equality and Family	3
Korea Youth Counseling Institute	3	The Republic of Korea National Red Cross Volunteer's Association - Jeju chapter	2
The Korea Association of Youth Center	3	The Republic of Korea National Red Cross Chungbuk chapter	2
Gayang7 Welfare Center	2	The Korea Association of Youth Center	2
Gongneung Welfare Center	2	The Republic of Korea National Red Cross Gyeongnam chapter	2
Gunja Welfare Center	2	Pyeongchang National Youth Center	2
Daegu YWCA	2	Network for North Korean Democracy and Human Rights	2
The Republic of Korea National Red Cross Seoul chapter	2	-	-
Dukyu Welfare Center	2	-	-
Busan YWCA	2	-	-
Busan Social Welfare Center	2	-	-
Citizens' Alliance for North Korean Human Rights	2	-	-
Database Center for North Korean Human Rights	2	-	-
Ssangyong Welfare Center	2	-	-
Saengmyeong Welfare Center	2	-	-
SeoseoulLifeLine	2	-	-
The Republic of Korea National Red Cross Gyeongnam chapter	2	-	-
Jeonju YWCA	2	-	-
National Youth Center of Korea	2	-	-
Pyeongchang National Youth Center	2	-	-

※ Organizations with less than 1 in in-degree and out-degree are excluded.

In case of the Ministry of Gender Equality and Family, it marked 4 in in-degree and 3 in out-degree which is relatively high. It implies that it can work as an important bridge for support service as only government agency in the network.



<Figure 1> Information Exchange Network Structure of Settlement Support Service for North Korean Defectors

## 2. Centrality Analysis<sup>12)</sup>

### 1) Closeness centrality

<Table 6> summarizes analysis outcome on closeness centrality. Average in closeness is 0.058 and average out-closeness is 0.057 which are quite similar to each other. Standard deviation of out-closeness is 0.122 which is higher than 0.024. It means that discrepancy between estimated values of out-closeness is higher. Even when comparing differences between maximum and minimum value, distribution of in-closeness appears to be more widely spread (in-closeness: 0 and 0.124, out-closeness: 0 and 0.544).

<Table 6> Overall Summary of Estimation of Closeness

Type	Estimation	
	In-Closeness	Out-Closeness
Mean	0.058	0.057
Standard Deviation	0.024	0.122
Minimum Value	0	0
Maximum Value	0.124	0.544
Network Closeness Index	0.133%	0.309%

12) In order to discuss centrality, analysis of closeness and betweenness was conducted.

There was no where exhibiting consistency in the rank of in-closeness and out-closeness. For in-closeness, National Council of Youth Organization in Korea ranked the highest(0.124), secondly, the Ministry of Gender Equality and Family(0.11), and followed by National Council of Youth Organization in Korea and Korea Youth Counseling Institute(0.107). However, North Korean Refugees Foundation has the highest out-closeness(0.544) and followed by Korean Educational Development Institute Network(0.461). It illustrates that information and resource is not coming intensively into one organization. Rather, they seem to share different direction and core organization so that it resulted in the formation of diversified networks<sup>13)</sup>.

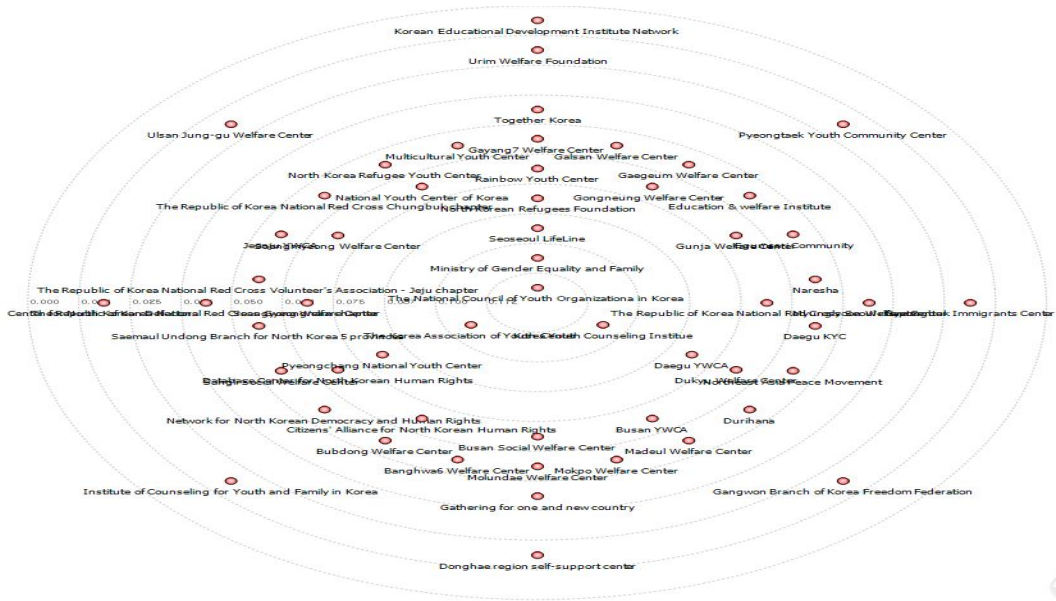
<Table 7> Individual Summary of Estimation of Closeness Centrality

Organization	In-Closeness	Out-Closeness	Total
National Council of Youth Organization in Korea	0.124462	North Korean Refugees Foundation	0.544444
Ministry of Gender Equality and Family	0.11025	Korean Educational Development Institute Network	0.461538
The Korea Association of Youth Center	0.107744	Gayang7 Welfare Center	0.323432
Korea Youth Counseling Institute	0.107744	Gathering for one and new country	0.323432
		Myunglyoon Welfare Center	0.323432
		Together Korea	0.323432
		Rainbow Youth Center	0.148148

※ Organization with total closeness less than 0.1 is excluded.

<Figure 2> shows the most influential organizations from the center of circle based on the closeness centrality. That is, National Council of Youth Organization in Korea is the highest in closeness centrality followed by the Ministry of Gender Equality and Family, The Korea Association of Youth Center, and Korea Youth Counseling Institute.

13) In closeness means connecting from outside into the center while out closeness means connecting the center to the outside.



<Figure 2> Estimation of Closeness

2) Betweenness

Average of betweenness centrality is 0.003 which is very low. It means that entire nodes do not have betweenness and it is rare to find the organization which is able to work as a mediator. Minimum value was 0 and maximum value was 0.064. When estimating betweenness centrality from all organizations, only 14 organizations showed estimation value. Betweenness centrality of North Korean Refugees Foundation is 0.6499, which is almost the three times of 0.026, the second highest. Second and third highest organization's value was 0.0262 and 0.0258, which were quite similar to each other.

<Table 8> Overall Summary of Estimation of Betweenness Centrality

Type	Estimated Value
Mean	0.003
Standard Deviation	0.012
Minimum	0
Maximum	0.064
Betweenness of network nodes	0.098%

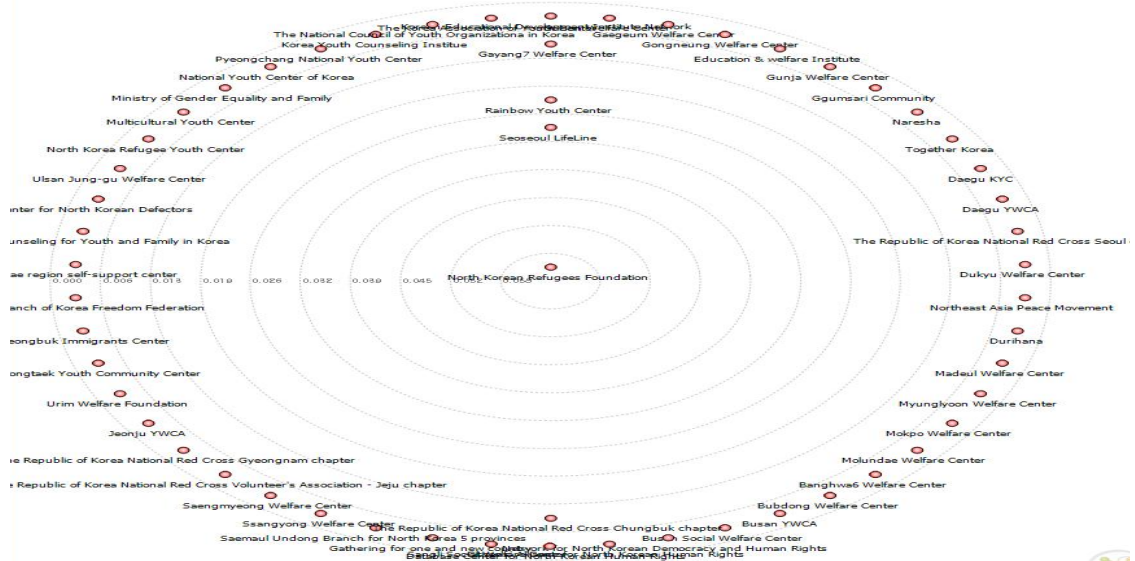
North Korean Refugees Foundation is outstanding as a mediator, also SeoseoulLifeLine and Rainbow Youth Center also has high betweenness centrality. It means that total 3 organizations

can work as mediators in the full network and they are expected to make contribution to expansion and vitalization of network.

<Table 9> Betweenness Centrality of Each Organization (organization with 0 betweenness excluded)

Rank	Organization	Betweenness Centrality
1	North Korean Refugees Foundation	0.06499
2	Seoseoul LifeLine	0.026205
3	Rainbow Youth Center	0.025856
4	Korea National Red Cross Chungbuk chapter	0.008386
5	Gayang7 Welfare Center	0.008036
6	Ministry of Gender Equality and Family	0.002446
7	Pyeongtaek Youth Community Center	0.002096
8	Daegu YWCA	0.001747
9	Pyeongchang National Youth Center	0.001398
10	National Youth Center of Korea	0.000699
11	The Korea Association of Youth Center	0.000349
12	Korea Youth Counseling Institute	0.000349
13	Jeonju YWCA	0.000349
14	The Republic of Korea National Red Cross Volunteer's Association - Jeju chapter	0.000349

Visualization of betweenness centrality is presented in <Figure 3>. North Korean Refugees Foundation is placed at the center of circle followed by SeoseoulLifeLine and Rainbow Youth Center. Other organizations are placed at the periphery.



<Figure 3> Visualization of Betweenness Centrality

### 3. Component Analysis

Total 3 communities are observed after community analysis. Total number of organizations in each group was 5, 5, and 3. Each group did not account for more than 10% of total number of organizations. However, each group presented high density: C1(0.4), C2(0.3), and C3(0.833).

<Table 10> Component Analysis Outcome

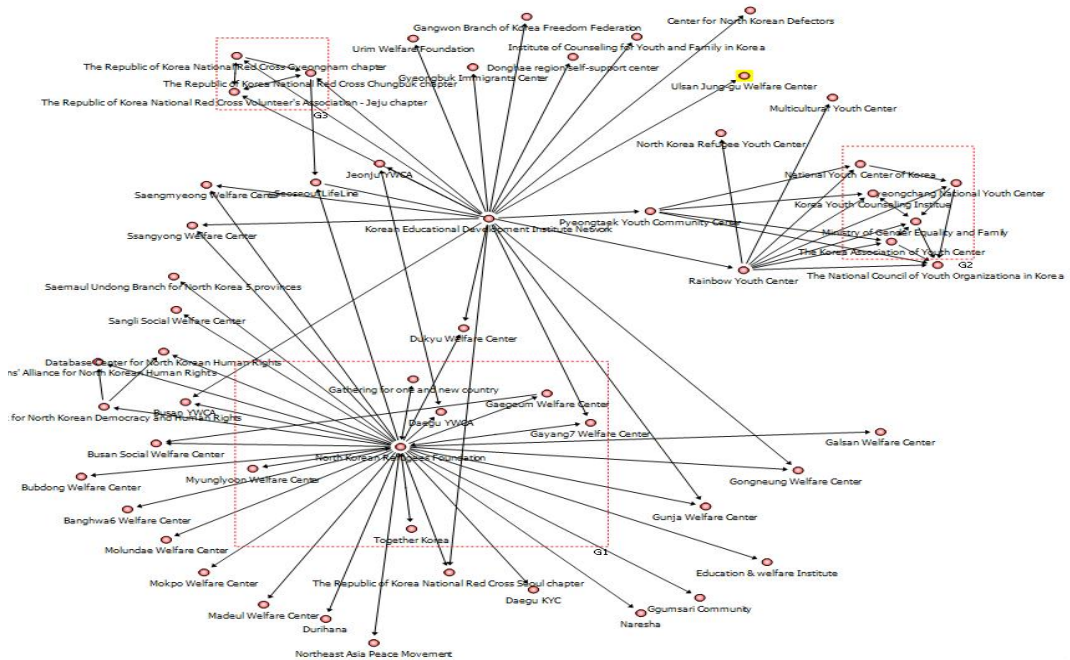
Components	Size	Percent	Density
C1	5	9.091%	0.4
C2	5	9.091%	0.3
C3	3	5.455%	0.833

<Table 11> presents the composition of each component. Component 1 consists of North Korea Refugees Foundation, Gayang7 Welfare Center, Together Korea, Myunglyoon Welfare Center and Gathering for one and new country. Component 2 is made up of the Ministry of Gender Equality and Family, Pyeongchang National Youth Center, National Youth Center of Korea, Korea Youth Counseling Institute, and The Korea Association of Youth Center. Component 3 is composed of The Republic of Korea National Red Cross Volunteer's Association Jeju chapter, The Republic of Korea National Red Cross Gyeongnam chapter, and The Republic of Korea National Red Cross Chungbuk chapter.

<Table 11> Component and its composition

Component	Composition
C1	North Korea Refugees Foundation, Gayang7 Welfare Center, Together Korea, Myunglyoon Welfare Center, Gathering for one and new country
C2	Ministry of Gender Equality and Family, Pyeongchang National Youth Center, National Youth Center of Korea, Korea Youth Counseling Institute, The Korea Association of Youth Center
C3	The Republic of Korea National Red Cross Volunteer's Association - Jeju chapter, The Republic of Korea National Red Cross Gyeongnam chapter, The Republic of Korea National Red Cross Chungbuk chapter

Average density is the highest in Component 3. However, Component 1 is deemed to be the most influential among others since it contains North Korean Refugees Foundation which is the highest in ego network and centrality. Component 3 is high in density so that mutual linkage is likely to be high. If it plays a central role in the network, it will help spur the growth of network. Network with classified components is presented in <Figure 4>.

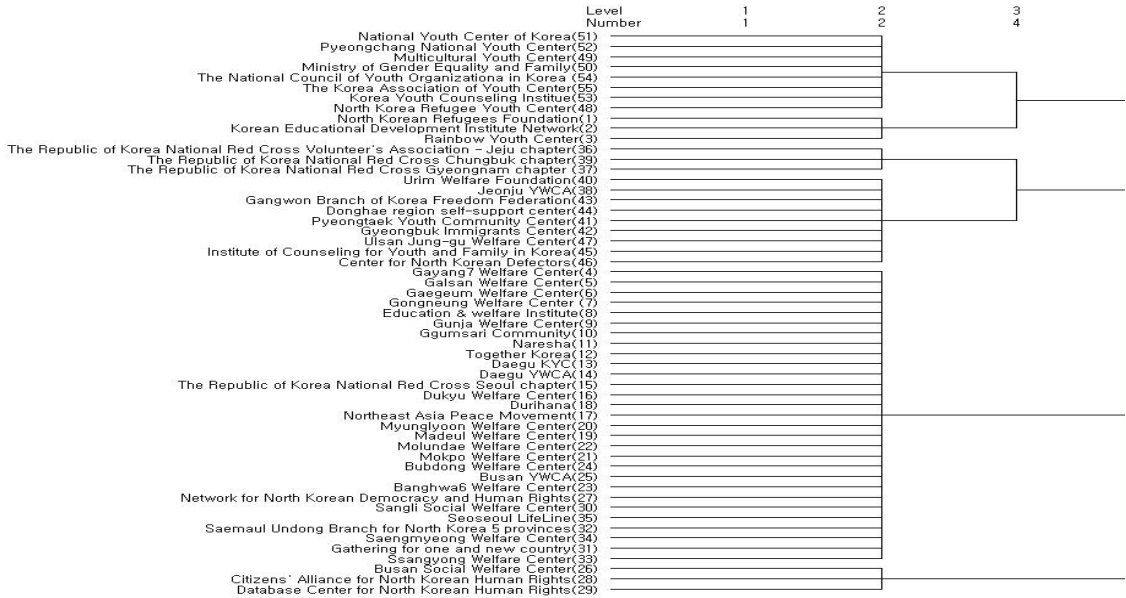


<Figure 4> Sociogram with Components

#### 4. Role Structure Analysis: Equivalence Analysis

Structural equivalence is to group the nodes which share the same relationship. The same relationship means sharing the same role. Structural equivalence measure the similarity of relationship by comparing rows and columns of nodes<sup>14)</sup>. Structural equivalence systemically describes what kind of relationship exists between grouped blocs(Son, 2008: 148). This study used CONCOR adopting correlation in order to estimate similarity and redundancy. Structurally equivalent relationship means that the relationship with similar structural position and the role. It groups the actors in the similar position and describes the relationship between the groups. Roles indicate similarity or redundancy. As a result, structurally equivalent groups can be identified by 6, 4, and 2 organizations each. The fact that the size of group with high correlation is small implies information exchange among limited number of organizations. And it hinders collaborative network structure. In such structure, information exchange is easily disrupted or biased so that each group cannot function properly.

14) Regular equivalence is to see if the nodes with similar roles have similar relationship as well.

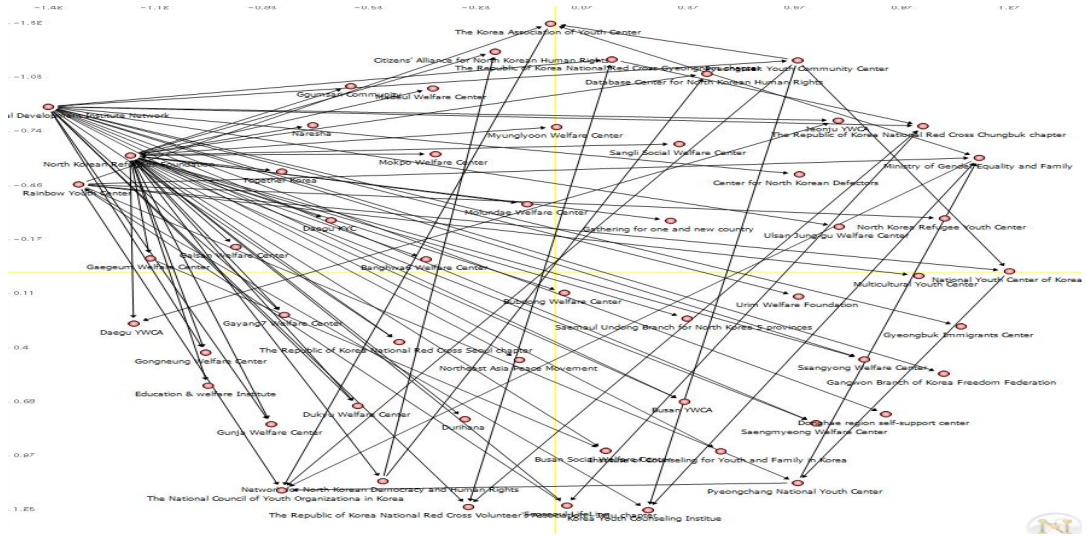


<Figure 5> Blocs in Dendrogram

### 5. Simulation Analysis using Scale-Free<sup>15)</sup>

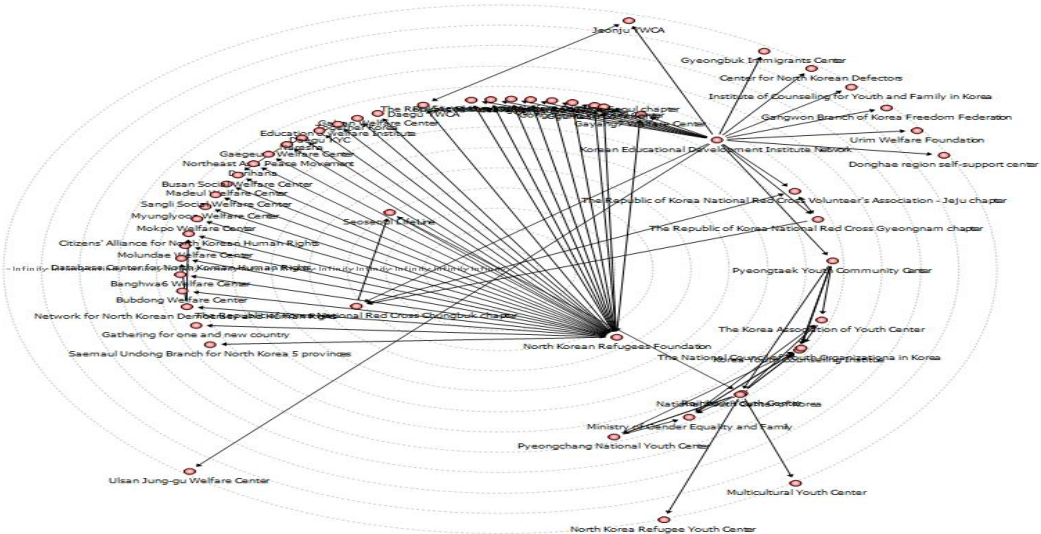
<Figure 6>, <Figure 7> shows the outcome of simulation for expansion of links. As time goes on, there are increased connections between the nodes at the center and the ones far from the center. Particularly, there are multiple connections around North Korea Refugees Foundation, Gayang7 Welfare Center, Korean Educational Development Institute Network, and Rainbow Youth Center. Moreover, not only the nodes at the center, but the ones at the periphery are evolved as well. It indicates the high feasibility of support program due to high connectivity in network.

15) Scale Free realizes social network for expansion of connectivity regardless of scope. It is based on common rules obtained by numerous trials of social network analysis. It continues connectivity at random as time goes on.



<Figure 6> 2D Simulation Analysis Outcome

If we suppose the continuation of service for North Korean defectors, there would be great increase in mutual connectivity and the network would evolve in multi directions. Current networks appear to be highly developed; however, measures or long term strategies are required in order to prevent the lowering of connectivity due to disappearance of core organizations. Also, it is expected that policy would be effective when the network is well developed based upon high connectivity among core organizations.



<Figure 7> Circular 2D Simulation Analysis

## V. Conclusion: Policy Suggestion

This study seeks to see ego network features of three organizations(North Korea Refugees Foundation, Korean Educational Development Institute Network, and Rainbow Youth Center) providing 'settlement support program'. It analyzes density, centrality, and components of network in order to see how information exchange network for supporting North Korean defectors is structured. As a result, the following policy implications are drawn.

First, the role of three core organizations should be equivalent in order to provide suitable and consistent settlement support program. While North Korea Refugees Foundation exhibits high level of density and betweenness centrality, Korean Educational Development Institute Network and Rainbow Youth Center are relatively less influential in the network. Therefore, their relationship needs to be re coordinated to provide better service and exchange information in the future. In order to achieve this, mediating agency or actor is in need. In this point of view, Presidential Committee on Social Cohesion is appropriate for taking the lead role as a mediator since it can do evaluation on coordination of tasks and budget without direct participation in the affairs.

Second, if the unity of small groups(such as components) is enhanced, work efficiency would be improved by dissemination of information from the center of network(North Korea Refugees Foundation, Korean Educational Development Institute Network and Rainbow Youth Center). That is, if the core organizations form organic relationship, large scale of support network for North Korean defectors would be flexible and maintain strong connectivity. It is found in the network analysis that small organizations got together and formed 3 to 5 networks. And if they gathered first, it is highly likely to raise connectivity.

Lastly, it is important to increase the number of groups with high structural equivalence in order to encourage efficient information exchange. In the collaborative network structure, information exchange is not easily biased or disrupted. Taking this advantage, collaborative network system has to be established with an effort to assign the similar jobs to similar organizations. Also, the organizations located at the center of network appear to have multi directional connections which enable providing flexible services. It also tells that external core organization(such as Presidential Committee on Social Cohesion) is needed.

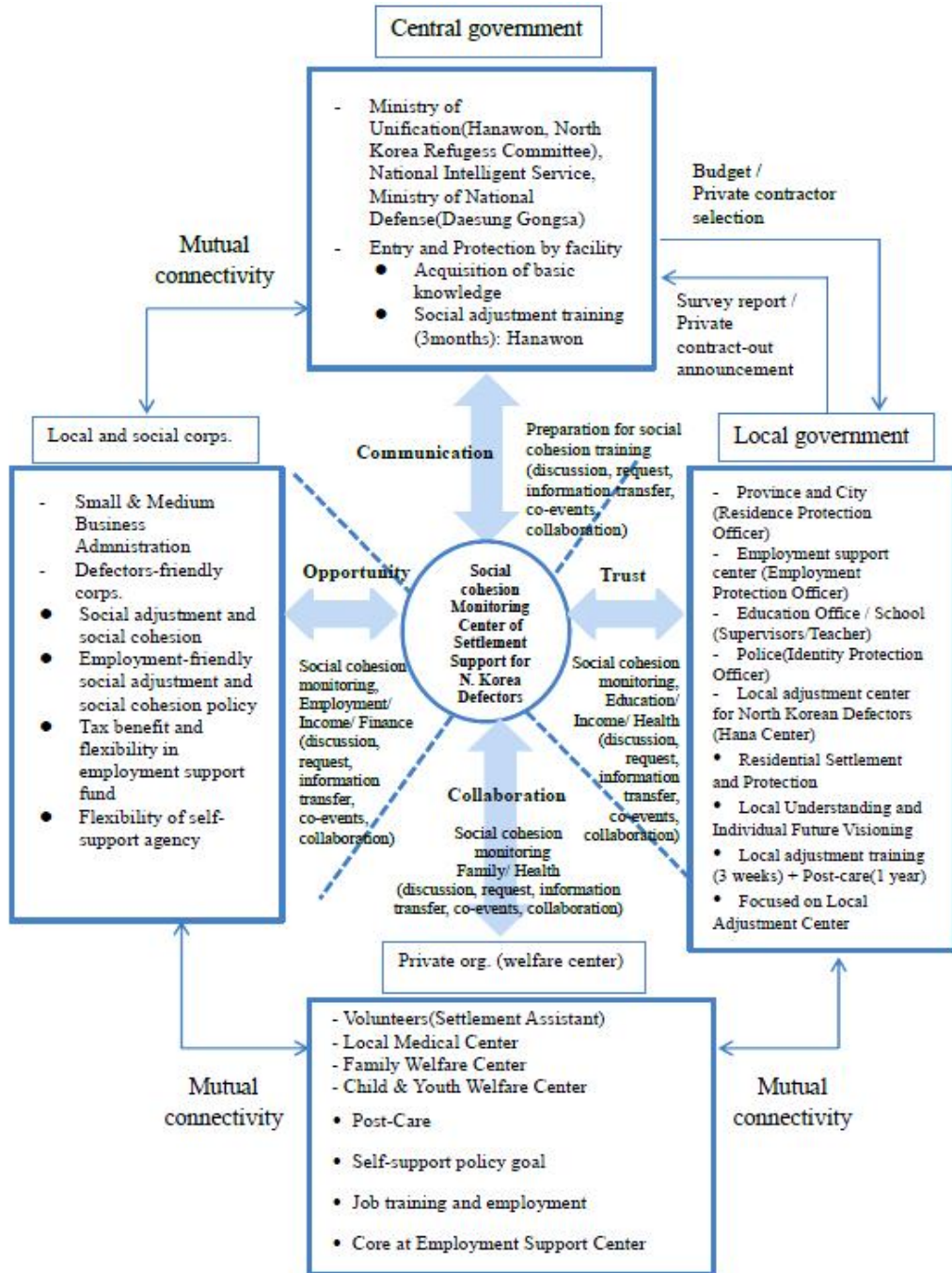
Based upon the aforementioned discussions, social cohesion monitoring centers as collaborative network for settlement support is presented in <Figure 8><sup>16)</sup>. In the network among central and

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16) Ministry of Unification(2001: 6), Lee(2009: 112), Choi(2010: 185), Seo(2009: 94), Lee(2009: 69), Roh(2009: 18), Roh et al.(2009), Choi(2008: 234) and National Information Society Agency(2009: 10).

local government, private organization, and local and social corporations, information exchange of communication, trust, collaboration and opportunity should be vitalized around social cohesion monitoring center. The reason is, first, collaborative network for information exchange among collaborating organizations should be realized based upon core areas of social cohesion policy(Roh, 2009). Second, asymmetry in information exchange should be resolved and opinion gathering, expansion of job opportunities and social adjustment for North Koreans should be systemically established under the supervision of executive agencies. Lastly, it will exploit the opportunities for concrete implementation of social cohesion in the long term.

However, this study contains the following limitations despite a number of significant implications. First, research data is based upon the webpage member so that details on the organizations could not be utilized. Hence, it is suggested that it is worthy taking survey from all the collaborating agencies including 19 ministries and bureaus in order to study the views of actors and detailed collaborative pattern. Also, ego network analysis is limited to webpage analysis. So, the study on the whole network is additionally requested in order to discover the relations among all agencies working on the settlement support for North Korean defectors.



<Figure 8> Establishment of Collaborative Network on Information Exchange for Social Cohesion: Establishment Plan with Social Cohesion Center as Core Organization for Settlement Support of North Korean Defectors(See also <Appendix 2>)

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<Appendix 1> Various terms and definitions related to social cohesion

Term	Definition
Social inclusion	<ul style="list-style-type: none"> <li>- State of institutional barriers removed which disrupts the opportunities for individual or group to improve the quality of life (meaning the state where social exclusion is overcome or absent)</li> <li>- In narrow definition, meaning the protection of people who cannot benefit from social welfare institution</li> <li>- In broad definition, meaning the protection of all people from social risk including poverty and unemployment</li> </ul>
Social integration	<ul style="list-style-type: none"> <li>- Enabling group of people to maintain the originality of each group and society is making an attempt to accept various individuals, not coordinating individuals for society(Huber, 2003)</li> </ul>
Social cohesion	<ul style="list-style-type: none"> <li>- Community members feel a sense of belonging and share the common vision. The members from various backgrounds can share the equal opportunities and individuals develop strong and positive relationship.</li> </ul>

※ Source: Roh, *et. al.*(2009); National Information Society Agency(2009).

△Use of term varies by author and the same term may imply different concepts. This study uses the term social cohesion and understands it as a society’s attempt to accept various individuals.

<Appendix 2> Main areas for social cohesion policy

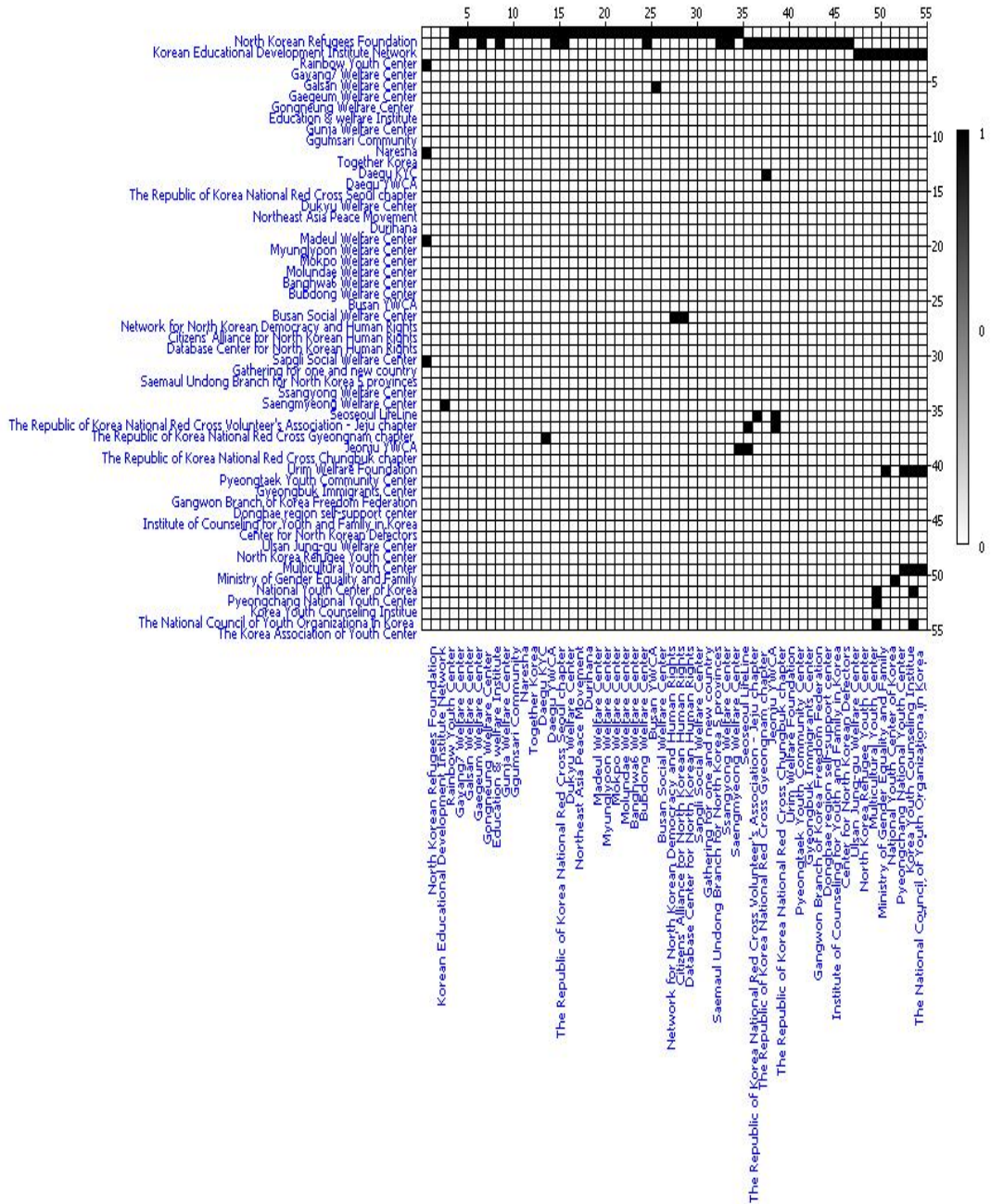
Area	Prevention	Post
Income	Public pension, Tax benefit for encouragement of work, Quasi-universal pay	Basic security, Emergency welfare support
Employment	Unemployment insurance, Minimum wage guarantee, Abortion of employment discrimination	Employment stabilization, Unemployment relief, Self-support
Finance	Bank-rate policy	Credit repair, micro-credit
Health	Promotion of health, Food safety	Health insurance, Long-term care insurance for the elderly
Education	Enforced education, Enrichment of public education	Student loan, Tuition support or learning support, Study after school
Asset/Residence	Housing supply, Transfer income tax	National rental housing, Deposit Loan
Family	Maternity leave, Baby bonus	Emergency welfare support, Welfare facility for single parent families

※ Source: Roh, *et. al.*(2009: 18).

<Appendix 3> Matrix Diagram

Matrix Diagram

Permutation Vector: None  
Value Bound: 1



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## Collaborative Network Structure for Information Exchange

– Focusing on ‘Settlement Support Program’ for North Korean Defectors –

Dong Kyu Lee, In Seok Seo, So Jin Jang

This study seeks to illustrate the structure of settlement support program for North Korean defectors applying the concept of collaborative network. Network features, unity, centrality, cohesion and structural equivalence are measured which would explain collaboration network structure on information exchange among settlement support programs for North Korean defectors and collaborating organizations as to identify the structural characteristics. It is found that reliable organization or mediator is in need for coordination among themselves. Therefore, collaborative network among central government, local government and social corporation should be established around social cohesion monitoring center with an emphasis on information exchange through communication, trust, collaboration and opportunity. Also, it turns out that settlement support system should be improved in order to seek for government taking the initiative and private sector providing assistance. By analyzing density, centrality, cohesion and structural equivalence, policy implications are drawn for the core and collaboration of settlement support network.

**Key words:** social network analysis(SNA), settlement support program for north korean defectors, collaborative network