Observing Partnership Innovation through Inter-organizational Network Analysis on Emergency Response of the Great East Japan Earthquake and Tsunami 2011

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ABSTRACT
This paper models the inter-organizational network in operation during emergency response to the Great East Japan Earthquake and Tsunami (GEJET) 2011, by using Social Network Analysis (SNA). Furthermore, it observes partnership innovation and analyzes in its significance inside the network. Lessons learned from the disaster emphasize the importance of partnership in emergency response as a strong basis for creative recovery.

KEYWORDS: Great East Japan Earthquake and Tsunami, Emergency response, Partnership, Inter-organizational network, Social network analysis

JEL CLASSIFICATION: H7, Y8, Z0

1. INTRODUCTION

Japan and its people always have been a benchmark for many nations with its disaster management system whereas its unique feature of social learning and changes in development lies in many of its experience to earthquake and any other disasters (Clancey, 2006). Clancy’s analysis was undoubtedly only focused on how Great Kanto (1923) and Great Nobi (1891) earthquakes affect Japanese way of development. Nevertheless, recent development saw contemporary disaster experiences in Japan have significant impact for global lessons learned; i.e. from the 1995 Kobe Earthquake and the 2011 Great East Japan Earthquake and Tsunami (GEJET).

In particular to the Great East Japan Earthquake and Tsunami (東日本大震災, Higashi Nihon Daishinsai), it was so severe that it went far beyond the expectation and coping capacity of the Japanese society (Okada, Tao, Yoshio, S, & Hirokazu, 2011). The earthquake occurred at 14:46 JST on 11 March, 2011. The epicenter is located at 38.322°N and 142.369°E around 77 km off the eastern coast of Japan’s Honshu Island. According to the JMA, the magnitude of this quake was 9.0 Richter scale. The earthquake thus induced gigantic tsunami, which caused massive damage in the north-east coast of Japan with maximum run-up measured 39 m. The coverage of total destruction was covering mostly Tohoku and Kanto area, while the most heavily damaged prefectures are Iwate, Miyagi, and Fukushima prefectures. In addition, the official number of death and missing persons was over 24 thousand people and more than 350 thousand lost their houses. The chain-reaction of the mega disaster became more complicated due to nuclear threat at Fukushima Nuclear Power Plants. In sum, the total direct economic losses were estimated around 210 billion USD (Ranghieri & Ishiwatari, 2014).

The GEJET was not totally unprecedented, because, as of February 2011, Government of Japan in
their document outlined four major earthquakes, which possibly hit Japan in the near future; i.e. Tokai-Tonankai Earthquake, Chubu-Kinki Earthquake, Tokyo Inland Earthquake, and also in the Vicinity of the Japan and Chishima Trenches, in which unfortunately happened the first (Cabinet Office of Japan, 2011). Central Government Disaster Management Council has prepared several policy measurements for these threats, however the prefecture and municipality governments in each area are designed as first-responder. It was in this issue that totally destroyed local government capacity delayed the response. Nevertheless, some good mechanisms functioned and could be highlighted as good-practices; e.g. the functioned local-government’s agreement (bousai-kyoutei) where a pre-established agreement between distant local governments to help and support each other at the time of disaster. In addition, partnership between government and private sectors or government with Civil Society Organization (CSO), which positively supported humanitarian goods and service delivery, also took place.

However, it is still worth to be noted that for other policy scholars, the GEJET showcases the limitation of Japanese disaster management system; e.g. lack of comprehensive national disaster response plan, the inability and unwillingness of ministries to share their agency-specific plans, and the limited resources and size of the crisis management offices (Samuels, 2013). Samuel (2013) also stressed another important limitation is related to the ability of local governments of affected area to coordinate with multiple actors during emergency response of major disaster. At that time, local government at least has to coordinate with around 19 foreign governments. However, one of the feedbacks was that poor coordination resulted in delay of a foreign missions’ disaster response team for two days as a result of needless negotiations with local authorities. Furthermore, many governments felt unimpressed and ended up their operation within 1-2 weeks.

Given this co-existence of initial good-practices and negative-findings in inter-organizational cooperation during emergency response in the case of GEJET, this paper would like to use the case for addressing an innovative direction in humanitarian partnership. It is still very relevant whereas the contemporary management of disaster situations and humanitarian fields faces several inter-related challenges in terms of how institutional should interact better to create a global resilient society, due to increasing trends of disasters occurrence and at a larger scales (OCHA, 2004; Cahill, 2012; UNISDR, 2013) in the face of diminishing global resources for disaster risk reduction. At the same time, there is a continuous search for an optimum cooperation process and coordination structure (Gillmann, 2010; Fredriksen, 2012; Taylor et al., 2012) in emergency response with the pressing issue on engagement with non-core disaster and humanitarian actors, such as the private sector, military, and diaspora groups (OCHA, 2004; Taylor et al., 2012; UNISDR, 2013). The combination of those challenges requires a more effective and efficient emergency and humanitarian response, such as to be drawn upon partnership within inter-organizational network of disaster responders.

2. OBJECTIVE AND METHODOLOGY

2.1 Objective

This paper mainly aims to produce inter-organizational network of organizations involved and conducted cooperation during the emergency of the GEJET 2011. Subsequently, the first objective is to construct the model of network formed by inter-organizational cooperation that took place during emergency response period of the GEJET 2011 Great East Japan Earthquake and Tsunami 2011; especially at Miyagi and Iwate Prefectures. Secondly, to identify and to highlight the position, value, and partnership innovation in the network during emergency response of the GEJET 2011; e.g. partnership between government-private actors, foreign actor-Japanese counterpart, CSOs-CSOs,
CSOs-INGOs, military-nonmilitary actors.

2.2 Approach, Analytical and Data Collection Methods

This research used Social Network Analysis (SNA) as its main approach. SNA is the study of the structural relationships among interacting network members and of how those relationships produce varying effects (Varda et al, 2009). In operational manner, a social network is a set of relations that applies to a set of actors as well as any additional information on those actors and relations (Prell, 2012). Mainly it has two components, nodes and ties; a node represents an entity be its individual or organization, while a ties represents relation between at least two nodes and could reflect almost any kind of relationship within a society. Wasserman and Faust (1994) stated that SNA is able to provide in-depth analysis on network as well as cooperative relation among actors and give warrant in terms of quantitative estimation. The SNA basically produces a graph and matrix of a social network whereas the SNA graph provides wider picture of a network, while the matrix serve as main input for its quantitative measurement.

This approach has been known of its versatility for many occasions; e.g. how community / organizational networks form and grow (Prell, 2003), how network governance influences policy (Hajer and Wagenarr: 2003), how crises cause change in social networks (Varda et al, 2009). As an approach, basically social network has been being used for various contexts and levels of research; for instance, from individual level (Quarantelli and Dynes: 1977), community (Tierney, 2001, Ulbert et al, 2005), as well as organizational context (Kapucu et al, 2010, Lassa, 2010). There are several past researches which already employed SNA to study inter-organizational cooperation at the time of a disaster; e.g. the 2005 Hurricane Katrina, the 2003 Mozambique Flood Moore et al, 2003), Peru’s earthquake (Kumar, 2011), and several other researches in Indonesia (Lassa: 2010, Bisri: 2013). Application of social network might work for both individuals and organizational level works in disaster management. Some individual-level research of social network gives complete explanations of who is at risk, who may have more capacity to recover, and how individual strategy to recover after disaster. From such research, it can also push necessity that vulnerable analysis is not only about physical attribute of people (individual or organizations) but also about its social attributes. Other works more concern on organizational level of social network in the context of aid and emergency response following the 2005 Hurricane Katrina (Kapucu et al, 2010).

The SNA of the inter-organizational network during response to the GEJET is performed using the UCINET social network analysis program. There are several other software that could perform SNA; however, UCINET and its NetDraw is comprehensive software for the analysis of social networks (Borgatti, Everett, & Johnson, 2013). Using UCINET, author analyzes the complete network structure (sociometric level), thus some basic SNA measurements used, i.e. the degree centrality and betweenness centrality, to understand the network structure. First, the degree centrality, which calculates the number of immediate contacts an actor has in a network (Prell, 2012) . In a communication network, an actor with high degree centrality is the one who can be considered as major channel for information. It may also be used as proxy to measure an actor’s level of involvement in a network. Second measurement is the betweenness centrality, which calculates how many times an actor sits on the shortest path linking two other actors together. In a communication network, this measurement shows how much potential control an actor has over the flow of information or to show the organizational leader in a network (Prell, 2012). To this end, while degree centrality resulted from the number ties a particular node has, the betweenness centrality not only considers the number of ties but also the relative position of a node in a direct path between two other nodes.

In addition, closeness centrality, density, and cliques’ identification will also be identified. Closeness centrality can be seen as a measure for an actor’s independence and for uncover how a network can quickly and efficiently relay messages through the group. It considers the entire network of ties when calculating the centrality of an individual actor. An individual actor with high closeness centrality
would also be seen as someone who could more easily mobilize a network (Prell, 2012, pp. 107-109). It is also useful to estimate information sharing within a network, with assumptions about location of actors (Comfort & Haase, 2006). Density refers to the proportion of ties in a network that are actually present. In essence, it looks at the extent to which all the individual actors in a network are linked together. It counts how many actual ties exist in a network and expresses this number as a proportion of the potential ties that could exist in the network (Prell, 2012, pp. 166-167). Cliques is an informal grouping of actors in the network, which indicate the strong cohesiveness in the sub-group; it refers to subgroups of actors consisting of mutual ties (Prell, 2012, p. 155). In a disaster situation, a clique is subsets of organizations that develop recurring patterns of interaction (Scott, 2000). Cliques usually develop in an effort to facilitate action under stress caused by a catastrophic disaster; however, it may also inhibit the full exchange of information and recourses with other organizations in the network by excluding others (Comfort & Haase, 2006).

The research used two types of data collection methods for supporting the network analysis of emergency response activities done by multiple actors in the aftermath the GEJET 2011. The first method is desk study: performing data gathering through online and offline sources in collecting related documents and reports. The information of emergency response activities came from compilation of Situation Reports; i.e. from Government of Japan, UNOCHA, Seeds Asia, Japan Platform (JPF), Japan NGO Center for International Cooperation (JANIC), Miyagi Prefecture, and Iwate Prefecture. Seeds Asia published 18 series of Situation Reports, which in its mandate aims to support the affected communities by compiling humanitarian information on the ground in the affected area to be disseminated to the greater humanitarian community. The JPF and JANIC also published data regarding NGO operations in Tohoku area during emergency response and early recovery, in which inputted to the database. In addition, for data in Miyagi Prefecture, the prefecture government through their International Division published data of support (in-kind or services) that received through them and distributed all across Miyagi Prefecture. Most of the data inputted was written and published in English, whereas the author only used two sets of data in Japanese and thus translated into English, i.e. from JPF and Iwate Prefecture.

3. THE EMERGENCY RESPONSE TO THE GREAT EAST JAPAN EARTHQUAKE AND TSUNAMI 2011 AND INTER-ORGANIZATIONAL NETWORK MODEL

3.1 The Emergency Response to the Earthquake and Tsunami

The tsunami on the March 11, 2011 was struck around half-hour after the earthquake, which inundated around 650 kilometers of coastline across six prefectures namely Miyagi, Fukushima, Ibaraki, Iwate, Tochigi and Aomori, in which the pre-disaster population of these prefectures was 14.8 million people, of whom 1.6 million lived within five kilometers of the coast. After the disaster, it was resulted in more than 371,800 people have been evacuated. In detail, approximately 154,000 evacuees in more than 2,300 official evacuation centers, which are 85% of evacuees, were concentrated in the worst affected prefectures of Iwate (48,736), Miyagi (56,386), and Fukushima (25,886). In terms of destructive impact to development, there were 190,000 buildings damaged, among which 45,700 were totally destroyed (Okada, Tao, Yoshio, S, & Hirokazu, 2011).

In the aftermath, although the Japanese Disaster Countermeasures Basic Act mandated local governments as first responder, largely due to the extent of affected areas, an emergency team composed of related ministries and agencies gathered immediately at the Crisis Management Center located at Prime Minister's Office to analyze the disaster situation. It was followed by

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4 The scope of the analysis is limited to Miyagi and Iwate Prefecture (combined). Author acknowledges that most of the emergency response activities were taking place in Miyagi, Iwate and Fukushima; however, due to the complex emergency nature in Fukushima and due to the nuclear crisis and the fact that nuclear crisis management mainly dominated by certain responders group, thus it was not within the scope of this paper.
inter-ministerial meetings at the ministerial level to decide the basic response policies. According to the damage, the government thus established a Headquarter for Extreme Disaster Management (headed by the Prime Minister), and supported by Minister of State for Disaster Management. In addition, a government investigation team was dispatched and an onsite response headquarter was established in Sendai City. In the case of large-scale disasters that exceed the response capabilities of the affected local government, various wide-area support systems thus were introduced and Japan welcomed international supports. The GEJET later found to be drawn assistance from 163 countries and 43 international organizations. As a whole, Japan received $720 million for emergency response (Ranghieri & Ishiwatari, 2014).

The inter-organizational cooperation and network model created to depict the reality during emergency response and relief efforts after the GEJET 2011, which was based on the author’s compilation on sample activities happened from 11 March until June 2011, taken from various situation reports. In total, there were 994 sample activities identified, which were categorized into Food Distribution (FD), Non-Food Items distribution (NFI), Health Services (HS), Damage Assessment (RA), Search and Rescue (SAR), Coordination and Communication service (CC), Cash Donation and Fund Raising (CD), Education and Child-related services (EDU), Water Sanitation and Hygiene (WASH), Shelter, Logistical support (LOG), Livelihood (Lv), Debris Removal (DR), and Others, which include activities such as dispatch of staffs/volunteer, additional energy supply, etc. As can be seen from the Figure 1(left), cash donation and fund raising activities were the most frequent activities done (206 activities), which involved cooperation between two or more organizations, in which one usually became the donor and the others as the beneficiaries or mediator to a third beneficiary. It was then followed by non-food items distribution (134 activities), food distribution (120), health service (96), coordination and communication services (85), search and rescue (69), WASH (57), EDU (56), logistics support (48), and others, which was lower than 40 activities. However, it should be noted that an activity is being counted for those involving cooperation between two or more organizations. On this paper, cooperation disregards its intensity and being counted as one activity / ties, e.g. frequency of activities or time length of activity.

![Figure 1: Sample of emergency response activities (left) and Type of responder (right)](source: Author's Analysis)

The right side of Figure 1, on the other hand, depicted the distribution of responders (type of organizations) involved during the emergency response and relief activities. In total, there are 340 organizations identified; i.e. 114 of them are local-Japanese NGOs/NPOs (34%), followed by 57 private companies (23%), 54 foreign government agencies (16%), 47 international NGOs/NGPs (14%), 21 local government agencies (6%), 14 community-based organizations (4%), 5 UN agencies, 3 central government agencies, and 3 military forces. Again, it should be noted that, regardless the size of an organization, in terms of authority, number of human resources, financial capacity, as well as their scale of operation, each is counted as one organization.
3.2 The Inter-organizational Network Model in the GEJET 2011 Emergency Response

Based on the compiled data of emergency response and relief activities, network analysis and modelling were performed, with the result in the Figure 2 below. As can be seen, each node represents one organization, and different color is assigned to different type of organization. In addition, the size of node depends on the value of degree and betweeness centrality of each organization; i.e. the bigger the value results in bigger size of node. Further explanation on the result of degree and betweeness centrality measurement and interpretation are given subsequently.

In terms of inter-organizational cooperation, which is symbolized as a line, the network model was treated as “valued” and “directed”. This means the frequency of interaction between two organizations (nodes) and the direction of the relationship (whether the cooperation was jointly implemented or one of the organization acted as a donor or a beneficiary) are taken into consideration. As such, in the figure thicker lines could be observed, which means more intensive cooperation with arrowheads resembles contribution from one organization to another in activity implementation; i.e. a line with two arrowheads resembles joint-activities. In addition, there are two types of lines: blue and red line. A blue line represents a cooperative relation between organizations which belongs to the same category, e.g. between two local/Japanese NGOs/NPOs. While, a red line represents cooperative relation between organizations from different category, e.g. local/Japanese NGOs/NPOs with private companies.

At a glance from the network model alone, several important notions can be made. First, the “four-party-meeting” network between Miyagi Prefecture Government, Cabinet Office, JSDF, and Japan Platform (JPF) is proved to be central in the network. Secondly, Japanese NGOs with international view have greater role in coordinating the network, namely JPF and JANIC. Thirdly, additional key and central organizations include Japan Red Cross, Ministry of Foreign Affairs (MoFA), and Iwate Prefecture Government. Fourth, there is a significant difference between the capacity of Miyagi and Iwate Prefecture Government in cultivating and managing cooperation.

Upon the network result, the degree centrality and betweeness centrality measurements were completed, as observed in the table below. Both measurements basically provide information on how central an organization within the network, which indicates leadership as well as functionality as coordinator. The degree centrality is basically counted by the numbers of lines connected to a particular node, in which each node will have values of InDegree, OutDegree, average Degree, and Normalized Degree. In this case, we have to pay attention to the Normalized Degree of centrality for objective interpretation. As the table suggests, Japan Platform has the highest normalized degree of centrality (0.501), followed by Miyagi Prefecture Government (0.434), Ministry of Foreign Affairs (0.212), JANIC (0.121), Iwate Prefecture Government (0.094), Japan Red Cross (0.068), Japan Self Defense Force (0.053), and Cabinet Office (0.044). Organizations ranked below the aforementioned ones have a very low value of degree centrality, which indicate most of them only have rather bilateral relation and affect little to their centrality. For those eights organizations, this relatively high degree of centrality indicates the perceived necessity of other organizations in selecting their partner to ensure the delivery of goods and services for emergency response and relief. In this sense, the organizations identified having significant degree of centrality is as expected; i.e. agencies from central government, affected local governments, red-cross society, and big and experienced NGOs.
Figure 2: Inter-organizational network model during emergency response of the GEJET 2011 in Miyagi and Iwate prefecture

Source: Author’s Analysis
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Table 1: Degree and betweenness centrality measurement result

| Rank | Organization       | Degree | Normalized Degree | Rank | Organization       | Betweeness | Normalized Betweeness |
|------|--------------------|--------|-------------------|------|--------------------|------------|-----------------------|
| 1    | Japan Platform     | 170.000| 0.501             | 1    | Japan Platform     | 25267.125 | 44.103                |
| 2    | Miyagi Pref. Gov.  | 147.000| 0.434             | 2    | Miyagi Pref. Gov.  | 196500.729 | 34.038                |
| 3    | MoFA               | 72.000 | 0.212             | 3    | JANIC              | 11440.894 | 19.970                |
| 4    | JANIC              | 41.000 | 0.121             | 4    | Japan Red Cross    | 5837.389  | 10.189                |
| 5    | Iwate Pref. Gov.   | 32.000 | 0.094             | 5    | MoFA               | 3154.041  | 5.505                 |
| 6    | Japan Red Cross    | 23.000 | 0.068             | 6    | PWJ                | 2965.487  | 5.176                 |
| 7    | JSDF               | 18.000 | 0.053             | 7    | KnK                | 1355.000  | 2.365                 |
| 8    | Cabinet Office     | 15.000 | 0.044             | 8    | Terra People Ass. | 1233.90   | 2.154                 |
| 9    | American RC        |        |                   | 9    | American RC        | 977.167   | 1.706                 |
| 10   | Iwate Pref. Gov.   |        |                   | 10   | ADRA Japan         | 9868.004  | 1.690                 |

Source: Author’s Analysis

Japan Platform ranked first in terms of its degree centrality measurement due to their instrumental role in connecting central government, local government, businesses and private foundations, which made donation, as well as implementing NGOs/NPOs. Similarly, Miyagi Prefecture Government ranked second due to their ability to be connected with numerous organizations and their clear publication on the report of accepting and channeling donation as well as other support from other organizations. On the other hand, MoFA could rank the third, which was greatly affected by their role as the first stop for coordination and cooperation in terms on channeling support from overseas to the affected areas. In addition, MoFA keeps a very good record on their interaction with other organizations during the emergency response and disaster relief phase.

Following the top-three organizations with a significant value of degree centrality are JANIC, Iwate Prefecture Government, and Japan Red Cross. These organizations basically showed the similar pattern with intensity difference. Besides, the existence of JSDF is a positive value and confirms their great role in the emergency response and disaster relief. Lastly, from the degree centrality measurement, it verifies the great role of “Four-Parties-Meeting” with JPF, Miyagi Prefecture Government, JSDF, and Cabinet Office being in the center of the network and having significant value of degree centrality.

Different from the degree centrality, the betweenness centrality value is calculated considering both number of ties connected to a node as well as its position in between two other nodes. Therefore, the position in which a node in between the ties of another two nodes is more important. This could be an indication of coordination and bridging capacity. Based on the betweenness centrality measurement, it is found that Japan Platform has the highest value (44.103), followed by Miyagi Prefecture Government (39.038), JANIC (19.970), Japan Red Cross (10.189), Ministry of Foreign Affairs (5.505), Peace Winds Japan (5.176), KnK (2.365), Terra People Association (2.154), American Red Cross (1.706), Iwate Prefecture Government (1.690), ADRA Japan (1.424), and World Vision Japan (1.423).

In the context of Japan Platform, Miyagi Prefecture Government, Japan Red Cross, and MoFA, the value of betweenness centrality further verifies their instrumentality in the network, both as leader as well as coordination in multiple joint activities. It further emphasizes their significant role in the network of emergency response and disaster relief as a whole. Aside from Japan Red Cross, the other three organizations were actually limited on their human resources for direct implementation. However, they play a role as bridging organization during coordination meeting contributed to their role.
betweeness value. In specific to Iwate Prefecture Government compared to Miyagi Prefecture Government, this was only due to the difference of organizations working on their areas. However, with the fact that the damages were actually similar between the two prefectures, it can bring further questions on the prefectoral government’s ability to find and channel resources for emergency response and relief in their area. For some responders, one possible explanation to this difference was due to the fact that the capital of Iwate Prefecture located in inland and not affected by the disaster, while Sendai city-the capital of Miyagi Prefecture was also affected, the sense of crisis and urgency were far greater. Lastly, the value of the betweenness centrality of ADRA Japan is interesting to be highlighted. The low value reflects the dynamic of which at first the organization was expected to lead the network of NGOs; however, due to the better ability, such role was taken over by JPF and ADRA Japan declared their focus on the field activity (Sakomoto, 2012). Altogether, this result shows the first characteristic of partnership innovation in GEJET 2011 whereas the big and internationally-oriented Japanese NGOs, JPF and JANIC, play great a coordination role.

4. OBSERVED PARTNERSHIP INNOVATION IN THE INTER-ORGANIZATIONAL NETWORK OF GEJET

In addition to measurements that emphasize on the relative position of particular nodes within the network, a more network-wide analysis is also being made; i.e. it is found that the network density is at 3.241, the connectedness at 0.654, the fragmentation at 0.346, the average distance at 3.249, and the compactness at 0.226. From this network-wide measurements, basically the network of organizations during the GEJET 2011 is moderately dense and compact; i.e. not all being centralized as there were several sub-network and organizational leaders, as well as not all fragmented and dominated by bilateral ties. The network density itself indicates the degree to which actual ties occurred out of the overall potential ties given by the number of organizations. Thus, it is fair to determine this network as multi-polar and moderately converge. Furthermore, in order to identify the cliques’ that occurred within the network of organizations during the emergency response and relief of GEJET, it was set that a minimum of three organizations can qualify for a clique. The result of cliques’ analysis was able to identify 13 cliques, which can be seen below.

Table 2: Cliques identified in the Great East Japan Earthquake and Tsunami 2011

| Clique | Members                                                                 |
|--------|-------------------------------------------------------------------------|
| 1      | AAR, JANIC, JPF                                                        |
| 2      | JANIC, JEN, JPF                                                       |
| 3      | JANIC, JPF, KnK                                                        |
| 4      | JANIC, JPF, Peace Boat                                                 |
| 5      | JANIC, JPF, PWJ                                                        |
| 6      | Japan Red Cross, WFP, Miyagi Prefecture Government                     |
| 7      | JPF, KDDi, Miyagi Prefecture Government                                |
| 8      | JPF, PWJ, Miyagi Prefecture Government                                 |
| 9      | Brazil-Miyagi Kenjinkai, Japan Red Cross, Miyagi Prefecture Government |
| 10     | JANIC, JOICFP, Oxfam Japan                                            |
| 11     | Mercy Corps, PWJ, Miyagi Prefecture Government                         |
| 12     | Cabinet Office, JPF, JSDF, Miyagi Prefecture Government                |
| 13     | EMI, Sony, Universal, Japan Red Cross                                  |

Source: Author’s Analysis
From the table above, those cliques consisting of a minimum three participating organizations are connected to either Japan Platform, JANIC, and Miyagi Prefecture, or its combination. It is interesting to look upon how Japan Platform and JANIC are identified in seven different cliques. In the case of cliques that are connected also to JANIC and Japan Platform sub-network, and also given the fact that both organizations have a high degree of centrality and betweenness, this means a clear indication of cross sub-network cooperation, or at least at coordination level. Furthermore, in specific to cliques participated by Miyagi Prefecture Government, it signifies the ability of such local government in connecting to different types of organizations.

A clique comprised of four organizations is Cabinet Office, Japan Platform, Japan Self Defense Force, and Miyagi Prefecture Government. This is another evidence of the robustness decision of having a “Four-party-meeting”. It was found due to the strong will of on-site headquarter of Cabinet Office who has an inclination to materialize such collaboration of which never existed before in Japan (Sakomoto, 2012). On the other hand, a clique that is comprised of five organizations is Japan Red Cross, EMI, Sony, Universal, and Warner. This clique was a cooperation of four largest record labels to make “Songs for Japan”, which all profit generated went to the Japanese Red Cross.

As portrayed in figure 2, there are two types of relations exhibiting blue and red lines. In such case, the cooperation between traditional and non-traditional organizations represented by the red line already included. Furthermore, the following observed relations: International NGO/NPO with private company, international NGO/NPO with military, Japanese NGO/NPO with private company, Japanese NGO/NPO with diaspora groups (a kind of community-based organization, mainly those of foreigners). On the other hand, there is also identification on military – military cooperation for disaster response, e.g. Operation Tomodachi between JSDF and US Army, as well as inter-private companies’ cooperation.

From network perspective, another important pursuit is to identify cooperation between the traditional and non-traditional humanitarian organizations. The first attempt to answer this challenge is through identification of cooperation between the same and different types of organizations, which can be seen in Figure 2: the same type of organizations cooperation represents by blue ties, while the different types of organizations represent by red ties. From the figure, we can see two characteristic of the network in the emergency response and relief of the GEJET 2011; i.e. first, the number of cooperation between different types of organizations supersedes those of same organization. In this case, it refers to the cooperation between traditional and non-traditional organizations represented with the red line includes the following observed relations: International NGO/NPO with private company, International NGO/NPO with military, Japanese NGO/NPO with private company, Japanese NGO/NPO with a diaspora group within the category of community-based organization. On the other hand, there is also identification on military-to-military cooperation for disaster response, e.g. Operation Tomodachi between JSDF and US Army, as well as inter-private companies’ cooperation. However, the second observation is that despite less number of relations, the intensity of traditional and same type of disaster/humanitarian organizations are still thicker in comparison of those that of different types of organizations.

Alternative important analytical observation is the fact that some of pre-determined cliques do not identified as cliques through SNA measurement. In this case, the Union of Kansai Governments is the example whereas even before the GEJET the union has long been well known for its existence and contribution at the time of disaster. Their level of coordination is actually high enough in deciding to which prefecture a particular Kansai prefectures will support; e.g. to Miyagi or Iwate in Bousai Kyoutei arrangement. On this regards, the explanation might be because that all coordination between prefectural governments of Kansai Union took place not at the operational level and not in the field of Miyagi or Iwate; leaving no coordination and inter-organizational cooperation between them during the direct emergency response activities. Nevertheless, on this activation of mutual and voluntary agreements between city and prefecture governments in managing disaster, i.e. BousaiKyoutei (防災協定) or also called Saigai-ji Ouen Kyoutei (災害時応援協定), which means Agreement concerning
Aid in the Case of Disaster, many scholars and practitioners appreciated such practice during GEJET, and encourage duplication (Kaneko, 2013; World Bank, 2012). In Figure 2, the ties which represented Bousai-kyoutei between Miyagi Prefecture to Hyogo, Tottori, and Tokushima prefectures as well as Iwate to Osaka and Wakayama prefectures was thick indicating strong intensity.

One area of partnership innovation was indeed between disaster/humanitarian responder with private sector whereas before the GEJET occurred, government to Business cooperation is generally rare in Japan and in the aftermath of the Tohoku Earthquake, most of them were on ad-hoc basis. This, however, is not true for several designated business entities, e.g. Japan Railway, NHK, and Tepco, which has specific duties and considered as “designated company” at the time of disaster. In this light, after the earthquake and tsunami, number of agreements between local government and business companies are very common nowadays. Some local governments make an agreement with an electric company such as TEPCO concerning the recovery of the system of the transmission of electricity after a disaster, while other local governments make an agreement with local medical association concerning the provision of medical services after a disaster. Some local governments make agreement with food companies or association of local retail stores concerning the provision of foods for evacuees after a disaster. Therefore, predetermined agreements between local governments and Non Profit Organizations, except for local medical associations, is what rare in Japan.

The GEJET 2011 provided large-scale disaster, which triggered the JSDF to operate at a large scale, and also later became source of public trust to their capabilities in Humanitarian Aid and Disaster Relief (HADR), which outlined in Japanese constitution. At the peak of operation in responding to the GEJET 2011, the JSDF dispatched approximately 107,000 personnel, 540 aircraft, and 60 ships; which accounted around 40% of its personnel and was the largest mobilization in its history in responding to a disaster (Ministry of Defense, 2011). It is worth noted, however, that JSDF does not work in isolation and rather quite versatile in its coordination and partnership as suggested by its central position in the network (Figure 2) and high value of degree and betweeness centrality. They also found to be linked to both military/semi-military organizations (e.g. the US Army) and non-traditional actors (e.g. private).

5. CONCLUSION

This paper has showcased the first attempt to construct the model of network formed by inter-organizational cooperation that took place during emergency response period of the GEJET 2011, in Miyagi and Iwate prefectures. From the inter-organizational network, it was found the relative positions of sample organizations that responded to the disaster, valued its relative position in the network, and identified various types of cooperation and partnership.

From the measurement of the degree centrality, the traditional and expected centrality of actors were observed whereas most of the organizations core to the network were Japanese central government, prefectural governments, and Japanese NGOs; i.e. Japan Platform, Miyagi Prefecture Government, Ministry of Foreign Affairs, JANIC, Iwate Prefecture Government, Japan Red Cross, Japan Self Defense Force, and Cabinet Office. On the other hand, by looking at betweeness centrality, additional coordinating actors could be identified, such as Japan Red Cross, PWJ, KnK, Terra People Association and American Red Cross. Furthermore, the network also exhibited the “four parties meeting” (Cabinet Office, Miyagi Prefecture, Japan Platform, and JSDF) as core of the network.

By revealing some of the insight, the analysis also revealed factors that influence partnership in the delivery of humanitarian aid during the emergency response of the GEJET 2011. The first was on the swift establishment of horizontal cooperation among local governments to overcome the crisis of leadership at local government resulted by the direct impact of the tsunami. Author agreed with the local government position that preparing capacity to respond to disaster in 2011 was too

5 Interview with Key Person MA, 17 September 2013.

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overwhelming for the city government. It requires support from central government and there is a need to further intensify mutual cooperation among local governments. On this, the following public administration aspects need to be considered in order to better prepare local government against disasters, e.g. back-up system on citizen record and development plan documents or stand-by agreement to accelerate access and distribution of emergency goods; and cooperation between local governments with distance counterparts located in hazard-free area. Such approach will also benefit vast countries like Indonesia, Philippines, or China.

From this research, it is also found that the ability of local government to build ties and network with different types of organizations will be instrumental. The notion of ability also includes individual capability and public administration setup that align fully with the national practices, and even international practices and standards, e.g. in the case of humanitarian cluster activation. In this research, it was identified that the humanitarian cluster-like approach was initiated and taking lessons from disasters from developing and least-developed countries. To this end, departments at local government level require capacity building for swift coordination with different actors.

With the predicted increasing numbers of disasters due to climate change and other man-made humanitarian crises, a more coherent humanitarian response with a diverse type of actors is needed; i.e. Non-traditional actors such as the military, private sectors, and diaspora group. On this, the author calls for further observation on military or military-like agencies impartiality and neutrality in performing HADR. Certainly, in this case, the JSDF was a good example and could setup a certain good practices and guideline for other similar organizations. While on the cooperation and joint-operation with private companies, the Japanese experience can be extended for drafting a guideline on private and humanitarian cooperation. Furthermore, private companies as part of the community can also extend the notions of preparing Business Continuity Plan into a wider region contingency and survival-ability plan than enable resource mobilization from private for the public. As for the diaspora group, e.g. foreigner communities, provision of a multi-language support and preparedness are needed as a basis for cooperation during emergency response. At the same time, in the community preparation, training, and elaboration of contingency plan, such diaspora groups should also be invited to ensure inclusiveness and such diaspora groups might have access to new innovative resources to overcome disasters taking lessons from their country.

From academic and scientific point of view, detailed network modelling using SNA at prefecture level, e.g. specific for Miyagi, Iwate, and Fukushima, is needed to better understand the reality of inter-organizational cooperation in disasters and even compare success and failure factors in emergency response operation. This may extend the author’s previous research in comparing inter-organizational network and emergency response performance in two earthquakes in Indonesia (Bisri, 2013a). Another direction is to model and understand the network building process and dynamic before the GEJET 2011, during emergency response like in this paper, and during long-term recovery process; i.e. similar with the one author did for the case of West Java Province in Indonesia (Bisri, 2012). Lastly, network modelling at the municipality or community level will be useful in relating the concept of traditional and non-traditional humanitarian actor cooperation with the theory of social capital.

To understand and tailor emergency response, thus it is also recommended to conduct similar research for other types of disasters; especially with a slow-onset disaster characteristic, e.g. volcanic eruptions and climate-related disasters. By doing so, a broader view can be seen whether the current system and organizations which are actively involved in disaster management are able to perform regardless of the disaster type. In relation to the ongoing humanitarian transformation agenda, the author is calling upon humanitarian community to apply SNA during in-cluster and inter-cluster meeting and disaster simulation; so that empirical evidence can be brought to the table for comparison between coordination protocol and actual flow of information and communication that leads to cooperation at the time of disaster. Furthermore, humanitarian community may also start to invite and include resourceful actors, e.g. private company, for preparing operation plan of humanitarian clusters at global and in-country level.
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