Humanitarian Information Exchange Network: Why Do International Humanitarian Organizations Collaborate?

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Abstract: While in recent years research has highlighted the rise of inter-organizational collaboration among organizations in the nonprofit sector and has documented issues related to forming and maintaining of these relationships, there is little known about inter-organizational humanitarian information exchange and especially the motives of collaboration. In this paper, we examine collaboration relationships among organizations member of a community of interest in humanitarian information exchange. We use the social network block-model method to analyze collaboration network data collected from 35 international organizations. Six strongly connected clusters are identified in the community. Evaluating reported reasons for these collaborations, we find that the two main motivations are related to relational characteristics of organizations, which interestingly are the most and least reported reasons in two of the most densely connected clusters of relationships. These findings are discussed through the lenses of resource dependency and network structural equivalence.

Keywords: Inter-organizational network, humanitarian organizations, social network, collaboration, network clusters.

BIOS:

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1 Introduction

International response to humanitarian disasters such as the 2010 Haiti earthquake depends highly on information. In humanitarian relief operations, organizations deal with information that is multi-sector, multi-dimensional, multi-source, and usually non-standardized. In recent years as the number and complexity of man-made and natural disasters has risen, so has the need for resources including information. This rise in the number of disaster has also led to more inter-organizational collaboration especially in information management and exchange. Inter-organizational information sharing has become increasingly important to the humanitarian relief sector (Wentz, 2006; Comfort, 1993). Though humanitarian information management has improved in recent years, some constraints continue to handicap inter-organizational humanitarian information management and exchange (Wentz, 2006; Maiers, 2005; Bharosa et al., 2010).

Researchers have identified numerous humanitarian information management related problems, including the quality and timeliness of information (e.g., DeBruijn, 2006; Fisher & Kingma, 2001), unpredictability of required information (Longstaff, 2005), unwillingness to share (Ngamassi et al., 2010), and mismatch in location, information overload, misinterpretation of information (Bui et al., 2000; Saab et al., 2008). In their investigation of the challenges and obstacles in sharing and coordinating information during multi-agency disaster response, Bharosa et al., (2010) identified three different levels of obstacles that challenge information sharing. They include community, organizational and individual levels. According to Galbraith (1977), the information issues in inter-organizational collaboration are closely related to the issue of uncertainty, with higher levels of uncertainty requiring greater amounts of information to be processed by decision makers. In addition to the challenges specific to humanitarian information management and exchange related problems, humanitarian organizations are also challenged by what are recognized as problems facing most organizations (see Galbraith, 1977; Ngamassi et al., 2010).

In an attempt to mitigate these challenges, humanitarian organizations are increasingly collaborating through coalitions, alliances, partnerships, and networks, both within and across the sector (Guo & Acar, 2005; Stephenson, 2005; 2006; Arya & Lin, 2007). Though an accurate census of these humanitarian collaborative entities does not exist in the literature, several studies offer some insight into their growing presence (Saidel and Harlen, 1998; Stone, 2000; Moore et al., 2003; Guo and Acar, 2005; Stephenson, 2005; 2006; Feiock and Andrew 2006; Jang and Feiock, 2007; Arya & Lin, 2007).

Only a small number of these studies focus specially on inter-organizational collaboration in the special conditions that exist in the humanitarian field (Stephenson, 2005; 2006). In addition, in the existing literature on humanitarian inter-organizational collaboration research, little is known about inter-organizational humanitarian information exchange and especially the motives of collaboration. Moreover, the literature on inter-organizational collaboration shows that resource dependence theory (Pfeffer & Salancik, 1978) and transaction cost theory (Williamson, 1991) have been the most widely used theories to explain collaborative relationships. Resource dependence theory deals with, among other aspects, resource scarcity as a motivator for meeting these needs through collaboration, but with an accompanying concern about the potential loss of autonomy and power to the resource provider (Pfeffer & Salancik, 1978). According to the resource dependence theory, inter-organizational relationships are formed as a consequence of efforts made by organizations to manage external dependencies on resources. The transaction cost theory looks at inter-organizational collaboration as a way to reduce transaction costs and maximize gains. Despite their popularity in inter-organizational research, these theoretical perspectives have weaknesses that have been documented in the literature. They have for example been criticized for not paying sufficient attention to environmental constraints as well as other contextual and organizational process factors (Galaskiewicz, 1985; Oliver, 1990; Cigler, 1999). Such oversight is even more problematic in the humanitarian collaboration context where the environment can be very dynamic.

Drawing upon two main theoretical concepts including exchange relationship (Levine & White, 1961) and social network structural equivalence (Burt, 1976; 2008; Wasserman, & Faust, 1994; Kilduff & Tsai, 2003), this study aims at providing some insights on inter-organizational collaboration in humanitarian information sharing. To this end, we explore collaboration relationships among organizations/agencies member of a community of interest in humanitarian information exchange. Especially, we investigate the patterns of interconnections among organizations/agencies in the community and seek to understand the reasons that explain these collaboration patterns. We collected data through interview and a survey among organizations/agencies member of the GlobalSympoNet1, a United Nations Office for the Coordination of Humanitarian Affairs (UNOCHA) sponsored community of interest on humanitarian information management. We used the network block-model method (Lorrain & White, 1971; Breiger et al., 1975; White et al., 1976) to analyze the data collected. This study is part of a larger research agenda that seeks to understand how humanitarian organization/agencies can organize themselves to promote higher levels of collaboration and coordination particularly in the domain of information and communication technologies.

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1 GlobalSympoNet is a pseudonym we used to protect the confidentiality of the organizations.
2 Inter-Organizational Collaboration in the Nonprofit Sector: A Brief Literature Review

According Wood & Gray (1991), inter-Organizational Collaboration takes place when organizations share authority and responsibility for planning and implementing an action to solve a problem. Stakeholders “engage in an interactive process, using shared rules, norms, and structures, to act or decide on issues related to that domain” (Wood & Gray, 1991, p146). In their discussion of inter-organization collaboration, Guo & Acar (2005) define nonprofit collaboration as what occurs when different nonprofit organizations work together to address problems through joint effort, resources, and decision making and share ownership of the final product or service. The potential gains from inter-organizational collaborations, especially those occurring within inter-organizational networks, include economic efficiencies, more effective response to shared problems, improvements in the quality of services delivered to clients, the spreading of risks, and increased access to resources (Guo & Acar, 2005; Gazley, 2008). There is concurrently, an increasing number of research addressing issues involved in forming and maintaining these inter-organizational collaborations (e.g., Milne et al., 1996; Austin, 2000; O’Regan & Oster, 2000; Guo & Acar, 2005; Gazley & Brudney, 2007; Jang & Feiock, 2007).

Studies are also accumulating on the benefits and cost related to inter-organization collaboration in the nonprofit sector (e.g. Feiock & Andrew, 2006; Jang, 2006; McGuire, 2006; Gazley & Brudney, 2007; Jang & Feiock, 2007; Gazley, 2008). Inter-organizational collaboration benefits include benefits to the individual members of the network (e.g. the ability to address shared problems more effectively, the potential for cost savings and organizational learning), benefits to the clients of members of the network (e.g. the higher quality service or end product) and benefits to the community as a whole. According to Jang & Feiock (2007), inter-organizational collaboration among nonprofit organizations has the potential to enhance service to clients. They argue that inter-organizational collaboration is beneficiary to nonprofits because it allows them to share the risks associated with service production and delivery. Gazley (2008), identifies five potential gains that nonprofit organizations could ripe from collaborating. They include (i) economic efficiencies, (ii) more effective response to collective problems, (iii) improvements in the quality of services, (iv) the spreading of risks, and (v) increased access to resources. According to Jang (2006) collaboration with governments, other nonprofit or private organizations is an attractive option especially when nonprofits face transaction cost.

The major constraints and costs involved in inter-organizational collaboration in the nonprofit sector have also been intensively documented in the literature (Gazley & Brudney, 2007; Ngamassi et al., 2010; Maitland et al., 2009). They include loss autonomy, financial instability, difficulty in evaluating organizational results, and the opportunity costs from the time and resources devoted to collaborative activities. Nonprofit inter-organizational collaboration must also content with problems related to conflict of interests among organizations and coordination cost in terms of resource inputs, especially staff-time (Ngamassi et al., 2010). According to Jang & Feiock (2007), the costs of inter-organizational collaboration tend to be individual to organizations that participate in collaborative efforts while the benefits tend to be collective. They assert that nonprofits are confronted with a collective action problem because the benefits of collaborative services are diffused and difficult to measure for individual organizations, but many of the costs are borne by individual organizations.

This vast and growing literature in the nonprofit sector is however silent in investigating the motives of humanitarian inter-organizational collaboration especially with regards to humanitarian information exchange. The objective of this paper is to contribute to the literature by providing some insights on this aspect of collaboration among nonprofit organizations in the humanitarian sector. Our research question is twofold. It is framed as follow: (i) what are the characteristics of interconnections among organizations/agencies which are members of a network of humanitarian information sharing? (ii) What are the major reasons that can explain inter-organizational collaboration patterns observed in a network of humanitarian information sharing?. We discuss below the analytical framework used in the paper. We draw upon network analysis and exchange theory. Network analysis coupled with the theory of exchange provided the framework for our consideration of the relationships within the network. Network analysis captures the embedded nature of a network’s organizational actors and structural element (Brass et al., 2004). It focuses on patterns of communication and information flows without placing value on the nature of the exchanges. The theory of exchange, meanwhile, assumes that the ties between organizations consist of exchange relations of valued items and that what matters is the value of the items (Levine & White, 1961; Provan & Milward, 1995). When combined, network analysis and exchange theory permit to understand more fully the relationships that exist and the nature of these links.
3 Analytical Framework

3.1 Exchange theory of inter-organizational collaboration

One of the approaches that inter-organizational researchers have been using to study inter-organizational relationships is the exchange perspective (Levine & White, 1961; Provan & Milward, 1995). The exchange theory conceptualizes inter-organizational collaboration more broadly, as to compare with the perspectives of resource dependency and transaction costs theories. This theory posits that organizations get involved in relationships when there is a perception of mutual benefit for interacting. According to Levine & White (1961), exchange among organization does not necessarily involve elements of economic value. They assert that part of the exchange process is the development of consensus among organizations. The issue of consensus is especially in humanitarian information sharing. For example, organizations need to agree on a set of information standards. In addition to explaining the motivations for inter-organizational relationships, the exchange approach also implies that the nature of the interactions between participants in these relationships is characterized by a high level of collaboration (Schmidt & Kochan, 1977).

3.2 Network structural equivalence

According to the concept of structural equivalence, organizations which have the same or similar ties to others tend to be equivalent in terms of their potential to act in the network (Burt, 1976; Lorrain & White, 1971; Wasserman, & Faust, 1994; Kilduff & Tsai, 2003). Structural equivalence also takes into account the pattern of connections among all members of the network. Unlike the clique detection methods which are based on relations among members of the sub-group, this approach detects subgroups based on their similar patterns of relations with other members of the network (Wasserman, & Faust, 1994; Kilduff & Tsai, 2003). Members of a network are put in a structurally equivalent group when they have comparable patterns of linkages with other members of the network, even if they do not maintain relations with one another (Lorrain & White, 1971).

Central to structural equivalence analysis is the concept of distance (Burt, 1976). Using the structural equivalence criterion, distance between network members is measured by the degree of similarity in their patterns of interaction: The greater the similarity, the shorter the distance. If two members have exactly identical patterns of relations with other members, their distance from each other is zero. The greater are the differences in their patterns of interaction, the greater is the distance between them. In a nutshell, the goal of structural equivalence analysis is to simplify the structure of relations in a network so that it is possible to understand the various kinds and patterns of interactions occurring in the network.

4 Research Methodology

We used CONCOR (CONvergence of iterated CORrelation) a social network block-model method for our investigation. Network analysis is becoming increasingly popular for understanding complex patterns of relationships. The network perspective examines actors which are connected directly or indirectly by one or many different relationships. Regardless of unit level, network analysis describes structures and patterns of relationships and seeks to understand both their causes and consequences. We chose to use CONCOR because we believe that this network block-model method suits quit well with the purpose of our investigation. Moreover, in the literature, CONCOR is one of the earliest and most used approaches to partitioning actors into positions based on structural equivalence. This method was first used by Breiger and colleagues in the 1970s for analyzing social network (Breiger, Boorman, and Arabie, 1975; White, Boorman and Breiger, 1976). Since then, CONCOR has been used extensively in network research in many fields (Breiger and Ennis, 1979; Knoke and Rogers, 1979; Van de Ven et al., 1979; Friedkin, 1984; Anderson and Jay, 1985; Gerlach, 1992; Barnett and Danowski, 1992; Ashton, 2008).

4.1 Research site

We analyze data drawn from the GlobalSympoNet inter-organizational project collaboration network (Maitland & Tapia, 2007a; 2007b). The GlobalSympoNet is a UNOCHA sponsored inter-organizational community for humanitarian information management. The GlobalSympoNet began its activities in 2002 as a meeting of humanitarian information management professionals. This community of interest is made up of about 300 humanitarian information technology (IT) and information management (IM) professionals from roughly 120 international and national organizations in the field of humanitarian assistance. Most of these professionals occupy high ranked position (e.g. Chief Executive Officer, Chief Information Officer) in their organization. The goals of the GlobalSympoNet include (i) to foster collaboration among members on humanitarian information management related projects, (ii) to disseminate best practices of information exchange, (iii) to sensitize its members on the critical aspect of humanitarian information management preparedness and (iv) to facilitate headquarter-field partnerships and to advocate for more funding from donors for humanitarian information management related
projects. Organizations member of the GlobalSympoNet are for their vast majority, large international organizations. They could broadly be grouped into the following categories: non-governmental organizations (NGOs), United Nations organizations, Academia, Intergovernmental Organization, and Media.

4.2 Data collection
A total of 61 responses were registered from an online survey conducted among 267 attendees of the 2007 GlobalSympoNet meeting. Respondents represented 47 different organizations out of the 119 organizational members of the GlobalSympoNet network that were surveyed; making a response rate of nearly forty percent (39.50%). They were asked to identify organizations/agencies with which they had collaborated on humanitarian projects and to indicate their reasons for collaboration. The survey was the second in a series of three. It was developed with insights gained from survey results obtained at the time of the Symposium itself as well as those gained from an historical analysis of Symposium. Both the first and this second survey were reviewed by leaders of the Symposium.

The survey data was supplemented by data collected through nine (9) personal semi-structured interviews with representative of organizations members of the GlobalSympoNet. These interviews were conducted at the end of the first surveys. Each interview lasted between three quarter and one and half hours. Our intent was to have a more detailed description and explanation of activities in the GlobalSympoNet community and especial to gather the motives for collaboration among the members of the community.

Social network analyses were conducted to explore the data collected in order to assess inter-organizational collaboration patterns in the network. The UCINET software (Borgatti et al., 1999) was used to computerize the data. Social network features used in the paper include network density (Freeman, 1979; Wasserman, & Faust, 1994), degree centrality (Freeman, 1979; Wasserman, & Faust, 1994), network position (Burt, 1976; 2008; Wasserman, & Faust, 1994) and a block model (Lorrain & White, 1971; Breiger et al., 1975; White et al., 1976; Wasserman, & Faust, 1994).

5 Research Data
5.1 Project collaboration network data
As said earlier, through survey, we collected data from 47 organizations/agencies members of the GlobalSympoNet. Respondents were asked among other questions, to indicate organizations/agencies with which their organization/agency had collaborated on humanitarian projects. In order to increase the reliability of this network data, we provided respondents with the complete list of organizations/agencies, rather than relying on their memory. Thirty five (35) organizations answered this question. Among these organizations, ten (10) were NGOs; nine (9) from the United Nations systems; six (6) form the academia and four (4) from the private sector. The rest (6) were from a verity of other categories including governmental organizations, intergovernmental organizations and media.

Figure 1 Network diagram
Table 1 Raw network project collaboration matrix

![Matrix Image]

During the coding of data, we took into consideration all reported project collaboration relationships from multiple informants of the same organization. For example, let say survey participants SP1 and SP2 work for the same organization ORG1. If participant SP1 reports collaboration between organization ORG1 and organization ORG2, and participant SP2 reports collaboration between organization ORG1 and organization ORG3, we consider in our analysis that organization ORG1 collaborates with organization ORG2 and organization ORG3. There were five (5) cases of multiple informants. Figure 1 depicts the relationship structure while Table 1 presents the 35*35 directed network matrix generated from the data collected. To protect confidentiality, we identify organizations/agencies by assigning codes for example ORG1. The collaboration relationships represented in the matrix are those reported by organizations on the rows. In this study, we considered both the reciprocated and non-reciprocated reported collaboration ties. A reciprocated collaboration tie is one in which both organizations/agencies report the collaboration relationship. Many researchers report reciprocated ties, with the premise that this strategy increases the reliability of network data and provides a more conservative estimate of inter-organizational relationships (e.g., Morrissey et al., 1994). However, non-reciprocated ties are also often reported (Bolland & Wilson, 1994), suggesting that an over reliance on confirmed ties may underestimate relationships in the network.

In order to gain a better understanding of tightly and loosely connected members of the network, we used the CONCOR block modeling procedure. CONCOR block modeling method relies on structural equivalence. It aggregates network actors into positions based on similar patterns of interaction, regardless of whether or not they interact with each other. Table 2 shows the matrix resulting from this procedure. The content of this matrix is the same as that of the original network matrix represented by Table 1. The only difference is that the organizations/agencies in the rows and columns have been reorganized by CONCOR in a manner to group together those that are structurally equivalent. Four different network positions (P1, P2, P3, and P4) are identified. Each position comprises a set of organizations/agencies that collectively reported collaboration or no collaboration with other organizations/agencies in the network.
Table 2 Blocks of organizations in the network identified through CONCOR block-modeling

Figure 2 Network reduced graph

The CONCOR block modeling procedure also provides a density matrix (Table 3). A density matrix is a table that has positions instead of individual organization/agency as its rows and columns and the values in the matrix are the proportion of ties that are present from the organizations/agencies in the row position to the organizations/agencies in the column position. This density can be used to measure the level of connectedness, which means collaborations in this network, among organizations in the position. In this paper, each cell of the density matrix is referred to as a cluster. For example, the cell at the intersection of position P1 and position P2 will be referred to as cluster P1P2. In order to define a tightly connected network block, we set the cutoff density value to the density of the whole network which is 0.15. In other words, a tightly connected cluster is a cluster in which at least 15% of all possible collaboration ties are effectively made. This method of determining the cutoff density value is frequently used in the literature (e.g. Wasserman & Faust, 1994). Based on this decision, six tightly connected clusters (set of relationships between two positions) were found in the network data. These clusters (P1P2, P2P1, P2P2, P3P1, P3P2 and P4P4) are represented in the image matrix by 1s (Table 4). The rest of the clusters are represented by 0s.
To better understand the collaboration relationship between and within positions, the inter-organizational collaboration network in Table 2 is transferred into the reduced graph in Figure 2. In this graph, positions are represented as nodes and ties between positions in the image matrix define the arcs between nodes. A “1” in an image matrix indicates that there is an arc from the node representing the row position to the node representing the column position in the reduced graph.

5.1 Data on reasons for collaboration

Respondents to the survey were also asked to indicate the reasons their organizations/agencies collaborate with other organizations/agencies member of the network. They were provided with a list of eight reasons from which they could choose all that applied to their organization (Table 5). These eight reasons were derived from the results of the first survey and the data collected through interview and from the literature review. The first survey included an open ended question asking survey participants to provide the reasons for which their organization collaborates with other organizations.

Table 6 shows the responses that were collected. These responses were aggregated for each of the six tightly connected network clusters identified through CONCOR. The aggregation was made based on the number of reported project collaboration relationships in each cluster. For example, if organization/agency ORG1 collaborates for reason R1, this reason will be credited with the total number of collaborations report by ORG1. After calculating the total frequency of occurrence of each reason, we computed the mean frequency per cluster (Table 7) and ranked them from the most important (high mean frequency) to the least important (low mean frequency). Table 8 presents the result of the ranking.
### Table 5 List of reasons for collaboration

<table>
<thead>
<tr>
<th>R1</th>
<th>The goals of both organizations overlap.</th>
</tr>
</thead>
<tbody>
<tr>
<td>R2</td>
<td>The project was on my organization's agenda already.</td>
</tr>
<tr>
<td>R3</td>
<td>Both organizations are operating in the same geographical area.</td>
</tr>
<tr>
<td>R4</td>
<td>My organization is seeking a relationship with the project partner.</td>
</tr>
<tr>
<td>R5</td>
<td>The other organization has a successful track record of securing project funding.</td>
</tr>
<tr>
<td>R6</td>
<td>The other organization has data in which my organization is interested.</td>
</tr>
<tr>
<td>R7</td>
<td>The other organization has information management policies or procedures in which that my organization is interested.</td>
</tr>
<tr>
<td>R8</td>
<td>The other organization has technical tools in which that my organization is interested.</td>
</tr>
</tbody>
</table>

### Table 6 Organizations’ reasons for collaboration

<table>
<thead>
<tr>
<th></th>
<th>R1</th>
<th>R2</th>
<th>R3</th>
<th>R4</th>
<th>R5</th>
<th>R6</th>
<th>R7</th>
<th>R8</th>
</tr>
</thead>
<tbody>
<tr>
<td>NGO1</td>
<td>√</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>NGO10</td>
<td>√</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>NGO20</td>
<td>√</td>
<td>√</td>
<td>√</td>
<td>√</td>
<td>√</td>
<td>√</td>
<td>√</td>
<td>√</td>
</tr>
<tr>
<td>NGO6</td>
<td>√</td>
<td>√</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>NGO8</td>
<td>√</td>
<td>√</td>
<td>√</td>
<td>√</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Table 7 Mean frequency reported types of reasons for collaborations

<table>
<thead>
<tr>
<th>Cluster</th>
<th>R1</th>
<th>R2</th>
<th>R3</th>
<th>R4</th>
<th>R5</th>
<th>R6</th>
<th>R7</th>
<th>R8</th>
</tr>
</thead>
<tbody>
<tr>
<td>NGO1</td>
<td>UN</td>
<td>1.07</td>
<td>1.03</td>
<td>1.37</td>
<td>0.78</td>
<td>0.93</td>
<td>1.16</td>
<td>1.32</td>
</tr>
<tr>
<td>UN</td>
<td>NGO1</td>
<td>0.98</td>
<td>0.94</td>
<td>1.55</td>
<td>0.72</td>
<td>0.43</td>
<td>1.03</td>
<td>1.14</td>
</tr>
<tr>
<td>UN</td>
<td>NGO1</td>
<td>0.95</td>
<td>0.94</td>
<td>0.62</td>
<td>0.95</td>
<td>1.23</td>
<td>0.84</td>
<td>0.76</td>
</tr>
<tr>
<td>OTHER</td>
<td>NGO1</td>
<td>0.96</td>
<td>0.86</td>
<td>0.65</td>
<td>0.98</td>
<td>1.10</td>
<td>0.70</td>
<td>0.74</td>
</tr>
</tbody>
</table>

| NGO7   |    |    |    |    |    |    |    |    |
| NGO18  |    |    |    |    |    |    |    |    |
| NGO21  | √  | √  | √  | √  |    |    |    |    |
| NGO26  | √  | √  | √  | √  |    |    |    |    |
Table 8  Ranking of types of reasons for collaboration in decreasing order of mean frequency

<table>
<thead>
<tr>
<th>Rank</th>
<th>NGOs → UN</th>
<th>UN → NGOs</th>
<th>UN → UN</th>
<th>OTHER → NGOs</th>
<th>OTHER → UN</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>R3</td>
<td>R3</td>
<td>R3</td>
<td>R5</td>
<td>R5</td>
</tr>
<tr>
<td>2</td>
<td>R7</td>
<td>R8</td>
<td>R7</td>
<td>R8</td>
<td>R4</td>
</tr>
<tr>
<td>3</td>
<td>R8</td>
<td>R7</td>
<td>R6</td>
<td>R4</td>
<td>R1</td>
</tr>
<tr>
<td>4</td>
<td>R6</td>
<td>R6</td>
<td>R8</td>
<td>R1</td>
<td>R2</td>
</tr>
<tr>
<td>5</td>
<td>R1</td>
<td>R1</td>
<td>R4</td>
<td>R7</td>
<td>R7</td>
</tr>
<tr>
<td>6</td>
<td>R2</td>
<td>R2</td>
<td>R1</td>
<td>R8</td>
<td>R8</td>
</tr>
<tr>
<td>7</td>
<td>R5</td>
<td>R4</td>
<td>R2</td>
<td>R7</td>
<td>R6</td>
</tr>
<tr>
<td>8</td>
<td>R4</td>
<td>R5</td>
<td>R5</td>
<td>R3</td>
<td>R3</td>
</tr>
</tbody>
</table>

6 Data Analysis

6.1 Characterizing network positions and network clusters
As shown in Table 3, applying the CONCOR procedure to the network data produced four structurally equivalent positions in the network. The number of organizations/agencies in each the network positions varies significantly ranging from 4 (four) to 15 (fifteen). Positions P1 and P4 have the smallest number of organizations/agencies, 5 (five) and 4 (four) respectively. These two positions could also be characterized as NGOs positions since 4 (four) out of the 5 (five) organizations/agencies in position P1 and 2 (two) out of the 4 (four) in position P4 are NGOs. We refer to these two positions in the rest of the paper as NGO1 and NGO2. Position P2 in made up of 11 (eleven) organizations/agencies mainly from the UN System (six out of eleven). The only Donor organization in the 35 surveyed belongs to this position. This position could be characterized as the UN position. Position P3 has the greatest number of organizations/agencies (fifteen) and is the most diversified in term of different categories represented (eight). With six organizations/agencies, academia is the category with the highest number of organizations/agencies. The only Media organization surveyed belongs to this position. Position P3 could be characterized as the ‘other agencies’ position. In the rest of the analysis, we will refer to positions P1 and P4 as NGOs positions; position P2 as United Nations (UN) agencies position and position P3 as Other position. Similarly, the cluster P2P2 for example will be referred to as the UN agencies cluster. This examination of the GlobalSympoNet collaboration network positions sheds some light on the grouping of the members of the network.

6.2 Patterns of collaboration
After the network is partitioned into structurally equivalent positions, patterns of relationships between and within the positions are examined using the density matrix and the image matrix (see Wasserman, & Faust, 1994 p.389-391). As said earlier, a density matrix shows the proportion of potential linkages that are actually sent from a row position to a column position. It is possible for a position to send many linkages to other positions and not to receive linkages in return. Another possibility is for a position to be internally linked, with members of the block sending links to one another.

Six tightly connected clusters of collaboration were identified in the GlobalSympoNet network data. With regards to the density of interactions, these clusters present diversified patterns of project collaboration between and within the four structurally equivalent network positions. Scores in the density matrix range from 0.40 to 0.167. The cluster formed by NGO1 and UN is the most strongly interconnected. Forty percent (40%) of all the possible project collaboration relationships between the organizations in this cluster were actually found to exit. In contrast, only about seventeen percent (17%) of all possible linkages between organizations/agencies in the cluster NGO2 were found to exist.

6.2.1 Patterns of collaboration within clusters
Among the six tightly connected clusters that were identified in the network data, two were concerned with inter-organizational collaboration relationships within cluster. They include the UN agencies cluster (P2P2) and one of the two NGOs clusters (P4P4). The level of collaboration among organizations/agencies in each of these two clusters was higher than the average in the whole network. However, these two clusters differed
significantly in term of density of collaboration. With approximately twenty seven percent (26.4%) of connections, the UN agencies cluster has one of the highest densities among the tightly connected clusters while one of the NGOs cluster (P4P4) has the lowest density (less than 17%). The reduced graph (Figure 2) shows that the NGOs cluster P4P4 is an isolate in the network. That means that organizations/agencies in this cluster collaborate only among themselves.

6.2.1 Patterns of collaboration between clusters
As depicted in the reduced graph (Figure 2) the following between clusters collaboration relationships were found to exit in the network; (i) NGOs, UN agencies, (ii) NGOs, Other and (iii) UN agencies, Other. An examination of the directions of relationship flows between clusters in the reduced graph shows a unique directional relationship between Other and NGOs (P1) and between Other and UN agencies. This means that organizations/agencies that we characterized in this study as “Other” (position P3) reported a significant number of collaboration relationships with organizations/agencies in both NGO1 position and UN agencies position. Organizations/agencies in NGO1 and UN agencies positions did not report collaboration relationships with “Other” or the number of reported relationships were not important (less than the cutoff point in the density matrix). This finding may be a common characterization of relationships between resources providers and resources seekers. The pattern of relationships is consistent with this notion. The reduced graph also shows a bidirectional relationship between NGOs (P1) and UN agencies, indicating organizations/agencies in both positions reported a significant number of collaboration relationships with organizations/agencies in the other position.

6.3 Reasons for collaboration
Table 7 shows for each of the six tightly connected clusters of interactions the mean frequency of occurrence of reasons for collaboration. The highest score cross cluster is for reason R3 (both organizations are operating in the same geographical area). This highest score is registered within the UN agencies cluster. The lowest score cross cluster is for reason R5 (the other organization has a successful track record of securing project funding). This score is also registered within the UN agencies cluster. The appearance of these two extreme scores in the same cluster suggests a strong indication of the motivations of inter-organizational project collaboration relationships among the United Nations agencies.

An examination of Table 7 also shows that two different main reasons for collaboration (highest scores) are identified that could characterize two of the six clusters. As mentioned earlier, reason R3 would characterize the United Nations agencies cluster, while R5 (Successful track record of securing project funding) would characterize cluster P3P2. This finding suggests that the need for resources and especially the need for funding would be the main motivation for organizations in the “Other” position to collaborate with the United Nations agencies.

Another interesting finding of our investigation is that the two main reported reasons for collaboration (both organizations are operating in the same geographical area; the other organization has a successful track record of securing project funding) occupy respectively and inversely the top and the last positions in the two most densely connected clusters.

Table 9 Density of collaboration among organizations grouped per reasons

<table>
<thead>
<tr>
<th>Reasons for Collaboration</th>
<th>R1</th>
<th>R2</th>
<th>R3</th>
<th>R4</th>
<th>R5</th>
<th>R6</th>
<th>R7</th>
<th>R8</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of organizations</td>
<td>30</td>
<td>17</td>
<td>12</td>
<td>16</td>
<td>17</td>
<td>22</td>
<td>17</td>
<td>23</td>
</tr>
<tr>
<td>Max number of possible ties</td>
<td>870</td>
<td>272</td>
<td>132</td>
<td>306</td>
<td>272</td>
<td>402</td>
<td>272</td>
<td>506</td>
</tr>
<tr>
<td>Number of ties present</td>
<td>166</td>
<td>93</td>
<td>77</td>
<td>124</td>
<td>103</td>
<td>128</td>
<td>103</td>
<td>124</td>
</tr>
<tr>
<td>Density</td>
<td>0.19</td>
<td>0.34</td>
<td>0.58</td>
<td>0.41</td>
<td>0.38</td>
<td>0.28</td>
<td>0.38</td>
<td>0.25</td>
</tr>
</tbody>
</table>
Table 9 presents the density of collaboration among organizations grouped per reported reasons of collaboration. As highlighted in this table, R3, R4, R5 and R7 register respectively the first, second and third highest density of collaboration. These findings are concordant with the result obtained from block modeling.

7 Discussion and Conclusion
The objective of this research is to investigate inter-organizational collaboration behavior / reasons among humanitarian organizations/agencies which are members of a community of interest in information exchange. We seek to understand the patterns of interconnections among organizations/agencies in the community. We also investigate the reasons that explain the collaboration patterns observed in the community. Although previous research highlight the popularity of inter-organizational collaboration in the nonprofit sector and document issues involved in forming and maintaining these inter-organizational collaborations few studies examine the behavior of humanitarian organizations/agencies members of a community of interest in information sharing.

The findings of this study can be grouped into two categories, one related to the structure of relationships in the GlobalSympoNet community and the other related to the motives of information exchange within the community. With regards to the structure of relationships, our study shows that the UNOCHA GlobalSympoNet community is fragmented into four groups described as network positions. The density of collaboration relationships within and between these groups varies significantly ranging from 0% (zero) to 40% (forty). Organizations/agencies of each group appear to be almost all in similar category (e.g. NGO, UN agencies, Academia). This may mean that organizations in similar categories hold similar structural positions in the inter-organizational humanitarian information exchange network. This finding is consistent with some previous inter-organizational network research that used the structural equivalence lens. As mentioned earlier, structural equivalence measures the extent to which certain network members occupy similar positions and serve similar functions, or roles, within the network. Knoke (1983) and Galaskiewicz and Krohn (1984) describe inter-organizational structural equivalence as being based upon the function and activity of the organization. In the case of humanitarian information exchange network, these groups are most likely to be defined by their categories.

Concerning the motivations for collaboration, the study shows that two main reasons predominantly characterize collaboration relationships among members of the GlobalSympoNet community. More importantly, we found that the two predominant reasons were inversely the most and least reported in two of the most densely connected clusters. The first reason is related to location of operation (i.e., both organizations/agencies are operating in the same geographical area). This finding suggests that similarly to people for who when they reside near one another, they have more opportunities to interact (Hoegl & Proserpio, 2004), proximity is one of the reasons for humanitarian information management among organizations. Humanitarian organizations that are collocated are more likely to interact thus to collaborate in information exchange than those that are geographically distant. The second reason indentified in our study is related to resources (i.e., the other organization has a successful track record of securing project funding). This finding suggests that resources play a significant role in information exchange among humanitarian organizations in the GlobalSympoNet community. This finding is consistent with that of Knoke & Rogers, (1979). In their analysis of multiple relationships among community development organizations, Knoke & Rogers found that organizations enter into relations with others to secure needed resources. Their findings also suggest that organizations that receive resources are expected to reciprocate by returning resources comparable in value. We believe the fact that the two predominant reasons were inversely the most and least reported in two of the most densely connected clusters is consistent with Bolland & Wilson (1994). According this paper every inter-organizational network is clustered into groups of agencies centered on specific needs. Our study extends their work in the humanitarian information exchange field.

As stated earlier, according to the exchange perspective of inter-organizational relationships, relations form when organizations perceive mutual benefits or gains from interacting (Levine & White, 1961; Hall et al., 1977). Our findings corroborate with this perspective as proximity and resources are found to be the major reasons for which organizations collaborate in humanitarian information exchange. Proximity provides opportunity for interaction and interaction would lead to mutual benefit. When looking at the findings from the structural equivalence perspective (Burt, 1976; 2008; Wasserman, & Faust, 1994), the fact that the two predominant reasons for collaboration were inversely the most and the least reported in two different clusters would be consistent with this approach. Organizations in the same structurally equivalent network position would tend to have similar behavior in the network. The results of this research contribute to the body of literature inter-organizational collaboration among humanitarian organizations/agencies by identifying and describing the patterns of collaboration as well as the motives that could explain these patterns.
Summarizing, this paper responds to a call for researchers to further examine solutions to interorganizational collaboration issues. It sheds some lights on collaboration behavior in a community of interest in humanitarian information exchange. It also identifies some factors that explain the patterns of collaboration found in the community. The results of this study should be considered in light of several limitations. Of particular concern, is the potential sampling bias due to the fact the survey participants were not selected through any scientific sampling technique. Rather, the survey was conducted on a sample defined by UNOCHA thereby generating an organizational bias. Another limitation to the study concerns the source of information. The network data was constructed based on information provided by individuals. Although most of our survey participants were high ranked senior staff in their respective organizations, they might not always have complete information about the organization’s relationships and the motivations for these relationships. A third limitation concerns CONCOR, the social network block model that we use. CONCOR has been criticized as lacking validation. That is, there is no proof that convergence of the correlation matrix actually represents structurally equivalent positions. Lastly, two important assumptions are made in the study. First, we assume that interorganizational collaboration relationships are of different kind. At any particular time, an organization could be engaged collaboratively in different kind of projects with other organizations. The second assumption is that reasons for which an organization collaborates with others were the same irrespective of projects or collaboration partner’s characteristics.

References


