

Appendix 3. SNA term definitions.

Betweenness centrality - a measure, developed to assess the extent to which a node is among other nodes in a network i.e. how many times a certain node connects the other two nodes that are not directly connected (Freeman 1978). Betweenness centrality takes the intermediary nodes into consideration and is calculated based on the shortest path among the nodes (Opsahl et al. 2010).

Broker - a node with high betweenness centrality (Freeman 1977) and/or low Burt's constraint score (Burt 1992, Lee 1999, Therriault et al. 2004), which both, receives but also sends many relational ties out to the other stakeholders (Wasserman and Faust 1994) and serves as a bridge between the disconnected or weakly connected stakeholders. Betweenness centrality locates the brokers with respect to all the other actors in the network. Burt's constraint however, is a local measure of brokerage based on the triadic closure principle. A triad is any three nodes in the network with any type of relationship (Davis and Leinhardt 1967). If the tie is absent between two neighboring nodes in a triad, then the triad is incomplete and has a structural hole in it (Burt 1992). A node connecting two disconnected nodes in an incomplete triad has a power to broker. Brokers have low Burt's constraint score, meaning that their behavior is not constrained by the other disconnected nodes in a triad (Burt 1992). High constraint on the actor means that it is involved in many complete triads and is constrained to act as broker.

Burt's constraint - a measure, developed to assess the extent to which an actor's behavior is constrained by the other actors in a network, based on a triadic closure principle. Actor can have a Burt's constraint value ranging from 0, if it is involved in many incomplete triads, to 1, if it is involved in many complete triads (Burt 1992). Lower the actor's Burt's constraint score, lesser its behavior is constrained by other nodes in the network.

Confirmation rate - proportion of relational links described similarly by both nodes involved (Stork and Richards 1992).

Degree centrality - the number of connections that a particular node has with all the other actors in a network (Freeman 1978). In a directed network, the degree of a node is measured through a combination of in-degree and out-degree values. The in-degree value of a node is the number of the actors that have an incoming link to it, and the out-degree value is the number of outgoing links from the node (Kleinberg 1998). In weighted networks node strength represents an extension of degree centrality to the sum of tie weights and integrates information about connectivity and the weights of links (Barrat et al. 2004, Newman 2004, Opsahl et al. 2008).

Directed network - a network, in which the edges have a direction, as such a message or resources are sent from a sender to a receiver (Shannon and Weaver 1949).

Edge - a relational link between actors, also known as arc or tie (Wasserman and Faust 1994).

Network centralization - a measure of the extent to which certain actors are more connected in the network than the others (Freeman et al. 1979, Wasserman and Faust 1994). A centralized network is one in which only one or few actors are having the majority of ties. Such a network has a high overall centralization score. If actors are not very different from each other in their degree of connectedness, the

overall centralization score is low, so the network is decentralized. The network centralization index can be calculated based on 'degree centrality' scores of individual nodes, and indicates the relative dominance of single actors in the network (Freeman et al. 1979).

Network density - also referred to as the graph density, is a measure of the proportion of the relational ties that are actually present in a network. It is calculated by dividing the number of existing ties by all the possible ties in a network (Scott 1991). Density can have a value ranging from 0, if all the ties are absent, to 1, if all the possible ties are present (Scott 1991, Wasserman and Faust 1994).

Network homophily - a selective linking between actors based on specific attributes, such as the category of institution (Newman 2003). Stakeholders are more likely to form strong connections with similar stakeholders than with stakeholders from other categories as they have higher mutual understanding (Prell et al. 2009).

Node - representation of actor in a network, also referred to as a vertex or point (Wasserman and Faust 1994).

Node centrality - a measure of a particular actor's involvement in the network, represented through the degree and betweenness centralities. The more relational ties an actor has, and more times it connects the other nodes that are not directly connected, the more central it is.

Shortest distance - a minimum number of steps that the nodes are away from each other in a network. In weighted networks the tie weights shall be taken under consideration (Opsahl et al. 2010).

Sociogram - a two-dimensional picture showing relationships between the actors where the actors are represented by the nodes and the relationships between them are represented by the edges (Moreno 1953).

Theme - a recurrent unifying concept or a statement about the content/subject of the inquiry (Bradley et al. 2007).

Triad - any three nodes in a network with any type of relationship (Davis and Leinhardt 1967). A triad is complete if all three actors in it are connected to each other, and incomplete if a tie is absent between two neighboring nodes in it (Burt 1992).

Weighted network - a network in which the edges carry values that can be used as a measure of the strength of the relationship (Wasserman and Faust 1994).

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