

SOCIAL NETWORK ANALYSIS

Social Network Analysis (SNA) covers a range of different tools and methods, designed to help map and analyse social networks. Its main purpose is to identify and analyse the relationships within and between different actors within social networks. SNA can be applied to any size of network from very small, localised networks through to large, international ones.

Social Network Analysis (SNA) covers a range of different tools and methods, designed to help map and analyse social networks. Its main purpose is to identify and analyse the relationships within and between different components of a social network. SNA is often associated with complex diagrams and maps of networks, such as the one displayed at the bottom of this page (see Brayton 2013). However, it also covers other methods such as matrices and metrics.

A social network can be defined as “a number of actors connected by some kind of relationship” (Davies 2009, p3). The actors may be individuals, groups or organisations. The relationships between actors may be formal or informal. They might be based on friendship or business. They might involve communications flows, business transactions, social media interactions, or any other kind of relationship. Networks can take many forms, including coalitions, partnerships, communities of practice, associations, and unions (Hearn 2012).

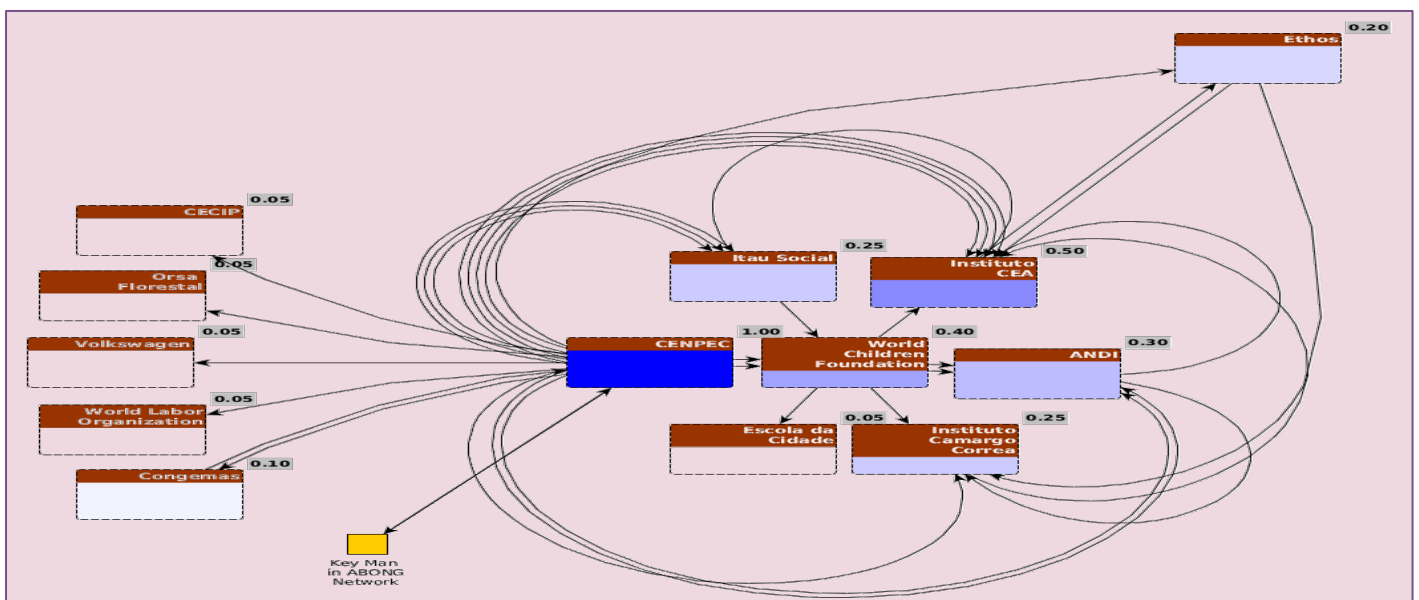
SNA has been in use for a long time. However, recent advances in Information Communications Technology (ICT) have made it much easier to capture and graphically display large amounts of information. This helps to explain why SNA has become much more popular over recent years.

Another factor is the large amount of development work that is now being done through partnerships and coalitions

of different kinds. Sometimes the partnerships are simple, but at times they can be very complex indeed, covering many actors and different relationships (Sette 2013). SNA can lead to better understanding of these partnerships, with a view to improving them and helping them better serve their purposes.

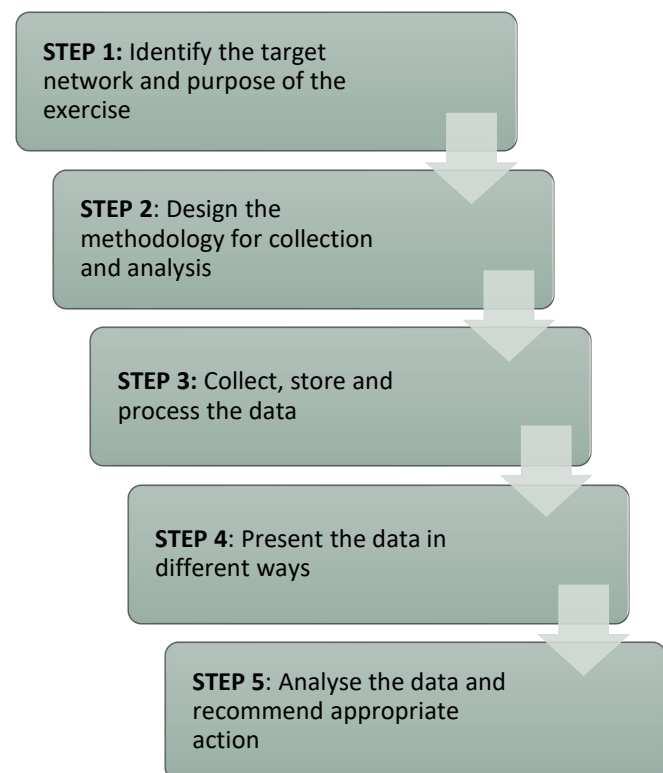
SNA can be used during situational analyses or project / programme design for diagnostic purposes. In other words it can be used to help try and understand a network better. Based on this better understanding a plan may be put in place to support the network. This plan can then be monitored and evaluated using standard monitoring and evaluation (M&E) methods. Alternatively, a Social Network Analysis exercise can be repeated after a period of time to see what has changed. These changes can then be further examined to see what contributed to them, and how they have affected the performance of the network.

SNA can be applied to networks at any level from very small, local networks through to large, international ones. Within social development, CSOs have commonly used SNA in areas of work such as policy influencing and mobilisation, where large amounts of work are carried out through partnerships and coalitions. SNA has also been used extensively to map and analyse knowledge networks and communities of practice.



How it works

There is no fixed methodology for Social Network Analysis. However, most approaches contain all or most of the steps described below.



STEP ONE

The first step is to **identify the network** that is of interest. In some cases it may be obvious what the network is, particularly if there are formal rules governing the relationships between different actors. In other cases some work may need to be done to define the network, or to draw boundaries between where one network ends and another one starts.

The purpose of the exercise should be made clear at this stage. If the intention is to repeat the SNA exercise at some stage in the future then that should be clear from the start. During this initial step it is often useful to produce a set of questions that the SNA exercise will be designed to answer.

STEP TWO

The next step is to **design the methodology for data collection and analysis**. Data for SNA is often generated through questionnaires or surveys, administered to different network actors. The type of questions contained within the questionnaires or surveys have a significant impact on the information generated. It is therefore considered particularly important to spend a lot of time ensuring that the questions are the right ones (see Hovland 2007). This heavily depends on the type of network. A formal alliance based around policy influencing goals is likely to require very different questions than an informal, knowledge sharing network.

STEP THREE

The next step is to **collect, record and store the data**. Nowadays it is normal for SNA to be conducted through specialist software, in which case the data needs to be stored in a format that is suitable for the software. Sometimes this means storing data in a common software package such as Microsoft Excel or Access. In other cases data might need to be input directly into the specialist SNA software package.

STEP FOUR

After it has been collected and stored, the next step is to **present the data**. Nowadays, presenting data in picture or diagram form is normally the easiest part of SNA. Once the information has been collected and stored then computer software can be used to generate a map (or different maps) of the network. There are also other ways in which data can be presented, including matrices, graphs, tables and plots. These are described in the following section.

STEP FIVE

The final step is to **analyse the data and recommend appropriate action**. It is important to note that SNA software can help present and display data with a view to supporting analysis, but the analysis itself needs to come from human beings. In some circumstances (such as in an evaluation or situational analysis study) the analysis can be done by an individual or a team. At other times, analysis can be conducted as a participatory exercise, involving members of the network.

Actions taken based on the analysis will vary according to the purpose of the exercise. In some circumstances the data and analysis can be used to form a baseline against which future change can be assessed. In other circumstances an action plan can be developed to help support or improve a network in areas where analysis suggests change might be useful. This action plan could then be monitored to see if desired changes are taking place. If SNA is used within an evaluation or impact assessment then the analysis can contribute to the findings of the evaluation (or impact assessment) along with any recommendations.

Different methods for data presentation and analysis

As stated above, SNA data can be presented in different ways and in different formats, including network diagrams or pictures, matrices, graphs, etc. Some of these are described briefly below.

Diagrams: Network diagrams are not new and have been around for many years. Participatory mapping has always formed an important part of Participatory Learning and Action (PLA), and Venn diagrams have often been used to help communities analyse the relationships between themselves and other social actors. Indeed, some network mapping is still done by hand without the aid of computer software. But improvements in ICT over the past two decades have enabled much larger networks to be mapped, and far more complex diagrams to be developed with relatively little effort.

Network diagrams developed through software are usually made up of a series of nodes. These represent the actors in the network, such as individuals, groups or organisations. The nodes are then connected by lines. The lines represent the relationships, information flows or connections between the different actors (see diagram on the first page). Different aspects of the relationships can be displayed by comparing the length of the lines (e.g. the closer the line the closer the relationship). Alternatively, lines may be different in terms of width, colour and shape to show different kinds of relationships.

There are many different software packages that can be used to help develop network diagrams. Some of the most often cited free packages are UCINET/NetDraw, Gephi and NodeXL (see references at the end of this paper). In the opinion of Rick Davies (2009) one of the biggest challenges for newcomers to SNA is choosing which software package to use, and then learning how to load the data and produce useful network diagrams.

Matrices: The same data used to develop a network diagram can also be used to develop matrices or tables that can show the linkages between different actors in a different way. Matrices can be used to provide detailed information about the connections between individual actors. For example, the matrix in the following table shows which NGOs are providers or recipients of information from which other actors. In the box '1' is used to show that an NGO (in the row) provides information to another NGO (in the column). For example, NGO 1 provides information to all the other NGOs, but only receives information from NGO 2. NGOs 4 and 5 only provide information to each other.

	NGO 1	NGO 2	NGO 3	NGO 4	NGO 5
NGO 1	-	1	1	1	1
NGO 2	1	-	0	1	0
NGO 3	0	0	-	1	0
NGO 4	0	0	0	-	1
NGO 5	0	0	0	1	-

Metrics: The same data that is used to develop diagrams and matrices can also be used to produce some

mathematical analysis of networks. For example, data can allow assessments of how dense a network is, or the degree to which it is centralised. Some examples of the types of metrics (or indicators) that can be generated through SNA are contained in the box below, adapted from a recent study by Dersham and Bokuchava (2016).

Sample metrics (indicators) used in SNA

- Number of network members
- Diversity of network members (e.g. different types of actors in the network)
- Connectedness (e.g. percentage of network members connected or linked to each other)
- Reach (the number of steps or path lengths between different organisations in the network)
- Reciprocity (the proportion of interactions that are mutual, e.g. where information flows in both directions)
- Number of clusters (e.g. clusters where members have much interaction with each other but little connection with other network members)
- Degree of centralisation (the degree to which relationships are dominated by one organisation or a group of organisations)
- Sustainability (which can be calculated by looking at the potential for a network to fragment if one or more members leaves or becomes inactive)
- Outreach (how many alliances members have relationships and connections outside of the network)

Clearly, any metrics will need to be tailored to the specific network. But the types of metrics listed above can be used not only to develop network diagrams but also graphs, tables, plots and charts as well.

Strengths and weaknesses

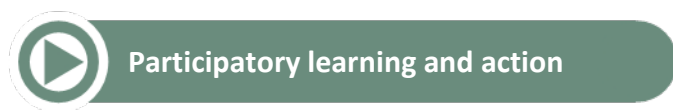
Perhaps the biggest strength of SNA is that it is one of the few methodologies currently available that looks beyond the individual characteristics of individuals and organisations, and focuses instead on the relationships between them.

The main challenge, as mentioned above, is that it can be difficult at first to use dedicated SNA computer software. This means there is a tendency to employ outside experts to conduct the data collection and presentation, and sometimes the analysis as well. Consequently, analysis can turn into a 'top-down' exercise rather than a participatory one involving network members.

As with many similar technologies, SNA software does not actually conduct the analysis itself. It merely helps organise and present data so that others can more effectively conduct the analysis. The interpretation of the data is still key, and needs to be done by humans.

Further reading and resources

Venn diagrams used with Participatory Learning and Action (PLA) are covered in a separate paper in the M&E Universe. There is also a paper on monitoring and evaluating network development. Links to these papers are contained below.



Links to the three SNA software packages mentioned can be found below

- UCINET/NetDraw - <https://sites.google.com/site/netdrawsoftware/home>
- Gephi - <https://gephi.org/>
- NodeXL - <https://nodexl.codeplex.com>

The document “NGO Network Analysis Handbook: How to measure and map linkages between NGOs: Understanding and Improving the Impact of Youth Confidence-Building Initiatives” provides a step-by-step account of how a Save the Children project in Georgia measured and mapped a network of youth-focused NGOs working in the Samegrelo and Gali regions. The project used NetDraw, and provides a detailed account of the processes used. It was written by Larry Dershem, Tamar Dagargulia, Lilly Saganelidze and Stephanie Roels, and was published by Save the Children Georgia in 2011. It is freely available from the internet.

References

- Brayton, C (2013). *SNA: Merging and Emerging Order*. <https://tupiwire.wordpress.com/2013/11/29/sna-merging-and-emerging-order/>
- Davies, R (2009). *The Use of Social Network Analysis Tools in the Evaluation of Social Change Communications*. Communication for Social Change Consortium, 2009.
- Dersham, L and Bokuchava, T (2016). *Network Weaving for Regional Development: An Evaluation of the Caucasus’ Agricultural Alliances in Armenia and Georgia Using Social Network Analysis*. Oxfam Research Reports, August 2016.
- Hearn, S (2012). *Evaluating networks - some resources and some software*. Better Evaluation. Blog retrieved January 2017 from <http://betterevaluation.org/en/blog/evaluating-networks>
- Hovland, I (2007). *Making a Difference: M&E of policy research*. Overseas Development Institute, 2007.
- Sette, C (2013). *Using Social Network Analysis for M&E*. Better Evaluation. Blog retrieved January 2017 from http://betterevaluation.org/en/blog/Using_SNA

Author(s):

INTRAC

Contributor(s):

Nigel Simister and Alison Napier

INTRAC is a not-for-profit organisation that builds the skills and knowledge of civil society organisations to be more effective in addressing poverty and inequality. Since 1992 INTRAC has provided specialist support in monitoring and evaluation, working with people to develop their own M&E approaches and tools, based on their needs. We encourage appropriate and practical M&E, based on understanding what works in different contexts.

M&E Training & Consultancy

INTRAC’s team of M&E specialists offer consultancy and training in all aspects of M&E, from core skills development through to the design of complex M&E systems.

Email: info@intrac.org

Tel: +44 (0)1865 201851



M&E Universe

For more papers in the M&E Universe series click the home button