

'Ladies and gentlemen, we got him!'

(Amb. Paul Bremer. Baghdad, Dec 2003)

Saddam Hussein was captured through US-led Intelligence Social Network Analysis (ISNA) on his extended family



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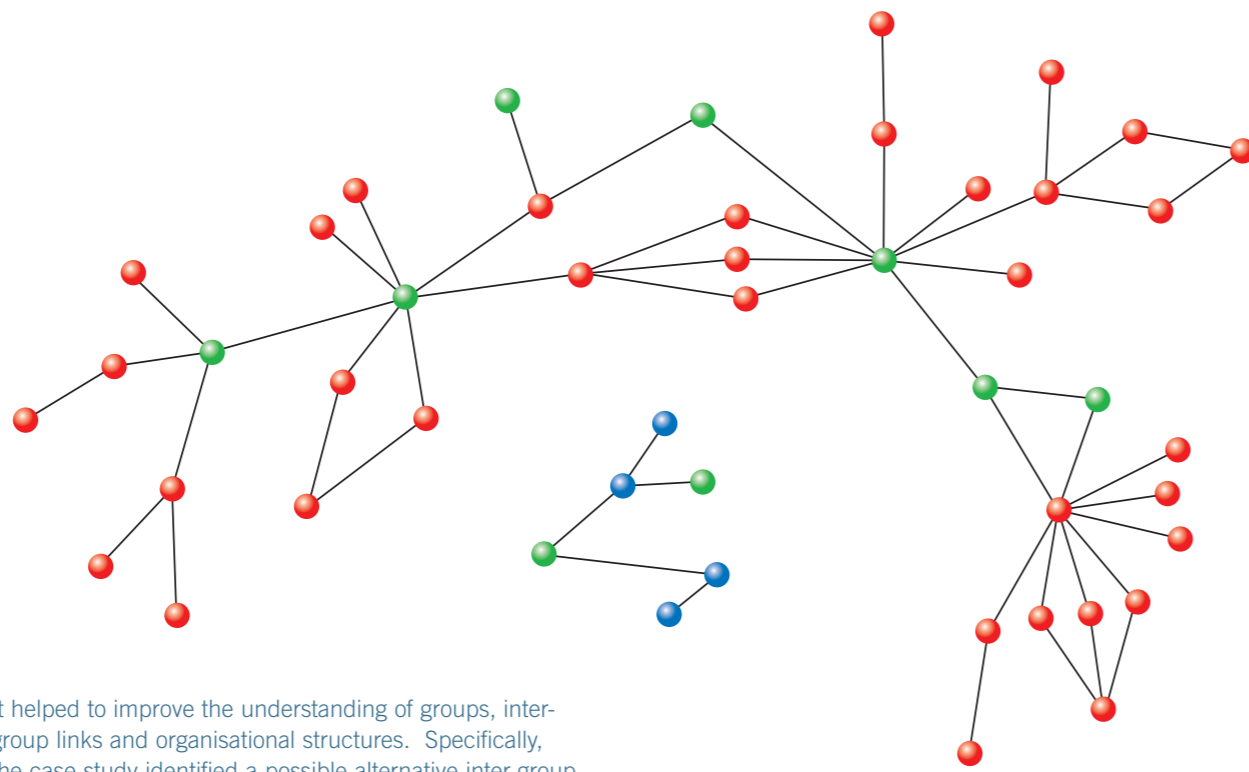
Social Network Analysis (SNA) is a mathematical technique for understanding social interactions within groups of interest. Social networks are represented visually as points with lines between them. The points are entities such as people or groups and lines indicate the existence of some kind of relationship (eg. 'is a friend of'). SNA applies numerical algorithms to study network structures, identifying strengths and vulnerabilities by drawing upon understanding of social interactions, cultural and psychological factors.

The value of SNA has already been demonstrated in academic and commercial applications. Dstl Strategic Analysis Group has, over the past 2.5 years, undertaken a number of case studies to progress towards determining whether elements of SNA can extend to intelligence information, where data is imperfect, networks are not naturally bounded and people of interest are inaccessible and covert.

Little work had previously been conducted to utilise SNA in defence and intelligence. Intelligence analysts have been visualising target groups as networks for some time, but there is a growing awareness that pictures alone are not enough. A number of Dstl case studies, conducted in conjunction with the Intelligence Agencies, have demonstrated that SNA can support and enhance more traditional analysis methods.

The original case study highlighted that employment of a systematic approach to identify, extract and manage social network data from Intelligence material, combined with the use of quantitative SNA techniques, could significantly improve the quality of existing Intelligence outputs. For example:

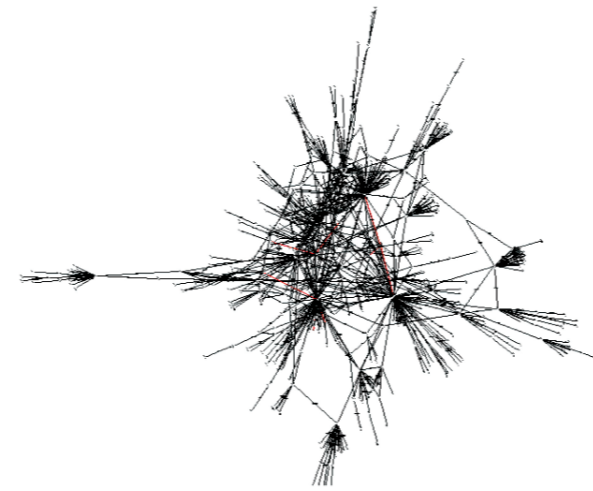
- It helped to improve the understanding of groups, inter-group links and organisational structures. Specifically, the case study identified a possible alternative inter-group structure to that previously assumed by the Intelligence Agencies when using conventional analysis methods.
- SNA techniques were adapted to infer possible links and pathways between individuals and groups that were not readily apparent from the raw data.
- A more systematic approach to data capture aided transfer of knowledge between analysts, afforded great flexibility to address 'what-if' questions in subsequent analysis and provided a rigorous audit trail.



Two case studies have now been completed and a further two are currently underway!

ISNA Tasking and Study Design

- Getting tasked is not as simple as it sounds. Before someone will commission an ISNA study, they need to be convinced that SNA is worth investing time and effort in. Typically, added-value needs to be demonstrated before a study is commissioned.



This image represents the actual network picture from one of the Dstl-led case studies.

- Once a project has been tasked, the project team needs to be identified. Who is going to do the coding and who is going to do the analysis? How many people are needed? Where should they come from? The effort required before SNA analysis can start should not be underestimated. The team needs to include Subject Matter Experts for the scenario being modelled. These people will be of the utmost importance when you reach the stage of data tidying and analysis.
- Although the approach used within our studies is to code quite a broad range of data, the whole process should be focused upon answering customer questions. The question to be answered will drive everything from the set up of the study through to the results which are presented. Where possible, the customers should be engaged at the start and some form of draft (at least) questions identified.
- Once a case study has been commissioned, the team established and customer questions drafted, a taxonomy for the study must be determined. What are the elements of the situation which you are interested in? For example, people, groups and places. Do you want to code events as nodes? What sort of relationships are you interested in? Here you have lots of choice. Some people simply code relationships as either positive or negative. This makes things easy at the analysis stage but misses a lot of information. Other people have lists of 50-100 relationship types. This captures the true (reported) nature of every link, but raises the question of how easy it is to code and how this information will be used during analysis.

- Who is going to do what? Who is going to code what? What are you going to code your information into? How are you going to analyse your information?

Issues associated with the application of SNA methods in the Intelligence context

- Techniques and measures used in traditional (academic) SNA need to be adapted to make them more applicable to ISNA.

Links between Questions, Techniques and Added Value

Question	Technique	Added Benefit
Who are the key people in the system of interest?	Centrality measures	Answers provided may not be easily identifiable by eye Solutions may not be apparent even with data familiarity
Are there any links between A and B?	Path identification and analysis Affiliation analysis	Easy identification of all paths between specified nodes Identification of paths not easily discernible by eye
How does X talk to Y?	Path identification and analysis	Understanding the nature of communications between two nodes
How close are M and N?	Affiliation analysis Link type identification and analysis Trusted links distances and analysis	Understanding of the relative distances between groups of interest Understanding the impact of stronger links on the distance between nodes Understanding how close nodes are with respect to more trustworthy links
Who is linked to whom through training, upbringing or operating locations?	Location interlock analysis	Identification of links formed between people at some stage in their lives that may be the basis of relationships emerging at a later date
How long has X been the key?	Time slicing by report dates	Understanding of how the system is changing with time
How is Y's importance changed over time?	Time slicing by report dates	Understanding of how the system is changing with time
What are the key links in the system of interest?	Link analysis using centrality measures Key nodes	Links may be easier to influence than nodes May be an effective means of targeting the network
How can I best influence the system of interest?	Key links Trusted links Other links	May be an effective means of targeting the network High impact if able to influence May be easier to influence

- Software available for SNA has not been designed to cope with difficulties associated with Intelligence data. Although the tools may be manipulated to perform the required tasks, this is typically laborious and time-consuming. Disproportionate amounts of time were consequently spent managing software rather than undertaking analysis.
- It is important to retain a balance between data coding and analysis: sufficient data must be coded to allow analysis to be undertaken, but time must also be allowed for analysis. The split between coding and analysis in the SNACS case study was approx. 40%: 60%. However, the systematic coding process allows retrospective examination of the stability of SNA metrics. For example, the same conclusions about who were the most central people in the network could have been drawn at the end of the first half of the coding period. Further analysis and research should be conducted to examine the stability and reliability of SNA metrics.

Nevertheless, systematic coding and quantitative SNA should help to make such bias more explicit. The approach also allows data to be filtered in a flexible fashion. For example, it would have been possible to assess the different network pictures derived from specific Intelligence sources.

- Raw Intelligence data was not available to the analysts in the original case study. It is likely that the raw data contains additional information that would add value to the SNA.
- The case study highlighted that the coding and analysis processes are iterative. For example, analysis of the network helped to identify Intelligence anomalies and coding inaccuracies.

Intelligence Social Network Analysis Has Proved Extremely Successful and is Now Being Used Operationally by HMG!

- Comprehensive, unbiased data on covert social networks is not available. Intelligence data is likely to be skewed towards targets of particular interest at any given time.