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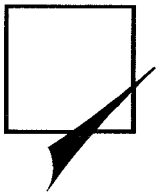

Scale, Complexity and the Representation of Theories of Change

Part II

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Because of the global scale and diversity of their work, international aid agencies face major problems when attempting to represent their plans and evaluate their achievements. In this second of two articles looking at types of change processes, the focus is on complex processes of change that include mutual influence, parallel processes and feedback loops. Four practically oriented arguments are put forward for using a network perspective to represent these processes: the broad applicability of a network framework, its scalability, the range of measurement and descriptive tools available and the multidisciplinary body of theory and research available to inform agencies' theories of change. Networks are then contrasted with hierarchies as background metaphors, and implications are identified for the monitoring and evaluation of development projects. In this article relevant examples have been drawn from the author's consultancy experience with development aid programmes in Bangladesh and Ghana.

KEYWORDS: complexity; networks; representation; scale; theory of change

Introduction

The previous article (Davies, 2004a) argued that organizational scale brings complexity and it is not possible or appropriate to try to represent all types of change processes using one standard form of representation, i.e. the Logical Framework, as is widely used in the planning of development aid projects (Coleman, 1987; Gasper, 1997, 2000).[1] The Logical Framework offers a very simplified and linear view of the processes of change in which most aid organizations are involved. Efforts at change often involve many steps, some of which are retraced and others may then have to be discovered. Change usually has many actors working in parallel, not one main actor and a relatively passive audience of other stakeholders. These actors often interact with and influence each other; they are not working in isolation. Attempts at change can involve many iterations of activities, on different scales, which are informed by previous experiences.

Instead I have argued for the development of a range of methods each of which is more suitable for representing the particular type of change processes found in particular types of settings. Some of these involve adaptations of the normal use of Logical Frameworks, others involve different forms of hierarchy (ecological rather than temporal hierarchies) and heterarchies (overlapping hierarchies). Others, such as the use of business process maps, have no relationship to the Logical Framework.

All of these types of change processes involve some form of *directional* change. Left out of all of them is the possibility in theory and probability in practice that most change is a two-way process. When two parties interact they both influence each other, despite the inequalities of power that may exist between the two. This is especially so outside of and between organizations, as distinct from within organizations. However, theories of change summarized in Logical Frameworks rarely recognize this aspect of change, nor does the structure encourage this reflection. Even in NGO advocacy campaigns where influencing others is the prime objective this tends to be a neglected area, rarely subject to any planned monitoring (Davies, 2001).

Removing the one-directional nature of change leads us from thinking about a chain of events to a network of events, and from a chain of actors to a network of actors. Networks are found on all scales, within and between organizations, and can be formal and informal, visible and less so (Barabasi, 2002). Dynamic network structures also vary in the degree of order, complexity and chaos that they exhibit, depending on how inter-connected they are (Kauffman, 1995).[2]

Practical Arguments for Using a Network Perspective

In this second article I will argue for the relevance of a network perspective, as a comprehensive but flexible means of representing (and thus developing and evaluating) theories of change in development aid projects. There are two bodies of thinking about networks that have informed these arguments. One is Social Network Analysis (SNA) and the other is the field of Complex Adaptive Systems (CAS). In my view, the most useful introduction to the description and measurement of social networks is that by Scott (2000), whereas Monge and Contractor (2003) provide a comprehensive survey of the social science theory relating to networks. The most accessible summary of the CAS literature, from an organization theory perspective, is by Axelrod and Cohen (1999). Probably the most important difference between these two bodies of literature is the greater attention given to dynamic models and simulation studies in CAS, versus more static models and more empirically based work in SNA. This article does not draw on another related field known as Actor Network Theory because there was little I could see which would be practically useful to aid organizations, interesting as the theory may be (Callon, 1998; Ryder, 2003).

To begin by spelling out four main arguments for adopting a network perspective:

- The various types of change processes discussed in the first article can be seen as specific types of network processes. Networks provide a broad and inclusive framework.
- Networks can be described and analysed at many scales, from interactions between individuals in small rural communities to international linkages between large organizations.
- There is a range of tools available to describe and measure networks, which is relevant to the analysis, planning and evaluation of change in those networks.
- There is an extensive and developing body of theory and research on the nature of networks, that spans many disciplines, and which is available to help inform development agencies' theories of change.

A Broad and Inclusive Framework

A network is a set of relationships between a set of entities. These may be roads linking towns, or people linked by past associations, or animals linked by predator–prey relationships. As noted by Monge and Contractor (2003), 'The concept of a network is extremely general and broad, one that can be applied to many phenomena in the world'. Nevertheless, as will be shown, the concept of a network is still specific enough to be observable and measurable.

In the first article, five types of change processes were outlined: (a) linear processes with varying numbers of stages, (b) linear processes with branching structures, (c) simple parallel processes, (d) interacting parallel processes, (e) re-iterated processes. All of these can be seen as specific expressions of a network perspective.

Linear processes, with varying numbers of stages: As suggested in the first article, if the vertical narrative in the Logical Framework is populated with actors then the course of intended change can be more readily understood, and independently verified. When this step is taken linear processes can now also be seen as a specific pathway, of connections between people, within a wider network of surrounding relationship. What were the 'assumptions' in the right-hand column of the Logical Framework can now be seen as other actors in the wider network, who do or may have links to those actors who are part of the pathway spelled out in the Logical Framework narrative. (See Figure 1A.)

Linear processes with branching structures: This type of process can be found when an agency seeks to identify and test a number of different pathways between various intermediaries (1B, 2B, etc.) in order to find the best way to influence or inform the final intended beneficiary. It should be possible to map both expected and actual pathways of influence. (See Figure 1B.)

Simple and interacting parallel processes: Any network diagram involving multiple actors who have some linkages with each other will by definition be representing parallel process of change. All the actors involved will be pursing their own agendas at the same moments in time, through existing relationships or by

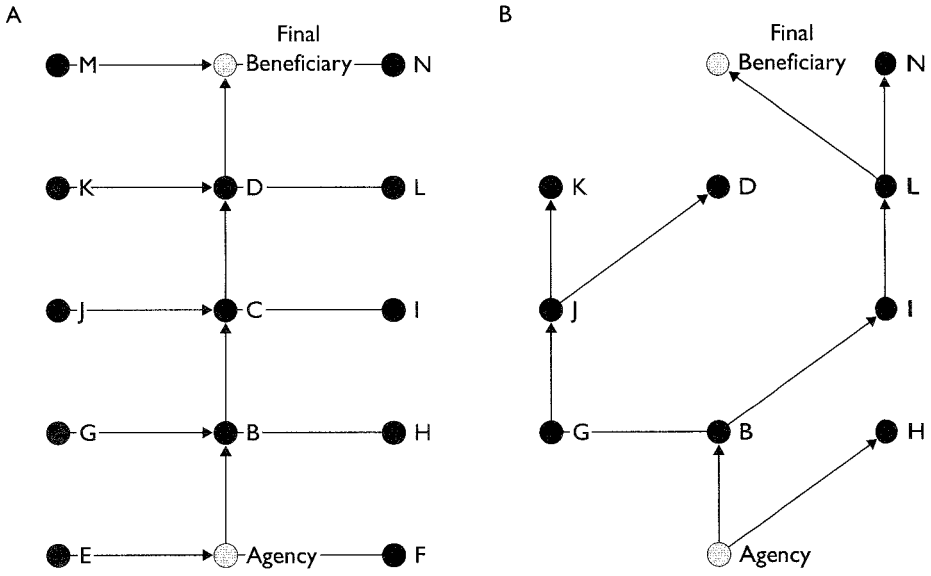

Figure 1. Linear (as in Logical Framework) and Branching Processes Re-Presented in Network Form

creating new relationships. The more these actors are inter-connected, the more those processes of change will be affecting each other. (See Figures 2A and B.)

Re-iterated processes: Network diagrams can represent feedback and re-iteration in two ways: (a) within individual relationships, when influence is shown as bi-directional links, not just one way, (b) within groups, when A is linked to B who is linked to C who is linked to A (or with a longer list of intermediaries). In addition, diagrams of business processes, as shown in the first article, have a self-evident network structure, with each step in the work process being connected to one or more other steps through feed-forward and/or feed-back links. An important part of the analysis of business processes is identification of missing or non-functional links between processes. (See Figure 3.)

Applicability at Different Scales

Network analysis has been carried out at many different levels of analysis (Barabasi, 2002). At the smallest scale, the network structure of the human genome has been the subject of research, as have metabolic networks within human cells. On a much larger scale, studies have been made of inter-locking directorates and global alliances in corporations, international trade networks and terrorist networks. The network structure of the World Wide Web is a subject of continuing research interest.

In contrast the usefulness of the Logical Framework and other linear logic models has been quite circumscribed. In my experience they are rarely used at the country programme or global levels even within the same donor agencies that

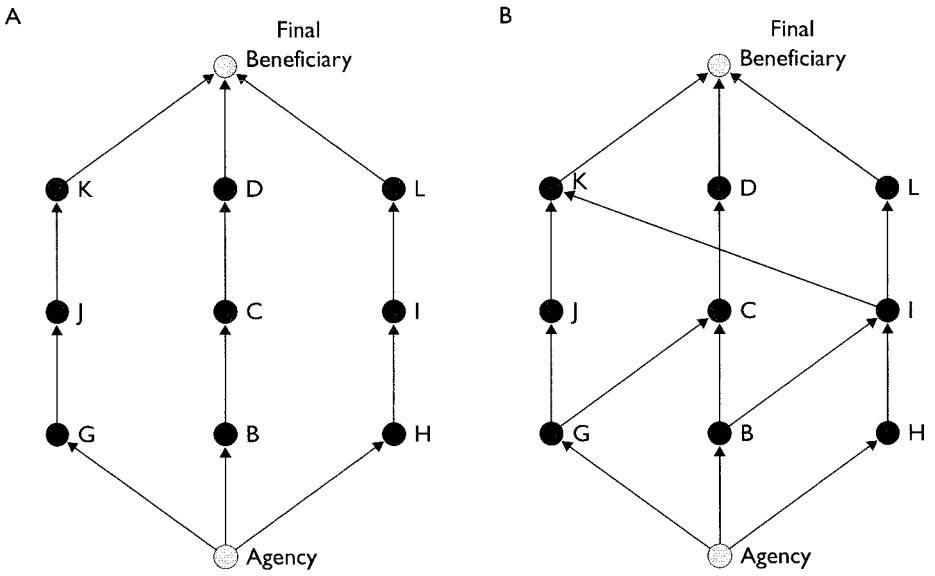

Figure 2. Simple and Interacting Parallel Processes

have promoted their use widely for project design and management. Their most common use has been in contractual relationships between a small number of parties likely to be working with each other over a period of years. Logical frameworks are supposed to be able to manage increases in scale by the method of nesting, whereby as scale increases a number of Logical Frameworks relating to

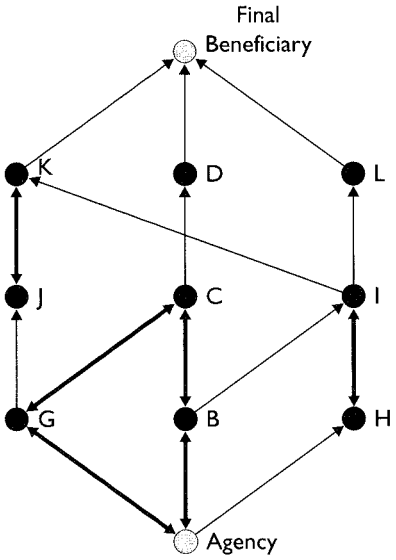

Figure 3. Interacting Parallel Processes with Feedback and Reiteration

change on one level are included as subsidiary elements within a large-scale Logical Framework. For example, each Output in the largest Logical Framework becomes the Purpose in the subsidiary Logical Framework. However, this practice has not caught on, to any noticeable extent, unlike the spread of the single use of the Logical Framework amongst NGOs. In contrast, multi-level analysis of networks is common. This can be done both deductively and inductively. Groups of actors can be experimentally aggregated into larger categories and the linkages between these mapped (known as 'block modelling'). Clusters of actors can also be identified through visualization software using different display algorithms (see Figure 4) and statistical analysis.

There are a number of developments that make scalability an important attribute of network representations. As is now well known, in many countries DFID has been scaling up the size of its aid investments and moving from single donor to multi-donor support via sector-wide approaches (SWAPs), direct budget support and other mechanisms. Coordination and aid harmonization initiatives are high on the agenda. Combined these increase the complexity of the environment within which aid interventions have to be planned and monitored. The interactions of a multitude of actors need to be taken into account. A network perspective is increasingly relevant at this level (Davies, 2004b).

There are also scale-related developments within the third (NGO) sector that increase the relevance of a network perspective. Alliances between major northern NGOs – such as Oxfam, Save the Children Fund, CARE and World Vision – all have varying degrees of semi-autonomous network like structures, with less centralization of authority than their individual country components have had up to now. More visible are the special Purpose international advocacy networks involving large numbers of very diverse groups of NGOs, around issues such as debt, trade and HIV/AIDS.

The network diagram in Figure 4 illustrates some of the large-scale complexity of current aid developments. The diagram shows more than 30 different ministries, departments and agencies participating in five cross-sectoral planning groups working on the revision of Ghana's Poverty Reduction Strategy. Each group is addressing a major theme, such as governance, macro-economic performance, vulnerable groups, etc. The linkages shown between these organizations are those arising through their co-participation in the same planning groups. While the decisions that were made about group membership were based on the historical interests of those organizations, concerns have now arisen as to how the structure of participation will affect the contents of the new Poverty Reduction Strategy. The structure as shown is a dependent variable reflecting the past, but it may also be an independent variable affecting the future, along with others, such as the nature of each organization's representation in the planning groups. Members of multiple planning groups may or may not be advantaged, depending how they choose to represent themselves in those groups (e.g. by one person overall, one person per group, or by whoever is available at the time).

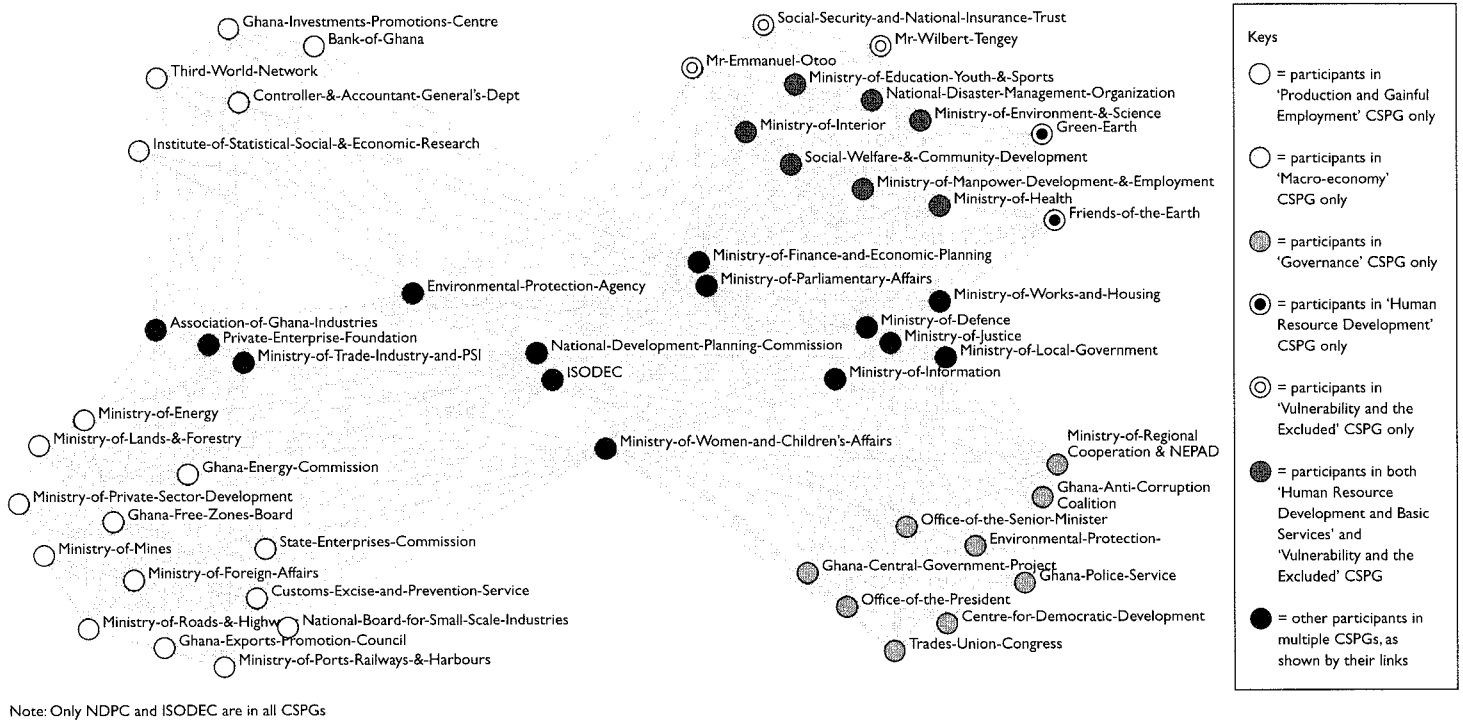

Figure 4. Linkages between Ghana Poverty Reduction Strategy Planning Groups (CSPGs)

A Range of Tools Available to Represent and Analyse Networks

There is now a wide range of methods for describing the structure of networks, and individuals' places within those networks. This provides managers of development projects with a correspondingly large number of opportunities to specify the types of changes they think will take place in network structures (as a dependent variable), or the type of network structures that will be associated with particular changes (network structure as an independent variable).

There are three main types of tools for representing networks: (a) matrices, (b) network diagrams, (c) specific measures of network structure. These provide a mixture of qualitative and quantitative forms of description, in text and diagrammatic form.

The simplest means of representing networks structures is through the use of matrices showing actors' links with actors. These allow compact and detailed descriptions of network relationships, but they are not easy to comprehend at a glance. There are examples of such matrices now being used to map relationships between actors in development projects. Figure 5 shows a matrix describing actor linkages in an agriculture project in Namibia (Biggs and Matsaert, 1998). Connections are conventionally represented in these matrices as being from the actors in the left column to the actors in the top row. In most cases cells contain numerical data, which are either coded categorical data or values on a specific variable of concern. In the simple example shown in Figure 5 the cell entries provide nominal data only (the existence of relationships).

Such matrices can also be used to collate detailed textual descriptions of large sets of individual relationships, cell by cell, as can be seen in the example of a use by Temel (2003) to describe the relationship between nine components in what he describes as the agriculture innovation system in Azerbaijan (see Figure 6). The 'components' listed in the diagonal are groupings of organizations with similar functions. More conventional uses of a matrix would have these listed in the left-side column and the top row.

More recently, in Ghana, I made a less conventional use of such matrices, as a means of representing the budget of a section of a government department. A range of input costs, which are associated with different units of the department (on the left column), were linked to a range of different expected Outputs, which are in turn associated with different external actors (on the top row). Cell entries described the relationship between the inputs and Outputs, in terms of budgeted funds.

Because of the complexity of many large-scale networks, a substantial amount of effort has gone into developing a range of means to visually represent network structures (Freeman, 1999). These include both manual methods and (publicly available) software such as Ucinet (Borgatti et al., 2002), which has been used to produce the network diagrams shown in Figures 1 to 3. Network diagrams can be laid out on specific dimensions chosen for their pre-identified significance (e.g. important attributes of the actors), or by algorithms designed to make any patterns of connections easier to grasp at first glance (i.e. using a more inductive approach).

Measures of network structure range from the simple to the complex. It is easy

		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
		LCS Staff	Part Time MEs	Full Time MEs	Retail SMEs	Other SMEs	Large/Formal Enterprises	Suppliers/Wholesalers	Kavango Chamber	Other Business Associations	Co-operatives	Training Programme	Donor	NGOs	Parastatals	Other Lenders/Insurers	Local Government	SME Fora	National Business Associations	Businesses outside region	Central Government
A	LCS Staff	■			■							■		■				■			
B	Part Time MEs																				
C	Full Time MEs									■				■							
D	Retail SMEs	■							■			■	■	■			■				
E	Other SMEs																				
F	Large/Formal Enterprises							■					■		■	■			■		■
G	Suppliers/Wholesalers				■	■	■									■	■		■		
H	Kavango Chamber	■			■				■			■	■				■				
I	Other Business Associations													■							
J	Co-operatives													■							
K	Training Programme	■							■					■							
L	Donor	■										■		■							
M	NGOs										■							■			
N	Parastatals																				■
O	Other Lenders/Insurers						■	■											■		
P	Local Government						■	■													
Q	SME Fora																				
R	National Business Associations						■		■				■	■				■			
S	Businesses outside region																		■	■	
T	Central Government	■									■				■					■	

KEY

Intense Communication ■

Figure 5. Actor Linkage Matrix KFSR Project, Namibia, from Biggs and Matsaert (1998)

to observe changes in numbers and types of members in a network. The 2001 annual report of STEPS, an NGO in Bangladesh, cites the number of networks that it has been working with and the number of NGOs who are members of those networks. The PETRRA rice research funding project in Bangladesh has reported how it has brought elected local government officials, master's degree agriculture students, NGOs and small companies into their agricultural research and dissemination networks. It is also relatively easy to describe changes in frequency of interactions, the contents of interactions and the value given to each relationship by each party. Within the substantial literature on social network analysis there are also more sophisticated statistical measures of network structure, using terms such as network centrality, diameter, density and hierarchy (Scott, 2000).

Policy Component (P) (Reorganization)	**Formal & weak**	**Formal & weak**	**Formal & weak**	**Mixed & weak**				**Formal & medium** Priority setting Programme devel. & review
Formal & weak	**Research Component (R) (Reorganization)**	**Formal & weak**		**Mixed & weak**	**Mixed & medium**	**Informal & medium**	**Informal & medium** Information sharing Problem diagnosis Technology diffusion Exchange of staff	**Formal & weak** Workshops/seminars Information sharing Personnel training
Formal & weak	**Formal & weak**	**Education Component (E) (Reorganization)**				**Informal & weak**	**Informal & medium**	**Formal & weak** Workshops/seminars Information sharing
Formal & weak			**Credit Component (C) (Reorganization)**					**Formal & weak**
Formal & medium Information sharing	**Formal & medium** Information sharing			**Extension and Information Component (I)**		**Formal & medium** Programme development Problem diagnosis Priority setting Tech. diffusion/demon. Training	**Formal & medium** Programme development Technology diffusion Info. & finance sharing Workshops Seminars	**Formal & weak** Technology diffusion & demonstration Information sharing
Formal & medium	**Informal & medium**				**Private Enterprise Component (M)**	**Mixed & medium** Tech. demonstration Training		**Mixed & weak** Programme development Tech. development Workshops
Informal & medium Information sharing	**Informal & medium** Information sharing Problem diagnosis Technology diffusion Exchange of staff	**Informal & weak** Information sharing			**Mixed & weak** Tech. demonstration Training	**Private Farm Component (F)**		
Informal & medium Information sharing	**Informal & medium** Information sharing Problem diagnosis Technology diffusion Exchange of staff	**Mixed & medium** Information sharing		**Formal & weak** Programme development Sharing of info. & finance Worshops	**Informal & weak**	**Mixed & medium** Problem diagnosis Priority setting Technology diffusion and demonstration	**Private Consultancy Component (D)**	**Formal & weak** Programme development Technology diffusion Info. & finance sharing Workshops
Formal & medium Priority setting Programme development Programme review	**Formal & weak**			**Formal & strong** Priority setting Programme development Technology development Technology diffusion and demonstration Information sharing	**Mixed & weak**	**Formal & medium** Problem diagnosis Programme development Tech. demonstration Information sharing Training	**Formal & medium** Programme development Technology diffusion Info. & finance sharing Workshops	**External Assistance Component (X)**

Figure 6. Actor Linkage Matrix with Text Descriptions of Relationships, Azerbaijan, from Temel (2003)

Analyses of networks can involve qualitative as well as quantitative inquiries. In my work with STEPS's partners each network representative was not only asked about frequency of contacts with other networks, but also about what types of information other networks would contact them for, and what types of information they would seek from each of the other network members. Relationships can be ranked by the participants in terms of their relative importance, and differentiated according to the net direction of information flow.

The more problematic area is the ability to represent change over time in networks. A great deal of technical work has been done on the production of animated networks, but this work is hardly transferable to countries where many organizations may not even have a computer. A more modest and achievable version of the same idea would be a fast-moving PowerPoint slide show. The simplest option of all is to colour code linkages between actors according to age of those links. However, this would be at the cost of precluding the colour coding of any other characteristics of those relationships.

An Expanding Body of Theory and Research about Networks.

There is a wide range of multidisciplinary theories available to inform thinking about changes in networks. In their review of 'Theories of Communication Networks' Monge and Contractor identified and analysed five major families of social science theories in terms of networks. Outside the field of social network analysis there are other important theoretical perspectives on networks, most notably that of Complex Adaptive Systems (CAS) (Axelrod and Cohen, 1999), and the mathematics of networks (Barabasi, 2002) which have prompted new forms of investigations into social networks. These theories are a major potential resource for those thinking about how development interventions should or might be working. In contrast, few development project plans, cast into Logical Frameworks, make any reference to other theoretical perspectives on how development projects do or do not work. Even a recent DFID-funded examination of networks and social capital seems to have limited its references largely to the literature within the development field (Fraser et al., 2003).

Network theories have practical value. In 2002 I was asked to help provide advice and training on how STEPS could monitor and evaluate its achievements. One method, which was pre-tested in a workshop with network members, made use of Burt's (2000) analysis of the 'network structure of social capital'. This distinguished two aspects of social capital, as it exists in network form. One is in the form of a dense set of interconnections between network members, which is seen as the basis of trust. The other is in the form of individual members' own particular linkages beyond the network, their means of brokering access to influence or resources between the network and the wider world, especially those linkages not available to the other members of the same network. The actual linkages existing in and outside the STEPS network were then documented and compared to what might be seen as an ideal set of internal and external linkages, based on Burt's analysis. Linkages within the network were not very dense, and tended to focus on two members only. All members had their own specific links to external resources (in the form of donors) but fewer had external links that

could be used for influencing Purposes in their field. More importantly, mutual knowledge about the existence of these links seemed more limited.

A network perspective also has implications for how monitoring and evaluation activities might lead to cumulative learning within a wider population of projects and organizations. First, it suggests that evaluations of individual projects should not be seen as free-standing assessments of performance according to objectives. Evaluations can be linked in with other evaluations, through connections between the people involved and between the documents being shared. But linked in what way? The literature on the 'small-world' phenomenon indicates that a mixture of local and distant links is needed to ensure efficient connectivity within a large system of actors (Watts, 2003). If these conditions of interconnectedness exist then we might expect the system as a whole to evolve over time, through mutual adaptation. Linkages can be promoted by donors explicitly requiring that in every project evaluation there should be a built-in comparison of findings with other comparable projects. In turn the resulting evaluation findings need to be made available for similar comparisons by other project evaluations. The Diana, Princess of Wales Memorial Fund in the UK has recently moved in this direction. Linkages can be created not only through specifying the content and distribution of reviews, but also through the participation requirements. In September 2002 the PETRRA project was subject to a mid-term review, three years into its five-year lifespan. The review team was well linked internationally through international consultants. However, local linkages were weak, because of poor representation of local consultants in the review team. The research on 'small worlds' suggests that the proportions should be the other way around (Watts, 2003).

There are many other areas of research and theorizing about social networks that have relevance to development aid projects, but which I have not yet made use of in my own work. In the health sector there is already an established record of social network analysis techniques being used as part of epidemiological studies (Morris, 2004), as well as in studies of the effectiveness of health communications, especially in the field of HIV/AIDS (NIDA, 2001). A number of studies of Third World poverty (both urban and rural) have focused on the significance of people's linkages with the local and wider community, often in the context of analyses of the nature of their social capital, or the lack of it (Demos, 1997; Rosas, 2001). At the more macro-level there is a significant literature on policy networks (Peterson, 2003) within and surrounding governments, and of civil society advocacy networks (Boudourides and Botetzagias, 2004; Kwak and Liu, 2004). The study of the diffusion of innovations in terms of network structure and participation is also established (Gladwell, 2002; Valente, 1995). Standing further back are the more mathematically based network analyses of the prevalence of power law distributions which are shedding light on factors affecting the distribution of wealth and inequality in societies (Barabasi, 2002). References to a range of development aid related applications of network analyses are now being accumulated on the Monitoring and Evaluation NEWS website.[3]

Choosing Metaphors . . . A More Philosophical Argument

Morgan's (1986) 'Images of Organization' puts forward an extended argument for the importance of metaphors in affecting how we think about the organizations we work in or study. Metaphors work precisely because they emphasize some features and obscure others. Changing the metaphors we use may produce a better fit with our observations, but it might also have more radical impact on how we see the world and decide to respond.

Underlying all the types of change processes outlined in these two articles there are two background metaphors: of hierarchy and of networks. The Logical Framework is an explicitly hierarchical structure and as such promotes thinking about the world in hierarchical terms. In the first article different types of change processes were initially represented by different types of hierarchical representations. The emphasis then moved towards the more network-like structures of heterarchies and business process maps. In this article the focus has been on networks, both as a way of representing processes involving reciprocal influence and feedback loops, and also as a means of including the representation of more hierarchical structures.

In this section I would like to make some final and more philosophical arguments for choosing to make more use of network perspectives. First, as already touched upon above, a network view is not exclusive of hierarchy. Networks diagrams can include hierarchical structures, both in the simple form of a branching tree structure, and in the more complex form of hierarchies of connectedness found in structures such as the World Wide Web (Barabasi, 2002). However, networks cannot be so easily seen as subsets of hierarchies.

Second, the starting points within network analyses are populations of actors who connect to and interact with each other. These are the people who should be populating the accounts of the theory of change within the Logical Framework, but who are often absent, obscured by de-personalized and abstract descriptions of change processes.

Third, a network view provides a less egocentric view of the world. Other actors are inherently part of the picture and they are acting in parallel, not simply in response. A network view is a more post-Copernican view. This contrasts with many development planning tools, such as stakeholder analysis, which start with 'the project' as the central reference point, around which all other actors are positioned, in terms of their ability and interest in influencing the project (Dearden et al., 2002).

Fourth, a network view inherently assumes actors have limited abilities to affect the world around them, because there are other actors. Much of their effects on the world, and their knowledge of the world, will be mediated through others.

Fifth, all information is embodied, held by someone. In contrast to this view the Logical Framework seems to encourage a disembodied view of information that is of value, regardless of the people who do or do not hold that knowledge. In the real world this is not the case.

. . . And their Implications

The recognition of these very basic features of networks has a number of significant implications for how we should monitor and evaluate in development, and other projects.

First, different types of planning choices are highlighted. These are not just about what we do, but *who* do we work with. In development aid projects one of the most crucial decisions made, usually at the project planning and appraisal stage, is who will implement the project in cooperation with whom. However, the structure of the Logical Framework does not encourage any specific recognition of this fact. Instead the focus is on the specific Outputs to be delivered within pre-defined relationships. At the meso-level many aid agencies' country strategy statements tend to focus on the types of economic and social changes that are desired, but less on who will be involved. The alternative is to describe country strategies in terms of portfolios of relationships the aid agency is involved in, and the type of changes that need to be made in that mix (Davies, 2002). This might help address a weakness of the kind identified by the 2002 review of the DFID Bangladesh Country Strategy Paper (CSP) that 'Although the CSP makes a number of references to partners and partnerships there was no strategy or action programme related to the development of such partnerships' (DFID, 2002).

Second, objectives cannot be taken as predefined givens. In a network where power is not manifestly centralized it is more appropriate to see *agreement over objectives as an achievement,* and something to be tracked over time and evaluated. Even in explicit hierarchies there is often a substantial amount of persuasion and negotiation over objectives and priorities. The first article suggested a ranking method that has been used to measure alignment of objectives in strategies, as seen by those responsible for each. Another method that I used in Ghana is to measure the degree of overlap in the set of indicators associated with different national policies (including the Ghana Poverty Reduction Strategy, PRS). The same data were also represented in the form of a network diagram, which showed five distinct clusters of indicators, which were the most frequently associated with each other in policy documents. Elsewhere, in a UK NGO, network data from a survey of members' specific interests (similar to objectives) were converted into a network diagram showing who was most closely linked to whom, by their overlapping interests.

Third, information about distant changes cannot be made available by command. When it does become available this is because there is some degree of fit between the objectives of adjacent actors. This sounds like the real world: where aid agencies are dependent on their field officers who are dependent on their local partners who are dependent on their field offices who are dependent on local community leaders . . . for their information about impacts on the ground. If information is not available, then attention needs to be paid to where there are differences of view, and their effects. This is a more *symptomatic* view of information. It contrasts with the engineering approach prevalent in much of the M&E literature and certainly emphasized by the Logical Framework, where the means of verification column typically refers to the material source of data, but not to who will provide them.

Fourth, because all information is embodied, information is needed not just about distant changes, but also about who holds and provides that information. A networked view implies more attention to meta-monitoring: asking what people know and what that means. A greater emphasis on meta-monitoring should itself help aid agencies cope with the problems of scale, the initial problem posed by the first article. For example, both the ILO and DFID (among others) have global targets relating to the number of people who will benefit from their interventions. Both organizations work directly with national governments, and these bodies can be expected to know what is happening to the policies and practices of those governments. But neither organization works directly with poor people. Their knowledge of poor people's lives is much more highly mediated. In both cases it would be more appropriate for the two agencies to be measuring *the numbers of governments who are able to report* specific types of changes in the number of people in poverty, or children in child labour: for example, achievements above or below their national targets, and the scale of those targets compared to a global ideal target. Apart from being easier to obtain, it is those governments' *knowledge* (or the lack of knowledge) of desired changes that is as significant as the simple facts of these changes. It is this knowledge that is very likely to affect the sustainability and replicability of change.

An Interim Summary

In the two articles published in this journal I have tried to address the issue of how aid agencies can represent (and thus plan, monitor and evaluate) their activities when they are operating on a large scale, either nationally or globally. Scale is a problem because it generates complexity. I have outlined a number of methods suitable for different types of change processes, found in different types of settings. Reviewing these, I have also argued for the use of one inclusive but flexible overall perspective, a network perspective. This has both practical utility and a good fit with the observed world. It also generates some implications for how monitoring and evaluation tasks should be approached, which are relatively new.

Further work lies ahead. A set of guidelines now needs to be developed, detailing how a network perspective can be systematically operationalized within the design, monitoring and evaluation stages of development programs.

Notes

1. The Logical Framework is a 4 by 4 planning matrix, forming 16 cells, each containing text information. The four columns are the Narrative – a description of expected changes, Objectively Verifiable Indicators – of those changes, Means of Verification – of those indicators, and Assumptions about external influences on the expected changes, both positive and negative. The four rows are the Activities, which lead via Assumptions on that row, to the Output, which leads via Assumptions on that row, to the Purpose, which leads via Assumptions on that row to the Goal.
2. Hence the common use of suspension of trading on stock markets as a means of bringing order to markets.
3. At www.mande.co.uk/networks.htm

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