Mind the network gaps

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1 Introduction

The concept of 'networks' arguably plays as important a role in social, political and economic life in the early 21st century as that of 'machines' did in the early 20th century. Whether in academic research, the popular press, government policies, corporate strategies, blogs or just day-to-day conversation, the term seems unavoidable. Googling the word 'network' returns 845 million hits, not much fewer than the 870 million hits for the word 'country.'

Like machines before them, networks today are used to describe all kinds of activities, or any set of objects or people that are connected to each other. As such, the term can be used in virtually any context, sometimes in very distinctive and practical ways but more often as a metaphor for human organisation. It has strong positive associations connotations – of being modern, technologically savvy, connected, dynamic (crime and terrorist networks notwithstanding). In fact, globalisation scholar Robert Holton argues the concept risks becoming at best a hyped-up, over-used metaphor for any kind of social connection, and at worst a meaningless piece of rhetoric (Holton, 2008).

The international development and humanitarian sector has long had a fascination with the idea of the network, one which predates the current internet-driven enthusiasm by several decades: the oldest networks examined here are those that involved agricultural researchers in the 1960s using the creaking global postal system to share papers, letters and ideas.

With its global span, multiple actors, many activities and plethora of goals, the aid system lends itself well both to the network metaphor and to the kind of misuse Holton suggests. Networks might bring together groups of like-minded actors in 'clubs'; they might be professional, technical, knowledge sharing, campaigning, fundraising or operational. Networks can be informal – shaped by friendship, by the fact that foreign development specialists are living in close proximity in countries far from home or by shared experiences working on projects and programmes.

There is also growing use of the term in the marketing of aid. One of the most notable examples is in the branding of the UN Development Programme: 'UNDP is the UN's global development network, an organization advocating for change and connecting countries to knowledge, experience and resources to help people build a better life'[1] (emphasis added).

This breadth of use can hinder clear understanding and can lead to fuzziness and imprecision in how the term is used and what it means. This can have knock-on effects on strategies and day-to-day practices. At the extreme, the ubiquity and marketing-focused use of the term could diminish attempts to understand networks in a more empirical manner. Any distinct advantage of the idea and its implications could be lost in a sea of overblown rhetoric.

As Rick Davies notes,

> 'the solution to the sloppy use of the term network is to encourage people to think in more discriminating terms about different kinds of network structures, and to test theories about such networks against empirical observations' (Davies, personal communication, 2011).

This think piece is a modest contribution to this process of encouragement. It is intended to support practitioners, researchers, evaluators and policy-makers interested in taking a more reflective and empirically grounded approach to networks. It draws together findings from a light literature review, information from informal discussions and personal reflections obtained from working on and in networks over a number of years.

1 www.undp.org/about/, accessed 16 April 2010.

It first looks at the range of ways networks are currently thought about and dealt with in the development and humanitarian sectors. After highlighting gaps apparent in the understanding of networks, it then explores different approaches that might help address these.

2 A growing literature and practice around networks

As we have seen, networks are an increasingly prominent feature of the evolving development and humanitarian landscape. At the policy level, numerous high level leaders – from the World Bank President to the Permanent Secretary at the UK Department for International Development (DFID) – have suggested that the concept of a network should be a fundamental principle for 21st century aid. In academia, an online database search of citations with 'international development' and 'network' shows a considerable rise in the numbers of these between the 1960s and the 1990s.[2] At the level of practice, there are a growing number of advertised jobs, training courses and requests for advisory and support services from formal 'named networks.'

There is a growing challenge to develop a more systematic and thorough approach to understanding and analysing networks, whether this is in relation to policy, research or practice. This in turn means finding ways to explain what networks are, how they work and why. However, there is a notable tendency for those working on such issues in development and humanitarian efforts to shy away from overtly theoretical approaches to understanding networks.

Mendizabal, for example, hopes to contribute to the 'vast and more theoretical research on networks' but places the emphasis on 'finding a way of thinking about networks that may be useful for the people working within or with them' (2006b). This emphasis on utility for those working within networks has led to at least four interrelated strands of work, which are worth looking at in turn.

- Strategic approaches;
- Operational aspects;
- Networks as a distinct way of organising and structuring aid efforts; and
- Efforts to evaluate the performance and achievements of networks.

In 2003, a Global Public Policy Institute (GPPI) report on networked governance noted that 'no definite typology of the forms and functions of networks has been established' (Street, 2003). Since that time, networks have increasingly been described as carrying out certain **strategic functions** in pursuit of shared goals. It is now possible to make use of a range of approaches to help clarify these functions and establish related goals.

Work led by the International Development Research Centre (IDRC) and by the Overseas Development Institute (ODI) is of relevance here. Both organisations have sought to understand how networks work in the context of their wider mission of bridging research and policy and strengthening Southern civil society capacities. On the IDRC side, this has included strategic evaluations and reviews of the advantages of network models for achieving certain goals – for example policy influence and sustainability (Willard and Creech, 2008).

On the ODI side, this work has included literature reviews (Perkin and Court, 2005), exploratory working papers (Mendizabal, 2006a; 2006b), guidance notes on specific methods (Ramalingam et al., 2008) and various opinion pieces (Mendizabal, 2008). This work makes some concrete suggestions for network functions, highlights the different functions of networks and how these might shape the form of networks, and explains ways of developing network strategies.

This growing body of work appears to have had only a limited influence on day-to-day network practices. In 2001, Creech and Willard argued as follows: 'We believe that there is a

2 Google Scholar Search, 2010.

fundamental deficiency in the current practice of networking. The deficiency lies in the limited understanding about how to conceptualize, develop and follow through on the strategic intentions of a network.'

Despite the volume of work carried out since then, the evaluators of a major donor agency saw fit to repeat this comment in their findings 10 years after Creech and Willard made their statement: 'a fundamental deficiency in the current practice of networking was revealed. The deficiency lies in the limited understanding of how to conceptualize, develop and follow through on the strategic intentions of a knowledge network' (SDC, 2009).

Operational aspects of networks have traditionally been described using ideas such as purpose or motivation, levels of network intervention, scale of collaboration, types of activity, membership (numbers and composition), resources and geographical scope and structure (Taschereau and Bolger, 2007). Each of these ideas has played a role in understanding and furthering network operations.

A key operational question, and one that is frequently raised, relates to how to ensure network success. The history of networks in the aid sector is one of false starts and inflated promises, with more efforts falling by the wayside than taking off. What is it that makes some networks work in some contexts? Why do other networks fail?

Creech and Willard's widely used International Institute for Sustainable Development (IISD) handbook from 2001 explores in detail how to design and implement knowledge networks, starting with strategies and then moving through to the practical ways to deliver against these – from governance, communication, managing language issues, using technologies and undertaking effective monitoring and evaluation (M&E). A more recent handbook by German Technical Cooperation (GTZ) provides a set of good practices in broadly similar areas, as well as a number of templates and tools drawn from the broader literature on knowledge management (GTZ, 2006).

Some widespread assumptions about what networks actually are shape the operational understanding of networks, and donor willingness to support certain kinds of network activity and not others has reinforced this. In particular, much of the literature seems to assume that central secretariat bodies manage networks, 'directing' them to carry out key tasks and activities. This excludes many less centralised forms of networks from both discussions and funding considerations. The oft-repeated donors' complaint that networks are 'too much net and not enough work' tends to gives more weight to these assumptions. Overall, this highlights the inadequacies of existing approaches to understanding how networks operate.

One notable exception is to be found in the work of Rick Davies (2003), which draws on social network analysis as a means of representing aid interventions. As he argues,

> 'Unfortunately, few development project plans, cast into Logical Frameworks, make any reference to other theoretical perspectives on how development projects work, or don't. 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).

Davies focuses on clarifying what is distinctive about network models, and then shows how they can be applied in a variety of settings. He usefully suggests four areas where 'network models' might usefully be applied for operational benefits:[3]

1 Where there are many actors (people and/or organisations) who are fairly autonomous and where there is no central authority;
2 In large projects with many stakeholders, rather than small projects with few, where a single authority is less likely to be found;
3 In projects with no single objective but many alternative and/or competing objectives; and
4 In projects deliberately designed to function as networks (called 'named networks').

3 www.mande.co.uk, 25 October 2009.

This brings us onto **what makes networks distinctive** from other forms of organisation. The European Centre for Development Policy Management (ECDPM) review cited above (Taschereau and Bolger, 2007) notes that the literature is limited in its contribution to an understanding of networks as an institutional form, as well as of how networks actually work to utilise their members' capacities. At the heart of this critique is the notion that networks are not the same kind of entities as formally constituted organisations.

There is much confusion in the aid sector, and more widely, about exactly how to distinguish networks from hierarchies. As already illustrated, the rhetoric of the aid sector increasingly describes even the most hierarchical of organisations as if they were networks. The counterpoint is also true: in the cold light of day, many networks are often automatically (and inappropriately) treated as projects or organisations. Certain centrally located people may be strongly associated with a network, and networks may be talked about as if they were single clearly defined entities, but this may be for reasons of analytical, conceptual and, perhaps, political convenience rather than accuracy.

The reality is that networks are not distinct entities like organisations. As a result, approaches that treat them as organisations can miss out on a great deal of what they actually do. Table 1 presents a number of 'ideal' distinctions between networks and hierarchies in relation to a number of characteristics, as follows:

- Mandate and constitution;
- Governance and accountability;
- Functions, roles and practices;
- Structure and relationships.

In its original form, this table highlighted the different aspects of networks and organisations. It has been adapted to provide a picture that is felt to be more precise, namely, to show that 'networks' and 'hierarchies' might be best represented as ends of a spectrum of institutional forms, with the 'ideal' network at one end and the 'ideal' hierarchy at the other, and most entities falling somewhere between the two.

Table 1: The network-hierarchy spectrum

Networks	Hierarchies
Networks are **constituted** through **voluntary association** of individuals and/or organisations to advance an issue or purpose.	Hierarchies are **mandated** by a governing body, shareholders or members to achieve organisational goals and objectives.
Members join, participate in or leave a network based on their perceptions of its added value: exchange of knowledge or practices, increased capacity to effect change, etc. The relationship among members is **fundamentally a social contract.**	**Employees and managers** may value the hierarchy's goals and objectives, but the contractual relationship is **fundamentally legal and/or financially based.**
Negotiated order and reciprocal accountability. Members share their ideas and engage in joint action to the extent they trust others will reciprocate. Participation 'at the core' is a distinctive feature of a network.	**Hierarchical order and accountability** to executives, boards of governors and shareholders, ministers, etc., is a key feature of organisations. Authority for decision-making and accountability ultimately rests at the top.
Networks are fluid and organic – they emerge, grow and adapt to achieve their purpose and to respond to members' needs and to opportunities and challenges in their environment. **Their trajectories and results are not easily predictable.**	**Hierarchies have codified functions and roles, and routinised practices** that allow them to **deliver products and services with a relatively high level of predictability.**
Informal structuring of relationships among network members is as important, if not more so, than formal structure. This is facilitated through information exchange, creation of common spaces to share knowledge and experience (workshops, conferences, websites), joint project work, etc.	**Formal structuring of work** is important in hierarchies, and much time is devoted to getting the structure right.
Structure usually involves different levels and types of membership. While member interactions are to a certain extent self-organising in successful networks, most also require a coordinator or secretariat, however small.	Structure usually combines three main components: a strategic apex, core operations and administrative support.

Source: Adapted from Taschereau and Bolger (2007).

This brings us to the last of the four areas listed above, namely, the **evaluative** body of work on networks. Evaluations of networks have sought to reflect how well networks have delivered on key goals, but all too often there have been methodological problems and issues. The disconnects between theory and practice are all too evident, with those being evaluated frequently complaining 'the evaluators never grasped what we do or how we do it.'

It is true that most aid evaluations acknowledge the importance of a theory of change, which shows how the intervention being evaluated has contributed to the change in question. More often than not, however, they have shied away from tailoring such theories to networks, preferring instead to assess networks as if they were just a variation on a project.

M&E of networks tends to focus on their tangible, output-oriented activities, and less on how they actually work. As a result, such approaches do not account for 'their political nature and the "invisible" effects of much of their work, such as putting people in touch with each other,

stimulating and facilitating action and the trust that enables concerted action' (Chapman and Wameyo, 2001).

Preliminary conclusions

In drawing these preliminary and partial findings together, it is possible to identify **a number of key gaps** in the aid network literature. In particular, there are gaps in relation to

- *What* exactly networks are and the different structural forms they can take;
- *How* exactly networks work and what kinds of principles and ideas help us understand their development and evolution; and
- *Why* they work in some contexts and not in others, that is, what value do they bring to their members that can make one network a success and another a failure?

The next section shifts the focus to theories of networks, and explores how these theoretical ideas can help address the critical gaps noted above.

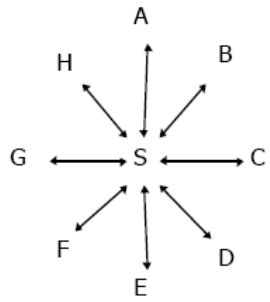
3 Different lenses for looking at networks

As already noted, there is a vast array of theoretical literature on networks, which has to some extent informed aid network research and practice. The aim of this section is to draw on this literature to provide an introduction to the aspects of networks that the different theoretical approaches address.

3.1 What are networks and what forms do they take? Social network analysis

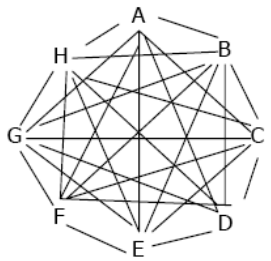
The structural forms networks can take have long been divided into two 'ideal types.' In 1997, Starkey described the two representations. The first is of a network as having a secretariat 'hub,' represented by the letter 'S' in Figure 1, which works as an intermediary between the network actors. The second is of a coalition of actors who are all interconnected (see Figure 2). These are the two simplest possible structural representations of networks.

Figure 1: Centralised network



Highly centralised network. All have reciprocal relationships with secretariat but not with each other

Figure 2: Decentralised network



All organisations linked to each other, without central facilitation

Source: Starkey (1997), in Church et al. (2002).

Social network analysis (SNA) is the main method by which this understanding of networks has been furthered. From an SNA perspective, networks are made up of two main ingredients: 'agents' and interactions between agents that influence each others' behaviour. The approach looks at networks in the abstract and finds common ground between very different entities. For example, supply networks feeding Toyota plants with machine parts may have similar characteristics to the neural networks that synchronise the brain and heartbeat of an earthworm.

SNA seeks to explore the relationships between network architecture and network features that are independent of the precise details of the agents and their interactions:

> 'An infection, for example, is transmitted more rapidly by people who have many contacts than by people who have few; with a few caveats about incubation times and the like, this is true whatever the disease might be' (Stewart, 2004).

In SNA, every network is hypothesised as being made up of nodes and links. Nodes represent the agents in a network, whereas the links represent the interactions. Typically, links exist

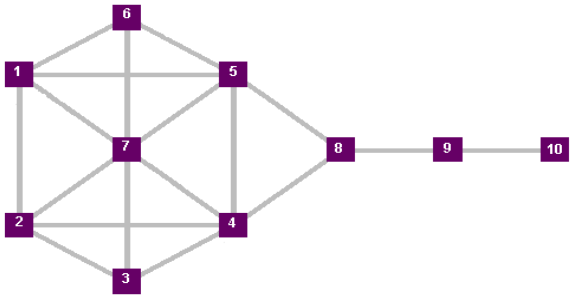
between agents that interact with each other. Such links can go both ways (indicating mutual influence or resource flow) or be unidirectional (usually indicated with arrows), illustrating that one agent influences or provides resource/support to another.

Links may also be weighted, with relative ranking, or thickness, to indicate the strength of the interaction. Links can be of different kinds. For example, knowledge-sharing links might be different to resource transfer links.

The construction of such models can help in establishing a number of different properties of the network, by abstracting from the nodes and the links key measures relating to the structure of the overall network. The measures include density, centrality, distance and 'betweenness.'

Krackhardt's Kite is widely used example of a structure exemplifying different kinds of centrality.

Figure 3: The Kite network and different forms of centrality



Node 7 has the highest 'degree centrality'

Node 8 has the highest 'betweenness centrality'

Nodes 4 and 5 have the highest 'closeness centrality'

Node 10 is the most peripheral, with the fewest connections of all

Source: www.mande.co.uk

Using these formulations, a number of academics have developed a more detailed understanding of the different possible network 'architectures.' These can be seen as the larger relationship structures manifested in the overall pattern of links in a network.

Issues and challenges

A number of issues face the use of SNA in real world social settings. The first and most obvious is that the images generated are prone to oversimplification and misreading. As with any graphical representation of statistics, social network maps can be manipulated to convey particular viewpoints.

A related point is that the maps generated and structural features determined are usually based on incomplete data. Network analysis is highly sensitive to missing cases, as it cannot be assumed that a sample of a network represents the entire network. In particular, changing a few ties can alter an overall network map dramatically. The approximations involved in developing such diagrams, the sampling issues and the material costs of using such tools – especially in terms of data gathering and analysis – mean that they need to be used carefully. At the present time, it may be that proxy methods, which take on the broad principles of SNA but do not incur considerable costs, are more feasible for use by network managers.

There is also an issue related to which measures to use for which types of network. Measures must be matched appropriately with network types and research questions.

Implications for network managers and researchers

Given the above, it would appear that SNA does have the potential to help develop a richer picture of network dynamics and interactions. If such research were undertaken in effective ways, it could be of use for network managers by helping them to:

- Identify the different structures that are at play within their networks;
- Better understand the relationships and cliques that alternately foster and hinder information flows;
- Improve actors' knowledge of the structure of the networks they belong to, and how this affects their participation;
- Grapple with issues of centrality and, importantly, given international aid trends, what this means for potential national ownership of networks and the broader aid agenda; and
- Work out how to facilitate effective collective action within networks of semi-autonomous actors without incurring an exponential rise in communication costs.

3.2 How do networks work (I)? Complexity theory

At the heart of all complexity theories is the notion of interconnectedness, and how different degrees of interconnectedness between the elements of a system can change the nature of that system dramatically. Stuart Kauffman's experiments at Santa Fe showed that, as interconnectedness increases, so does the complexity of a network. This gives rise to emergent properties, non-linearity and a number of other features that distinguish complex phenomena from complicated or simple ones (Ramalingam et al., 2008).

Seeing networks as complex adaptive systems means recognising that they are open to responding and co-evolving with the environment (Hall, 2002), and suggests that their ability to survive and thrive depends on their ability to learn from experience and adapt to new contexts.

Evidence suggests that effective and sustainable networks have the potential to self-organise; to create new structures and new ways of relating and mobilising energy for action; and to combine formal and informal elements to achieve their purpose (Taschereau and Bolger, 2007).

Such a perspective means that networks should not be thought of as planned, designed structures, but rather as fluid dynamic patterns of relationships, which evolve in response to both environmental factors and the network itself.

> 'Rather than looking for linear cause and effect relationships to understand development of capacity in networks, systems theory suggests we look for patterns of behaviour that emerge in response to particular contexts, and internal factors, over time [...] complexity theory offers practical insights and tools for managing some of the "messiness" of networks' (Taschereau and Bolger, 2007).

Some definitions of networks do take such issues into account. For example, as Stein et al. suggest (2001), a network is a 'spatially diffuse structure, with no rigidly defined boundaries, consisting of several autonomous nodes sharing common values or interests, linked together in interdependent exchange relationships.'

Issues and challenges

Complexity theory has a number of problems, but the fundamental one is that it does not provide a clear and coherent set of 'things to do.' Instead, it suggests that the best actions will always be context-specific. As noted by researchers at the Santa Fe Institute, it is best seen not as a way of generating answers but rather as an 'engine for intuition.'

Complexity science is also subject to much 'consultantese' on the one hand, and very abstract and dense academic writing on the other, both of which can blur what is potentially a useful set of principles and notions about how to work in an unpredictable, interconnected world.

Implications for network managers and researchers

Complexity theory can be a very useful framework for understanding real-world systems, change processes and actors' adaptive capacities. As such, it provides a useful framework to help network facilitators grapple with and navigate complexities within and outside the network. More research using a complexity lens on particular networks could generate much valuable material and shed light on the underlying processes by which networks emerge, form and are sustained.

For example,

- What is the best way to facilitate network behaviours that are strategically coherent and yet locally relevant?
- How can network managers establish 'minimum rules' around which network members can self-organise to generate desired outcomes?
- How can ideas of feedback and non-linear change be useful in understanding why some network activities, often relatively under-resourced and under-funded, can have disproportionate effects, while others can suck up resources with relatively few results?

3.3 How do networks work (II)? Actor-network theory

Actor-network theory (ANT) also provides explanations as to how and why networks work, looking at the network of influences that shape social behaviour:

> 'When going about doing your business — driving your car or writing a document using a word-processor — there are a lot of things that influence how you do it. For instance, when driving a car, you are influenced by traffic regulations, prior driving experience and the car's manoeuvring abilities; the use of a word-processor is influenced by earlier experience using it, the functionality of the word-processor and so forth. All of these factors are related or connected to how you act. You do not go about doing your business in a total vacuum but rather under the influence of a wide range of surrounding factors. The act you are carrying out and all of these influencing factors should be considered together. This is exactly what the term actor-network accomplishes. An actor-network, then, is the act linked together with all of its influencing factors (which again are linked), producing a network' (Akrich and Latour, 1992).

An actor-network consists of and links together both technical and non-technical elements. For example, both a car's capacity and the training of a driver influence the way a car is driven. ANT focuses on the 'heterogeneous nature' of actor-networks, and suggests that machines, people, language, standards, regulations, etc. all have equivalent influence on a network from an analytical perspective.

ANT claims that any actor, whether person, object (including computer software, hardware and technical standards) or organisation, is equally important to a social network. As such, societal order is an effect of the smooth running of an actor network. This order begins to break down when certain actors are removed. For example, the removal of telephones, banks or the president may all result in a significant breakdown in social order.

Such an approach means increasing the level of detail and precision in network research, akin to what Clifford Geertz has called 'thick description' (1973). The need to combine social and technical elements of a network encourages a detailed description of the concrete mechanisms at work gluing the network together, and how they are context-specific and situated within social relations and power dynamics. For example, in trying to understand a new network within an agency for managers to share knowledge on key issues, we would need to understand,

- Contractual obligations of managers;
- Existing modules and systems;
- The hierarchical power structure;
- Incentives;
- Existing informal relations; and
- The habits of employees.

Issues and challenges

The notion of an actor-network calls for researchers to map out the set of elements ('the network') that influence, shape or determine action. But each of these elements is in turn part of another actor-network, and so forth. Taken literally, exploring any actor-network fully would lead to unmanageably complex analysis. Employing ANT still requires a researcher to make critical judgements about how to delineate the context of study and to select issues of particular relevance. The task of trying to identify all of the heterogeneous elements in an actor-network is then ultimately up to the discretion of the researcher. This selection problem can in effect negate the ANT approach entirely.

Implications for network managers and researchers

ANT is a useful way to look at networks, but it is perhaps most important as a mindset than as a specific set of ideas for practical implementation. Its comprehensive nature is certainly valuable, but the selection process involved in choosing the aspects to be the focus of research can make the overall approach seem rather arbitrary and academic (in the pejorative sense of the term). Perhaps the most challenging aspect of ANT is its focus on power and its use, which can be uncomfortable in networks, which – at worst – can be seen as vehicles to disguise and blur power differences. Certainly, 'thick description' may prove of value for both researchers and network managers, but this would require a clear articulation of the benefits involved for both academic interest and the network itself.

3.4 What is the value of networks? Value network analysis

A third widely used tool for understanding how networks operate is value network analysis (VNA), which sees the network as the primary mechanism for 'value conversion.' VNA is used to understand how work groups, organisations and formal networks can work to achieve specific outcomes and generate economic and social good (Allee, 2002; Allee and Waddell, 2004). It does so by focusing on three elements (Box 1):

Box 1: Elements of VNA

VNA is based on integrated assessment of three aspects of a network – roles, deliverables and transactions.

Roles are played by real people or participants in the network, who provide contributions and carry out functions. Participants have the power to initiate action, engage in interactions, add value and make decisions. They can be individuals; small groups or teams; business units; whole organisations; collectives, such as business webs or industry groups; communities; or even nation states.

Deliverables are the actual 'things' that move from one role to another. A deliverable can be physical (e.g. a document or a table) or it can be non-physical (e.g. a message or request that is delivered only verbally). It can also be a specific type of knowledge, expertise, advice or information about something, or a favour or benefit that is bestowed on the recipient.

Transactions, or activities, originate with one participant and end with another. Transactions have directions, which represent movement and denote the course of what passes between two roles. This can include formal contract exchanges around product and revenue and intangible flows of market information and benefits.

This mapping enables network analysts to link network activities to performance and 'asset generation,' both for the overall network and for individuals involved in network exchanges and transactions. It sheds light on how participants in a network work – individually or collectively – to utilise their tangible and intangible asset base. In particular, it illuminates the assumed or created roles that help to convert assets into different kinds of value, which can then be delivered through transactions to participants playing other roles. Network members realise the value of these deliverables when they proceed to convert them into gains or improvements in tangible or intangible assets (Allee, 2008).

VNA opens the door to transaction cost analyses of networks. The basic idea is that there are costs and benefits to participating in a network, and that it is important to understand these clearly as a means of justifying a network's existence. Network managers may find it useful to consider the transaction costs facing members engaging in networks, in a qualitative and quantitative sense, and to use this analysis to check regularly that value for members exceeds costs incurred. Although it is possible to undertake this through proxy methods, VNA is certainly a useful approach worth further consideration. Work on networks and transaction costs in the context of aid governance approaches is increasing, as outlined by Owen Barder (2009), and this is worth further and more detailed exploration.

Issues and challenges

VNA is grounded in practice but, like SNA, requires a depth of analysis that may be beyond the scope of possibilities for network actors. It also assumes that network goals are clear and agendas transparent around the value, whereas there are key forms of value in the aid sector that are political and symbolic, and that are thus less amenable to such analysis. The underlying theory of asset creation and value generation may need some articulation if the approach is to have practical value for network managers.

In addition, the notion of objective value being determined for network activities raises a number of deeper issues around aid effectiveness and performance. The approach is an extension of value chain analysis and, as such, may be subject to many of the same issues around the quantification of intangibles and over-simplistic and mechanical assumptions about value creation.

Implications for network managers and researchers

The following questions might usefully be posed in the context of a given network:

- What is the overall pattern of exchanges and value creation in a network as a whole?
- How healthy is the network and how well is it generating value for its members?
- What impact does each input have on the network roles involved in terms of value realisation?
- What is the best way to create, extend and leverage value within the network?

4 How to bring the lenses to bear: a future *action* research agenda

This think piece has presented an overview of how networks are currently understood and researched in the development and humanitarian aid literature, and has used this to highlight a number of outstanding questions or gaps facing research and practice on aid networks. It has also looked at theoretical tools used in other sectors, and more slowly in the aid sector, to understand network relations in terms of the identified gaps.

On initial assessment, it would seem that the four frameworks presented could help in evaluating networks and understanding network effectiveness, as well as the relationship between a network, the wider environment and network members' perpetually shifting mandates. Network researchers may find them especially useful when developing narrative case studies of networks. They can also be useful to provoke network managers to look at their work differently.

Each of these tools would also appear to have the potential to address aspects of the gaps identified in the first part of the paper. A more thorough exploration of these gaps and of the value of these theories is beyond the scope of this small-scale paper, but this would be a vital next step.

It would seem there is untapped potential for these to play a more central role in the future agenda for aid network research and practice, but this will not happen automatically. There are costs involved and non-trivial limitations to overcome. More work is needed to learn from experts in each of these fields, to understand in more detail issues facing their wider application. This means better engagement with academics who focus on these areas, but also with practitioners in areas such as negotiation, intelligence and defence, where such approaches have already had significant uptake.

Taking this agenda forward may call for a collaborative initiative in research and development on aid networks, whereby networks with an interest contribute to a multi-stakeholder process of action research and learning on how these theories could support deeper understanding of what, how and why networks work.

This will require different researchers and practitioners to come together to develop a '*network collective*' – a shared collaborative learning project that brings together major networks and leading analysts with a view to furthering practical evidence-based techniques and tools. This also needs open-minded donors who will be willing to fund exploratory research in this increasingly important, but still inadequately understood aspect of development and humanitarian work.

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