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Every month **Attractors** shares tips and tools from human systems dynamics. In this month's edition, Glenda Eoyang reflects on
NETWORKS

Why has “networking” become such a hot topic?

- Policy and practice are pushing public-private partnerships.
- More complex problems demand more collaborative action.
- Silo structures that were effective in the past are too expensive, slow, and information poor to meet future challenges.
- We all need to access more resources more often and from ever-more surprising partners.
- Learning is the key to success in an information-dependent economy.
- Maintaining the capacities of our systems to adapt and respond well (sustainability) is high on our list of expectations for our social and organizational (as well as for our environmental) systems.

Network structures open opportunities to respond to all of these 21st century challenges, so we need to understand enough to leverage the power of networks in all facets of our personal, professional, and organizational lives. So, here is a quick, simple intro to the complex and emergent world of networks.

What?

A network is a system of parts (nodes) that are connected to each other for some specific purpose. On-line examples include you and your links on LinkedIn, friends on Facebook, members on NING communities. Sometimes, the old-fashioned networks are even more powerful. Examples include fraternities, old-boys' clubs, quilting circles, religious communities, and any of the myriad other ways that individuals connect with each other for business or pleasure.

A network diagram (sometimes called just a network, which just confuses the map and the territory) is a picture that points out who (or what) counts, and how they are connected to each other. Such a picture can be developed through low or high technology.

A low-tech network diagram is created when you draw circles for all the players in a project and lines to indicate which of the players are connected to each other. All you need is paper and marker and garden-variety knowledge about what's going on. You may find it helpful to use sticky notes as you're creating your low-tech network diagram, because as you put it together, you'll learn new things, and your picture will change quickly and repeatedly as you learn.

You might construct a low tech network to diagnose a communication problem or to decide who you want on a team.

A high-tech network diagram is created by a computer in response either to data or to a hypothesis.. One such program that we have used at HSD Institute is called CRAWDAD and was created by Kevin Dooley and his colleagues, who analyze discourse or conversation to understand how language connects a group. Data-based (empirical) networks usually begin with a survey. All the known nodes are interviewed about their connections to all the other known nodes, then the computer puts the picture together. In addition to simply graphing the relationships,

most high-tech network tools can calculate statistics about the network structure and tell you things like which node is the most connected, which is involved in most meaningful paths, which function as outliers or bridges, and so on.

A high-tech, empirical network can tell you lots about leverage points, opportunities for rich connections, unused resources, or dead spots in an organization or a community.

Hypothesis-based (theoretical) networks begin with a definition of rules that guide relationships and a range of characteristics each node might have. The computer, then, uses those characteristics and those rules to generate a likely pattern of relationships. Which nodes with which characteristics are likely to hook up with which other nodes/characteristics?

Theoretical networks have been used to study migration patterns, real estate policies, and dissemination of information, for example.

So what?

You can use high- and low-tech networks (and network diagrams) in four ways.

First, you can use them to look backwards. We have clients who want to know how integrated their service delivery processes are or how effectively diverse service providers are working together or how well scientific research responds to the needs of citizens. Retrospective network analysis can tell very interesting stories about what has been and what currently is.

Second, you can use networks to understand what is happening in the present. If information is moving too quickly—or not quickly enough—across your organization, if you want to assess sustainability, if you want to know who is most influential in your environment, a network diagram can be quite helpful.

Third, you can use a network diagram to consider options for future action. Who should we rely on to champion an organizational change? How can we become more agile and responsive to our customers? Where should we invest training and development resources? How can we increase our individual and institutional resilience? An effective network diagram can help you answer those questions.

Fourth, you can use a series of network diagrams that have been constructed over time to evaluate the effectiveness of a change effort. Have our activities increased the density, variety, or coherence of the network? What new nodes have been added to the network? What kinds of new connections have been created among long-time nodes? Which nodes are making the greatest change over time in the number and kinds of their connections?

Now what?

Without either a low- or a high-tech network diagram, most of us are conscious of how we depend on networks and how our networks depend on us. In times of complex change, those relationships become more important at the same time that they become more ambiguous and difficult to maintain. When you begin to question your intuitive grasp of the networks that sustain your work, then it is time to dive into more rigorous network analysis. It is easy enough to begin with a low-tech network diagram. Whether you do it on paper or with the Tinker Toys we all used as children, you and your colleagues will gain new insights into the dynamics of what works and what doesn't for you and your team. Next month I will focus on some of the specific lessons network analysis has taught us about thriving in complex and turbulent times. Until then, stay connected.

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