BUILDING COMMUNITIES THROUGH NETWORK WEAVING

Communities are built on connections. Better connections usually provide better opportunities. But, what are better connections, and how do they lead to more effective and productive communities? How do we build connected communities that create, or take advantage of, opportunities in their region or marketplace? How does success emerge from the complex interactions within and between communities?

This paper investigates building sustainable communities through improving their connectivity – internally and externally – using network ties to create opportunities. Improved connectivity is created through an iterative process of knowing the network and knitting the network. Improved connectivity starts with a map – knowing the complex human system you are embedded in.

Know the Net

The Appalachian Center for Economic Networks [ACEnet], a regional economic development organization in Athens, Ohio has long followevd the connectivity mantra – create effective networks for individual, group and regional growth and vitality. Recently ACEnet has begun to map and measure the social and economic connections in the grassroots food industry in this region of Appalachia.

ACEnet, founded in 1985, provides a wide range of assistance to food, wood and technology entrepreneurs in 29 counties of Appalachian Ohio. This region has some of the highest poverty and unemployment rates in the country, and ACEnet works with communities throughout the region who want to improve their support for entrepreneurs as a means to provide more local ownership and higher quality jobs.

Network maps provide a revealing snapshot of a business ecosystem at a particular point in time. These maps can help answer many key questions in the community building process.

- Are the right connections in place?
- Are any key connections missing?
- Who are playing leadership roles in

the community?
- Who is not, but should be?
- Who are the experts in the area?
- Who are the mentors that others seek out for advice?
- Who are the innovators? Are ideas shared and acted upon?
- Are collaborative alliances forming between local businesses?
- Which businesses will provide a better return on investment – both for themselves and the community they are embedded in?

These are all important questions that ACEnet wants to answer so that they can help build a more vibrant economy in Appalachian Ohio.

Before you can improve your network you need to know where you are currently – the 'as is' picture. A network map shows the nodes and links in the network. Nodes can be people, groups or organizations. Links can show relationships, flows, or transactions. A link can be directional.

A network map is an excellent tool for visually tracking your ties and designing strategies to create new connections. A network map is also an excellent 'talking document' – a visual representation that opens up many conversations about possibilities.

Transformation that leads to healthy communities is the result of many collaborations among network nodes. Complexity scientists describe this phenomenon – where local interactions lead to global patterns – as emergence. We can guide emergence by understanding, and catalyzing, connections. For example, knowing where the connections are, and are not, allows a community development organization to influence local interactions.
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This is particularly important in policy networks where key nodes play an important role in what flows throughout the network. Influencing a small number of well-connected nodes often results in better outcomes than trying to access the top person or calling on random players in the policy network. If you know the network, you can focus your influence.

Recently ACEnet Food Ventures staff asked area entrepreneurs and organizations, "From whom do you get new ideas that benefit your work?" "From whom do you access expertise that improves your operations?" and "With whom do you collaborate?"

The answers to these questions were mapped using Valdis Krebs' InFlow™ social network mapping software into an Innovation Network, an Expertise Network, and a Collaboration Network.

Analyzing these networks led the team to realize that there were several entrepreneurs who played a critical role in the food sector, but with whom they had little relationship. The team developed a strategy for more explicitly working with these entrepreneurs, by asking them to conduct workshops for other entrepreneurs and finding out their needs for business assistance.

What does a vibrant, effective community network look like? Since 1997, much research has been undertaken to discover the qualities of vibrant networks. Sociologists, physicists, mathematicians, and management consultants have all discovered similar answers about effective networks. The amazing discovery is that people in organizations, routers on the internet, cells

in a nervous system, molecules in protein interactions, and pages on the WWW are all organized in efficient network structures that have similar properties.

Four general patterns are observed in all effective networks:

1. Birds of a feather flock together: nodes link together because of common attributes, goals or governance.
2. At the same time diversity is important. Though clusters form around common attributes and goals, vibrant networks maintain connections to diverse nodes and clusters. A diversity of connections is required to maximize innovation in the network.
3. Robust networks have several paths between any two nodes. If several nodes or links are damaged or removed, other pathways exist for uninterrupted information flow between the remaining nodes.
4. Some nodes are more prominent than others – they are either hubs, brokers, or boundary spanners. They are critical to network health.

Even though we know several keys to building effective networks, this knowledge is rarely put to use. Networks, whether social or business, are usually left to grow without a plan. When left unmanaged, networks follow two simple, yet powerful driving forces:

1. Birds of a feather flock together.
2. Those close by, form a tie.

This results in many small and dense clusters with little or no diversity. Everyone in the cluster knows what everyone else knows and no one knows what is going on in other clusters. The lack of outside information, and dense cohesion within the network, removes all possibility for new ideas and innovations. We see this in isolated rural communities that are resistant to change, or in a classic "old boy network". Yet, the dense connections and high degree of commonality form good work groups – clusters of people who can work together smoothly.

Instead of allowing networks to evolve without direction, successful individuals, groups and organizations have found that it pays to actively manage your network. Using the latest research we can now knit networks to create productive individuals and communities.

Knit the Net

A vibrant community network is generally built in 4 phases, each with its own distinct topology.

Each phase builds a more adaptive and resilient network structure than the prior phase.

Network mapping can be used to track your progress through these four stages.

1. Scattered Emergence
2. Single Hub-and-Spoke
3. Multi-Hub Small-World Network
4. Core/Periphery

Experience shows that most communities start as small emergent clusters organized around common interests or goals. Usually these clusters are isolated from each other. They are very small groups of 1-5 people or organizations that have connected out of necessity, see **Figure 1.** If these clusters do not organize further, the community structure remains weak and under-producing.

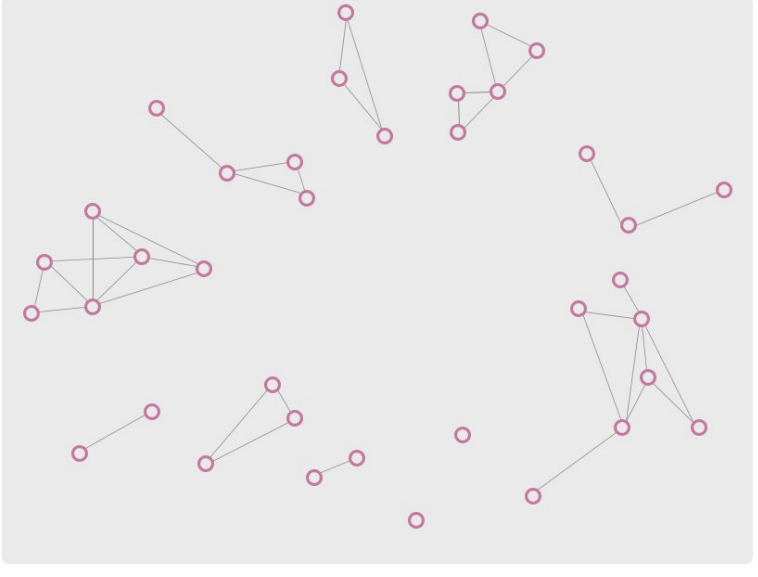

Figure 1 – Scattered Emergence

Without active leaders who take responsibility for building a network, spontaneous connections between groups emerge very slowly, or not at all. We call this network leadership a network weaver. Instead of allowing these small clusters to drift in the hope of making a lucky connection, the weaver actively creates new interactions

[1] Nodes with many direct connections that quickly disperse information.

[2] Nodes that connect otherwise disconnected parts of the network – they act as liaisons.

[3] Nodes that connect two or more clusters – they act as bridges between groups.

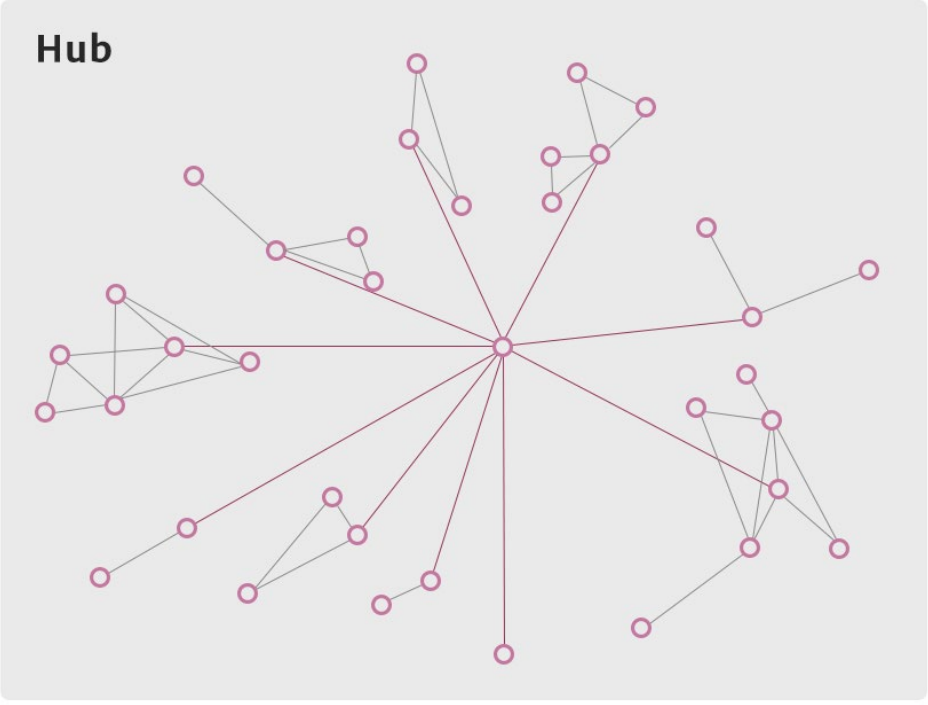

Figure 2 – Hub-and-Spoke Network

When ACEnet decided to build a Kitchen Incubator—a licensed processing facility where entrepreneurs could rent the use of ovens, stoves and a processing line to produce their products—they used the need to design the incubator as an opportunity to link small clusters. For example, for one design session they brought people from the town's restaurants together with small farmers who wanted to turn their produce into value-added products. Farmers were able to learn about food production safety from the restaurateurs who explained how these procedures could be incorporated into the incubator. Some of the farmers also used the opportunity to sell their produce to the restaurants, who were always on the lookout for unique raw materials. And, an unexpected bonus was that the restaurants realized that they could use the Kitchen Incubator's storage warehouse for large orders they made from their suppliers, and as a result became an important part of the network.

The first network weavers create is the hub and spoke model, with the weavers as the hub. The weavers have the vision, the energy, and the social skills to connect to diverse individuals and groups and start information flowing to and from them. The weavers usually have external links outside of the community to bring in resources and innovation. This is a critical phase for community building because everything depends on the weavers who are the lone hub in the network. **Figure 2** shows the weavers connecting the previously scattered little clusters.

Initially the network weavers form relationships with each of the small clusters. During this phase the weavers are learning about each individual or small cluster – discovering what they know and what they need. However, the hub-and-spoke model is only a temporary step in community growth. It should not be utilized for long because it concentrates both power and vulnerability in one node – the hub. If the leaders fail or leave then we are back to the disconnected community in **Figure 1**.

In healthy network weaving, the spokes of the hub do not remain separated for long. The weavers begin connecting those individuals and clusters who can collaborate or assist one another in some way. Concurrently the weavers begin encouraging others to begin weaving the network as well. Even though it is a temporary structure, the hub-and-spoke model is usually the best topology to bring together the scattered clusters seen in most immature communities.

An organization with a vision, and contacts to external ideas and resources, can play the role of the hub. This is the role ACEnet took up when it saw that SE Ohio was home to many small,

uncoordinated food clusters.
There was the Farmer's Market crowd, the natural bakery, a worker-owned Mexican restaurant and a few other entrepreneurs creating unique food products. ACEnet brought all of these unconnected groups together around a kitchen incubator – a state of the art facility for preparing and packaging a large variety of food items.
As the weaver connects to many groups, information is soon flowing into the weaver about each group's skills and goals. An astute weaver can now start to introduce clusters that have common goals/interests or complementary skills to each other. As clusters connect, their spokes to the hub can weaken, freeing up the weaver to attach to new groups. Although the spoke links weaken, they never disappear – they remain weaker, dormant ties, able to be re-activated whenever necessary. In order to accommodate new connections, the weaver must teach its early connections how to weave their own network. Training in network building is important at this juncture. Network mapping reveals the progress and identifies emerging network weavers.

This happened with ACEnet as several of the businesses and small non-profits began to build their own network neighborhood, bringing in new nodes and links into the early Athens community network. As the overall network grows, the role of the weaver changes from being the central weaver, to being a facilitator of network building throughout the community.

There are two parts to network weaving. One is relationship building, particularly across traditional divides, so that people have access to innovation and important information. The second is learning how to facilitate collaborations for mutual benefit. Collaborations can vary from simple and short term—entrepreneurs purchasing supplies together—to complex and long-term—such as a major policy initiative or creation of a venture fund. This culture of collaboration creates a state of emergence, where the outcome—a healthy community—is more than the sum of the many collaborations. The local interactions create a global outcome that no one could accomplish alone.

This transition from network weaver to network facilitator is critical. The original weaver is creating new weavers who will eventually take over much of the network building and maintenance. If the change is not made then the community network remains dependent on the central weaver who is now probably overwhelmed with connections. At the transition point the weaver changes from being a direct leader to an indirect leader, influencing new emergent leaders appearing throughout the community. This transition is necessary for the network to increase its scale, impact and reach.

The change from weaver to facilitator is critical in moving from a single-hub topology to a multi-hub topology that has many advantages. The first advantage of a multi-hub topology is elimination of a single point of failure. ACEnet is still a dominant hub in SE Ohio, and its failure would affect the region greatly – but not as significantly as five years ago when the network was sparser and more dependent on ACEnet. Now ACEnet has the luxury of spending time in new pursuits such as teaching others to knit their nets and expanding the network to other areas inside and outside of Appalachia.

To bring in new ideas from outside the region, ACEnet has developed several "innovation learning clusters" that bring together leading edge organizations from around the country who share their innovations with each other. ACEnet staff who participate then bring information about those innovations back to the region and adapt them to the local environment. For example, Larry Fisher, one of ACEnet Directors, participates in a rural entrepreneurship policy cluster where he learned the basics of building a policy network from organizations with many years' experience. He is now leading ACEnet's efforts to change the policy of local counties so that it is more supportive of entrepreneurship, but he can move forward with a more sure hand since he is building on the experience of others—and can contact them when he has questions.

As the weaver connects various individuals, organizations and clusters, these entities connect to each other loosely. A new dynamic is revealed here – the strength of 'weak ties'. Weak ties are connections that are not as frequent, intense, or resilient as strong network ties that form the backbone of a network. Strong ties are usually found within a network cluster, while weak ties are found between clusters. As clusters begin to connect, the first bridging links are usually weak ties. Over time weak ties may retain their structure by bridging separate clusters or they may grow in to become strong ties binding

previously separate groups into a new larger cluster.

Weak ties are also important in innovation. New ideas are often discovered outside the local domain. To get transformative ideas you often have go outside of your group. A successful formula for creating ties for innovation is to find other groups that are both similar and different than your own. Similarity helps build trusts, while diversity introduces new ideas and perspectives.

Now that other hubs are appearing in the network, the weaver connects the hubs to each other, creating a multi-hub community. Not only is this topology less fragile, it is also the best design to minimize the average path length throughout the network – remember, the shorter the hops the better for work flow, information exchange and knowledge sharing! Information percolates most quickly through a network where the best connected hubs are all connected to each other. A network with many hubs is also very resilient and cannot be easily dismantled.

and 'turf' issues are raging through the network. If two or more community development organizations start battling over turf and control of the community then the result may be two or more competing, single hub networks that ignore the larger community needs and just focus on survival of their own network.

Initially, the ACEnet Kitchen Incubator was a major gathering place, a physical network hub, where people ran into each other, hung around to talk, and often cooked up some kind of deal: joint orders of jars so they could get a cheaper price, an arrangement to jointly market their products, or an agreement to trade labor on a project.

However, after a few years, many other network hubs popped up. For example, the Athens Farmers' Market hosted more than 90 farmers and local food vendors who networked with each other and their avid customers. Several years ago, 4 local organizations set up a Farmers' Market Café that provides tables and chairs under tents so that people could hang around longer and network with more neighbors.

Casa Neuva, a worker-owned Mexican restaurant, is not only a networking hub, but has played a major role in organizing most of the locally owned restaurants into the Athens Independent Restaurant Association which donates money each month to community non-profits and is increasing the amount of area restaurants purchase from local farm families. Six miles outside town, more than 200 people flock on Saturdays to enjoy fresh baked focaccia, pastries and hearth bread on the outdoor terrace outside the Big Chimney Bakery. The proprietor is a major network hub himself, who helps new entrepreneurs develop their recipes and learn strategy from a pro.

Figure 3 shows a multi-hub small-world network. Here four clusters [designated by the thick links] have created many weak ties [gray links] to each other. The weak ties may, or may not, strengthen to create one tightly coupled larger cluster. The multiple hubs can be small businesses or other community development organizations.

The important next step is to strengthen some of the weak ties in the network so they become strong ties. This happens after turf issues have been handled. A multi-hub network may be difficult to achieve if political and 'turf' issues are raging through the network. If two or more community development organizations start battling over turf and control of the community then the result may be two or more competing, single hub networks that ignore the larger community needs and just focus on survival of their own network.

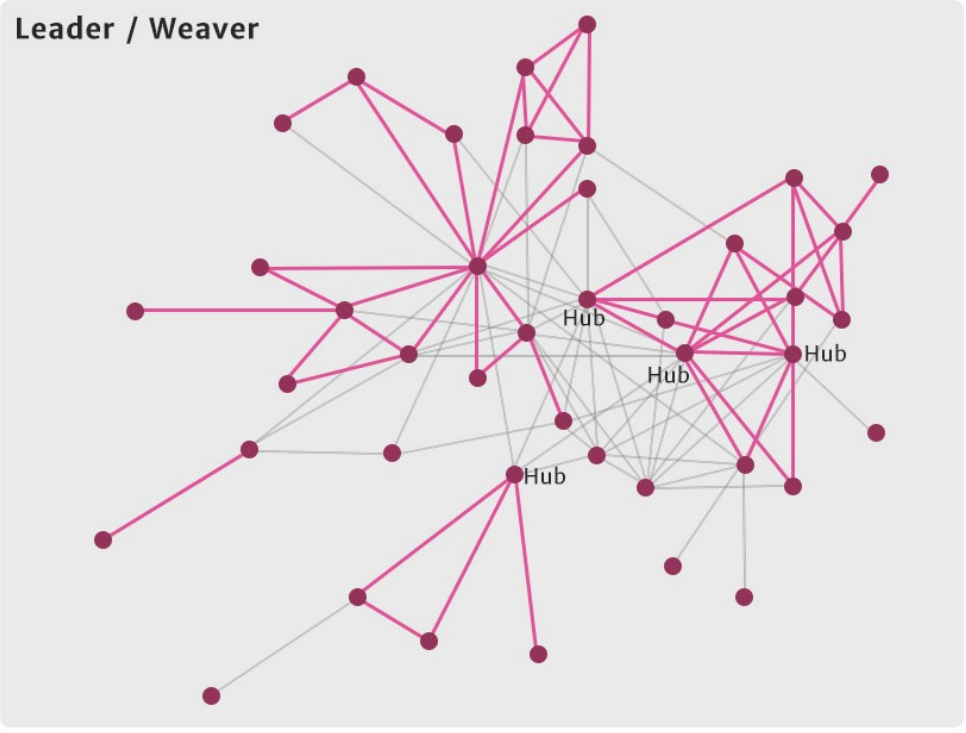

Figure 3 – Multi-Hub Small World Network

The end-goal for vibrant, sustainable community networks is the modified core/periphery model. This topology emerges after many years of network weaving by multiple hubs. It is a stable structure that can link to other well-developed networks in other regions. The network core in this model contains connected diverse clusters where key community members have developed strong ties between themselves. The periphery of this network contains three groups of nodes that are usually tied to the core through weak ties.

1. Those new to the community and working to get to the core
2. Bridges to diverse communities elsewhere
3. Unique resources that operate outside of the community, and may span many communities

The economic landscape is full of imperfectly shared ideas and information. The periphery allows us to reach ideas and information not currently prevalent in the network. The core allows us to act on those ideas and information.

The periphery is the open, porous boundary of the community network. It is where new members/ideas come and go. The periphery monitors the environment, while the core implements what is discovered and deemed useful.

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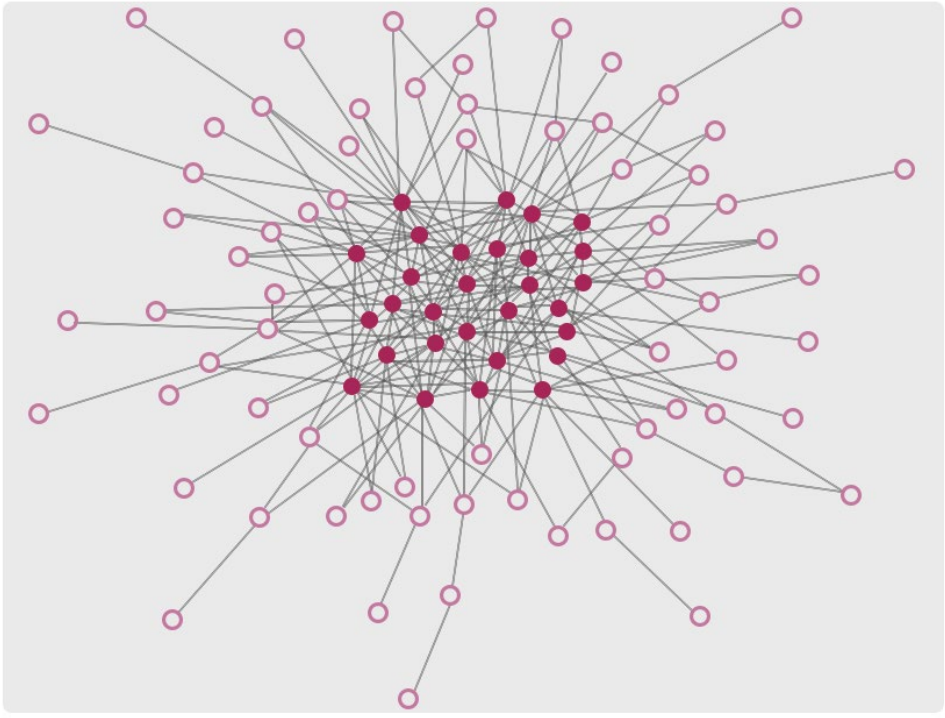

Figure 4 – Core/Periphery Network

Figure 4 shows a well- developed core/periphery structure. The dark nodes are the core, while the light nodes reside in the periphery. This network core is very dense -- not all cores will have as high a concentration of connections as this one. Too much density can lead to rigidity and an overload of activity. Monitoring your network using social network analysis can help you see where your network needs to shift connections to match the current environment.

At this point the network weaver's initial task is mostly completed. Now, attention turns toward network maintenance and building bridges to other networks. The network weaver can begin to form inter-regional alliances to create new products, services and markets—or to shape and influence policy that will strengthen the community or region.

This happens by connecting network cores to each other utilizing their peripheries. The network weaver maximizes the reach of the periphery into new areas, while keeping the core strong.

The weaver now focuses on projects of large substance that will have major impact on the community.

Conclusion

As we have seen weaving a network requires two iterative and continuous steps:

1. **Know the network** – take regular snapshots of your network and evaluate your progress.
2. **Knit the network** – follow the four phase network knitting process.

All throughout this process network maps guide the way – they reveal what we know about the network and they uncover possible next steps for the weaver.

Valdis Krebs is a management consultant and the developer of InFlow network software.
www.orgnet.com
valdis@orgnet.com

June Holley is founder and former President/CEO of the Appalachian Center for Economic Networks and now an international network consultant.
www.networkweaver.com
juneholley@gmail.com

[4] Network density is calculated by the number of existing connections as a percentage of the total possible. Any density greater than 50% is very high.