Social network analysis: A tool for better understanding and managing your cluster

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Outline

- Cluster-based economic development

- Social networks?

- Social network analysis?

- Using social network analysis

Cluster-based economic development

Our view of cluster-based economic development

- Have been working with the northwest Ohio greenhouse industry since 2004 helping them organize as an effective industrial cluster

- Recently started working with the photovoltaics cluster in northwest Ohio

- We view cluster-based economic development as a network driven economic development strategy built on collaboration and joint action among the participants in order to achieve higher levels of competitiveness
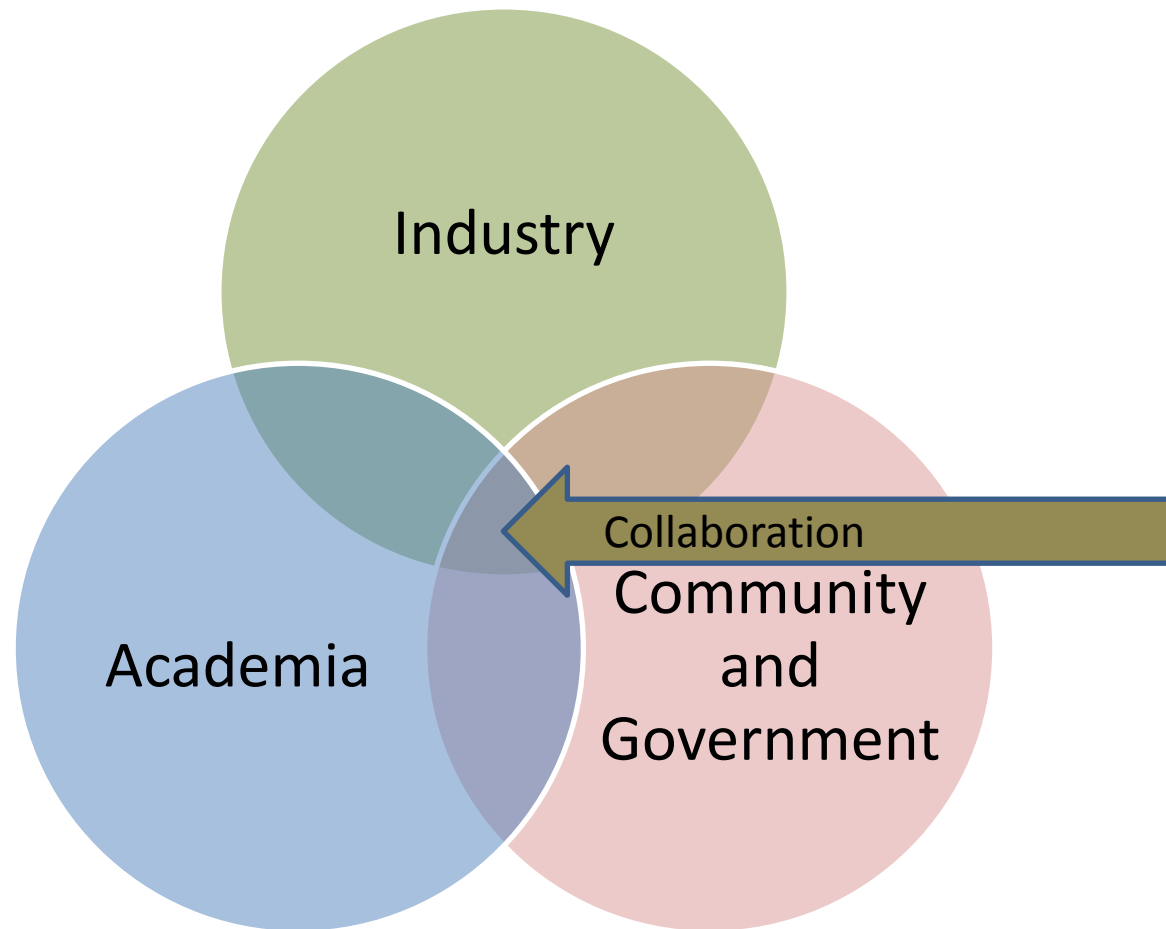

THE UNIVERSITY OF
TOLEDO
1872

Social capital

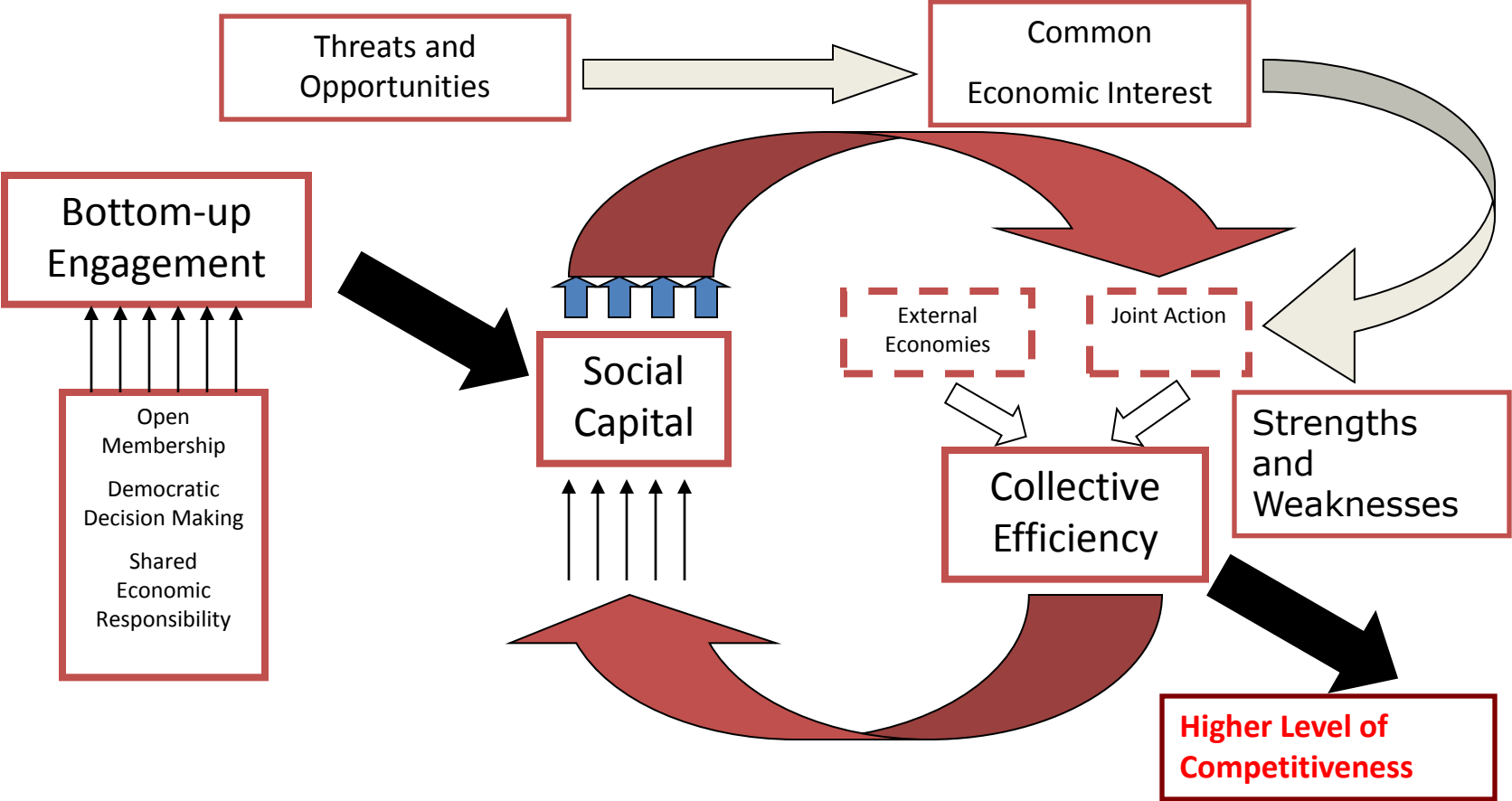- features of social organization, such as trust, norms and networks, that can improve the efficiency of society by facilitating coordinated actions" (Putnam 1993)

- "the stock of active connections among people: the trust, mutual understanding, and shared values that bind the members of human networks and communities and make cooperative action possible" (Cohen and Prusak)

- "social relations among agents combined with social institutions that allow for co-operation and communication" (Lorenzen 2007)

Collaboration

Our cluster model
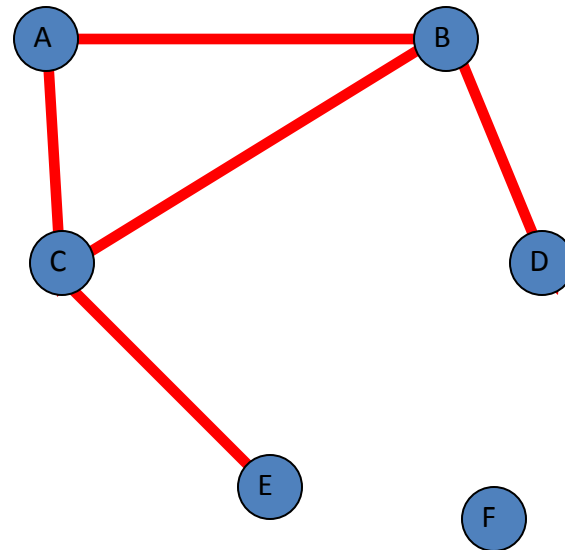
Social networks

Social networks

- A social structure made up of individuals (or organizations) who are connected by one or more specific types of relationship

  – Friendship

  – Kinship

  – Shared interests

  – Business relationship

Nodes, ties, and networks

- Individuals within a social network are called nodes

- The relationships between individuals within a network are called ties

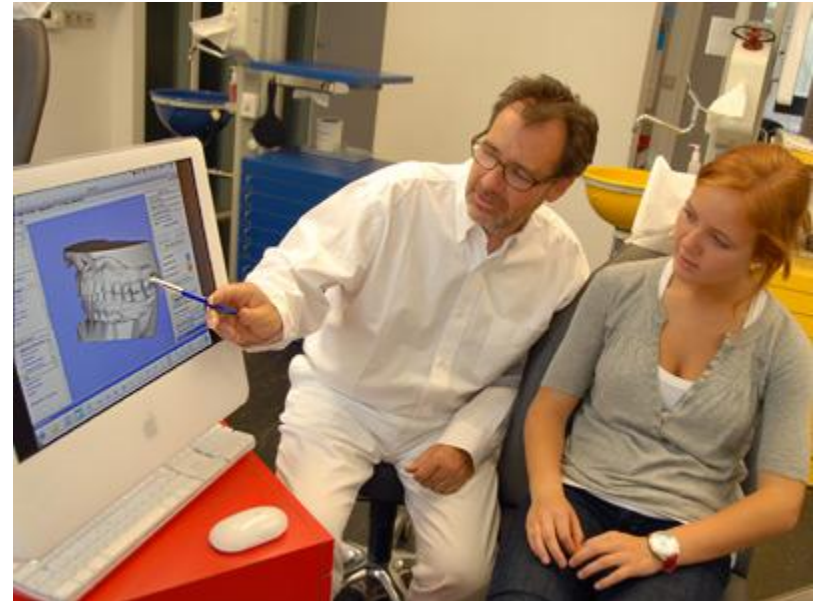- Collectively the relationships that exist between individuals constitute a network

Why are networks important?

- Facilitate the exchange of business-critical information

  – Helps members close the knowledge and experience gap

- Facilitate the diffusion and adoption of new ideas and innovations

  – Change agents and opinion leaders are critical in this process

- Builds the social capital and trust that is critical for businesses to engage in higher-level collaborative projects

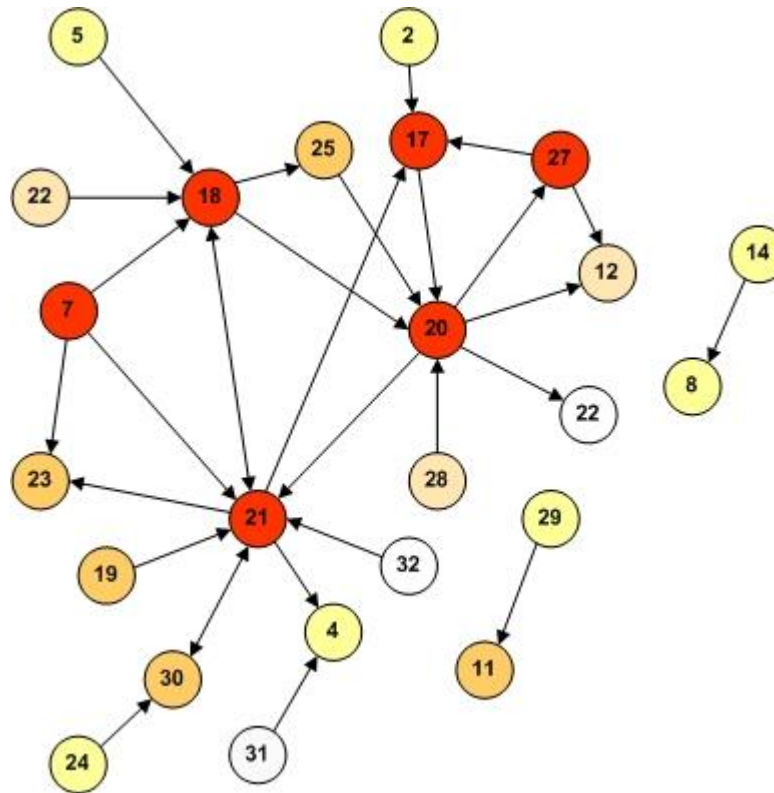 – Joint marketing
  – Joint production

Network types

- Collaboration networks

- Advice and support networks

- Innovation (new ideas) networks

- Information sharing

Social network analysis

Social network analysis

- The scientific study of social networks

  - Used in a wide range of fields
    - Criminology
    - Public Health
    - Organizational Science

  - Uses data on relationships between network members

  - Uses software to analyze the data
    - InFlow
    - UCINeT
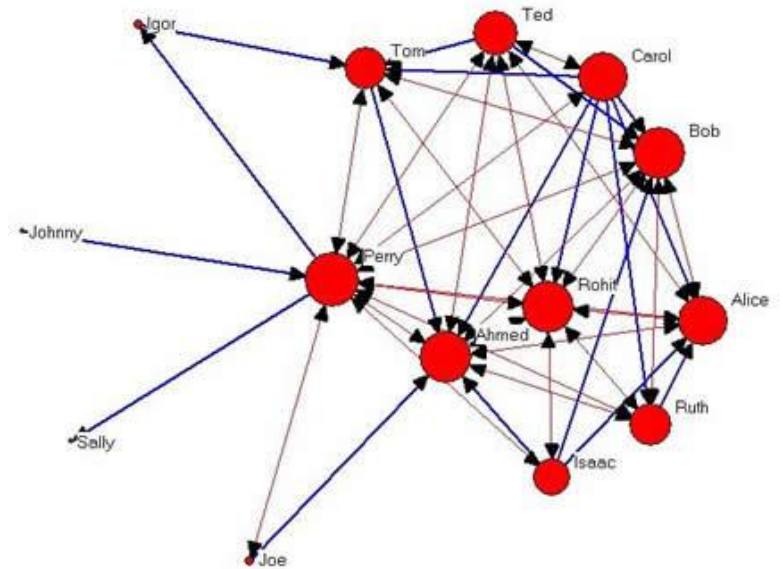
Data collection

- Data collection methods
  - Secondary data
    - E-mail traffic
    - Newspaper stories
  - Primary data
    - everyone in network identifies all relationships with everyone else
    - everyone in network identifies top 10 relationships
  - Relationship strength
    - daily, weekly, monthly, quarterly, yearly, never

	Collaboration	Advice & support	Innovation	Information sharing
Neil Reid				
John Smith		X		X
James Green	X	X	X	X
Susan Brown		X	X	X
Frank Jones			X	X
Steve White				X

Social network analysis

- Generates two types of data

  - Network data
    - Density

  - Individual data
    - Centrality
      - Degree
      - Betweeness
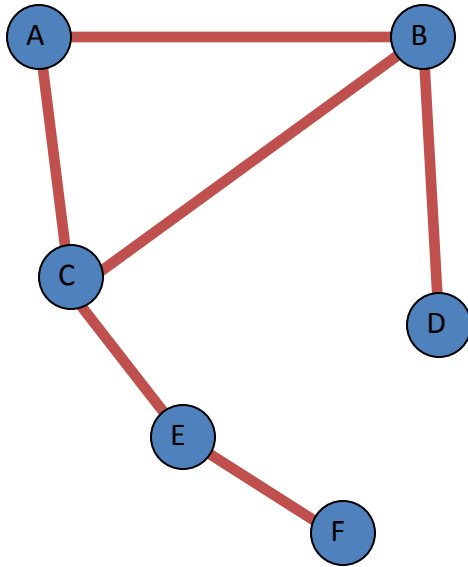   - Closeness

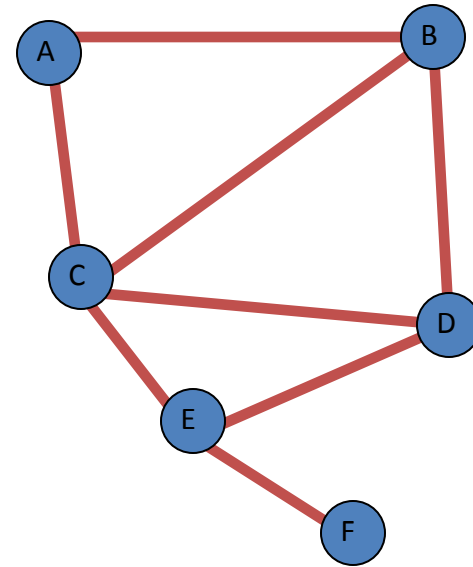# Using social network analysis

SNA can be used in clusters to

- **Measure network density**

  - High density networks desirable

    - Information flows more rapidly

    - Higher network durability

- **Identify key individuals**

  - People with high centrality have ability to bring people together and make things happen

- **Identify "Missing" Relationships**

  - Examination of network graphs allows relationship gaps to be identified

- **Measure and identify local buzz and global pipelines**

    - Using GIS can map local and non-local ties

Network density

40% density (6/15 ties)
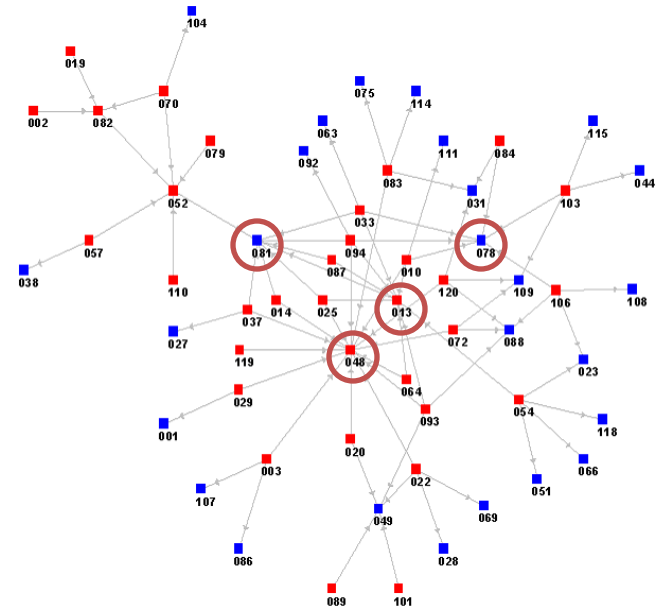
53.4% density (8/15 ties)

Identify network leaders

- Use degrees-in

  – The number of times that someone is mentioned by someone else as a source of advice and support

Identify network leaders

- Finding Opinion Leaders

  - Map shows how physicians seek each other out to discuss new medical treatments

  - 4 physicians are the most sought out for their advice

Source: Krebs 2002

Identify emerging network leaders

- Identify 9/11 terrorist networks

  - Data collected from the internet

  - al-Qaeda terrorists Alhazmi and Almihdahr photographed together in Malaysia in early 2000
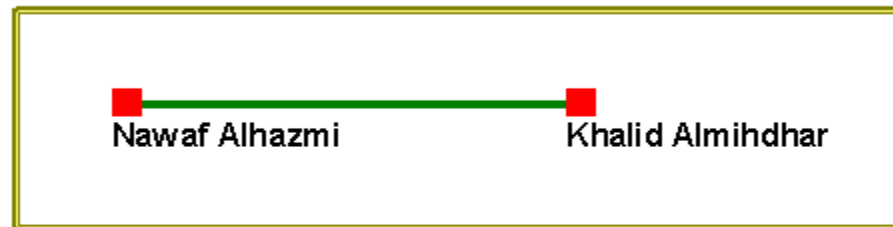

Figure 1 - Two known suspects in January 2000

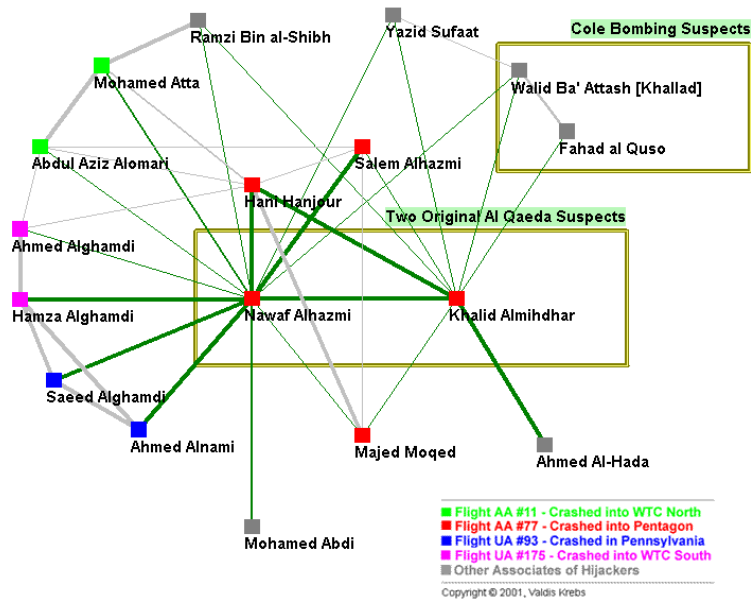Source: Krebs 2002

Identify emerging network leaders

Figure 2 - All nodes within 1 step [direct link] of original suspects
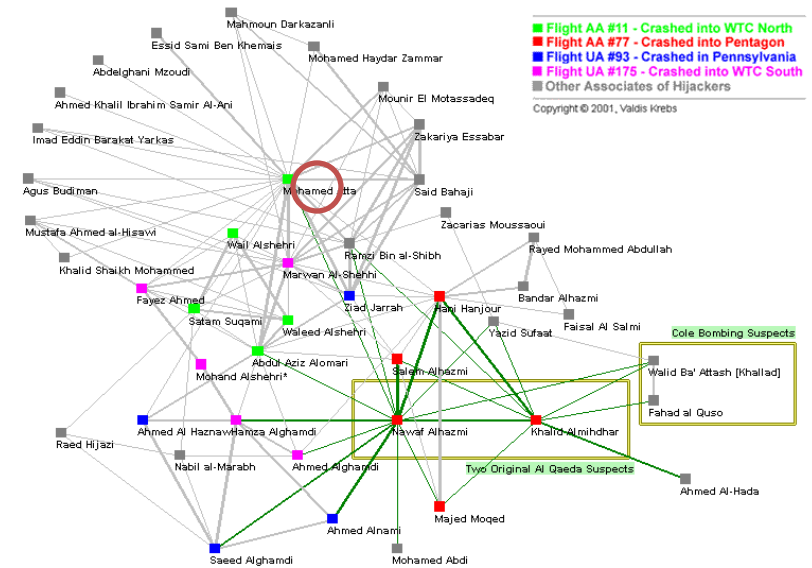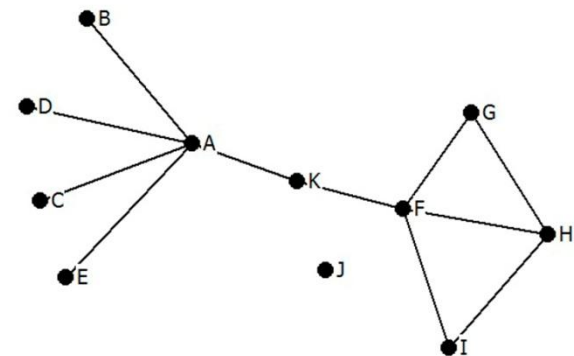
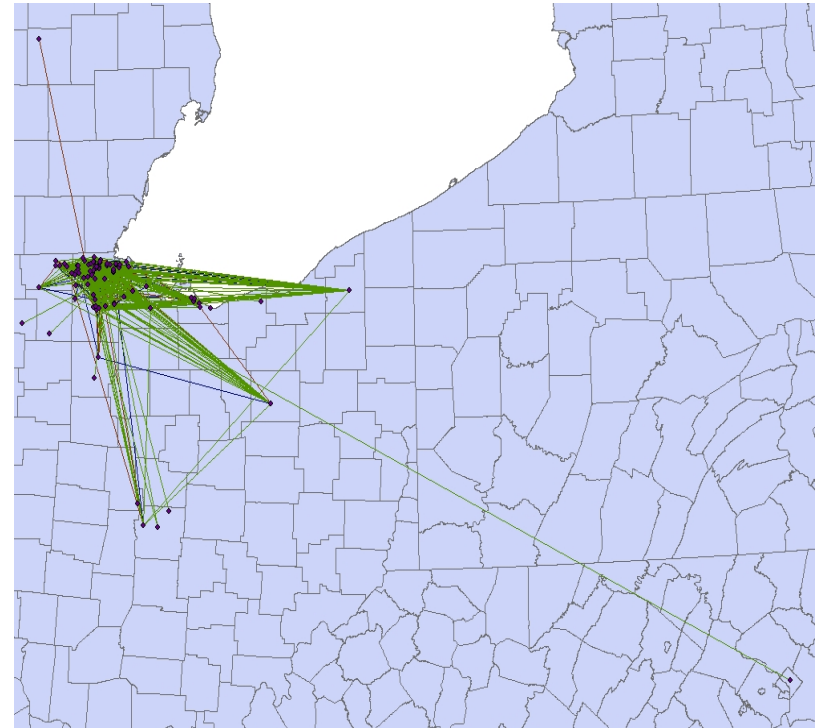Figure 3 - All Nodes within 2 steps / degrees of original suspects

Weaving networks and structural holes

- Network weaving

    - The process of intentionally and strategically fostering relationships between individuals

    - By examining existing network graphs, one can identify communication gaps that should be bridged

    - These gaps are referred to as structural holes

Local buzz and global pipelines

- Local buzz

  - Lots of communication within the network

  - Can lead to lock-in

    - Same people sitting around the table providing the same old solutions to the same old problems

- Global pipelines

  - Refers to communication outside of the network
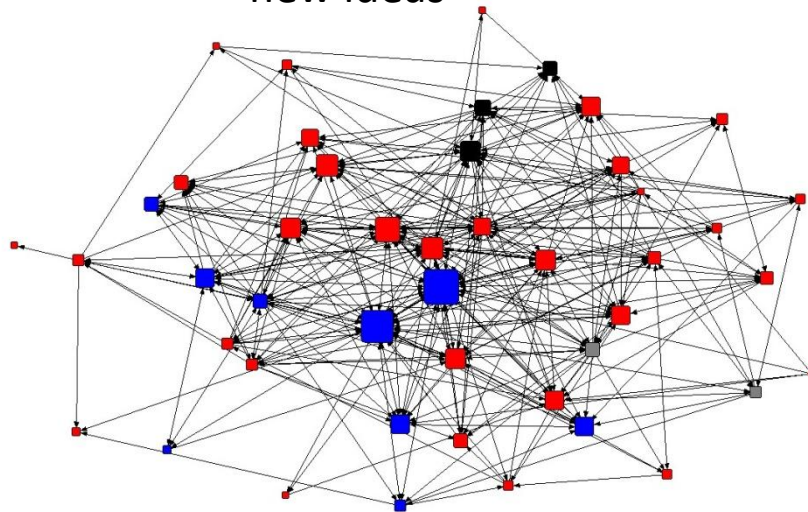
  - Is often the best source of new ideas

Monitoring networks

- Once a network has been established it should be monitored for changes in activity

    – Increase in volume of flow patterns

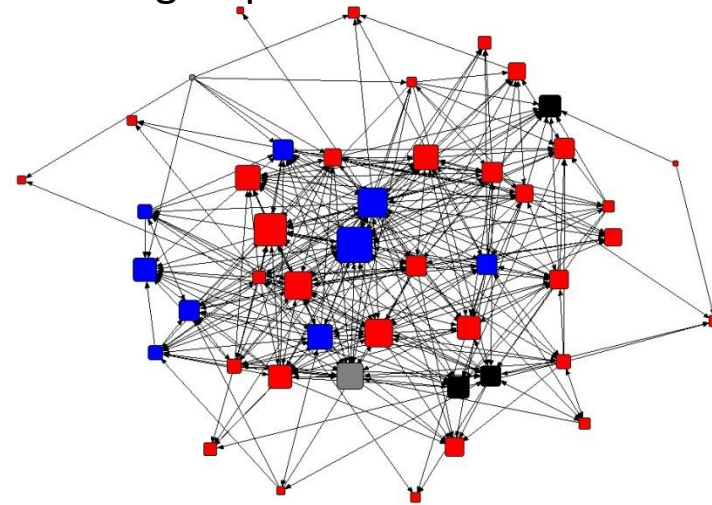   – Changes in directions of flow patterns

Greenhouse cluster, 2007 & 2009

2007

cluster management were main sources of advice and new ideas

advice and new ideas coming from a broader group

2009

Size of node indicates in-degree centrality

Management
Growers
Suppliers
Community

Conclusions

- Social Network Analysis can be a useful tool in helping to understand and strategically manage a network

- Software is relatively inexpensive

- Does require training that takes time and costs money

Questions/Comments

- Part of this work was was funded by the US Department of Agriculture