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
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

Industry

Academia

Community and Government

Collaboration
Our cluster model

Bottom-up Engagement
- Open Membership
- Democratic Decision Making
- Shared Economic Responsibility

Social Capital

Common Economic Interest
- External Economies
- Joint Action

Collective Efficiency

Strengths and Weaknesses

Threats and Opportunities

Higher Level of Competitiveness
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

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Social network analysis

- Generates two types of data
  - Network data
    - Density
  - Individual data
    - Centrality
      - Degree
      - Betweenness
      - 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

![Diagram of Alhazmi and Almihdahr](source)

*Figure 1 - Two known suspects in January 2000*
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

Source: Krebs 2002
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

Cluster management were main sources of advice and new ideas in 2007.

Advice and new ideas coming from a broader group in 2009.

Size of node indicates in-degree centrality.
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 funded by the US Department of Agriculture