

# Social Network Analysis: A Cluster-Based Economic Development Management Strategy

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# Purpose

- To explore:
  - the utility of social network analysis in managing an industrial cluster.
  - the utility of combining social network analysis with GIS.



# Context



# Maumee Valley Growers

- Maumee Valley Growers established in November 2005.
- Established in response to significant challenges facing the industry.
  - Canadian competition.
  - High and rising energy costs
- Organized around the concept of an industrial cluster.
- Managed and operated by an Advisory Board, Program Manager, and Champion.
- Supported by 5 Grower Ambassadors.
- Incorporated as a 501(c)6 in October 2007.



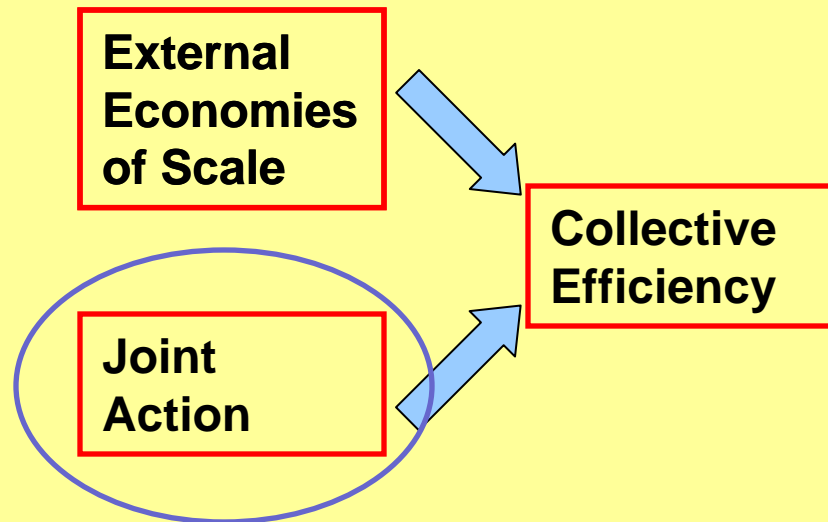
# What is an industrial cluster?

- Geographic concentration of businesses in a particular industry that **collaborate** with academia and other community partners to develop a **collective vision** for the future competitiveness of the industry and then **collaborate strategically** to implement that vision.



# Collective Efficiency: The Key to a Successful Cluster

- Collective efficiency is the competitive advantage that can be attained through the combination of **external economies of scale** and **joint action**.
- Geographic concentration is a **necessary** but not a **sufficient** requirement for a successful cluster.
- **Joint Action** is critical



# MVG Strategies

- Marketing only the highest quality plants possible under the Maumee Valley Growers brand.
- Increasing demand through awareness and preference of quality, locally grown products from our regional growers.
- Improving grower efficiency and profits through **joint problem solving** and **networking** to share best practices and resources.
- Growing our local economy by supporting new businesses that can supply our northwest Ohio greenhouse/nursery network.

MAUMEE VALLEY GROWERS

*Choose the Very Best.*

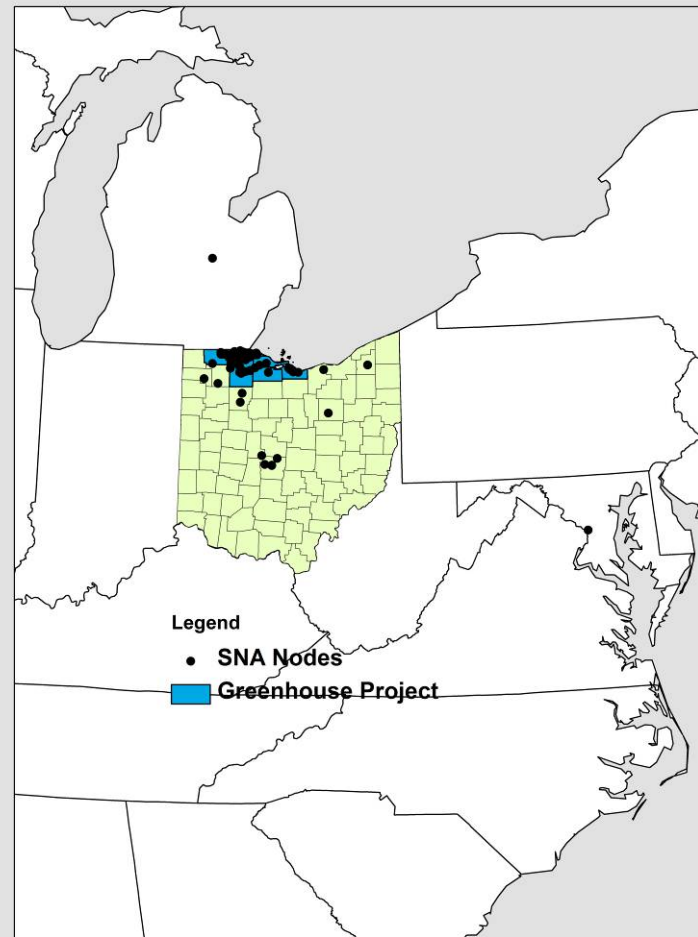


# Challenges

- 60+ greenhouses in 5-county northwest Ohio region.
- All family owned.
- Growers fiercely independent.
- Highly competitive industry.
- Little history of collaboration.



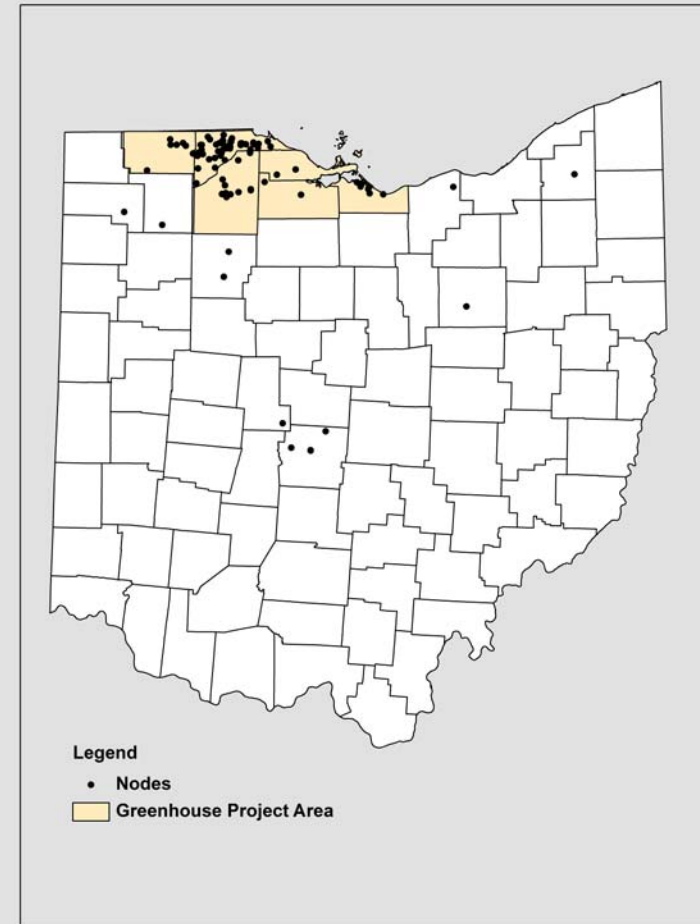
# Region



SNA and GIS are useful to describe attributes of the cluster

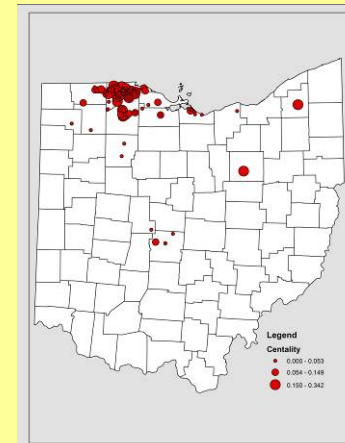
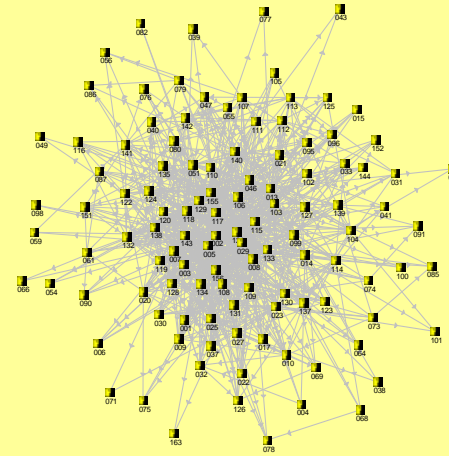
# Cluster Region Delineation

- Brokel and Binder (2007): There is a regional dimension to socio-economic processes but measuring the region is problematic. Ordinary cartographic definitions of regions are inadequate.
- SNA represents an alternative vision of regions to capture socioeconomic processes.



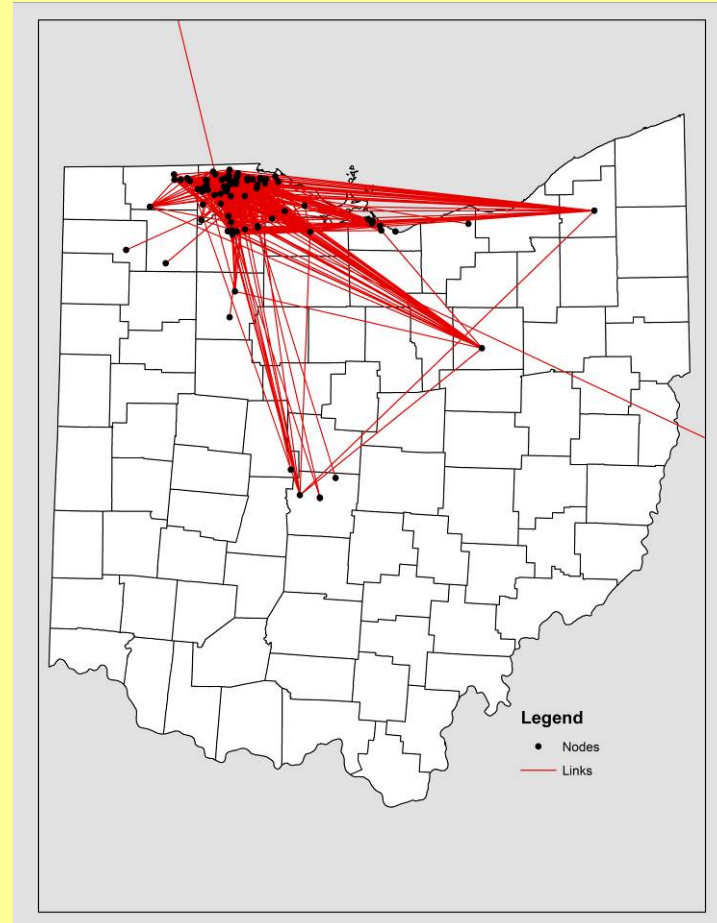
# Identify Key Cluster Members

- Degree-in centrality and K-2 network.
- Map the centrality values to display the spatiality of “key players.”



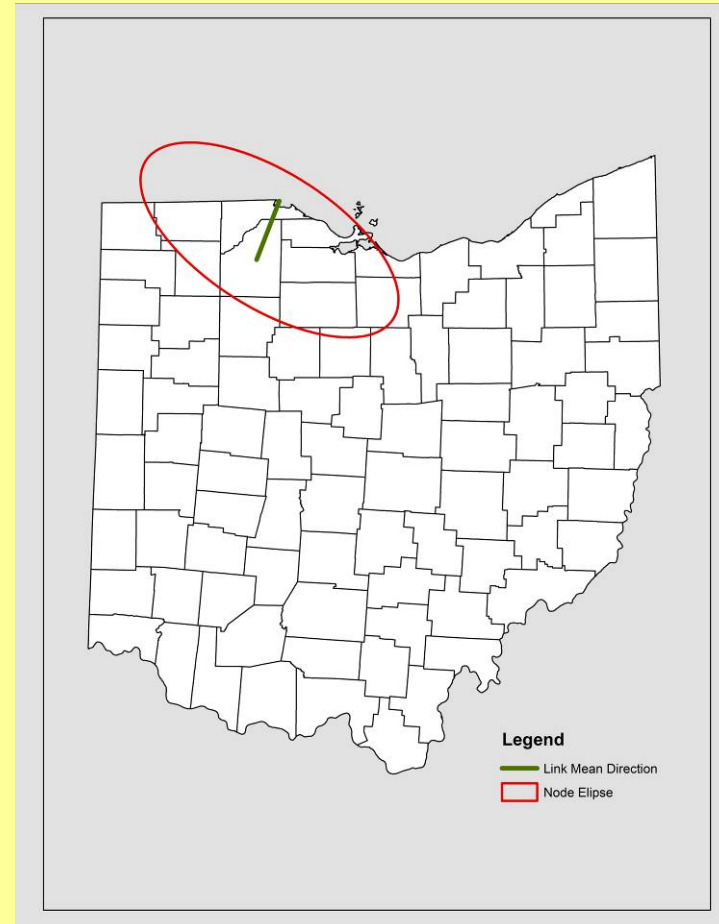
# Spatiality of Ties

- Few external links or “global pipelines”.
- No “market makers.”
- Attributable to the geographic horizon of the growers, which is local.
- 75% see their competition as being in their home county or an adjacent county.



# GIS Metrics

- GIS can summarize distributions.
- Nodes are aligned northwest to southeast.
- Links are north and south.



# SNA as an Evaluation Tool

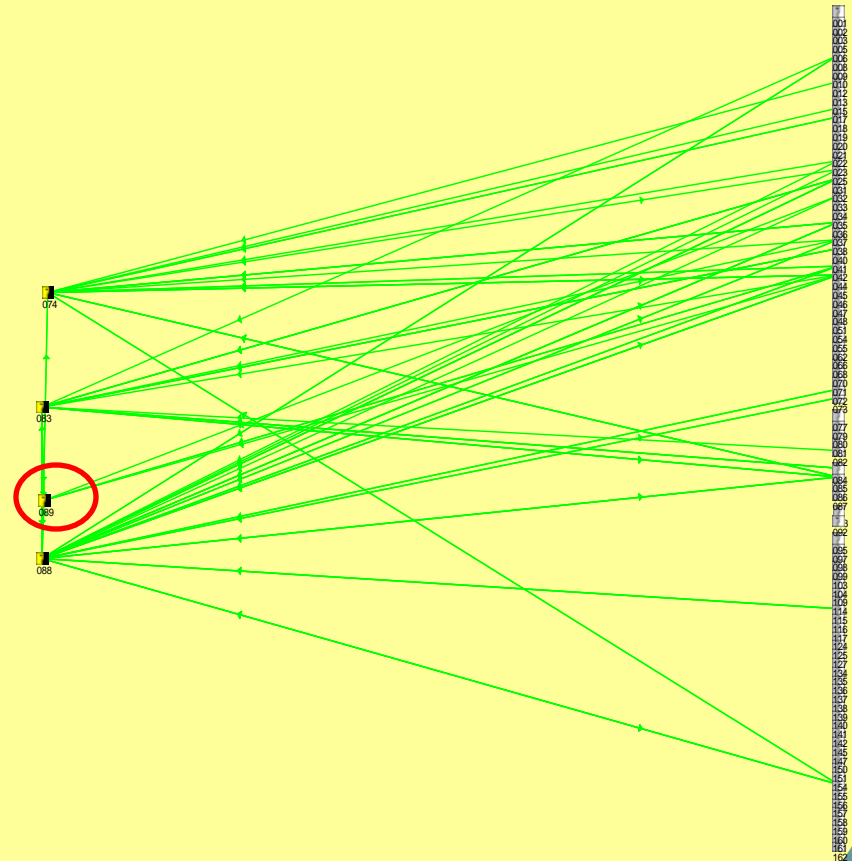
# Measure Communication Among Types of Firms in the Cluster

- E/I ratio for retailers was -0.61, indicating retailers primarily interact with other retailers.
- E/I ratio for wholesalers 0.65, indicating a more open orientation.
- May be due to wholesalers selling to retailers.
- Maybe retailers are more inward looking and less open to new ideas, unless those ideas originate from another retailer.



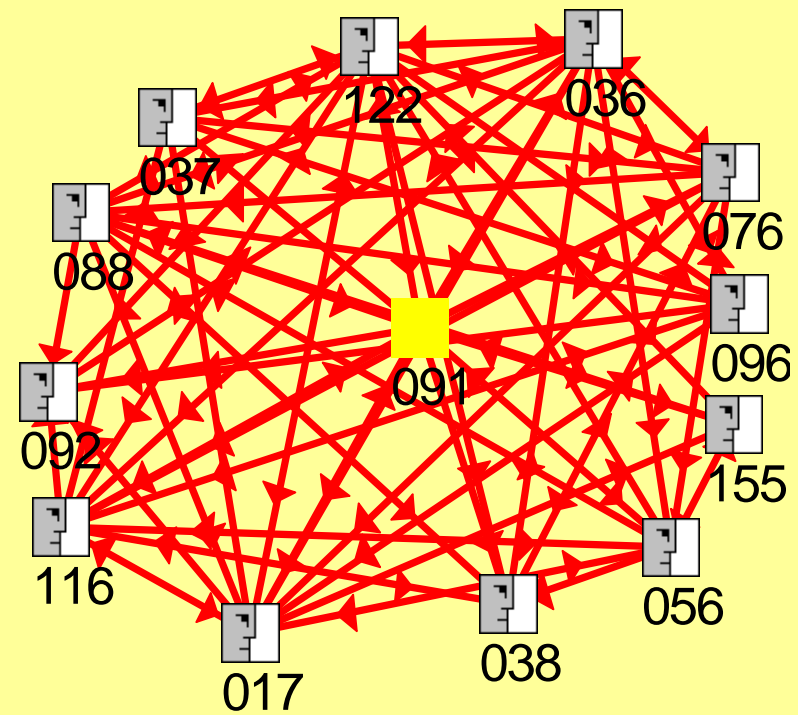
# Evaluation of Activities: Example of Ambassadors

- Goal to communicate with growers.
- SNA shows their level of activity in all 3 networks.
- Used In links to avoid self-reporting bias.
- One ambassador had few links.
- One ambassador did not complete survey.
- Some growers had no links.



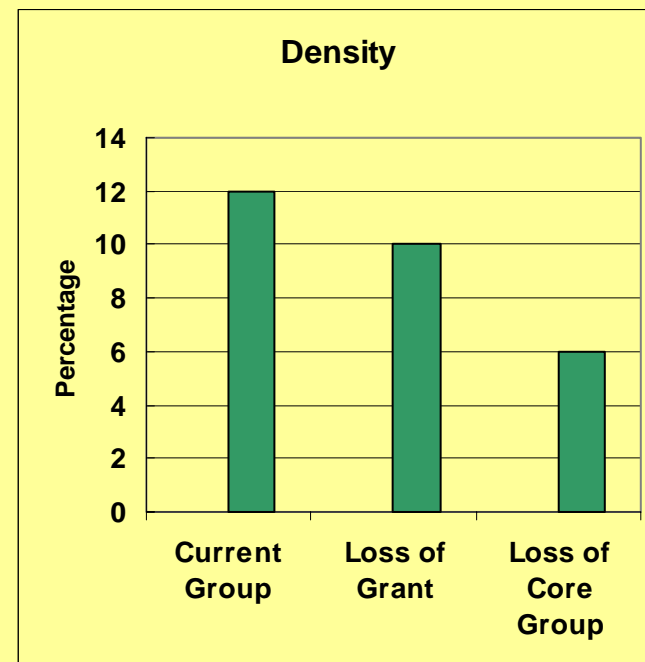
# Evaluate Activities: Connectivity of Champion

- Champion is the field agent who communicates with growers, identifies problems and opportunities for collaboration.
- Champion's centrality is 26.5% versus a mean of 9.5%.
- Champion is one of the key people in the network.



# Cluster Project Vulnerability

- If density index drops by 50%, then sustainability is questionable.
- Loss of grant, the cluster may be sustainable.
- Loss of core group, cluster will not likely be sustainable.

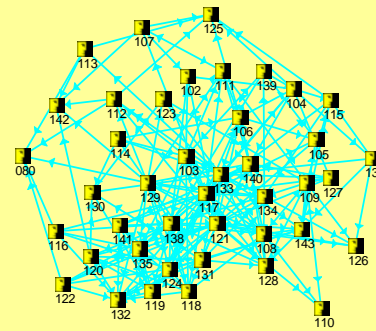


# Tracking Information Flows in the Cluster

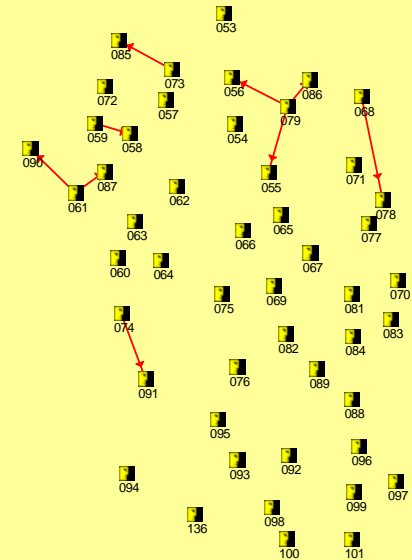
# Intra-cluster Structure of Knowledge Flows

- Core is growers K-4 network in region.
- Periphery is other growers in region.
- Average degrees for core is 10.1 versus 1.1 for periphery.
- Periphery's average degrees is 3.6 when the non-grower, cluster members are included in the periphery's network.

Core

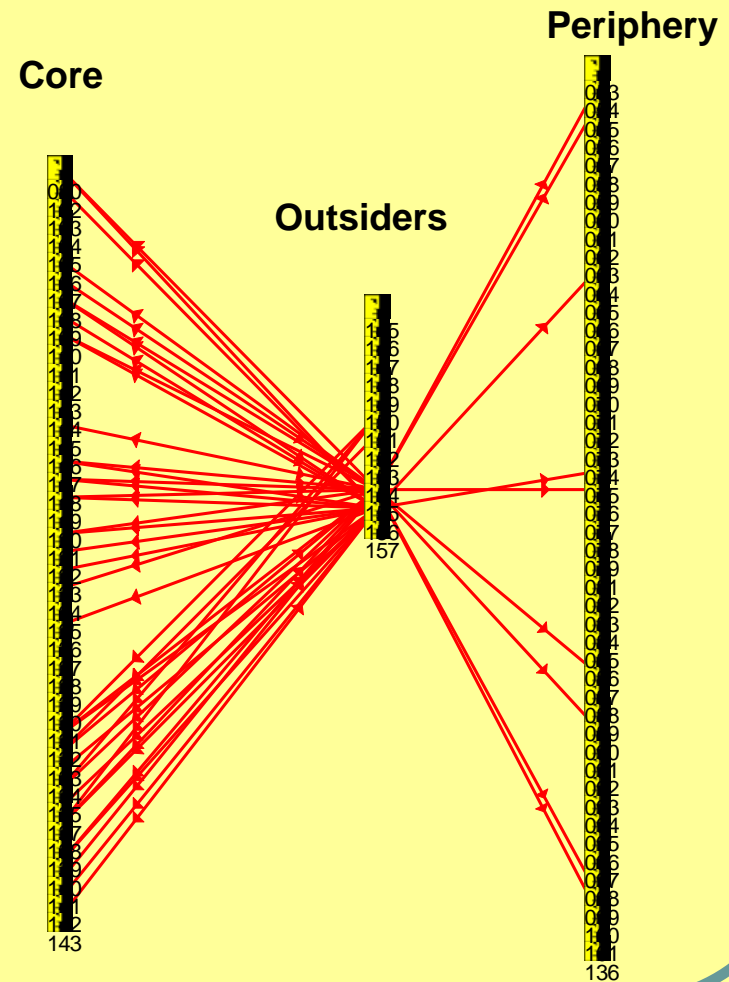


Periphery



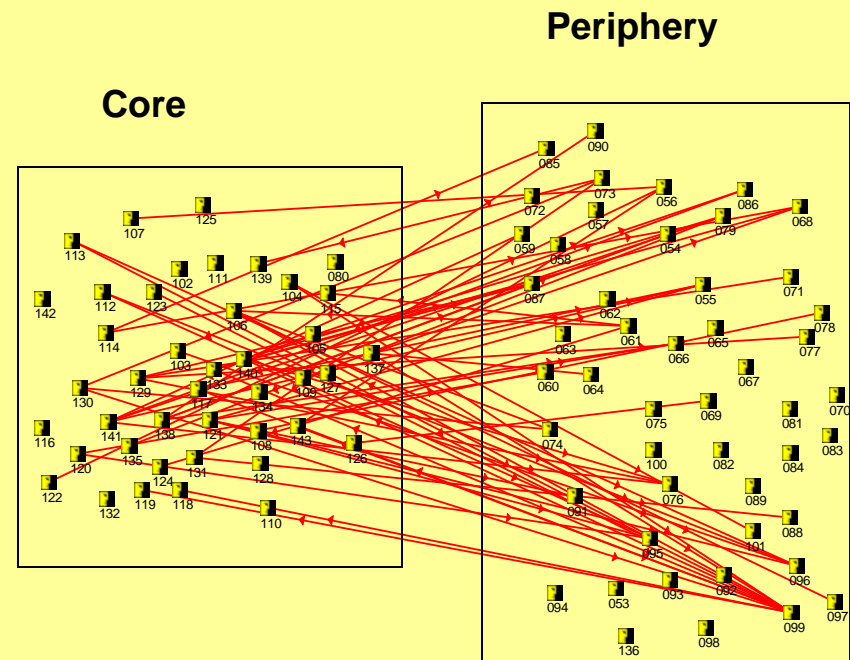
# Intra-cluster Structure of Knowledge Flows

- Outsiders are people outside the project area.
- Outsiders primarily communicate with people in the core.



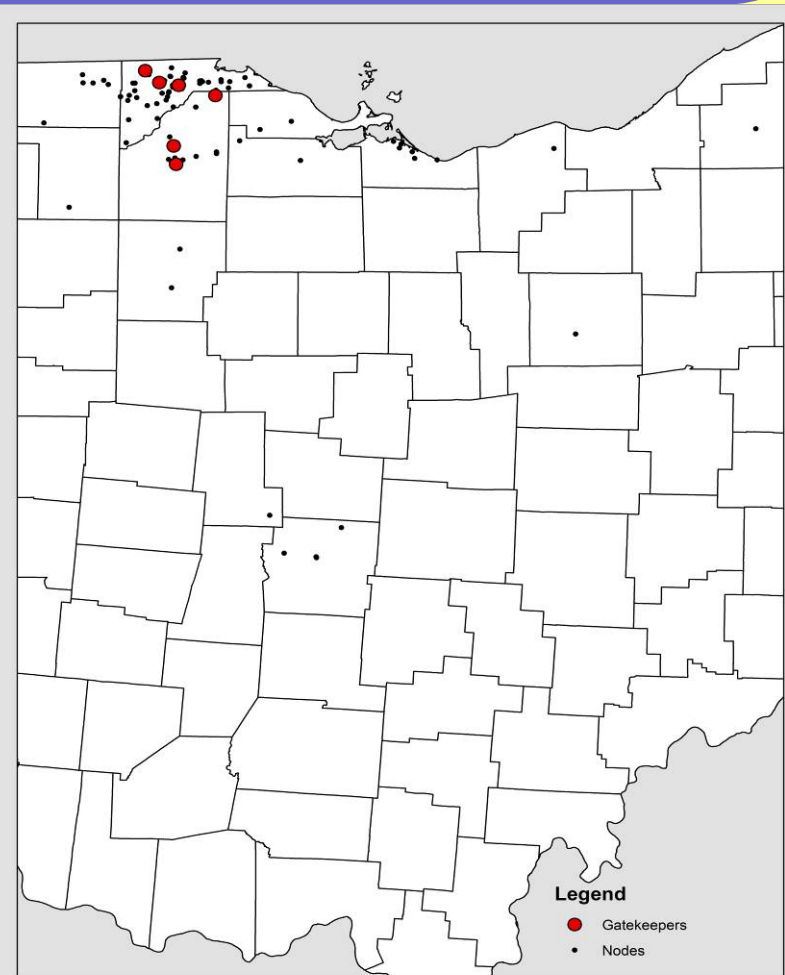
# Intra-cluster Structure of Knowledge Flows

- New ideas generally are received in core and communicated to periphery by core-periphery ties.

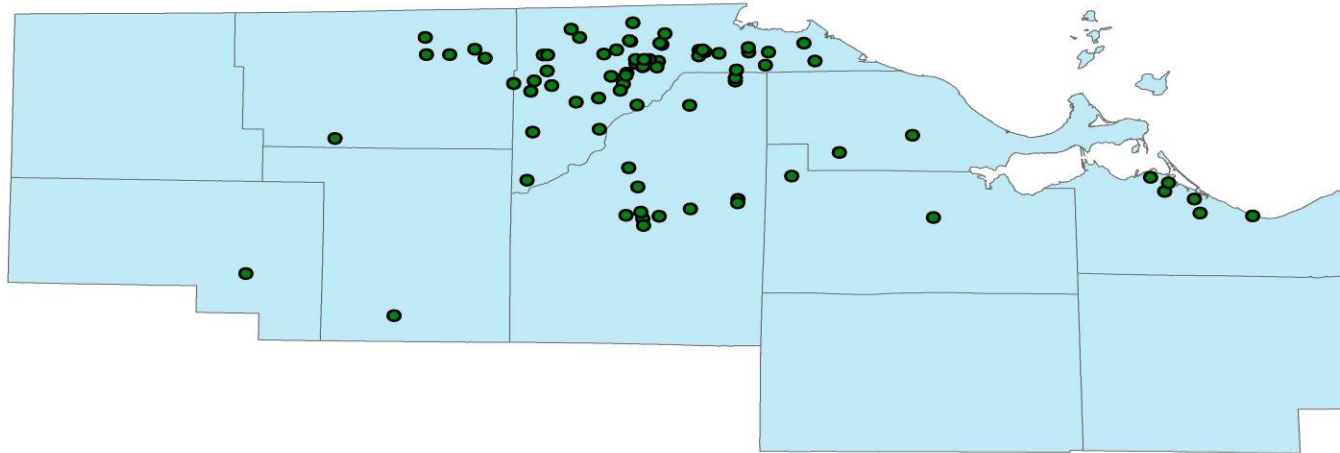


# Intra-cluster Structure of Knowledge Flows

- Used betweenness to identify those growers with strong connections to outsiders and many ties within the core.
- Used 1 standard deviation and above on betweenness metric to identify gatekeepers.



# GIS Database Functionality



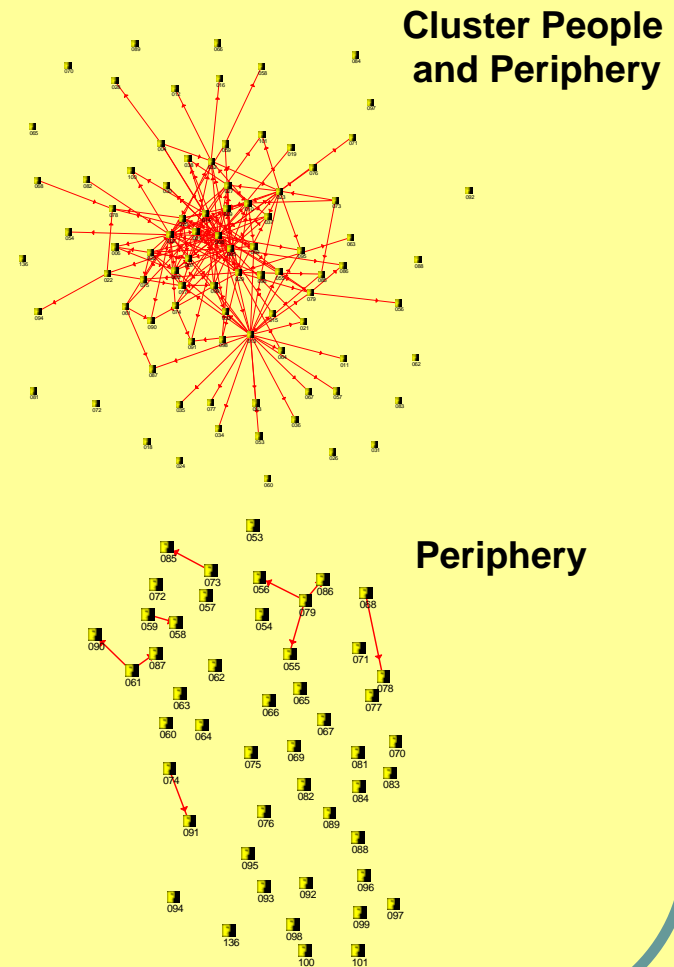
| OID | POWER | CENTRALITY | EMPLOYEES | GROWER       |
|-----|-------|------------|-----------|--------------|
| 0   | 0.342 | 0.783      | 43        | Mary_White   |
| 1   | 0.307 | 0.4        | 28        | Fred_Short   |
| 2   | 0.263 | 0.652      | 59        | Nancy_Long   |
| 3   | 0.246 | 0.729      | 89        | Bob_Posey    |
| 4   | 0.246 | 0.723      | 34        | Real_Need    |
| 5   | 0.237 | 0.672      | 4         | Mike_Black   |
| 6   | 0.132 | 0.982      | 67        | June_Johnson |

# Conclusions



# Cluster Project Has Increased Connections Among Growers

- Average degrees for periphery increases from 1.1 to 3.6.
- Number of isolates decreases from 34 to 18.
- “I feel less isolated now.”



# Conclusions

- SNA makes visible the invisible collaborations that are necessary for cluster success.
- SNA shows where collaborations can be strengthened through network weaving.
- GIS is useful for revealing the spatiality of network ties and performing spatial analyses.



# Acknowledgements

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