
Tracking the evolution of an industrial cluster using social network analysis

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Presentation Outline

- The northwest Ohio greenhouse project.
- Using Social Network Analysis to track the evolution of the cluster.

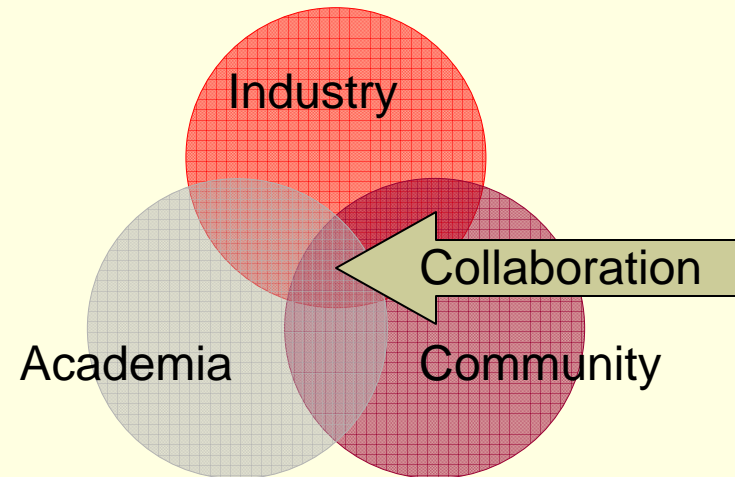


The northwest Ohio greenhouse cluster project

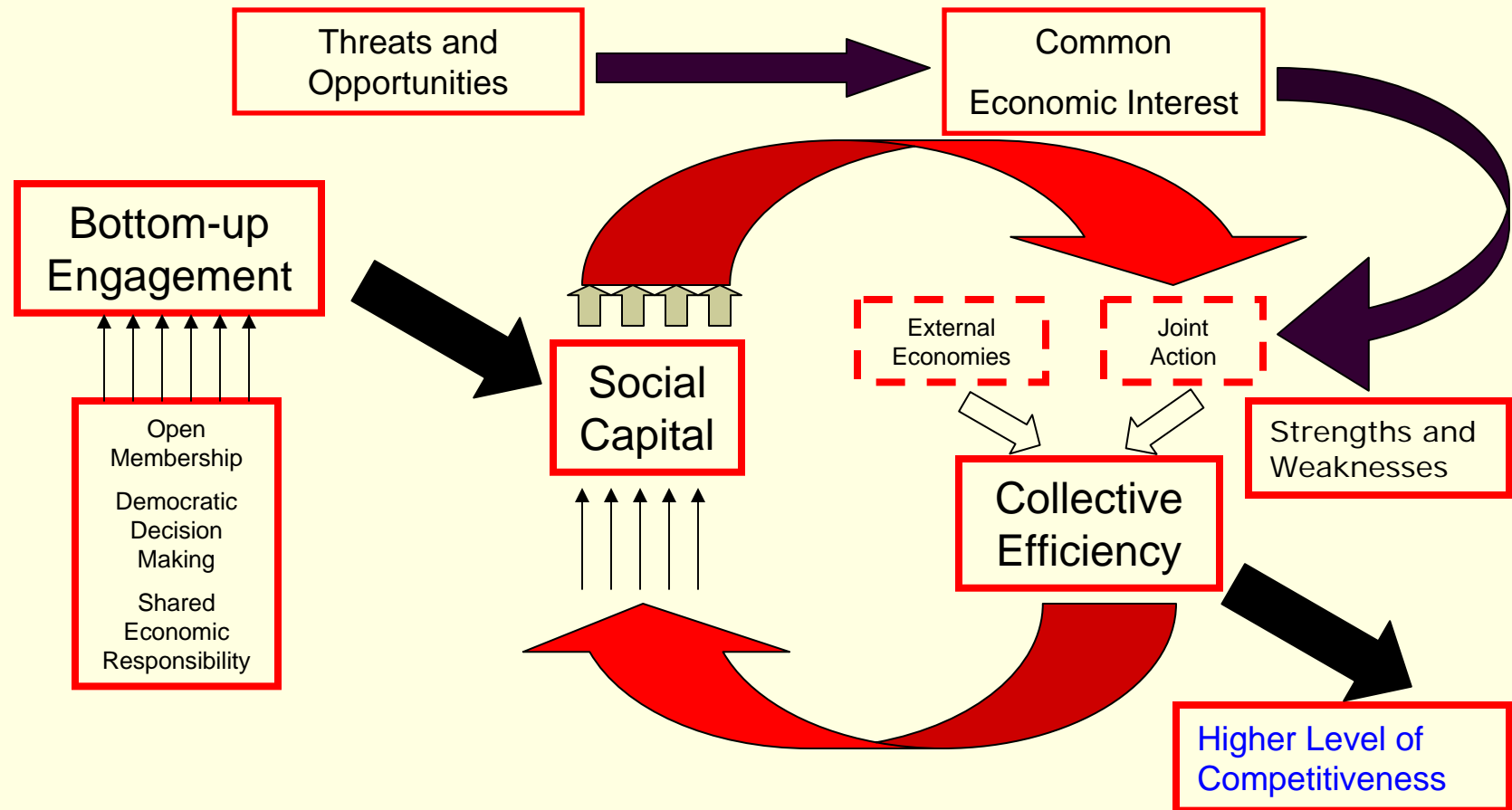


The northwest Ohio greenhouse cluster project

- Began in January 2005
- Objective is to help the 70+ greenhouses in northwest Ohio increase their competitiveness through the process of **collaborative problem solving**
- Industry is facing some significant competitive challenges
 - International competition
 - High and rising energy costs
 - Lack of a strong market identity



Modeling cluster-based economic development



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, 67)
- “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 2001, 4)

Challenges to collaboration in the northwest Ohio greenhouse cluster

- Fiercely independent.
- Highly competitive.
- Little history of collaboration.
- Lack resources to invest in collaboration..



The northwest Ohio greenhouse cluster

Industry

Individual Greenhouses

Suppliers to the Industry such as Waldo & Associates and Palmer Energy

Customers of the Industry such as The Andersons

Industry Associations, e.g. Toledo Area Flower & Vegetable Growers

Academia

Local Universities such as UT, BG, and OSU

UT Urban Affairs Center

BGSU Center for Regional Development

UT Plant Science Research Center

OSU Extension

Community

Toledo Botanical Gardens

Center for Innovative Food Technology

Toledo Area Rapid Transit Authority

City of Toledo

Toledo Choose Local

Local Garden Clubs

Catholic Diocese

Toledo GROWS



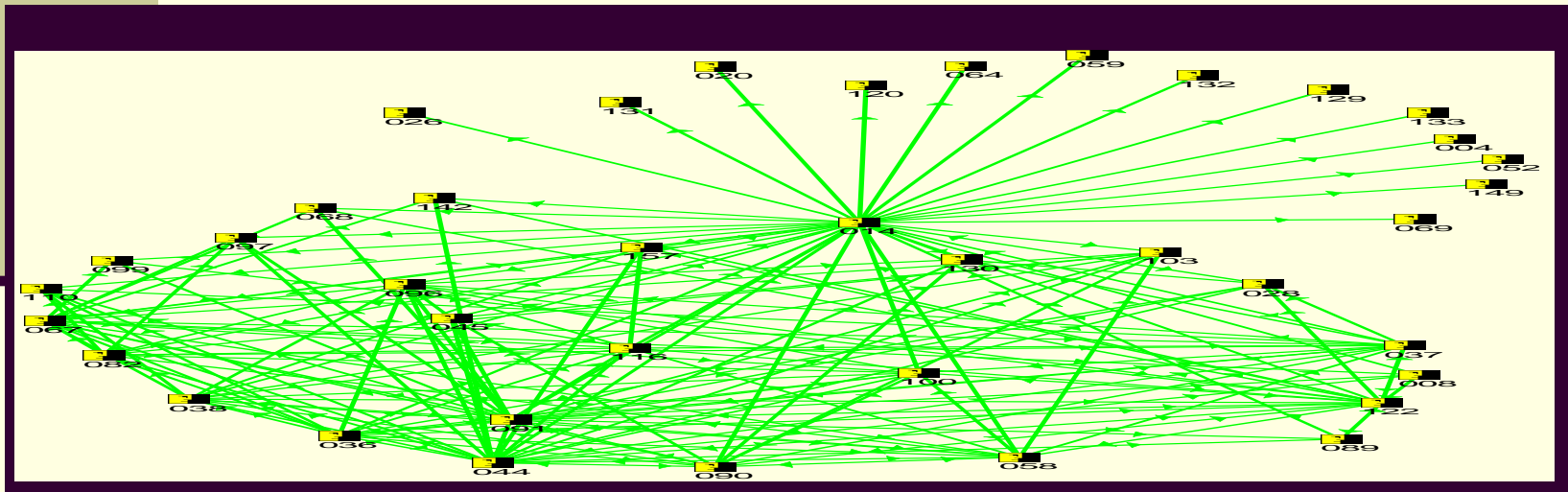
Collaborative Projects

Collaborative Projects

- Branding and marketing program
- Energy cost reduction program
- Recycling program

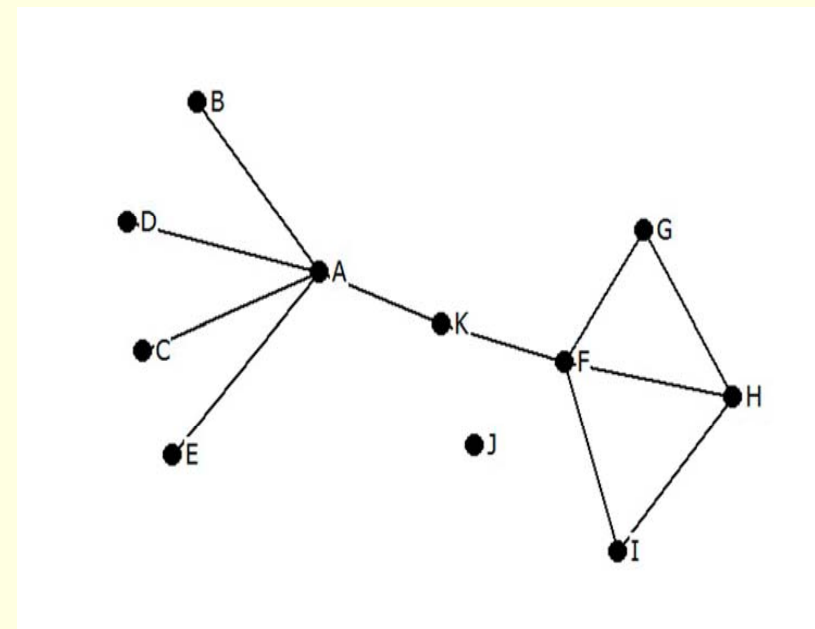


Using Social Network Analysis to track the evolution of the cluster



What is Social Network Analysis?

- Used to analyze the structure of **interpersonal relationships** within a group of individuals
- Collectively, these **relationships constitute a network**
- Individuals – **nodes**
- Relationships – **linkages**



Data analysis

- Once the data are collected they are analyzed using UCINET/NetDraw software
- Generate **network** maps and metrics
- Generate **individual** maps and metrics



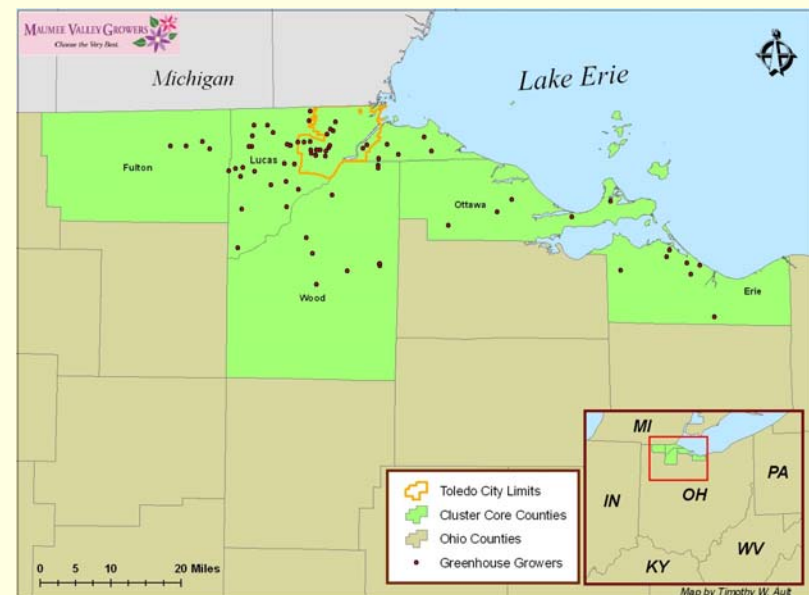
Collecting the data for an SNA

- Everyone in the cluster receives a survey that lists everyone else in the network
- Everyone identifies other members of the cluster with whom they have
 - Collaborated on a project
 - Received new ideas from
 - received advice and support from
- Individuals are allowed to add names of others, not on the list, with whom they have interacted
- First survey conducted 2007
- Second survey conducted 2009

	Collaboration	New Ideas	Advice & Support
Neil Reid			
Tom Wardell	X	X	X
Walter Krueger	X		X
Theresa Hoen			X

SNA of the northwest Ohio greenhouse cluster

- Focusing on the 46 people who completed the survey in both 2007 and 2009
 - 32 growers
 - 9 academics/management
 - 3 suppliers
 - 2 community



Metrics: Network Descriptors

- Density
 - Total # of ties divided by the total # of possible ties
- Average Path Length
 - For each pair of nodes the algorithm finds the # of edges in the shortest path between them and calculates the average
- Centralization
 - Measure the degree to which an entire network is focused around a few central nodes
- Homophily (birds of a feather)
 - Measures the extent to which ties are within a subgroup, rather than between subgroups
 - Growers, industry, academics, and community/government



Network metrics	Collaboration		Innovation		Advice and support	
	2007	2009	2007	2009	2007	2009
Density	0.25	0.24	0.20	0.19	0.22	0.21
Average Path Length	1.87	1.85	2.03	1.98	1.93	1.99
In-degree Centralization	21.4%	13.8%	43.4%	13.9%	57.1%	15.4%
Homophily	0.29	0.32	0.13	0.19	0.16	0.18

Preliminary findings

- All networks are stable
- Only metric in which there seems to be significant change is in-degree centralization
 - New people were nominated as collaborators, or especially, as sources new ideas and advice/support
 - Suggests that in 2009 the sources of advice and new ideas were less concentrated



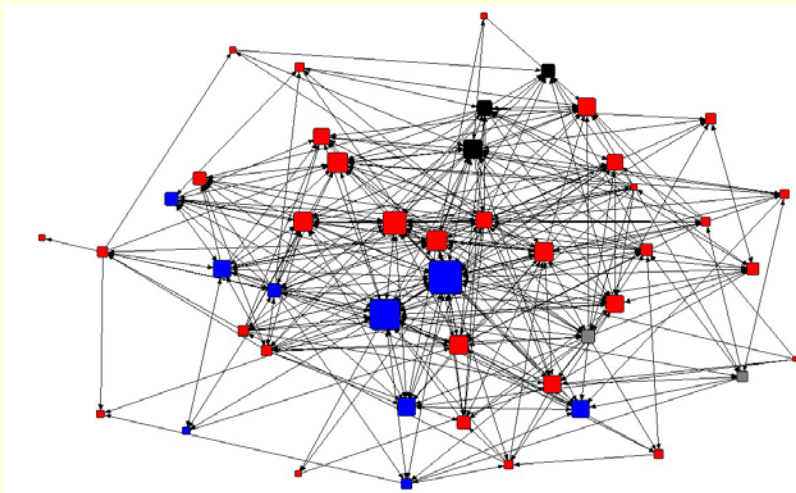
Preliminary findings

- Stability of the network is consistent with a conservative, slow changing, industry
- Change in in-degree centralization suggests that the process of bringing people together has led to more diversity in terms of sources of advice and new ideas
- 2007 – cluster management were main sources of advice and new ideas
- 2009 – advice and new ideas coming from a broader group

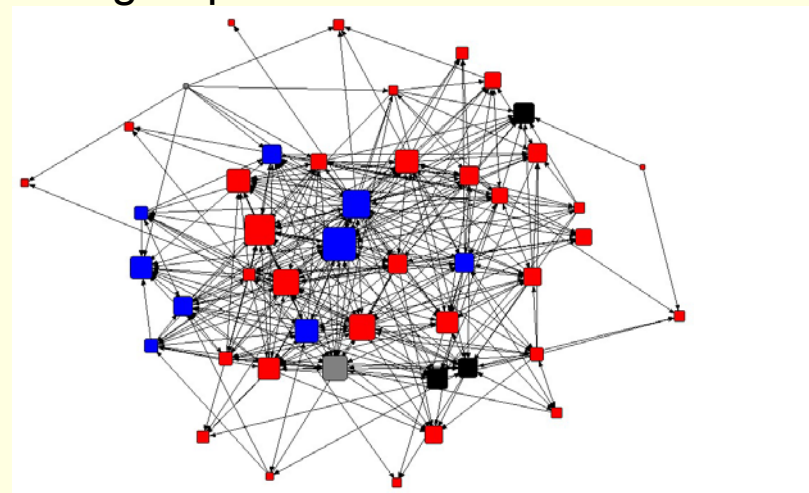


Innovation network, 2007 & 2009

2007 cluster management were main sources of advice and new ideas



advice and new ideas coming from a broader 2009 group



Size of node indicates in-degree centrality

- Management
- Growers
- Suppliers
- Community

Next steps

- Examine structural forces are at work in the cluster (Ter Wal and Boschma 2009)
 - Homophily (birds of a feather)
 - Measures the extent to which ties are within a subgroup, rather than between subgroups
 - Preferential Attachment (rich get richer)
 - Those with a lot of “friends” get the most new friends
 - Triadic Closure (friends of friends)
 - Tendency for individuals to form friendships with their friends’ friends

Thank You

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For more information contact neil.reid@utoledo.edu or visit our project websites:

www.maumeevalleygrowers.com

www.ohiogreenhouse.com

