



Toward a Trans-disciplinary Science of Society

Inter-University Centre, Dubrovnik,
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Social Development as Network Dynamics: An Economics Perspective

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Introduction

1. Social Development versus Economic Growth
2. What Roles play Networks in Social Development?
3. Examples of Effective Networks in Resource Allocation:
 - a. Global Local & Regional Networks for Climate
 - b. Industrial Clusters
4. Networks as Institutions
5. New Network Science

1. Social Development versus Economic Growth

Economic Growth – the most popular but the narrow concept referred usually as annual income measured by GDP increases.

Economic Development – larger concept defined as a process of increasing not only economic wealth but also quality of life, improving income distribution, productivity, competitiveness, and sustainability.

Social Development means a human-centered development process to higher standard of life, more empowerment, greater creativity and satisfaction.

Defining the Central Problem in Economics:
efficient allocation of resources to meet the population needs.

Two competing approaches – modes of coordination:

regulation by a government vs. self-regulation by market.

**Both modes, particularly in their extreme forms, do not produce efficient solutions
=> government and market failures**

2. What Roles play Networks in Social Development?

THE NEW MODE OF COORDINATION

Third mode of coordination – the **NETWORKS** – gaining significance over last twenty years.

Networks – flat and voluntary organizations.

One of the most popular and efficient forms of coordination are **industrial clusters** related to certain location. The other is the **International Council for Local Environmental Initiatives (ICLEI)**

3. Examples of Effective Networks in Resource Allocation:
 - a. Global Local & Regional Networks for Climate
 - b. Industrial Clusters

The Role of the Cities Networks in Climate Policy(1)

The movement of the local government leaders concerned with the global environment has a long tradition in North America.

=> A meeting of 35 Canadian and US leaders in Irvin, CA in December 1989 developed the initial concept of the ICLEI

=> The first World Congress of representatives of 200 LG leaders from 43 nations in September 1990 => Charter and Strategy.

=> 2003 the International Council for Local Environmental Initiatives became ICLEI—Local Governments for Sustainability.

=> Today this is the global largest organization of local government with over 1200 members from 84 countries.

=> The largest – more than half of the all members - and the most dynamic is the US chapter with over 600 members.

The Role of the Cities Networks in Climate Policy (2)

Contrary to the federal government the US LG leaders invested their time and resources to build organization, which responds to their communities' needs and ambitions to tackle the CC, energy and sustainability issues.

Today this 25 years old organization with over 600 members representing cities and communities of about 30% of US population set the ambitious goals, objectives and targets that could serve as inspiring examples for federal government actions and international communities.

These are not easy-make pledges but real commitment scrutinized by rigorous process of quantification, performance monitoring and evaluation (ICLEI Annual Report 2009). For instance, participants of the CC mitigation program have to follow the Five Milestone process:

- *Milestone One: Conduct a baseline GHG emissions inventory and forecast*
- *Milestone Two: Adopt an emission reduction target*
- *Milestone Three: Develop and secure formal approval of a local climate action plan*
- *Milestone Four: Implement the plan's policy and measures*
- *Milestone Five: Monitor progress, report results and re-evaluate the plan.*

The Role of the Cities Networks in ACCP (3)

Based on the commitments of 84 LGs and 101 communities the cumulative emission reduction by the 2020 will reach 1.36 billion metric tones of CO₂e and by 2050 6.8 billion tones CO₂e.

Assuming that the cumulative reduction of 1.36 billion mt of CO₂e will be equally distributed over 10 years (2010-2019) this would make approximately 2% of the annual total GHG emission of 2009 and about 2.2% of 1990 CO₂e level.

Taking into account that according to Annex I the US should reduce GHG by 7% of 1990 in 2012, the contributions from only 84 LGs and 101 communities – presenting the most active but also a fraction of over 600 member organization - would make 31% of the KP reduction target.

These very simplified figures show huge potential allocated in the LG and communities that could be further mobilized and synergized by complementary state and federal policies. It is worth to mention about sources of the GHG reduction committed by LGs.

The Role of the World Largest Metropolis Networks in Climate Policy

=>In May 2007 C40 announced a \$5 bln global Energy Efficiency Building Retrofit Program with CCI for more than 200 retrofit projects encompassing over 500 million sq ft of building space in more than 47 cities around the world

=>The CCI is a special program originated at the William J. Clinton Foundation oriented on three major areas:

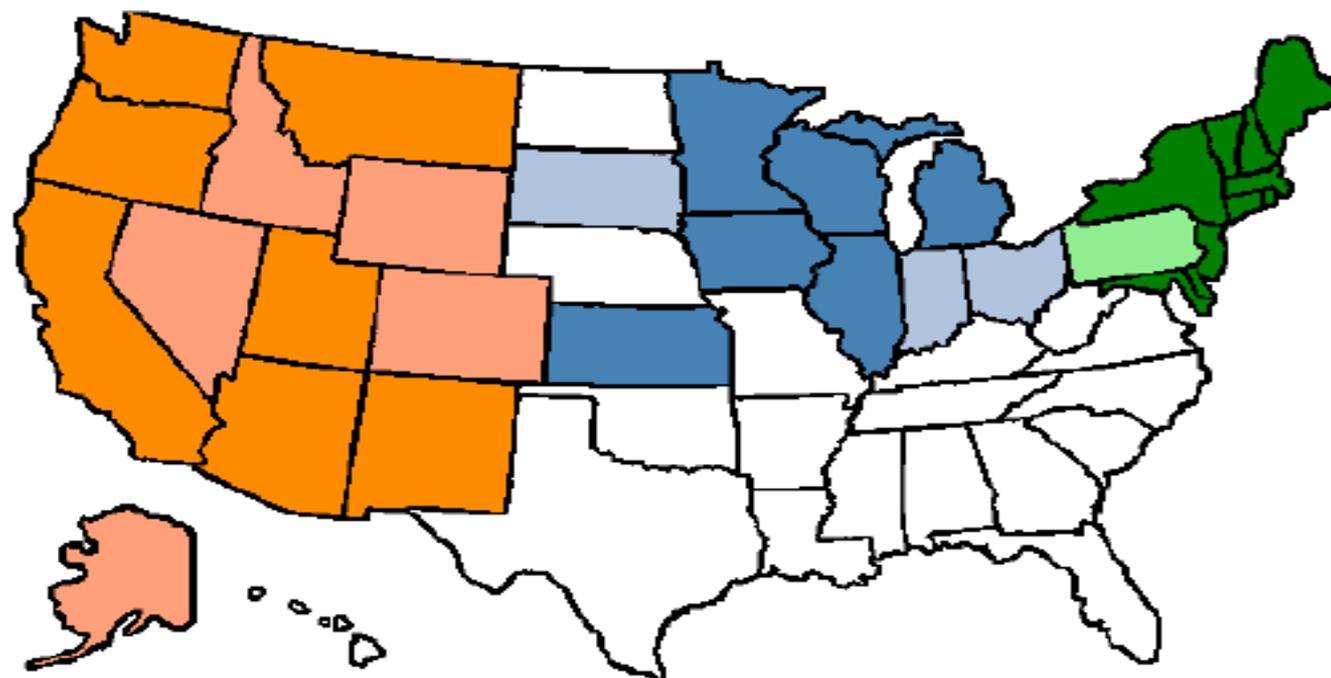
- *increasing energy efficiency in cities,*
- *catalyzing the large-scale supply of clean energy, and*
- *working to stop deforestation ([www. clintonfoundation.org/cci](http://www.clintonfoundation.org/cci))*

⇒Joint concern of the CC and similarity of programs made the CCI a solid delivery partner for the C40 since 2006 helping cities to generate and utilized energy more sustainably and save money, create green jobs.

=> According to newly elected Chair of the Climate Leaders Group Mayor Bloomberg of NYC the stake for C40 is huge for CC policy – *more than half of the world population lives in cities, which consume 75% of world energy and produce 80% of its GHG (C40 News, 20100910).*

Regional Initiatives

By *houkj*
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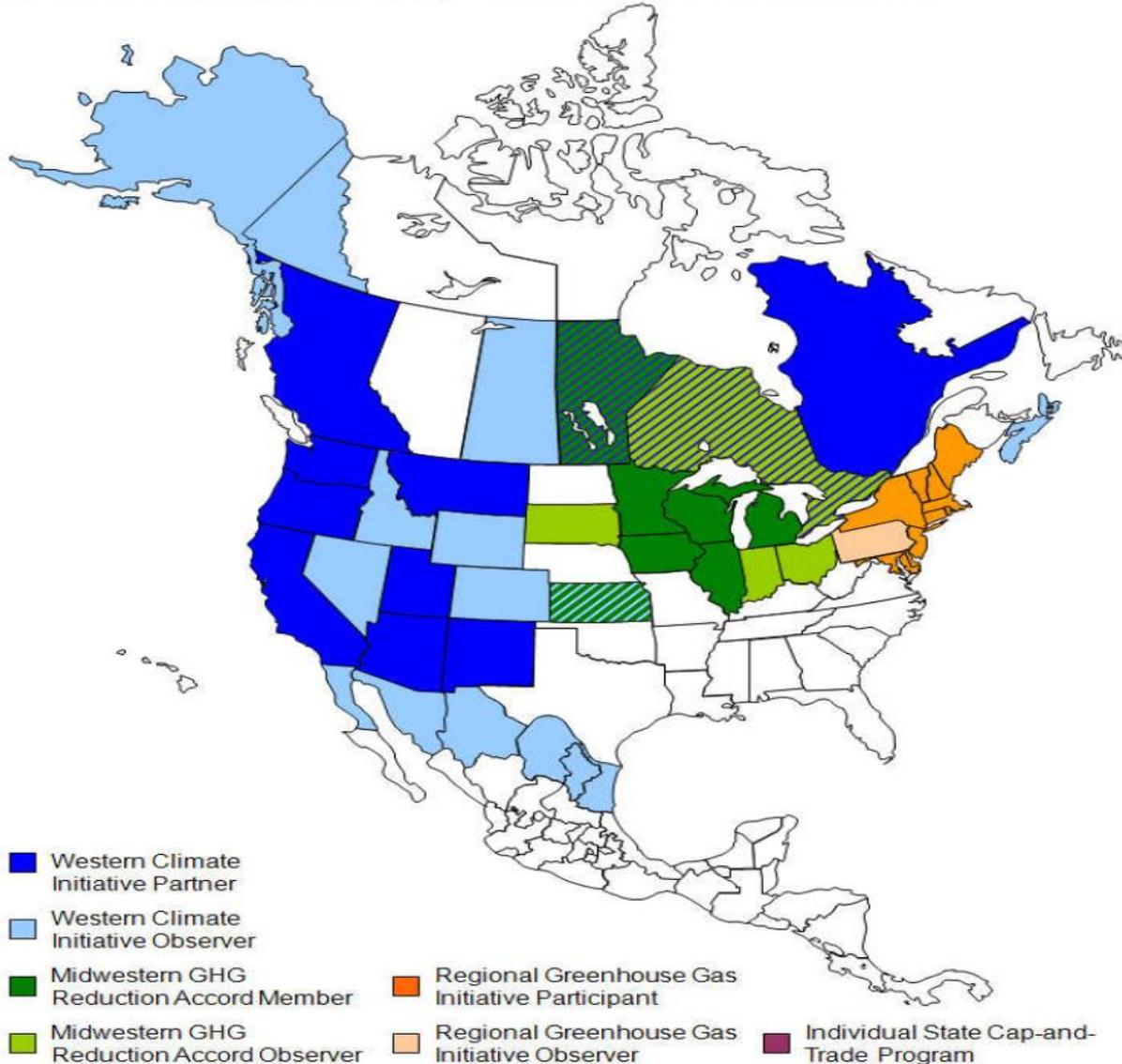


US Regional CC
Initiatives
spreading out
from the
Northeast
through Midwest
to the Western
States

- Regional Greenhouse Gas Initiative & TCI
- RGGI Observer; TCI
- Midwest GHG Reduction Accord
- MGGRA Observer
- Western Climate Initiative
- Western Climate Initiative Observer
- Individual State Cap-and-Trade Program

North American Cap-and-Trade Initiatives

North American Cap-and-Trade Initiatives



Inspiring Role of the US Regional CC Initiatives:

- **in Canada:**
 - 4 Participating Provinces
 - 3 Observing Provinces
- **in Mexico:**
 - 6 Observing States

DEFINING CLUSTERS

Clusters - geographic concentrations of interconnected companies, specialized suppliers, service providers, firms in related industries, and associated institutions that can cooperate and compete in particular fields [Porter 2008, 213].

Clusters - more than supply chain =>
academic institutions (training, research, consulting)
governmental agencies and non-governmental
organizations (professional services).

Critical Relations

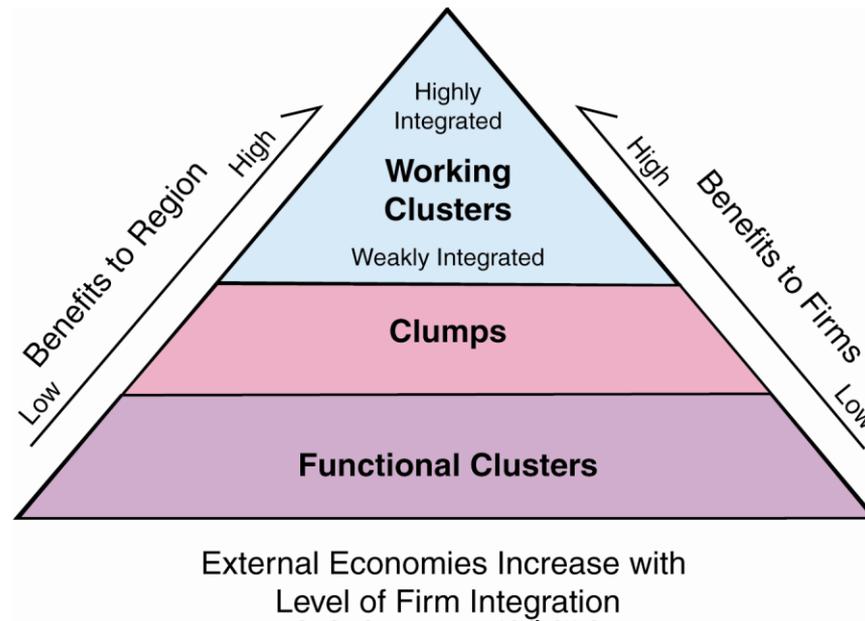
- Porter identifies three ways in which clusters produce benefit:
 - Productivity is enhanced through innovation, and innovation is encouraged through co-location which promotes the types of learning that are “facilitated by the ease of making site visits and frequent face-to-face contact” (Porter, 1998, p. 4)
 - Clusters also act as conduits through which tacit information that signals market opportunity flows
 - Finally, clusters act to reduce risks associated with employee relocation

Functional Clusters, Clumps, and Working Clusters (D. Andreoli)

- Functional Clusters are spatial networks of like and functionally linked industries
- Clumps are groups of functionally linked firms in which the physical distance separating member firms does not prohibit the range of benefits that are made possible through frequent interactions
- Working clusters are made up of firms and institutions which benefit from the types of integration and cooperation made possible by co-location

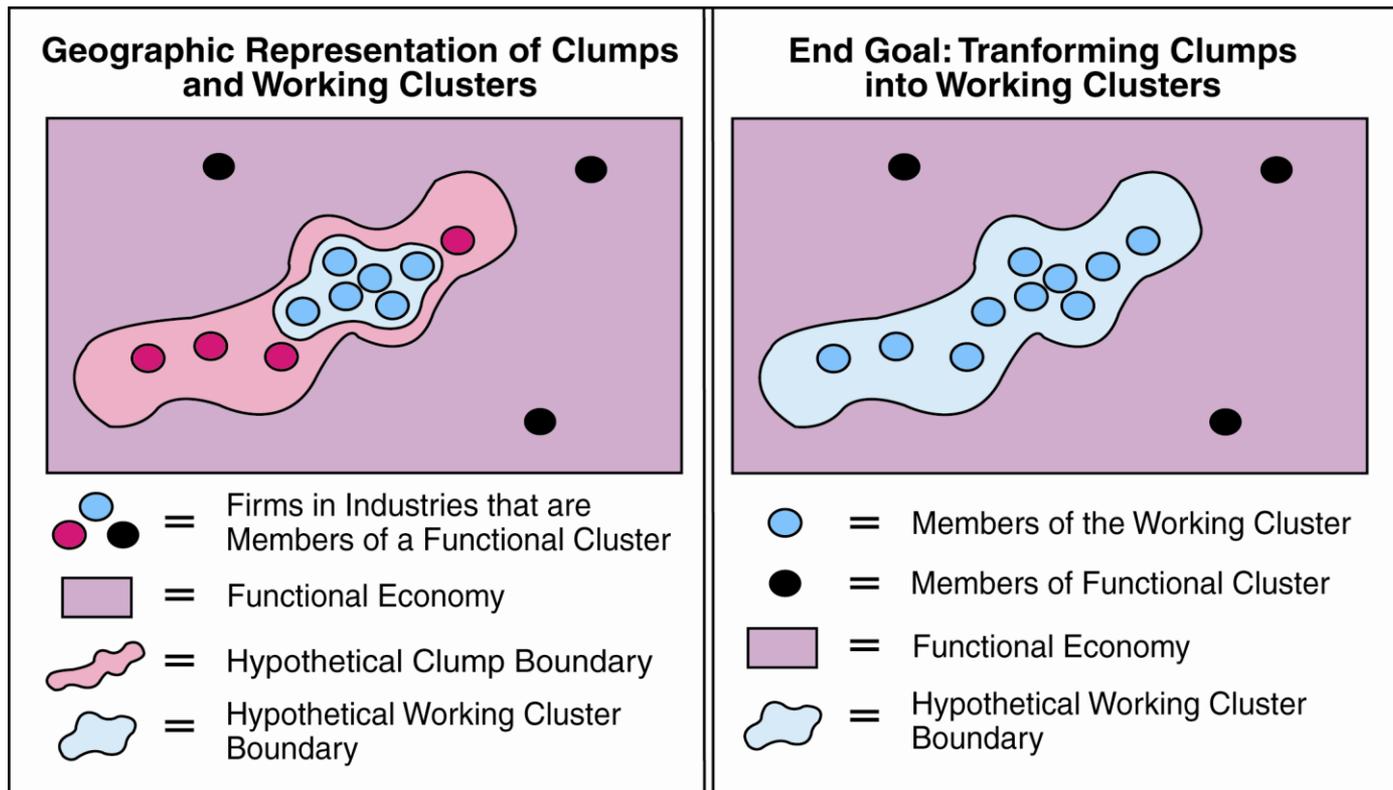
Functional Clusters, Clumps, and Working Clusters (D. Andreoli)

- The goal of any cluster initiative is to promote economic development by encouraging the positive externalities that come from integration (i.e. promote integration)



Functional Clusters, Clumps, and Working Clusters (D. Andreoli)

- From a geographic perspective:



What Makes the Working Cluster?

- Functional Cluster
- Social Capital => Cooperation=> Synergy=>Positive Externalities=> Knowledge Spillovers=>Innovations
- Working Cluster

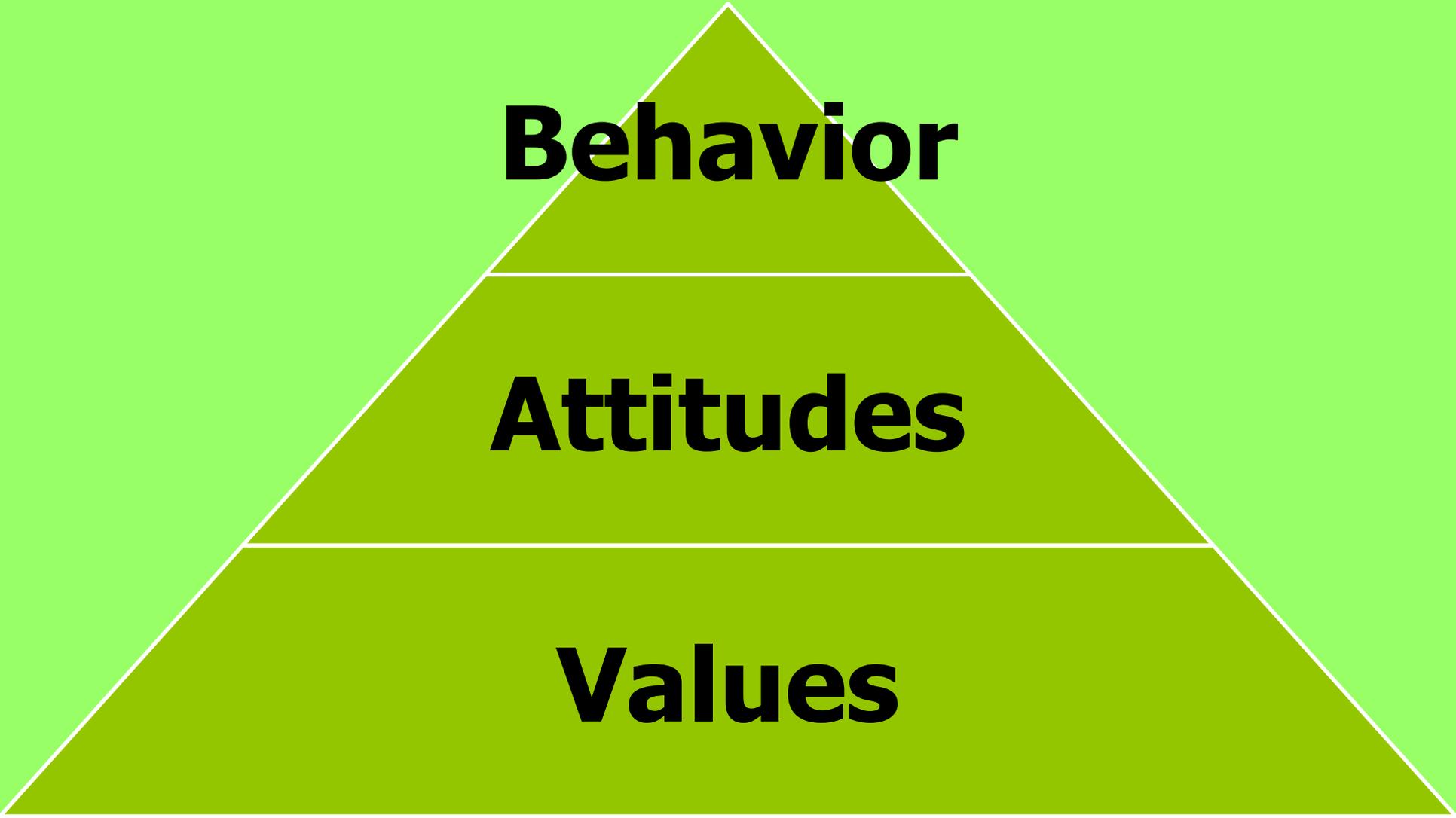
4. Networks as Institutions

- INSTITUTIONS ARE "REPRODUCED SOCIAL PRACTICES"
- PATTERNS OF INTENTIONAL HUMAN INTERACTION CARRIED OUT IN REPETITIVE FASHION OVERTIME
- INSTITUTIONS IMPLY:
 - HISTORY
 - CONTROL
 - RULES
 - NORMS

Disciplines Interested in Institutions

- Behavioral Sciences
- Philosophy
- Economics
- Public and Business Administration
- Political Sciences

Understanding the Basic Relations in Shaping Human Behavior



Behavior

Attitudes

Values

Institutions are patterns of social activity that give shape to collective and individual experience....
Institutions form individuals by making possible or impossible certain ways of behaving and relating to others. They shape character by assigning responsibility, demanding accountability, and providing the standards in terms of which each person recognizes the excellence of his or her achievements. Each person's possibilities depend on the opportunities opened up within the institutional contexts to which that person has access." (Bellah, *et. al.*, 1991, p. 40)

BASIC ELEMENTS OF HUMAN INTERACTION INVOLVED IN THE DESIGN PROCESS

IDENTITY

ATTACHMENT

EXCHANGE

COMPETITION

COOPERATION

ALTRUISM

BONDING

BASIC CRITERIA OF INSTITUTIONAL SUSTAINABILITY

INCENTIVES

EFFICIENCY

SUBSIDIARITY

THE SUSTAINABILITY TEST -- INSTITUTIONS SHOULD INSPIRE:

- Loyalty
- Spirit and Energy
- Perceived Fairness and Justice in Conflict Management
- Mutual Help in Difficult Circumstances

THE DESIGN OF INSTITUTIONS IS ANALOGOUS TO A PROBLEM IN GAME THEORY

- CAN A "GAME" [AN INSTITUTION] BE DEvised WITH RULES PROVIDING AN APPROPRIATE MIX OF COOPERATION AND COMPETITION, BY WHICH PEOPLE ACTING IN THEIR OWN INTERESTS, BEHAVE IN SUCH A MANNER AS TO ENHANCE OR MINIMIZE DAMAGE TO THE [ENVIRONMENT] [COMMUNITY] [CULTURE] AND PLAN FOR THE CONSERVATION [OR SUSTAINABLE USE] OF ITS RESOURCES.
- (AFTER HURWICZ, 1987)

BASIC ELEMENTS OF INSTITUTIONAL DESIGN

- INCENTIVES
- SOCIALIZATION
- LEGITIMATION
- MONITORING AND ENFORCEMENT
- MEANS FOR CONFLICT RESOLUTION

5. New Network Science

Models of networks (Weiler 2012) :

- *Regular Lattice Model* - Ising, one-dimensional, (1925) and Onsager, two-dimensional, (1944);
- *Random Network* - the Erdos-Renyi Model (1959);
- *Scale-Free Model* known as the BA Model called after Barabasi & Albert (1999);
- *Small World Model* - the Watts-Strogatz algorithm (2008) .