



The New Invisible College: Science for Development

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Proposition

- Structure of science is returning to its 17th century roots
- An invisible college is most influential force in science
 - Particularly at the global level
- Old models and metaphors no longer fit
- Network systems model is needed for governance



Precedence to the Emerging System

- Small science era
 - Boyle's "invisible college" 17th c. Europe
- Scientific societies grow in 18th century
 - Equipment and techniques developed
- Professionalization in 19th century
 - Curie, Pasteur, Volta
 - Disciplines emerge
- Scientific Nationalism in 20th century
 - "Big science" of D. de Solla Price



How Big was Big Science?

- 80-90 % of all scientists were alive in late 20th century
- US funding for R&D grew from \$15 million in 1923 to \$132 billion in 2005
- Total world R&D spending was \$729 billion in 2000
- All S&T >\$1 trillion in 2000



Is this System “Flat”?

“If I am right about the flattening of the world, it will be remembered as one of those fundamental changes—like the rise of the nation-state or the Industrial Revolution—each of which, in its day... produced changes in the role of individuals, the role and form of governments, the way we innovated, the way we conducted business... the way science and research were conducted...”

Thomas L. Friedman, *The World Is Flat*

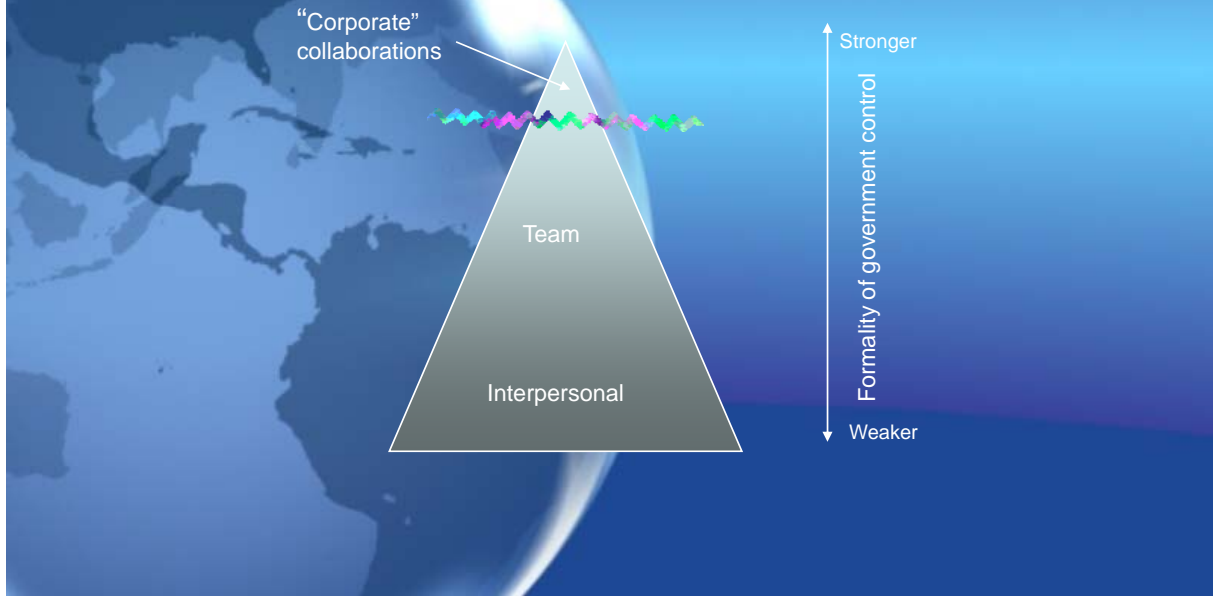


System is Structured

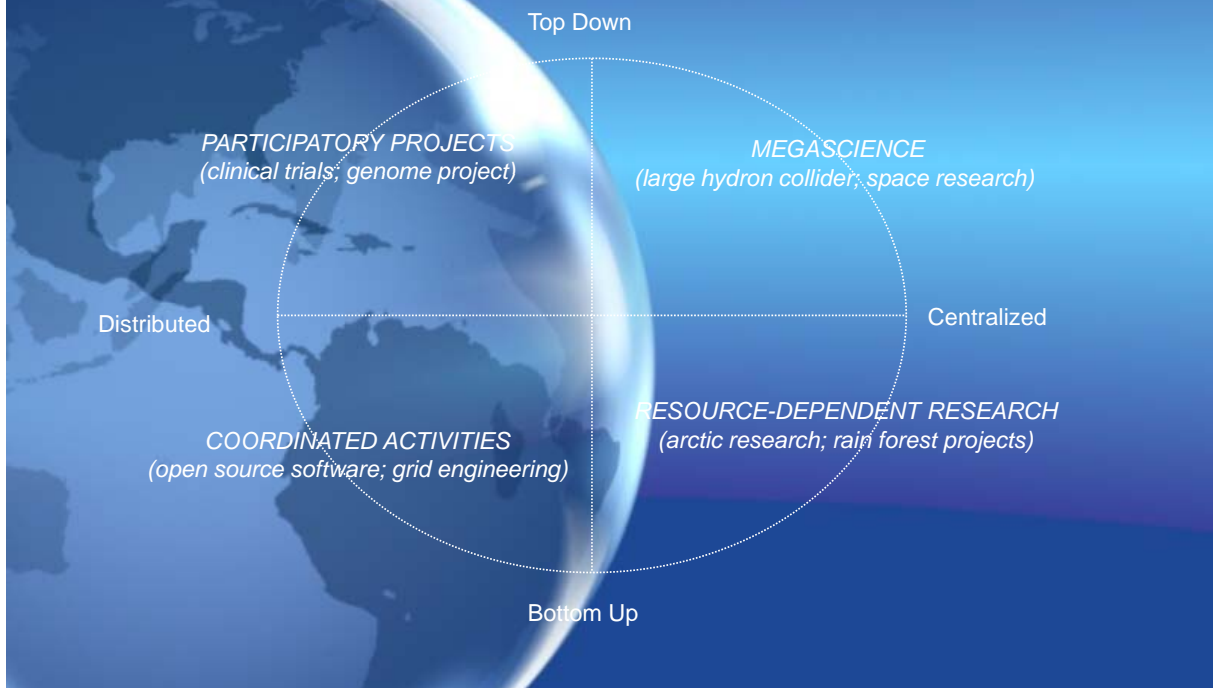
Five Forces are Structuring the 21st century system:

- *Networks*
- *Emergence*
- *Circulation*
- *Stickiness (place)*
- *Distribution (virtual)*

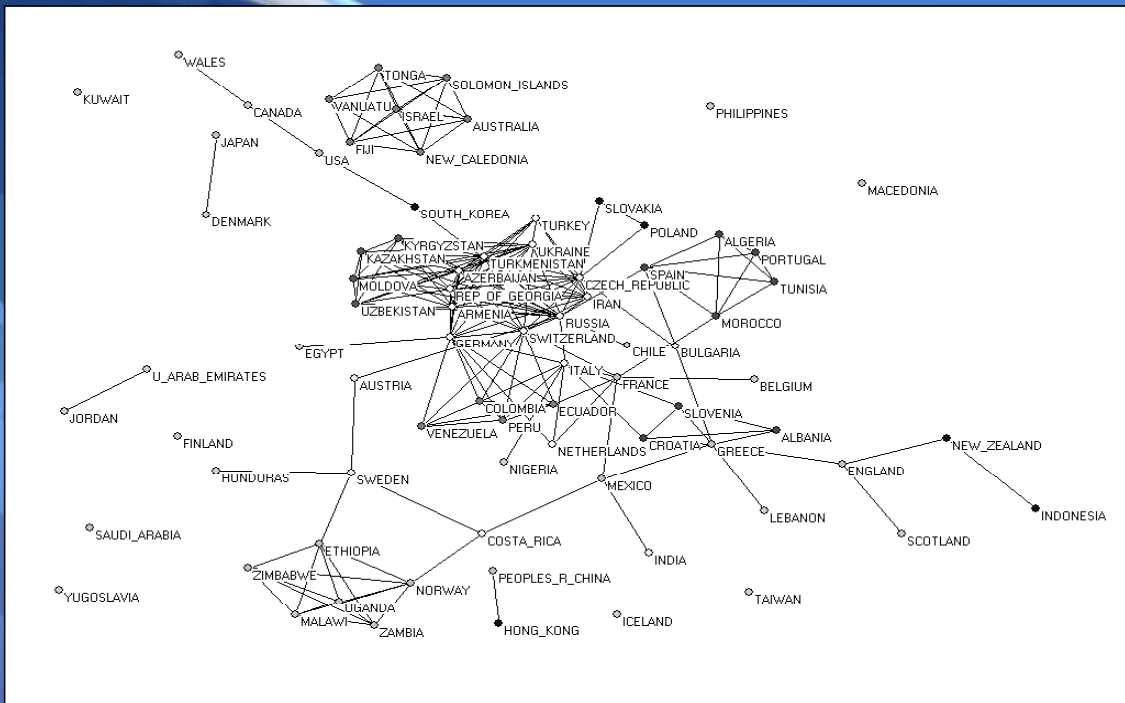
Why is the Structure Invisible?



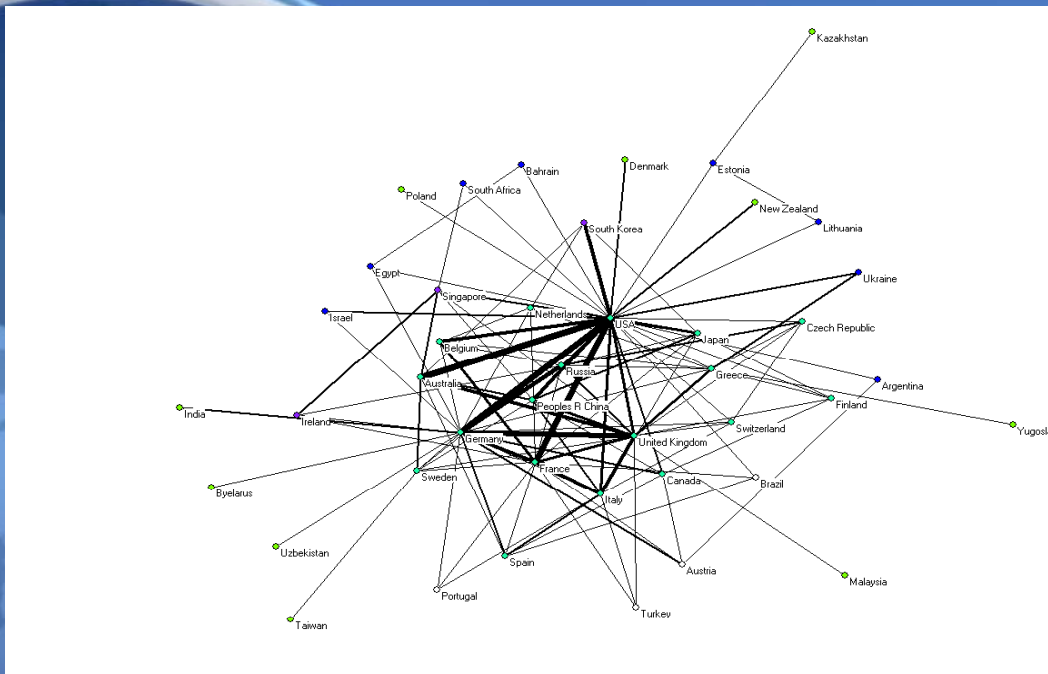
How does it Organize?



Communications Reveal Structure



Network of Broadband Collaborators





How to “Grow” a Network?

- Facilitate interaction among many actors
- Create incentives to organize
- Establish goals, invite “champions”
- Create conditions for sharing (i.e. grid computing)
- Enable teams to outline “rules” of interaction
- Provide information about the “landscape” (culture)



Beyond the NIS Myth

- Structure is neither flat nor national
- System is influenced by policy but only at periphery
- Communications and attachment, seeking recognition and reward are the underlying rules
- Policies in line with the actual structure of the Invisible College have a greater chance of succeeding to develop science