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National Science Foundation, Award No. SES-0750354 (3594.000: 2007-2010)

Dynamic Complexity of Cooperation-Based Self-Organizing Commercial Networks in the First Global Age, 1400-1800

[Acronym: DynCoopNet]

European Cooperation, EUFROCOS (European Collaborative Research) Scheme
Program: "The Evolution of Cooperation and Trading" [Acronym: TECT]

Abstract

The collaborative research project (CRP) "Dynamic Complexity of Cooperation-Based Self-Organizing Commercial Networks in the First Global Age, 1400-1800" (Acronym: DynCoopNet) will confer one of the major research challenges of world history: understanding the dynamic, non-linear world economic system of the first global age. In investigating the complex cooperation at this time, new cooperation was much more strikingly important than in the world economy that would follow. The CRP will contribute to "The Evolution of Cooperation and Trading" (TECT) program through an examination of the evolution of cooperation within self-organizing commercial networks of merchants and other groups. Through a convergence of methods unusual in the historical social sciences, the CRP will reveal the mechanisms of cooperation that permitted merchants and others to establish and sustain the often long-distance trading networks of the period. DynCoopNet will pay particular attention to the global domains of Iberian monarchies. After defining the characteristics and roles of cooperation in the early centuries of the first global age, the CRP will identify and analyze the emergence of new forms of commercial relationships in order to understand the system's transformation to a second world economy. In this second world economy, cooperation was marginalized as a means to sustain networked connections between locations. Through the collaborative efforts of historians, geographic information systems (GIS) and cartographic design professionals, and mathematical models in economics and geography, DynCoopNet will produce new spatiotemporal data models that can be queried and new forms of visualizing the evolving trading relationships at different scales.

Why Geographic Information Systems (GIS)?

- Adequate for the needs of historians
- Mathematical models can model domain knowledge from research disciplines.
- Current GIS software is static, and History is about change over time.
- DynCoopNet combines the work of mathematicians in economics and geography with geographic information technology (GIS) in creating a temporal GIS.
- Data visualization by Derrick Sharp, DynCoopNet graduate research assistant, ISU Idaho State University's GIS Program.

Why Visualization? Human Cognition & Art

- For the reduction of the cognitive weight when the alternatives are numerous and surpass the capabilities of human reason
- For the understanding of the evolution of the network and their geographic environment (pattern/form - process)
- The comprehension and communication of the spatiotemporal form of the world and its processes
- Fundamental for the implementation of the type of research within the discipline of history.

Why Mathematical Exploration & Modeling?

- Fans of the CRP program Nynhet knows that mathematics can model domain knowledge from research disciplines.
- Current GIS software is static, and History is about change over time.
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Why Mathematically Integrate? Master's in Geographically-Integrated History

- Interdisciplinary Ph.D. in Human Ecology and Social Dynamics
- Idaho Institute for Regional Science

What is the DynCoopNet collaborative research community?

- Multi-national (46 countries; 5 continents)
  - Australia, Denmark, France, Germany, India, Israel, Italy, Japan, Mozambique, Netherlands, Portugal, Spain, Sweden, Switzerland, United Kingdom, United States
- Multi-disciplinary (over 40 researchers)
  - Anthropology, cartography (history, cartography, economics, geography, history, geographic information science (GIScience)), sociology, mathematics

What are DynCoopNet's other assumptions?

- Avoid the linear phenomena in ecological and economic systems. The first global age was characterized by a diffusion of authority and frequently by-passed the segmented political hierarchies characteristic of the period's governments. Moreover, these networks served as the source of the creativity and innovation necessary to respond in a flexible manner to the era's endemic disturbances to information, transportation, and capital flows.

Why Cooperation?

- Foundational theory of evolutionary biology and economics on cooperation in competition within the biological and human communities, how possible?
- Avoid the "tragedy of the Commons" (Hardin, 1968)
- Local, regional, and international cooperation needed for resource allocation and environmental sustainability
- Cooperation across the boundaries of countries and firms becoming the norm of the global economy
- Because it was a different complex system, the first global age (1400-1800) will provide new insights into how cooperation relationships are established and maintained.

What is the European Science Foundation program for multi-national, multi-disciplinary research?

- To promote multi-national, transformative research

What is the DynCoopNet research?

- Organizes research in programs that are multi-national and multi-disciplinary, such as the program "The Evolution of Cooperation and Trading" (TECT)
- Proposed by Evolutionary Biologists & Economists

Funded TECT projects (PL = Project Leader)

- Dynamic complexity of cooperation-based self-organizing networks in the first global age (DynCoopNet)
  - 6 national projects
  - PL: Dr. Alex Cuneo Salazar, Consejo Superior de Investigaciones Científicas (CSIC, Madrid), Prof. J. R. "Jack" Owens, Idaho State University, USA
  - Cooperation in networks (COOPERATION)
  - 7 national projects
  - PL: Prof. Ronald Bid, Université Louis Pasteur, Strasbourg, France
  - The social and economic dynamics of cooperation (SOCODYN)
  - 11 national projects
  - PL: Prof. Herbert Gintis, Central European University (CEU), Budapest, Hungary
  - Cooperation in networks: contacts, markets, space, and dispersal (BIOCONTACT)
  - 6 national projects
  - PL: Prof. Marie-Pascale Maujean, Harvard University, USA
  - Generating new economic norms for a sustainable environment (SENSE)
  - 7 national projects
  - PL: Prof. Simon A. Pollard, Pennsylvania State University, USA

Some References