Web *.0 ?
Combining peer production and peer-to-peer systems

Personal view of work in the scope of the call

Objective IST-2007.8.4

FET proactive

David Hales

University of Bologna, Italy

COSI Info. Event, Brussels
24/01/08

Self-* + Web2.0 = Web *.0 ?

- Current Web2.0 apps. enable and channel user behaviour for "peer production". Also leverage social networks

- But highly centralised = expensive, difficult to administer, single points of failure and security / privacy + control

- Current P2P apps. provide limited user interaction but operate via distributed self-organised cooperative networks between nodes (so-called self-* systems)

Self-* + Web2.0 = Web *.0 ?

- If the two approaches can be combined = distributed, self-organised peer production systems with no central control, administration, set-up or running costs

- In fact, ultimately, if new code itself could be propagated through such networks they could transform themselves into any kind of social application over time (compare facebook apps)

- A techno-social operating system? Web *.0 ?

Two open issues

- But to achieve this we need to tackle two serious open issues in distributed ICT design
  - The "rationality gap"
  - The "power gap"
- These issues require careful theoretical and empirical work to address

The Rationality Gap

- Distributed systems designers often assume users and components:
  - Behave altruistically
  - Behave in an economically rational way
- But open systems can't assume altruism: we don't live in "hippie world"
- Rational action theory relies on assumptions that don't hold either
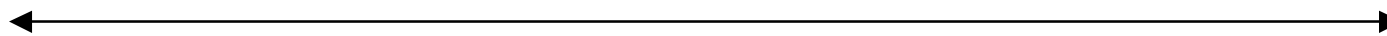
The Rationality Gap

Gap in the middle

Bounded Rationality
learning / adaptation

Altruistic   Rational

The Power Gap

- Distributed systems designers often assume users and components are:
  - Centrally administered or controlled
  - Are completely independent and autonomous
- But central control is not possible in massive open systems
- Complete autonomy is rare because components are interdependent

COSI Info. Event, Brussels
24/01/08

The Power Gap

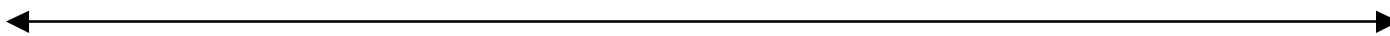Gap in the middle

Complex and changing
social structures

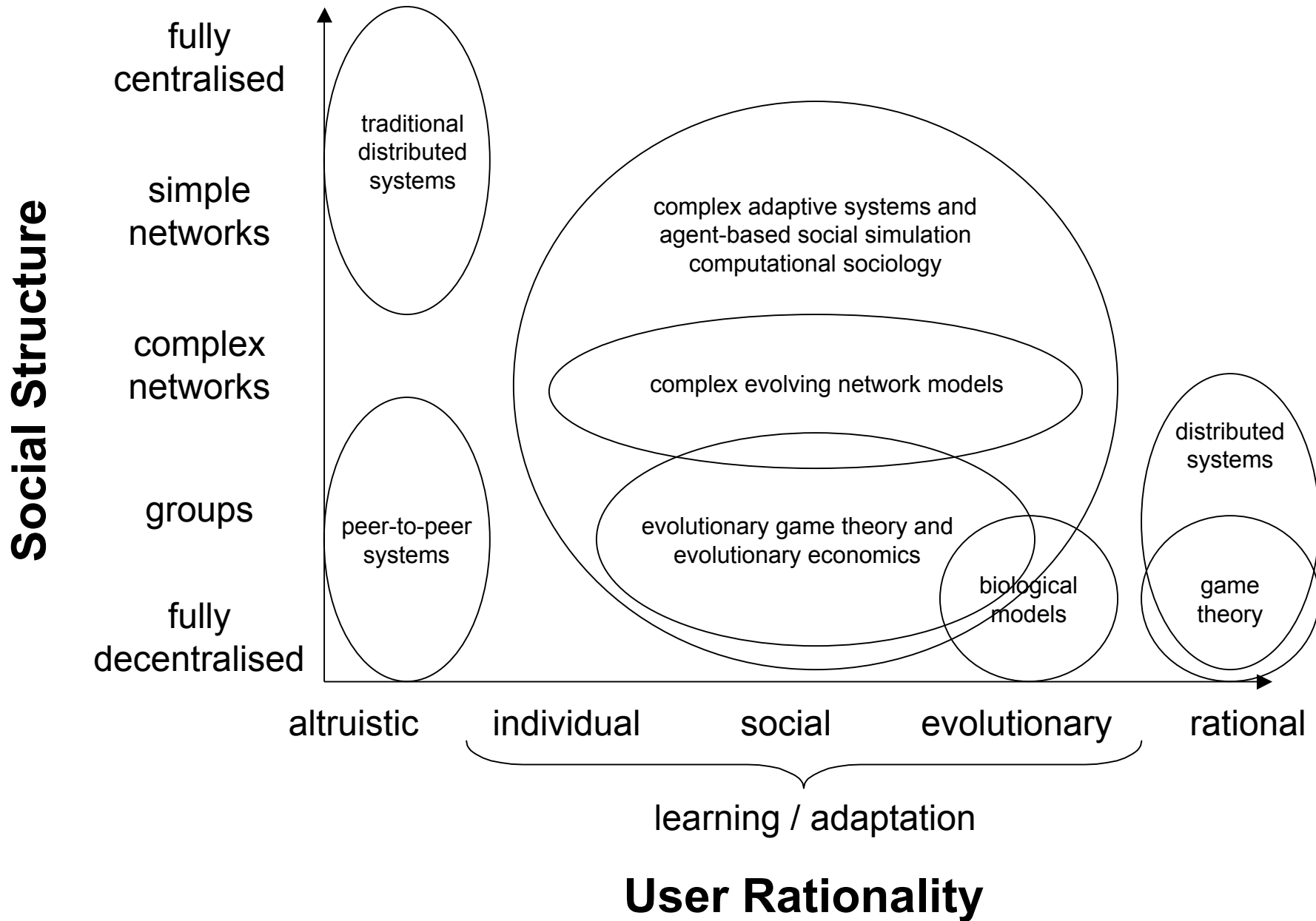Central Control   Complete Autonomy

<-->

Complexity Science to the Rescue!

- It is precisely in these gaps that complex systems are found
  - Bounded rational and adaptive behaviours
  - Complex evolving networks
  - Emergent structures and learning models
- Results and approaches from complex systems science can be applied

Social Structure (vertical axis)

- fully centralised
- simple networks
- complex networks
- groups
- fully decentralised

User Rationality (horizontal axis)

- altruistic
- individual
- social
- evolutionary
- rational

learning / adaptation

traditional distributed systems

complex adaptive systems and agent-based social simulation computational sociology

complex evolving network models

distributed systems

peer-to-peer systems

evolutionary game theory and evolutionary economics

biological models

game theory

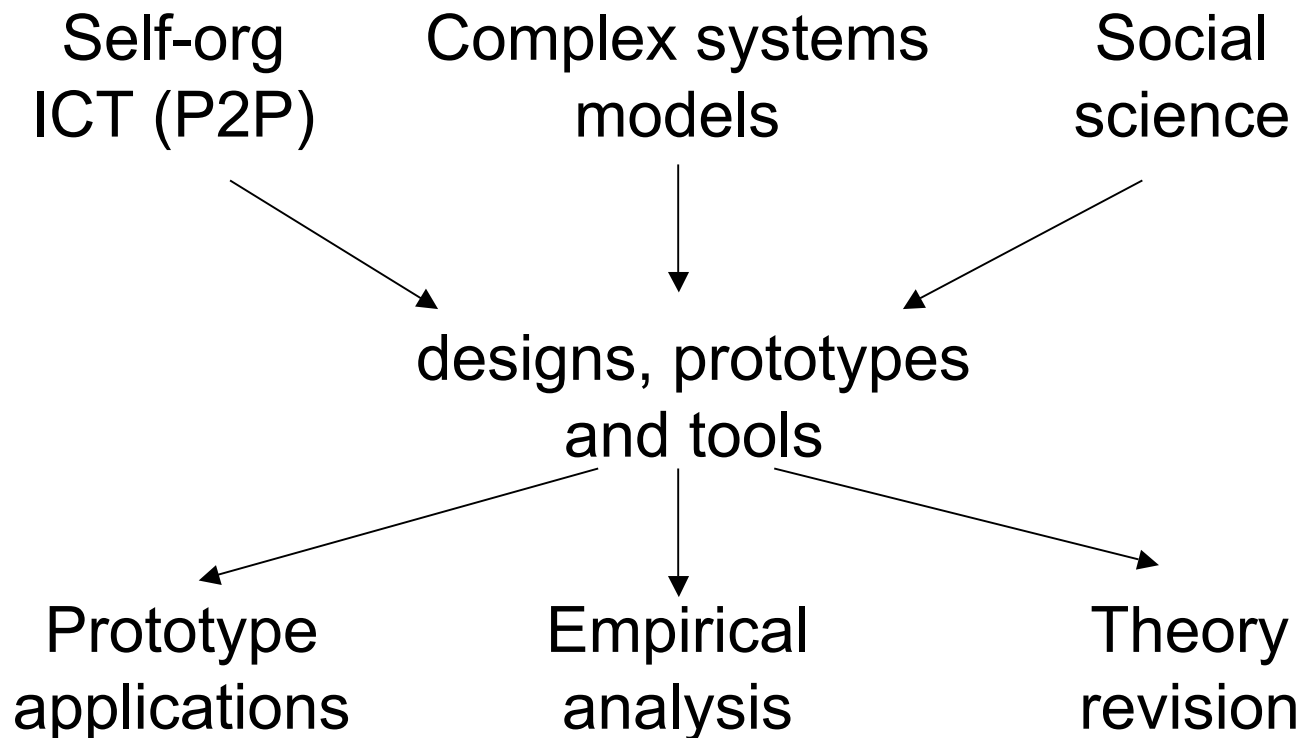COSI Info. Event, Brussels
24/01/08

What to do?

- Bring together leading EU:
  - Distributed systems designers (in the gap)
  - Social / complex systems modellers
- Produce plausible (predictive?) models of both user rationalities, distributed ICT protocols and social structures
- Apply them to open problem domains in self-organising ICT
- Analyse empirical results and revise models

Outputs

- Tools and models for developing next-generation socially intelligent ICT
- Socially intelligent design patterns
- Prototype systems / simulations
- Empirical evaluations from prototype systems => need a large initial user based to achieve this

Areas, methods, applications

Self-org ICT (P2P)   Complex systems models   Social science

designs, prototypes and tools

Prototype applications   Empirical analysis   Theory revision

COSI Info. Event, Brussels
24/01/08

FINI