

# Global Participatory Computing for Our Complex World



FuturICT

[www.futurict.eu](http://www.futurict.eu)

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Presented by Mario Paolucci  
LABSS/ISTC/CNR  
Ontology Summit 2012

# What It Means to Live in an Information Age

- Global ICT = most complex artifact
- Billions of interacting components
- Many autonomous decisions
- **Artificial social systems!**
- **Example:** Computer-based automated financial trading



- Too much data
- Too much speed
- Too much complexity

ICT is part of the problem, but also key to the solution! Need to understand socially interacting systems!





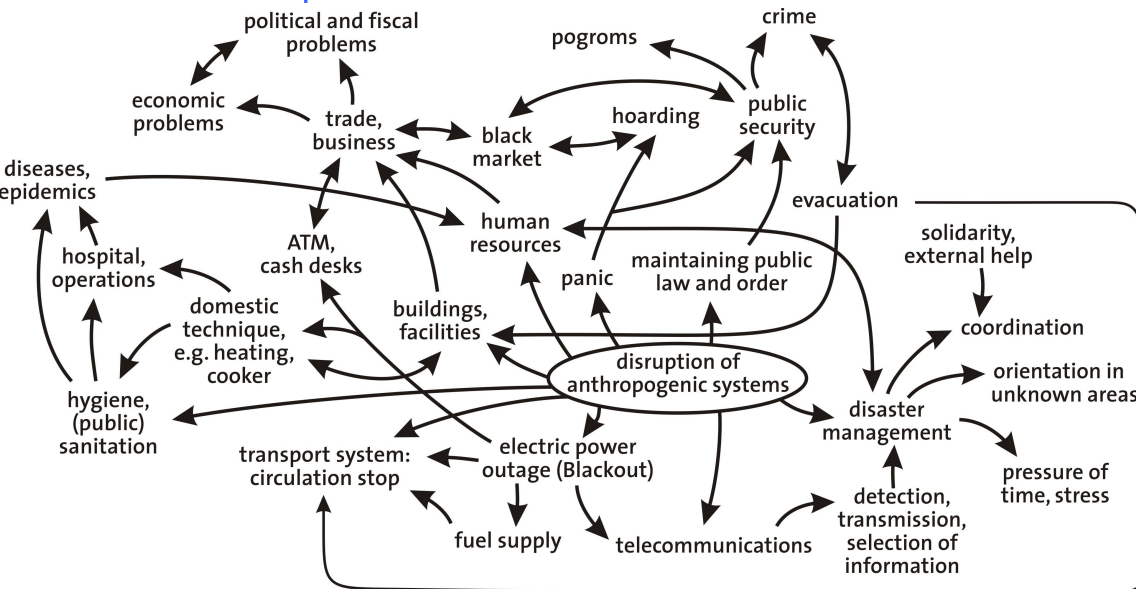
# FuturICT Could Create a European ICT Paradigm



- Create a **Big Data Commons**
- Ethical, **value-sensitive**, culturally fitting ICT (responsive+responsible)
- **Privacy-respecting** data-mining
- Platforms for **collective awareness**
- **Participatory platforms**, new opportunities for everyone
- A new **information ecosystem**
- **Coevolution** of ICT with society
- **Democratic** control
- **Socio-inspired** ICT (socially adaptive, self-organizing, self-regulating, etc.)
- A '**trustable web**'

# Networking is Good ... But Promotes Cascading Effects

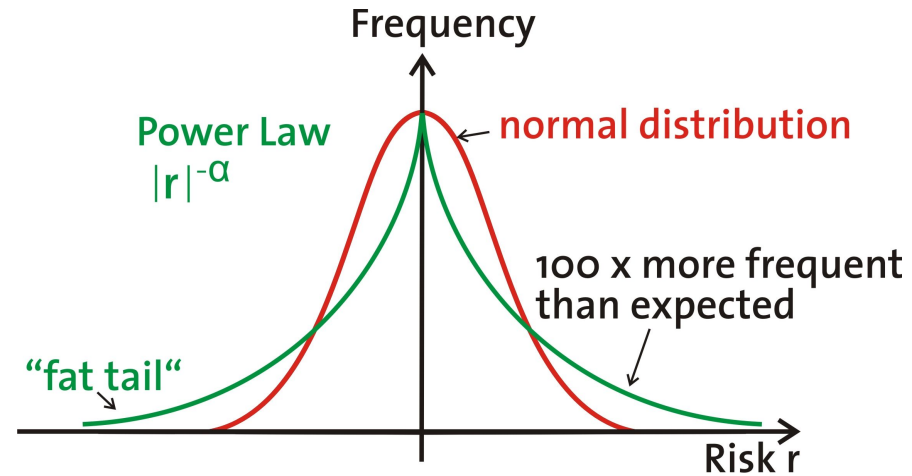
- We now have a global exchange of people, money, goods, information, ideas...
- Globalization and technological change have created a strongly coupled and interdependent world



Network infrastructures create pathways for disaster spreading!  
Need adaptive decoupling strategies.

# Strongly Coupled and Complex System Behave Fundamentally Different

1. **Faster dynamics**
2. Increased frequency of **extreme events** – can have any size
3. **Self-organization** dominates system dynamics
4. **Emergent and counterintuitive system behavior**, unwanted feedback, cascade and side effects
5. **Predictability** goes down
6. External **control** is difficult
7. Larger **vulnerability**



Change of perspective (from a component- to an interaction-oriented view) will reveal new solutions!

Need a science of multi-level complex systems!



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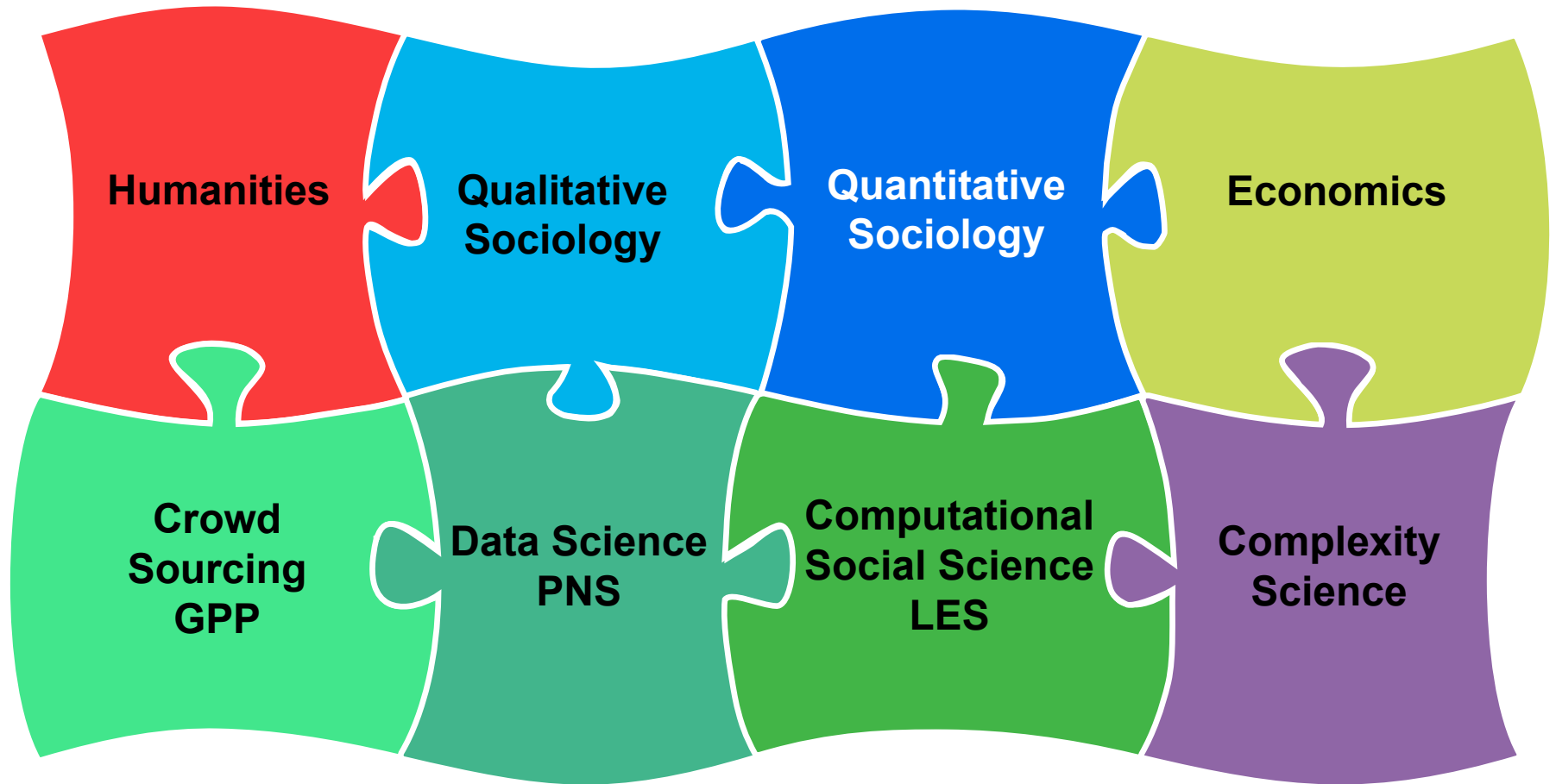
# As Coupling Gets Stronger, System Behavior Can Change Completely: Traffic Breakdowns



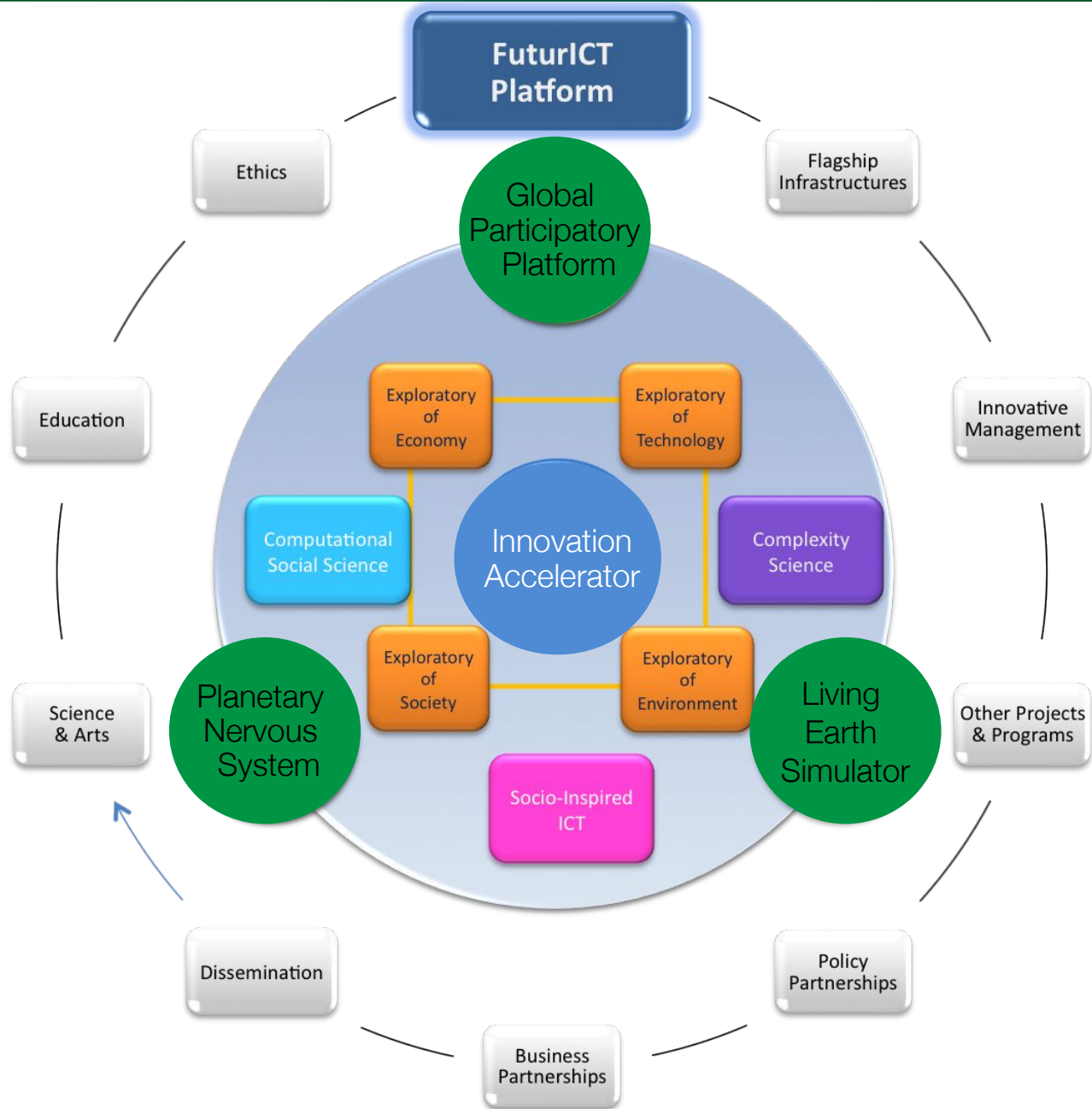
Thanks to Yuki Sugiyama

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# The FuturICT Knowledge Accelerator

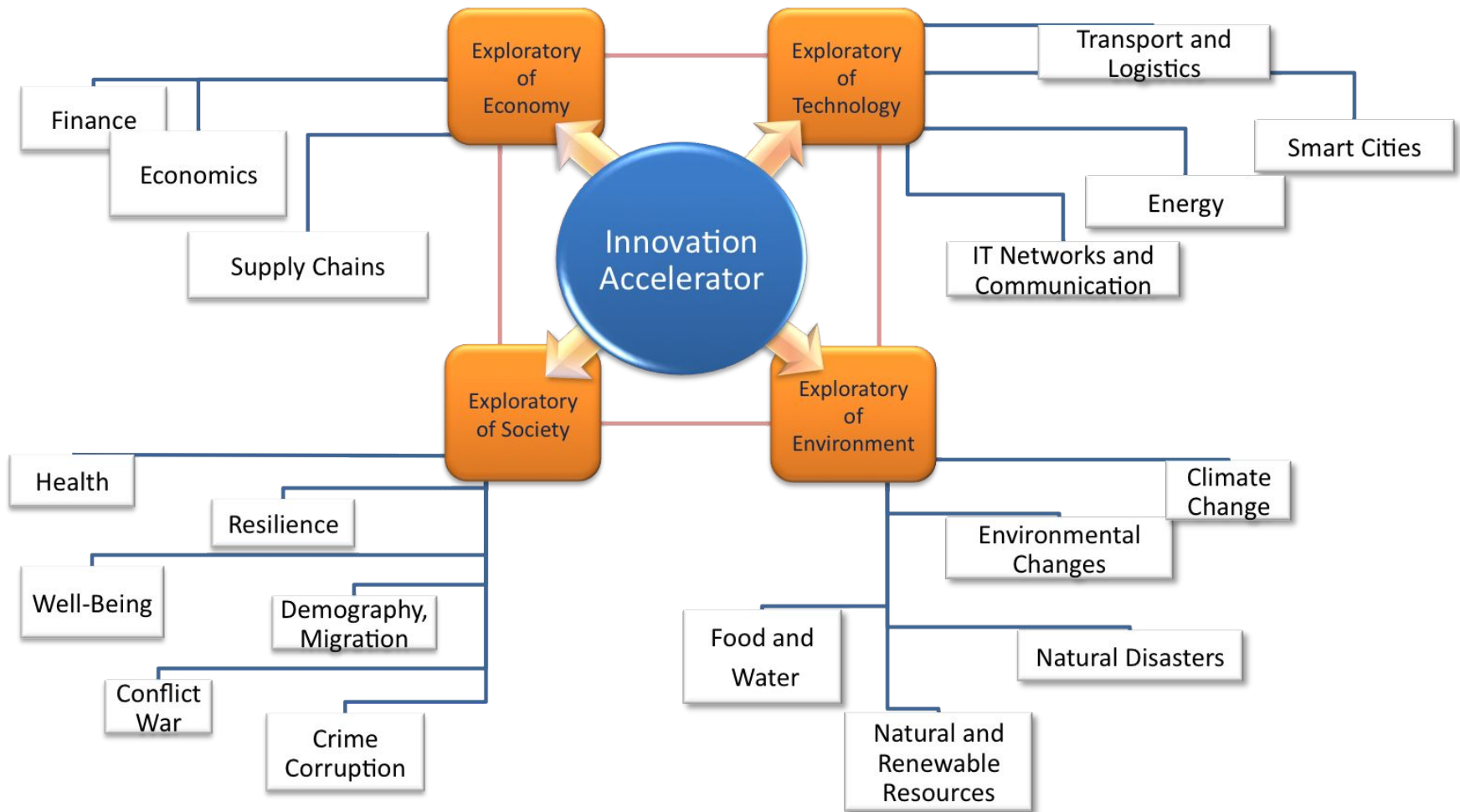


Integrating the best knowledge from the social, natural, and engineering sciences, particularly social sciences, complexity sciences, and ICT





# FuturICT Observatories and Exploratories



# An Open, Transparent Platform for Everyone

- **Goal:** More opportunities for social, economic and political participation
- **Open platform** for everyone, new public good
- Non-expert system
- Crowd sourcing, citizen science
- **Establish new information ecosystem to create new opportunities, services and jobs**
- Benefit from cultural diversity
- Value-sensitive design



# Coming Era of Socio-Inspired Innovations

Understanding socially interactive systems facilitates socio-inspired ICT

- Cooperation,
- adaptability and self-regulation,
- conflict resolution,
- resilience,
- trust,
- reputation,
- social norms,
- values, ethics, and
- culture

Economic benefits!

New solutions to societal problems!



Example: A 'Trustable Web', reputation-based and self-regulating, to keep cybercrime low

