

Global Participatory Computing for Our Complex World



FuturICT

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Presented by Mario Paolucci
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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!



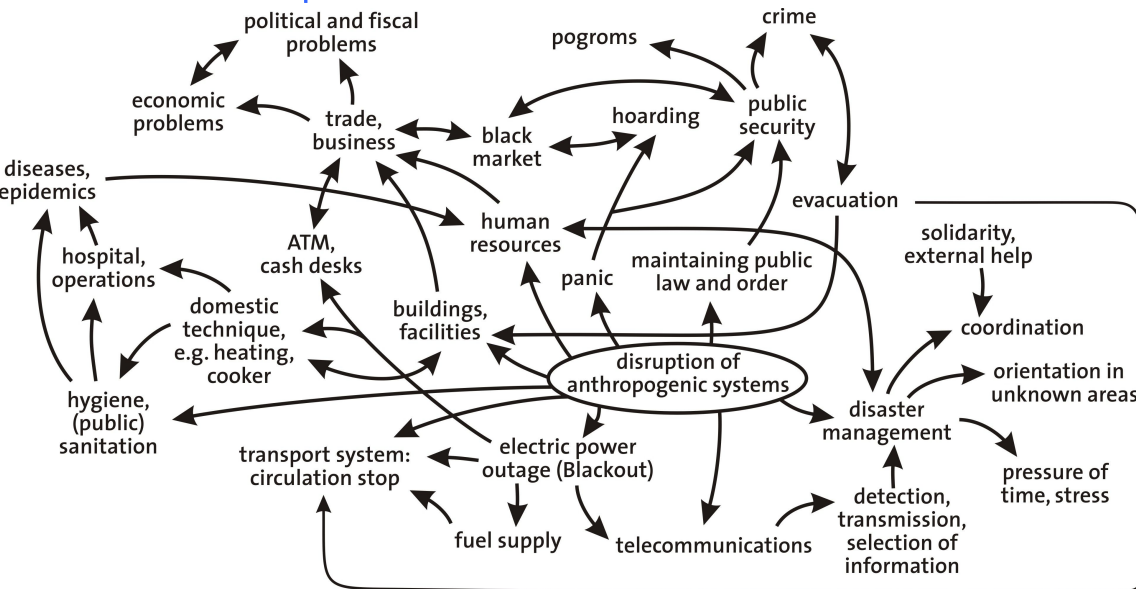
FuturICT Could Create a European ICT Paradigm



- 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

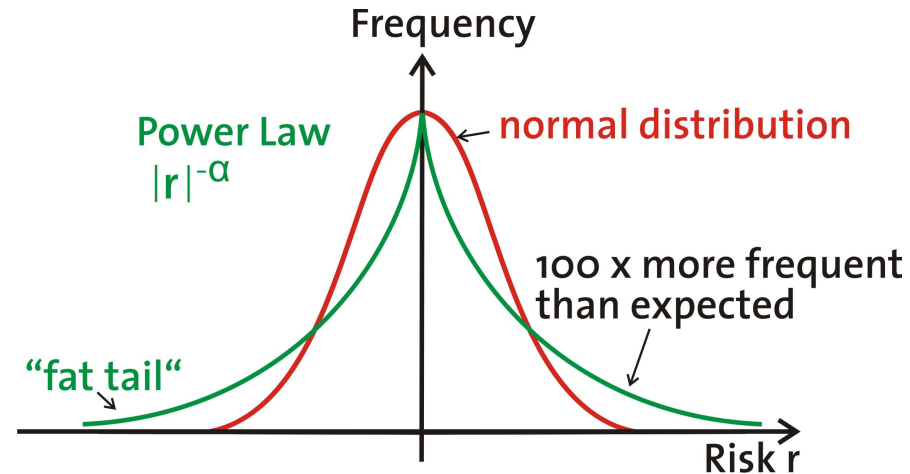
- We now have a global exchange of people, money, goods, information, ideas...
- Globalization and technological change have created a strongly coupled and interdependent world



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!

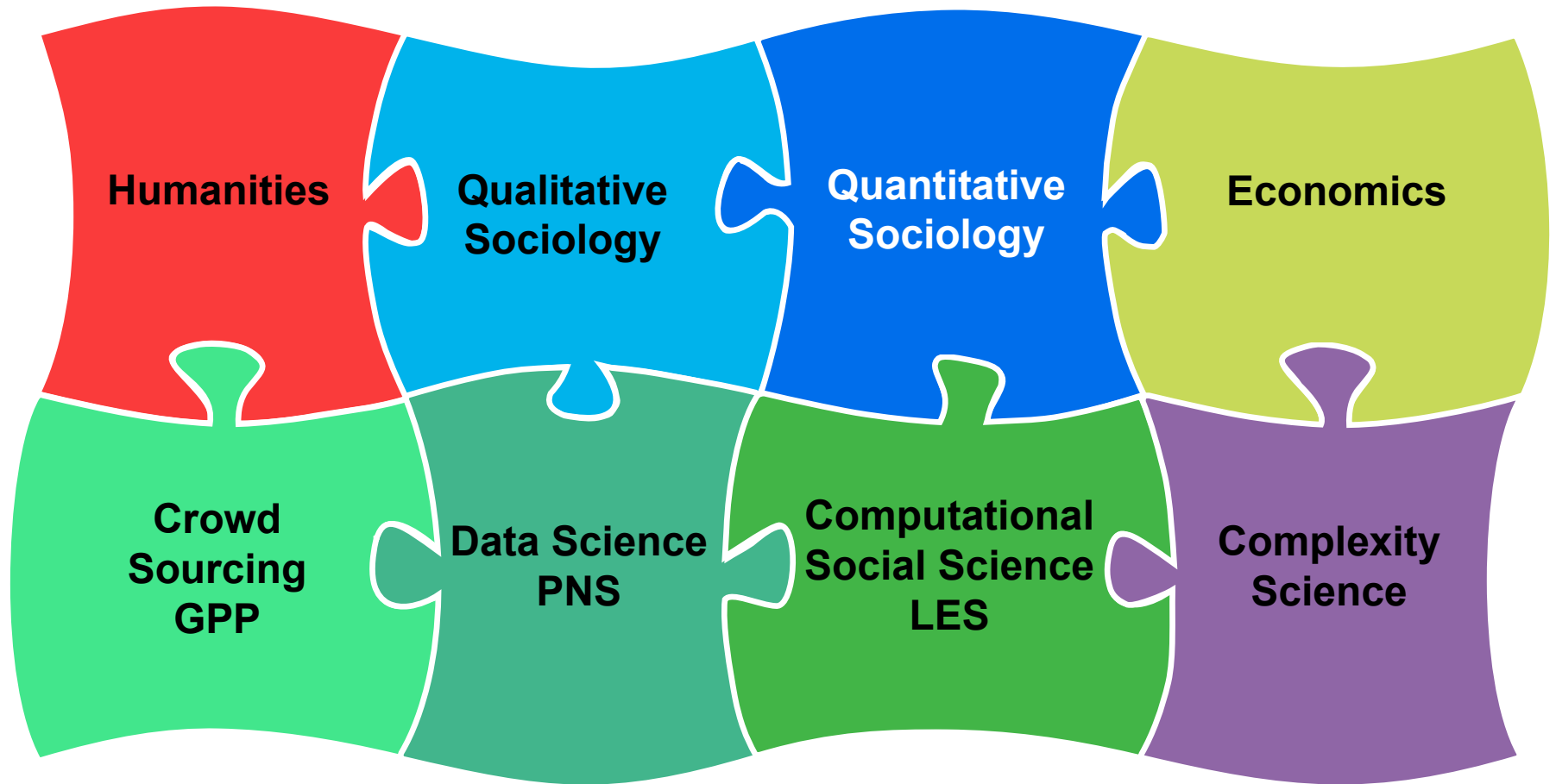
Need a science of multi-level complex systems!

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

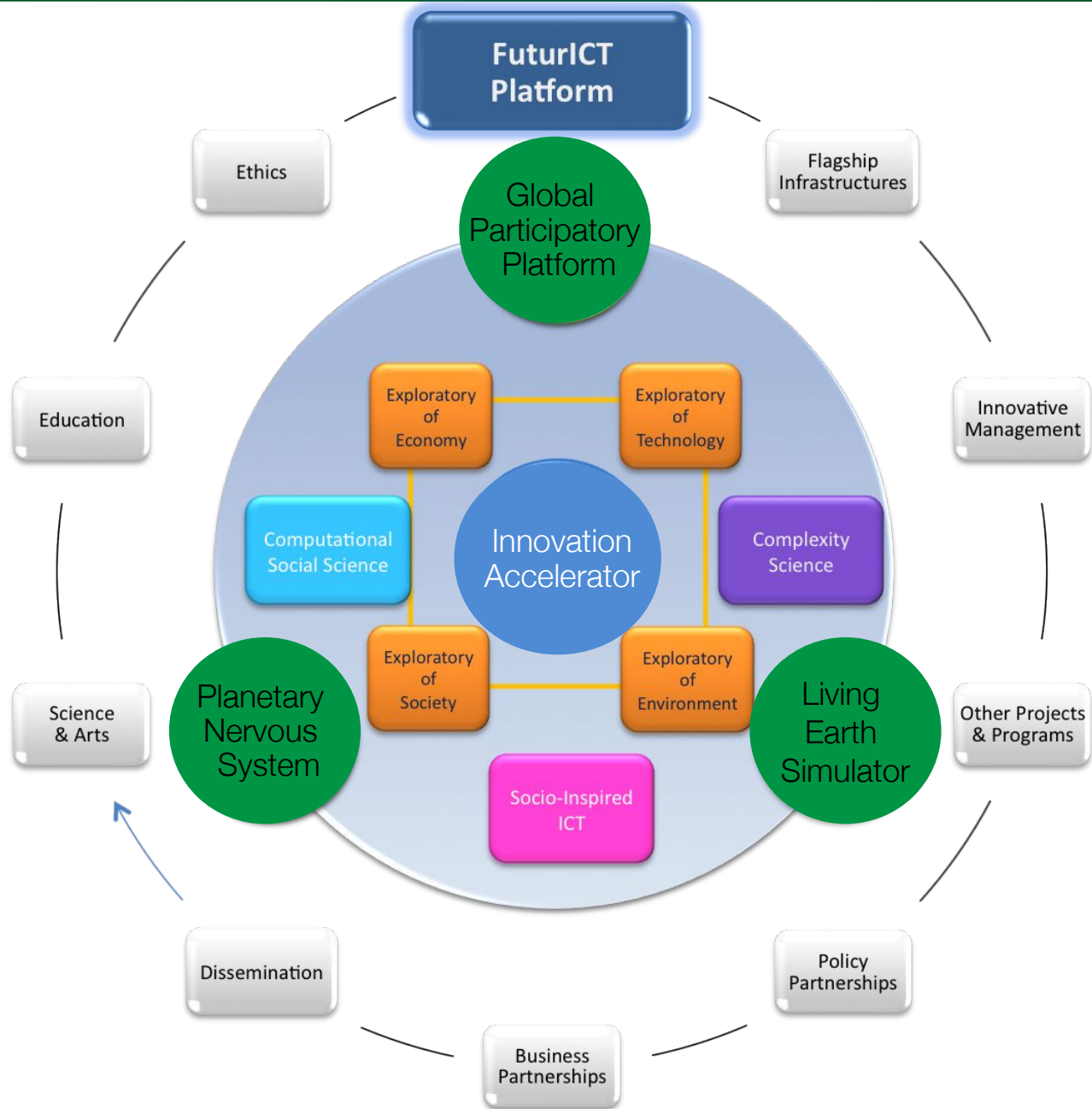


Thanks to Yuki Sugiyama

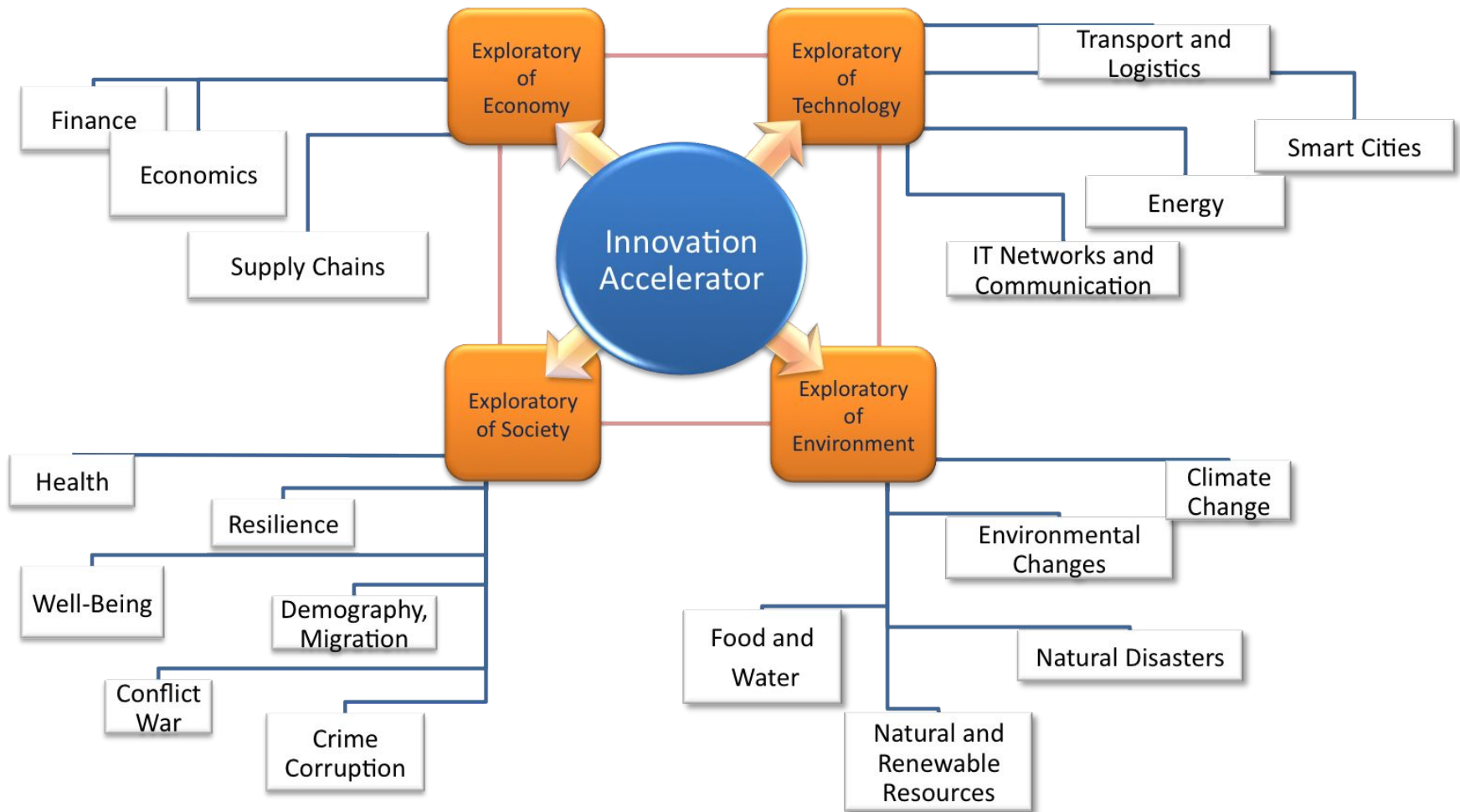
The FuturICT Knowledge Accelerator



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

