University Governance in the age of Block chain Technology

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Background Expertise and Motivation

- Complex Socioeconomic Systems structure and dynamics
- Patterns before complex systems collapse
- Polycentric governance of resilient socioeconomic systems and intervention strategies for crisis prevention

- Role of education in leading change for sustainability
- Institutional autonomy and socioeconomic relevance of the University and accountability
- Blockchain promise for decentralization and democratization in socioeconomic organizations

Nature vs. Engineering

Complex   **Complicated**
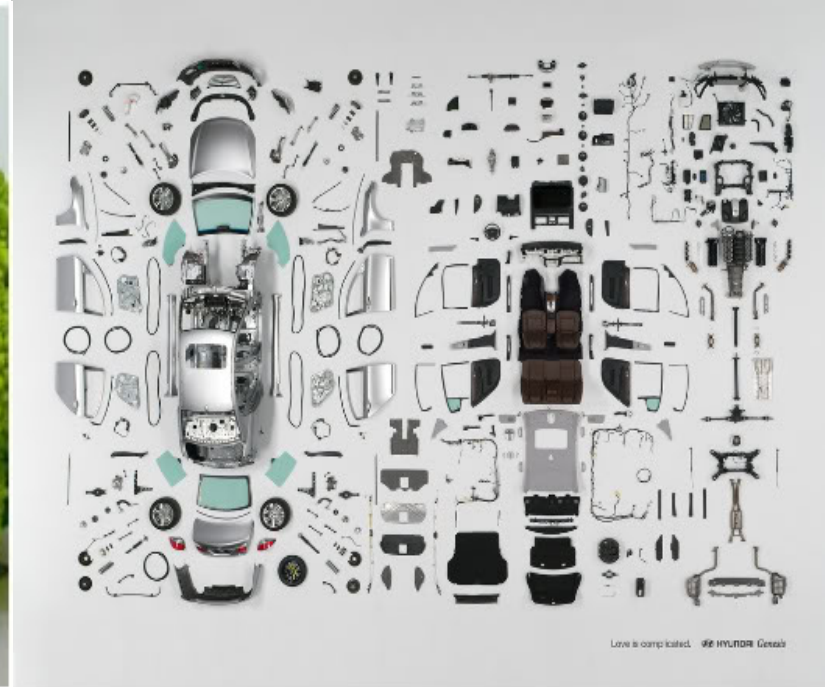
Nature vs. Engineering

Complex

- Nonlinear interaction of similar units organized in self-similar levels of increasing size and deceasing speed

- Few controlling processes preserve the integrity of the system

- Adapts to perturbation through self organization

- Adaptive capacity ↔ Sustainability

Complicated

- Fixed connections of dissimilar units, very different in shape, size, function

- Prescribed sequential functions prone to cascading failure

- Low tolerance for perturbation

- Low adaptive capacity ↔ Fragile

Socioeconomic System

- Complex hierarchical system
- Semi-autonomous levels developing at different speed
- Integrity depends on controlling processes from upper level
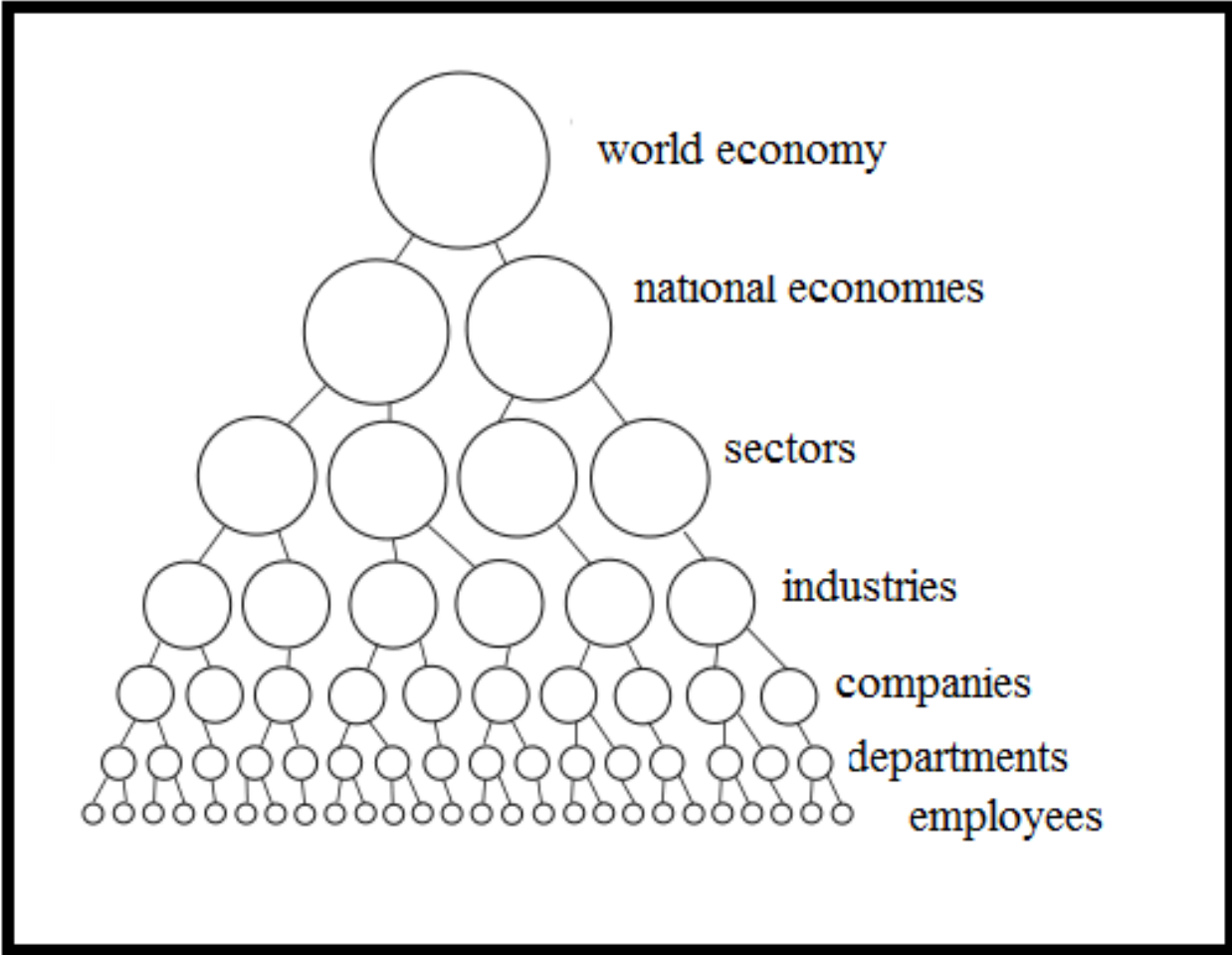- Experimentation generates innovation at lower levels
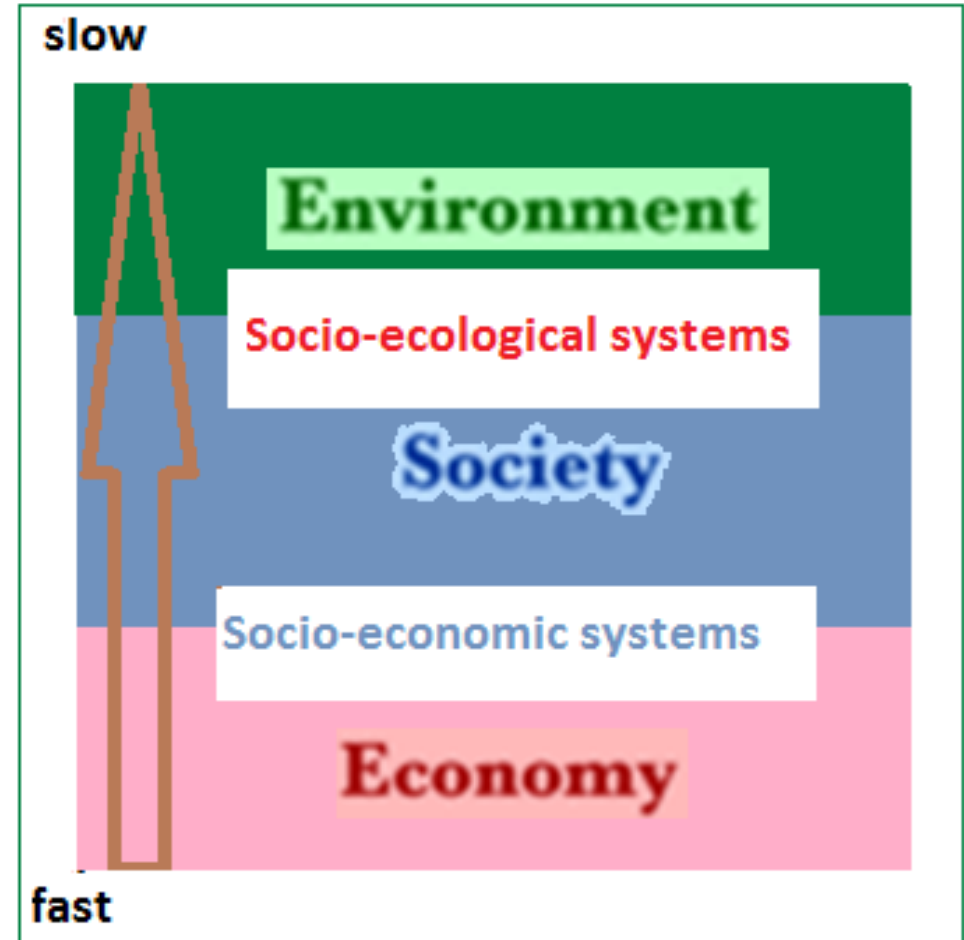
Dynamics

- Feedback processes preserve integrity
- Experimentation generates/tests innovation through

Adaptive Cycle

- Adaptive capacity
- Interconnectedness
- Opportunities

Multilevel self-similar structure

world economy

national economies

sectors

industries

companies

departments

employees

Social System Hierarchical Structure

Blockchain and Polycentric Governance

- The blockchain is a technology that permanently records transactions in a way that cannot be later erased but can only be sequentially updated

- Blockchains are enormous catalysts for change that hit at governance, ways of life, traditional corporate models, society and global institutions.

- Decentralized network of nodes, distributed database, transparent, incorruptible, accessible, durable and robust, secure…

Blockchain 2.0: Contracts

- An agreement between two or more parties to do or not do something in exchange for something else. Each party must trust the other party to fulfill its side of the obligation. Smart remove the need for trust between parties.

- A smart contract is both defined by the code and executed (or enforced) by the code, automatically without discretion.
  - *Autonomy* after it is launched and running, its initiating agents need not be in further contact.
  - *Self-sufficient* in their ability to organize resources, e.g. processing power or storage.
  - *Decentralized* - do not subsist on a single centralized server; but distributed and self-executing across network nodes.

Blockchain 2.0 Protocol Project

- Blockchain Development Platforms and APIs
  - link blockchain development environments out to other major segments like the machine-to-machine (M2M) communication and Internet-of-Things (IoT) networks infrastructure for rapid application development.
- Blockchain Ecosystem: Decentralized Storage, Communication, and Computation
  - Storage-secure, decentralized, off-chain storage for files
  - Decentralized secure file serving
  - Archiving – longevity provisioning and end-of-product-life planning for blockchains

Academic Certificates

- Ease of Publication & Distribution
- Independent validation
- Immutable Records using Digital fingerprints (hashes)
- Reduced time to issue Certificates
- Costs of re-issuing certificates are minimal
- Ease and instant authentication by interested parties Operational costs minimized
- Universities and issuing authorities protect their brand names from being tarnished
- Employers can examine job applications more efficiently, ensuring that a candidate employee is presenting true information, without long waiting times or processing costs

Increasingly Autonomous Smart Contracts - Dapps, DAOs

- Dapps (decentralized applications)
  - runs on a network in a distributed fashion with participant information securely (and possibly pseudonymously) protected and operation execution decentralized across network nodes.
  - completely open source, operate autonomously with no entity controlling the majority of its tokens, and its data and records of operation must be cryptographically stored in a public, decentralized blockchain.
- DAOs (decentralized autonomous organizations)
  - a constitution outlines its governance on the blockchain, and a mechanism for financing its operations
  - smart contracts running on blockchains execute ranges of prespecified or preapproved tasks based on events and changing conditions

Increasingly Autonomous Smart Contracts - DASs

- DASs (decentralized autonomous societies)
    - essentially fleets of smart contracts, or entire ecosystems of Dapps, DAOs. An interesting concept related to intellectual property and new ideas is the "self-bootstrapped organization." The project idea spins out to become a standalone entity with some standardized smart-contract, pay remuneration, receive feedback (automated or orchestrated) through blockchain prediction markets and decentralized blockchain voting.

The Blockchain as a Path to Artificial Intelligence

- Smart contracts as applications can themselves be decentralized, autonomous, and pseudonymously running on the blockchain.

- The blockchain could be one potential path to artificial intelligence (AI) in the sense that smartcontract platforms are being designed to run at graduated stages of increasing automation, autonomy, and complexity.

Blockchain Technology - Highly Effective Model for Organizing Activity

- A new paradigm for organizing activity with less friction and more efficiency at much greater scale.

- Decentralization utilizing a liquid underlying network with the Web interconnecting all humans without intermediaries.

- Blockchain technology affords a universal and global scope and scale that was previously impossible.

Effective Model for Organizing Activity

- Blockchain technology facilitates the coordination and acknowledgment of all manner of human interaction, facilitating a higher order of collaboration and possibly paving the way for human/machine interaction.

- Perhaps all modes of human activity could be coordinated with blockchain technology, or at a minimum reinvented with blockchain concepts.

- It is not just a better organizational model functionally, practically, and quantitatively; by requiring consensus to operate, the model could also have greater liberty, equality, and empowerment qualitatively.

Conclusions

- The concept of blockchain can be employed to solve more advanced problems than just serve as a payment mechanism.

- Future uses of the concept of the blockchain will increasingly give birth to a large number of promising applications and further concepts.

- Ethereum looks like the most promising platform at the moment to host disruptive decentralized applications