

THE GEORGE
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CSPRI Blockchain–DRR Research Themes

What DRR Can Learn from Blockchain



Jan 26, 2021

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Race between escalation of disaster impact and means to mitigate impact

DRR Target *before* COVID-19

- Hurricanes
- Fires **100K Deaths / year**
- Floods



DRR Target *after* COVID-19

- COVID-19 – **100K Deaths / week**
- Climate - > millions of people affected
- Famine / Water - millions of people affected
- Cyber – Millions of networked systems

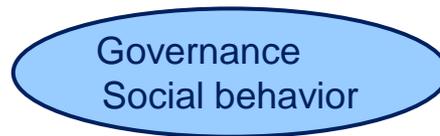
New Technologies

- Blockchain, Dapps, Web3
- Machine Learning
- CRISPR-Cas9
- MRNA / and other molecular vaccine innovation
- Social network analysis



Social behaviors needed to address increasing threats

Disaster Incidents



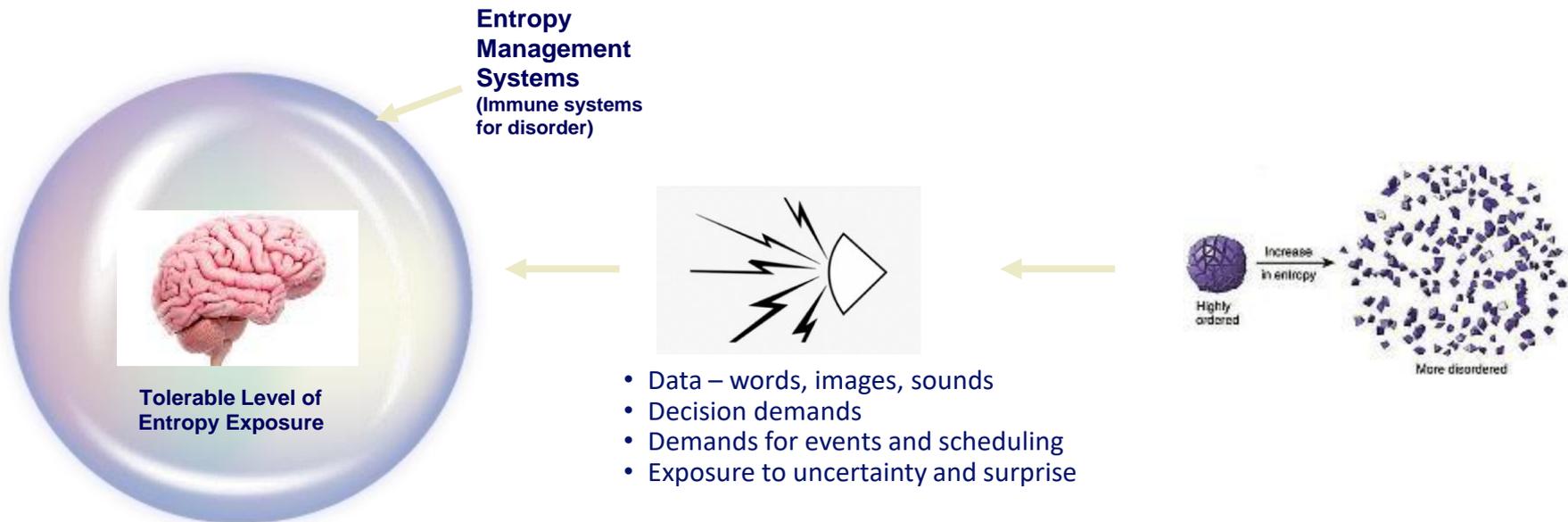
Potential outcomes

1) Manageable Loss

2) Unacceptable Catastrophe

Challenge of untrustworthy information overwhelming human processing power

New disorder: Toxic Entropy Exposure



What have we learned from the COVID-19 experience?

Simple behaviors make a huge difference in disease incidence

- Screening
- Masking
- Hygiene
- Distancing
- Testing
- Contact tracing
- Vaccination

But bad actors and a cooperative media complex can construct alternative realities

- The virus will disappear
- Treat the virus with bleach and light
- Logistics? It's the states' responsibility

In the US, the cost is hundreds of thousands of lives – worldwide, millions at risk.

Key role for trust – “Trust the science.”

Trust in a shared reality

- Validation methods (clinical trials)
- Authorities (Tony Fauci)
- Respected institutions
- Media
- Common narratives
- Group identity

Enables



Beneficial behaviors

- Vaccinations
- Inhibition of communicable disease
- Change in energy use
- Low impact infrastructure and commuting practices

Feedback



Evolution of trust – Methods of reducing uncertainty

Trust in science

- Aristotle, Euclid
- Astrology, alchemy
- Ptolemaic astronomy
- God said, 'Let Newton be!' and all was light.
- Experimental objectivity
- Statistical validation
- Peer review consensus processes*

Trust in governance

- Hunter / gatherer
- Land-based hierarchy
- Trial of Socrates (democratic justice)
- Divine law
- Monarchies
- Enlightenment, devolution of power
- Democratic clockwork
(balance of competing interests)
- Return of autocracy?

Trust in transactions

- Barter
- Seashells
- Rare metal coins
- Paper currency
- Double-entry accounts
- Administrative law and regulation
- Centralized accounts
- Electronic payments
- Distributed transaction governance and blockchain

* See Naomi Oreskes, *Why Trust Science*, The University Center for Human Values Series, 2021

How blockchain creates trust

Blockchain Consensus - A fault-tolerant method to determine a valid data set (e.g., transactions) or network state among distributed systems

- Variety of methods including Proof of Work, Proof of Stake, Delegated Proof of Stake, ...
- “Smart Contracts” can embody consistent business rules.
- ***Blockchain consensus creates a “social” system in which there is an economic cost to disinformation.***

Limitations and lessons

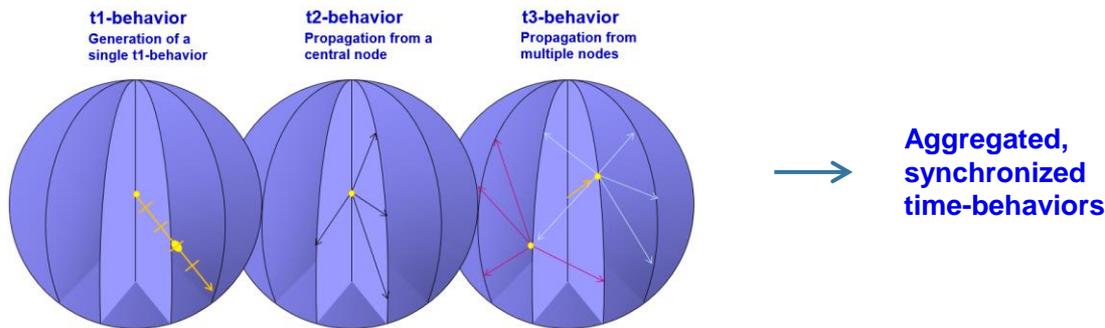
- Just because data is on the chain doesn’t mean it is accurate. Blockchain does not solve the problem of interfacing with real-world external data.
- Lack of governance means there is no responsible party to adjudicate disputes.
- Consistent, trustful data is a necessary but not sufficient condition to achieve human trust and behavioral response.

What blockchain can do for DRR

- Connect behavior with incentives
- Provide interoperable access to data and to people
- Provide trusted record of responsive actions
- Incentivize behavior change in networked populations
- (Maybe) reduce Toxic Entropy Exposure

Goal: To reduce the information needed to manage behaviors in populations

Means: Synchronization and Consensus (what blockchain is good at)



“Remember son, there’s no future in big antlers.”
— wise mother elk.



extinct

extinct