Blockchain Governance: Concepts, Challenges, and Implications

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Warm up

- Please go to this Miro board, we will get to know each other more: https://bit.ly/4kJA6gl
- Who's here from
  - Computer Science?
  - Political Science?
  - Business school?
  - Your background?
- What's your knowledge and experience with blockchain? (novice, learning, confident,
- What do you expect to gain from this session?

Content

- Governance
- Blockchain systems
- Blockchain Governance:
  - What is it?
  - A timeline of blockchain governance research
  - Blockchain Governance models
- Wrap up

Objective

- Understand the history and origin of the term “Governance”
- Identify key issues in blockchain systems
- Survey the evolving landscape of Blockchain Governance research
- Study and practice with some Blockchain Governance models

(→ will be helpful for your blockathon project)


Governance
RULES
Corporate
Manage
PRIVATE
Organization
MANAGEMENT
PROCESS
ACTIONS
Public
BUSINESS
System of Rules
Tasks
REGULATIONS
Accountable
Bureaucracy
Policies
Actions
Decisions
Group
Innovation
Regulations
PUBLIC
Global
DECISION-MAKING
Regulatory
RULES
Management
POLICY
Group
Processes
Systems
GOVERNING
Process

What is Governance?

- Governance vs Government
  - Many see this is a paradigm shift in organization, a critical concept
  - Some see ”governance” as merely jargon, a vague and slippery concept
  - And many confuse “governance” and “government”

- Discussion:
  - What do you think of when you think about “governance”?
  - Where in your life do you experience governance?

The origin and growth of Governance

The English word *"governance"* originated from Latin word *"gubergare"* and from Greek word *"kybernan"* meaning to steer a boat

→ Governance is the process of governing

1980s: *"Governance" captured the scholarly interest*

- Key milestones: Williamson's Transaction-Cost Economics: The Governance of Contractual Relations (1979)

- Growing interests in law and economics in corporate governance

1990s: *"Governance" became ubiquitous, a buzz-concept*

- More social groups (private, NGOs) have involved in governmental work as contractors

2010s: *Further acceleration of interest in Governance across disciplines, exceeding its original groups of interests (law, political science, economics, public administration)*

- *The growing communication regarding global issues (environmental)*
- *The growing complexity in international coordination*
- *The advanced and eventful innovations (blockchain, DAO hack, etc.)*

What is Governance?

- Definition:
  - *"Governance refers to all **processes** of **social organization** and **social coordination**."* (A very short introduction of Governance, p.3)
  - *"Governance is an **interdisciplinary** research agenda on **order** and **disorder**, **efficiency** and **legitimacy** all in the context of hybridization of **modes** and **control** that allow the production of fragmented and multidimensional order **within** the state, **by** the state, **without** the state, and **beyond** the state."* (The Oxford handbook of Governance, p.1)

- Governance vs Government:
  - Government is a political institution in the broad landscape of governance
  - Government participated in the governance of the society it resides in by shaping, enabling, and enforcing the governance process.
  - Governance includes government but goes beyond it, involving other organizations (corporates, markets) in the process of social organizations and coordination.

Four perspectives on Governance

Governance as Structure
System of rules, laws, regulations, judicial decisions, and administrative practices
→ A reflection of institutionalism in the social sciences

Governance as Process
Aims to capture the dynamic interaction between multiple social actors
→ Not as stable as the Structural view, focusing on the **ongoing** process of **steering**

Governance as Mechanism
Governance is to built and make routine the decision-making
→ Key considerations include monetized exchanges, non-monetized, command, persuasion, solidarity

Governance as Strategy
The design, creation, and adaptation of the governance system
→ Focus on the decentralization of power and the informal, creative systems

Some types of Governance

- **Corporate Governance:** balances power between board, management, and owners; protect shareholders and stakeholders interests
- **IT Governance:** Aligns IT strategy with business goals; ensure accountability, transparency, performance, and compliance in the use of technology
- **Global Governance:** Coordinates international cooperation and rule-setting across nation-states and global actors on global issues (security, climate, cross-border trades)
- **Environmental Governance:** Focuses on managing natural resources, enforcing environmental regulations, and balancing development with sustainability
- AI Governance, Blockchain Governance

Key issues in blockchain systems

Different types of blockchain

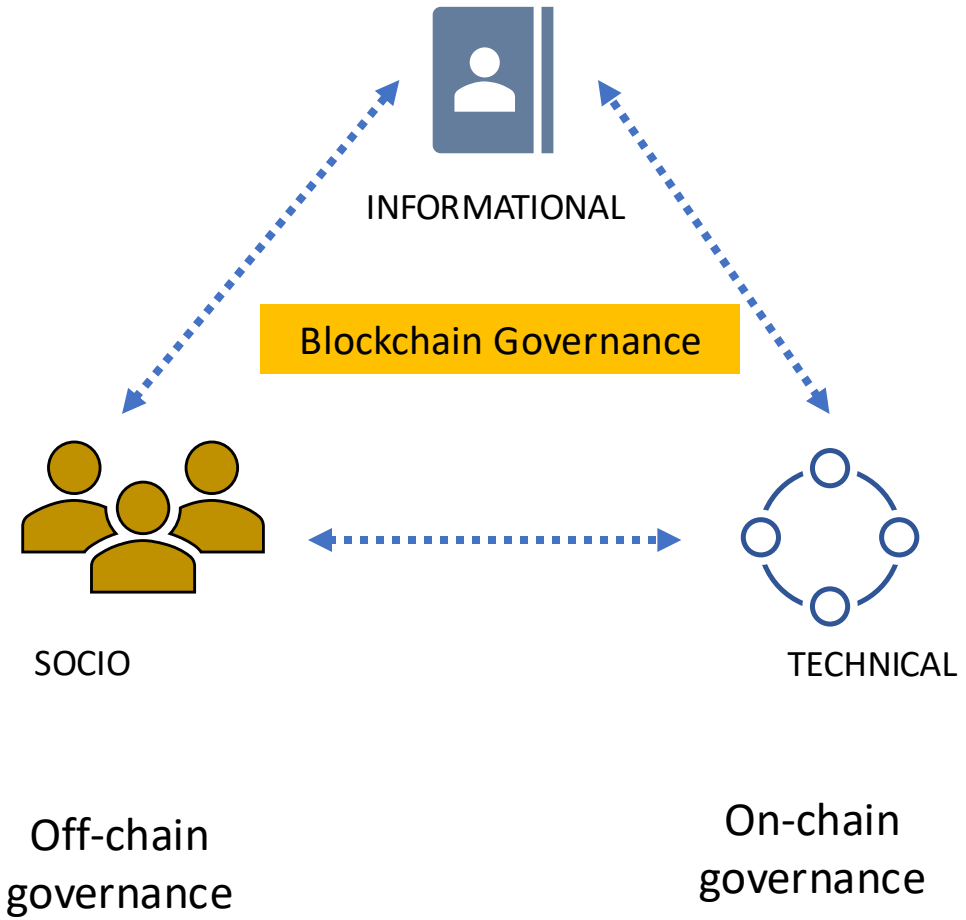
Blockchain typology adapted from (Beck et al., 2018, p. 1022)

		Access to transaction validation	
		Permissioned	Permissionless
Access to transactions	Public	Hybrid blockchains	Public blockchain
	Private	Private blockchains	Not applicable

What's a blockchain?
https://www.youtube.com/watch?v=yubzJw0uiE4

Blockchain as socio-informational-technical system

(Lemieux and Feng, 2021)

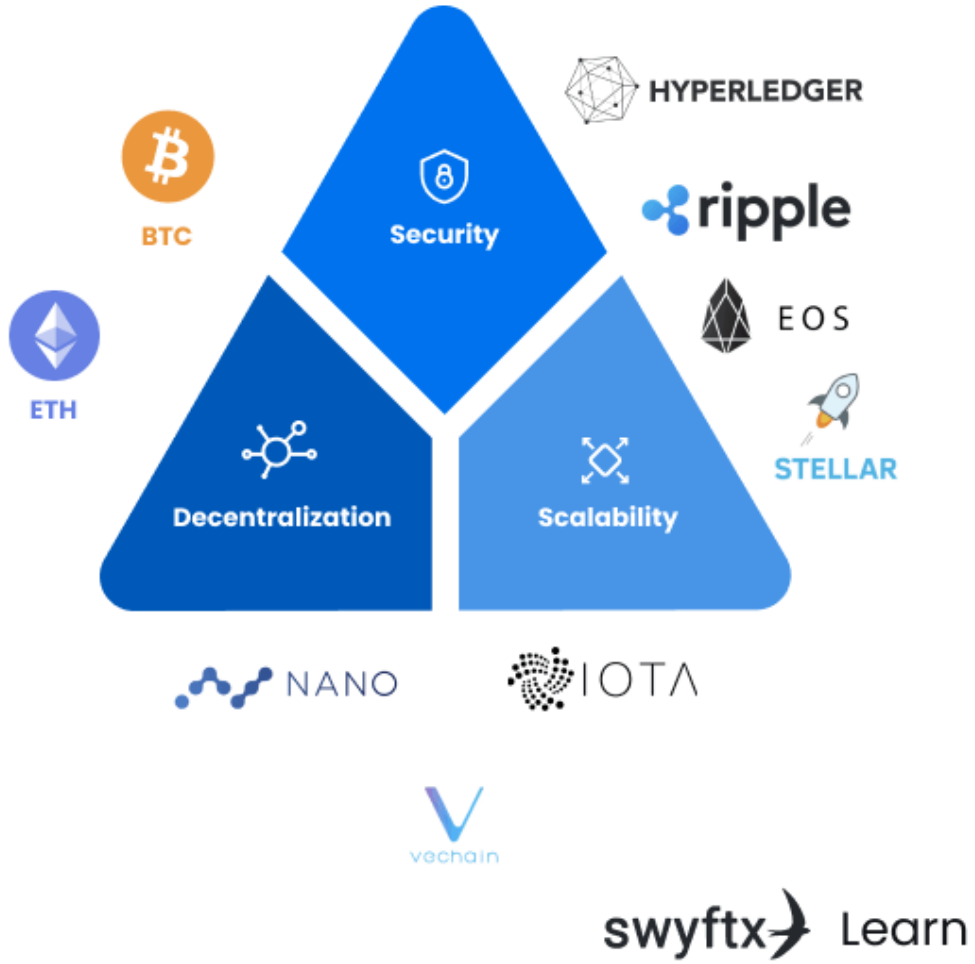


Technical issues: Blockchain trilemma

The blockchain trilemma refers to the trade-off between three critical aspects of blockchain technology: security, scalability and decentralization.

Examples of trade-off:
The Bitcoin network maintain the 1Mb block size and 10-minute block time, translating to around seven transactions processed per second.

Discussion: Implications of the resolution to the blockchain trilemma in the 2017 Bitcoin hard fork?



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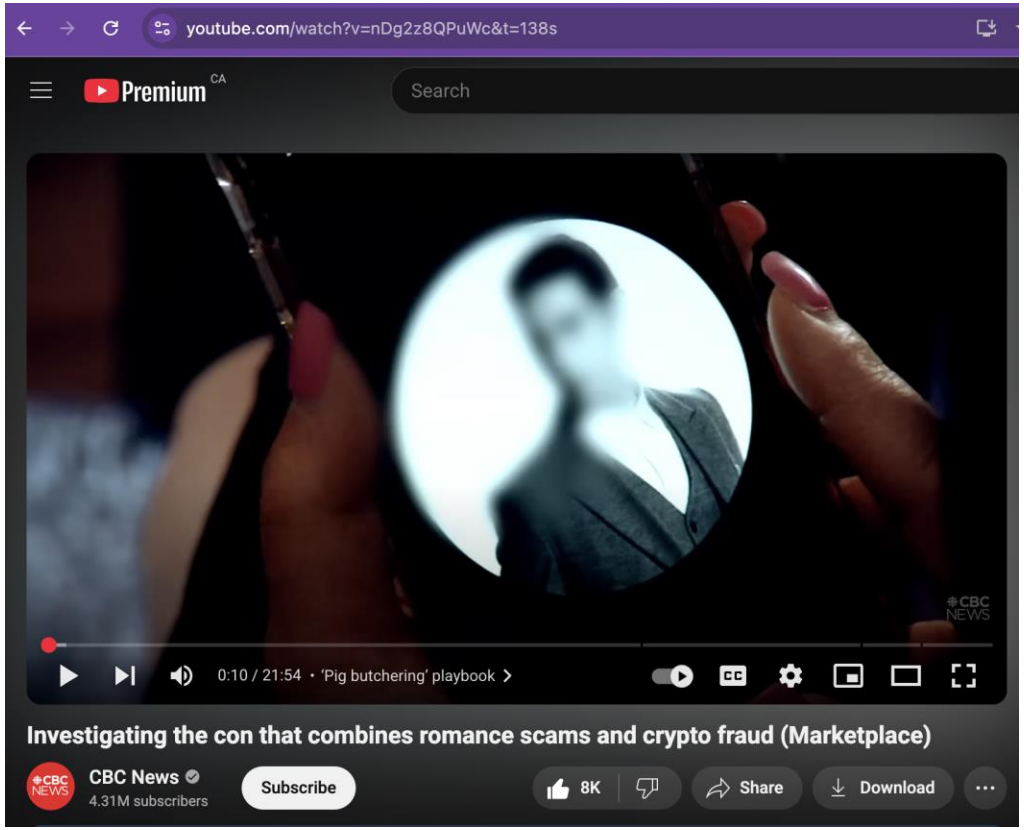
https://www.dbs.com.sg/personal/articles/nav/investing/what-is-the-blockchain-trilemma#:~:text=The%20Blockchain%20Trilemma%20refers%20to,this%20poses%20challenges%20to%20scalability.

Social issues: Engagement, Participation, and Regulatory adaptation

- Participation in decision making
- Navigate the uncertain regulation environment
- Manage public sentiment (blockchain hype, energy consumption, crypto frauds)
- Economic incentives

Social-organizational barriers in blockchain adoption (Lu, 2022):

1. *The negative stereotype about blockchain technology*
2. *Perceived complexity of blockchain*
3. *The inertia / hard to change nature of the use case industry (healthcare in this paper)*
4. *Lack of an "ecosystem" mindset*
5. *Lack of a mature Governance framework*



CLIMATE, ENERGY

Cryptocurrency's Dirty Secret: Energy Consumption

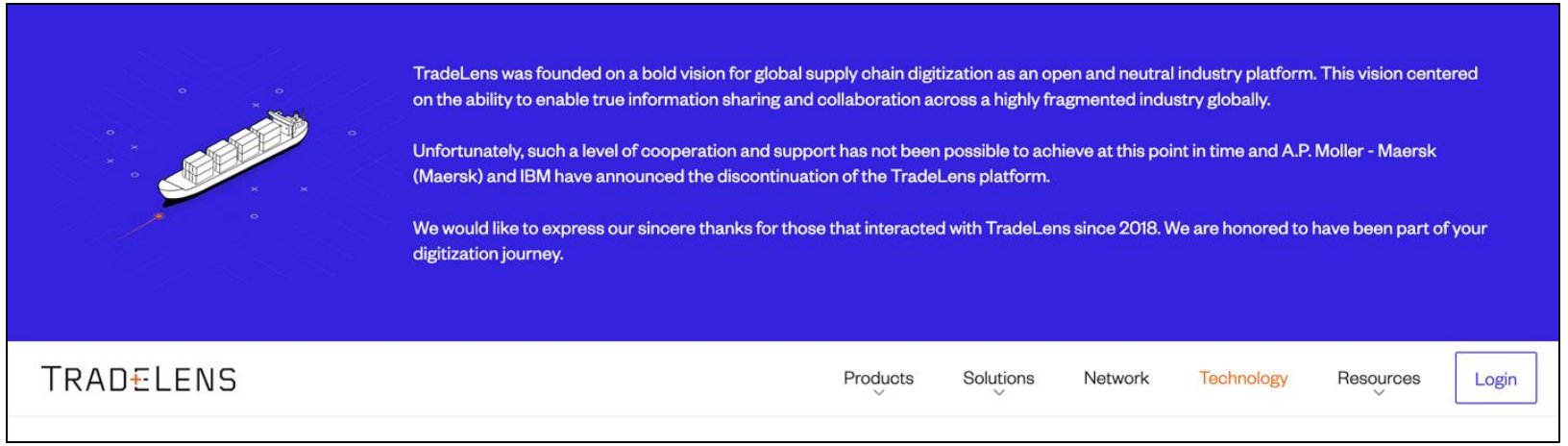
by Jeremy Hinsdale
May 4, 2022

Though skeptics may characterize cryptocurrency as "fake money," "worse than tulip bulbs," or a "greater fool" scheme, it is a very real business. The market capitalization of the almost 19,000 cryptocurrencies in circulation is currently around $1.75 trillion — about the same as the gross domestic product of Italy, the world's eighth largest economy. Even though you might not be able to buy a loaf of bread with Bitcoin at the corner store, many investors are putting a lot of legal tender money into cryptocurrencies.

But crypto has a dirty little secret that is very relevant to the real world: it uses *a lot* of energy. How much energy? Bitcoin, the world's largest cryptocurrency, currently consumes an estimated 150 terawatt-hours of electricity annually — more than the entire country of Argentina, population 45 million. Producing that energy emits some 65 megatons of carbon dioxide into the atmosphere annually — comparable to the emissions of Greece — making crypto a significant contributor to global air pollution and climate change.

Example of social-organizational challenges to blockchain: the discontinuity of TradeLens

"It turns out that building a network outside the traditional political system requires a lot of political decisions." (Vigna & Casey, 2018, p. 63)

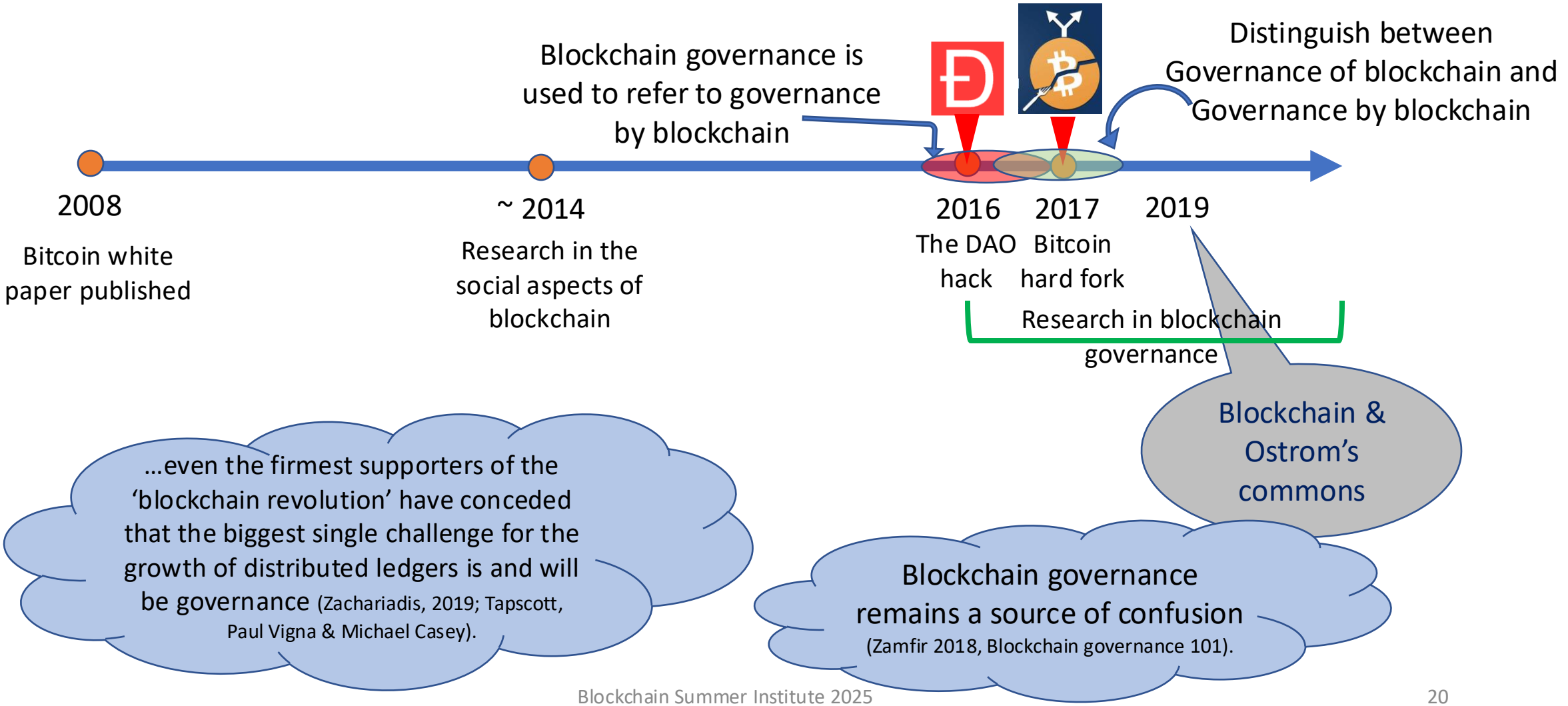


Informational issues: Immutability, Anonymity, Transparency, Privacy

- Custody, Ownership, and Right to access to data: the risk of recentralization (Lemieux et al, 2021)
  - Who keeps the data (Custody)?
  - Who owns the data (Ownership)?
  - Who controls the data (Access right)?
- Pseudonymity vs KYC (Know Your Customer)
- Compliance vs Resilience
- Transparency vs Privacy
- Blockchain vs GDPR (General Data Protection Regulation)

Navigating the complexities of Blockchain Governance

The development of blockchain governance research



What is Blockchain Governance?

- Governance of blockchain: a process of decision-making that “ultimately affect people” (called “stakeholders”).
- **How Crypto Project Changes Are Made**
- https://www.youtube.com/watch?v=tLb7TaaveXQ

- Include:
  - On-chain governance (built into the protocol, on-chain voting)
  - Off-chain governance (human coordination and decision making, improvement proposals)

Vlad Zamfir is a renowned blockchain researcher and software developer who has made significant contributions to the Ethereum network. He is widely recognized for his work on the proof-of-stake (PoS) consensus algorithm, a critical component of the Ethereum network's transition to a more energy-efficient system

Key issues to consider in Blockchain Governance

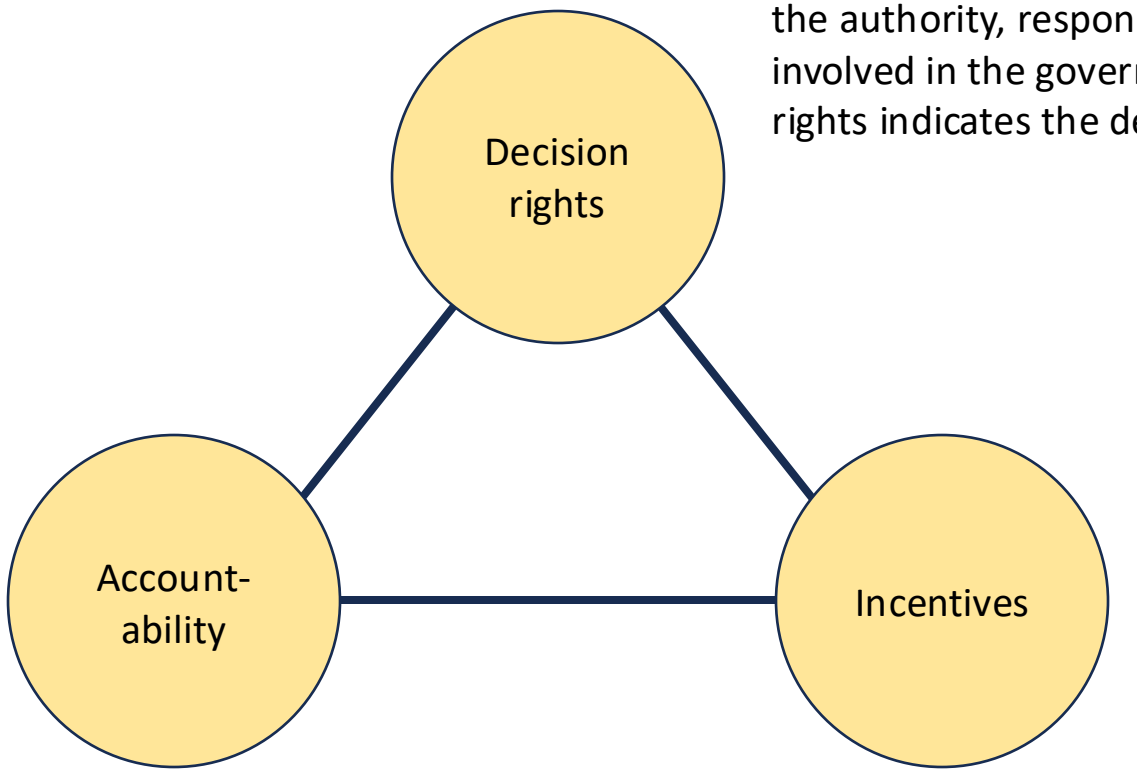
- Who decides to update the code?
- How are improvement proposals processed and approved?
- Who fund the projects?
- Who has the power and how much (core devs, miners, token holders, communities)?
- Who will make what decisions?
- How does the blockchain act as a trust (or confidence) machine? (De Filippi et al, 2020)

Activity

- Class make two teams, one go for Permissioned and one for Permissionless blockchain.
- Discuss for 10 minutes: Why governance your assigned blockchain is more difficult?
- Then debate for 5 minutes

IT governance-based model for blockchain governance

(Beck et al., 2018, p. 1022)



the authority, responsibility, and capability of the entities involved in the governing process. The allocation of decision rights indicates the decentralization of a blockchain

the right to monitor decisions and the responsibilities in addressing the consequences of those actions

the motivations that keep participants engaged with the blockchain and adjust their behaviors

Activity

- Each table choose your favorite blockchain
- •Input your information here:
- https://docs.google.com/document/d/1nHiMjCtNqZEC8IqdZlLnxSpuQ-nrB0Uif24lrppA3oc/edit?usp=sharing
- Review their governance based on Beck's (2018) three governance dimensions (10 minutes)
- Present to the class:
  - How does the blockchain structure their governance?
  - What surprises you?
  - If you had decision-making power, what would you do differently?

Rikken, Jassen, and Kwee, 2019 Blockchain Governance Framework (p.404)

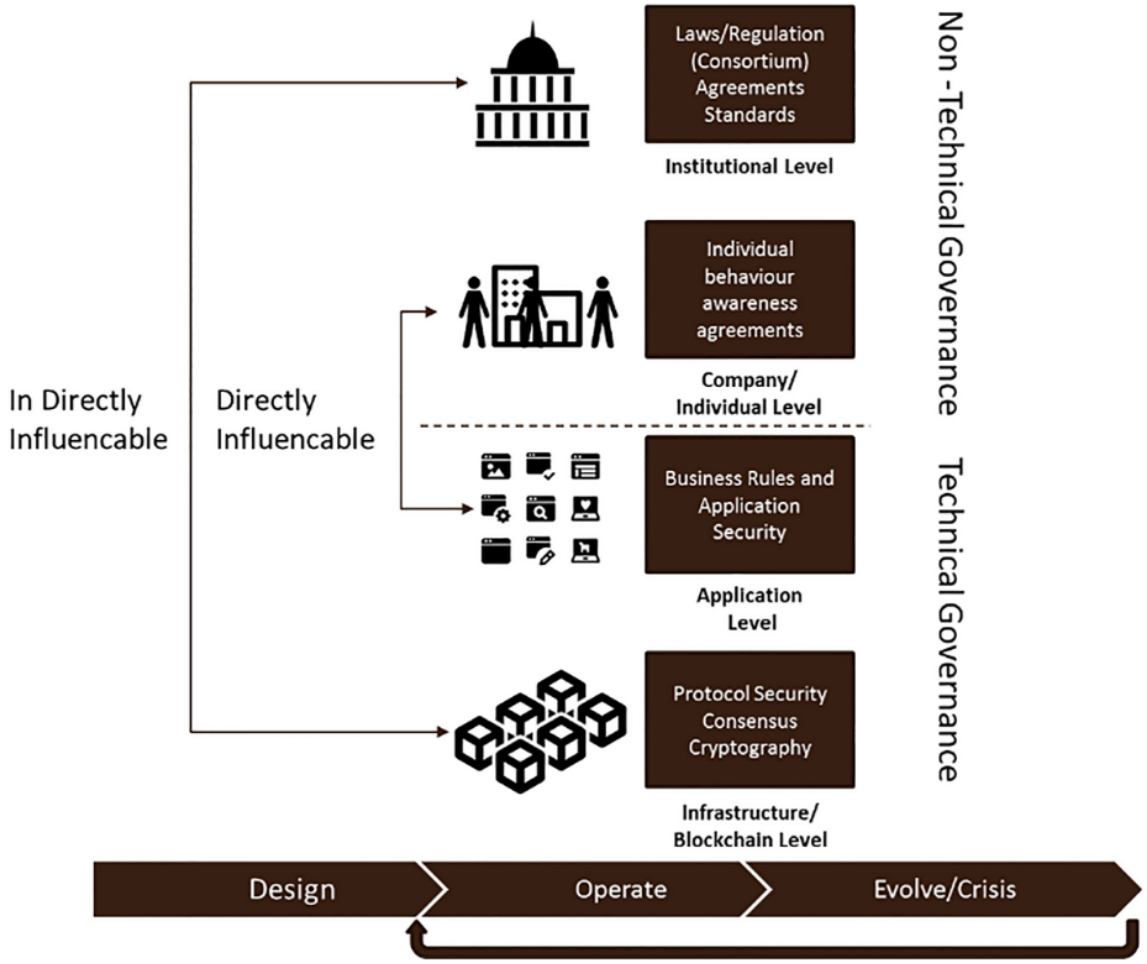


Fig. 4. Blockchain governance framework.

	Design	Operate	Evolve-crisis
Purpose	Design the solution	Daily operation (decisions and actions)	Update process
Time	Non time critical	Time restricted to rules and protocol	Time criticality
Stakeholder roles	Cooperation	Routine	Critical code updates, hard fork/soft fork

Comprehensive blockchain governance model, adapted from Tan et al. (2022, pp. 2–5)

Layer	Description	Decision types	Relevant matters
Micro	Micro-level governance pertains to the decisions of the blockchain's designers regarding the infrastructure of a blockchain-based system.	Infrastructure architecture	Public/private, blockchain protocol, system development, maintenance, and update
		Application architecture	dApps, smart contracts, oracles
		Interoperability	Standards, interoperability, measures
Meso	Meso-level governance pertains to the organizational processes in decision-making and actions.	Decision-making mechanism	On-chain/off-chain, community governance, voting, communication
		Incentive mechanism	Incentive structure, motivations for participants
		Consensus mechanism	Consensus models (Proof-of-work, proof-of-stake)
Macro	Macro-level governance focuses on institutional rules and norms.	Organization of governance	Level of decentralization, hierarchy, membership, roles
		Accountability of governance	Rules in governance, forking, dispute/conflict resolution, contract frameworks
		Control of governance	Decision rights, control systems, direction, oversight

Wrap-up

- Let’s do a quick wrap-up to reflect what we’ve discussed this morning! Please:

1. Go to Miro board: https://bit.ly/4kJA6gl
2. Use the sticker according to the color on each box and type your input there. Be short and sweet ☺
3. Let’s see how we build a team reflection!

Reference

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*** Required reading*


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