The Token Economy primer

Andy Martin, IBM

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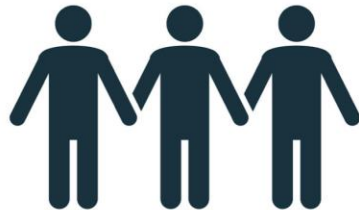# Token economy

Digital Asset

NFT Utility Value
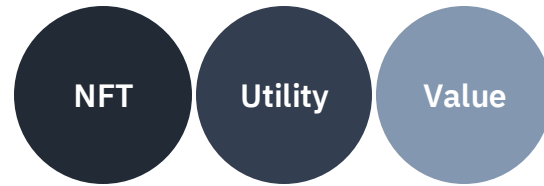
Tokenisation associates ownership, identity, governance & access rights

Smart Contract

Process codifies & automates the business model, organisation & governance for trading & use of digital assets
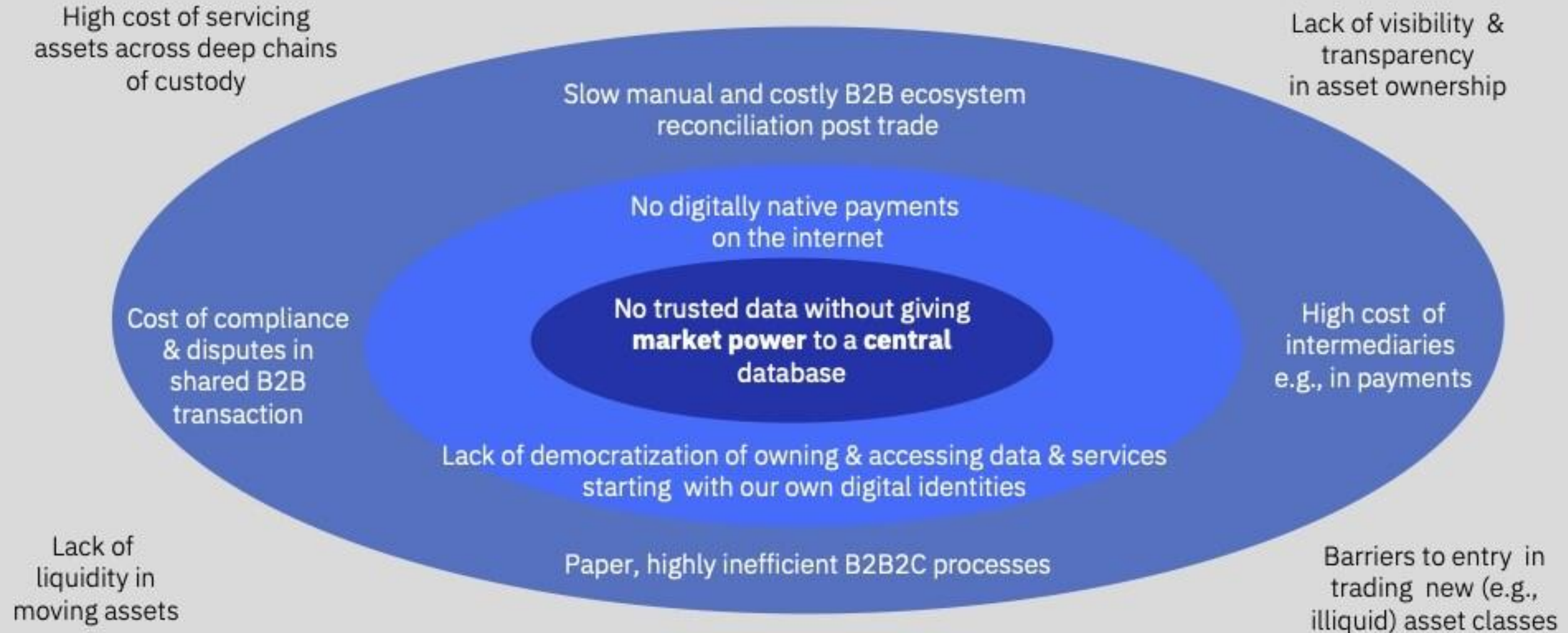
Blockchain

Shared, trusted, timestamped & distributed & decentralised source of the truth of that digital asset

Token economy – what's different?

	Old / web 2	New / web 3
Market data	Central governance & ownership	Distributed & decentralized governance & ownership
Platform power	Lock-in	Open-neutral
Identity	"Controls"	"Verifies"
Incentive	Winner takes all	Win-win-win
Liquidity	"Analogue"	"Digital"
Monetisation	Platform	Data owner, innovator & platform

Blockchain - what is the problem solved?

High cost of servicing assets across deep chains of custody

Lack of visibility & transparency in asset ownership

Slow manual and costly B2B ecosystem reconciliation post trade

No digitally native payments on the internet

No trusted data without giving market power to a central database

Cost of compliance & disputes in shared B2B transaction

High cost of intermediaries e.g., in payments

Lack of democratization of owning & accessing data & services starting with our own digital identities

Lack of liquidity in moving assets

Paper, highly inefficient B2B2C processes

Barriers to entry in trading new (e.g., illiquid) asset classes

6

Networked business value chain

Digital liquidity

DeFi Marketplace
Service layer replaces
commercial banks to create credit

Smart contract
Aggregate (small) investors

| Supply | Manufacture | Logistics | Distribute |

Smart contract
matches finance to demand

Smart contract
releases finance from escrow

Smart contract
Pays investor
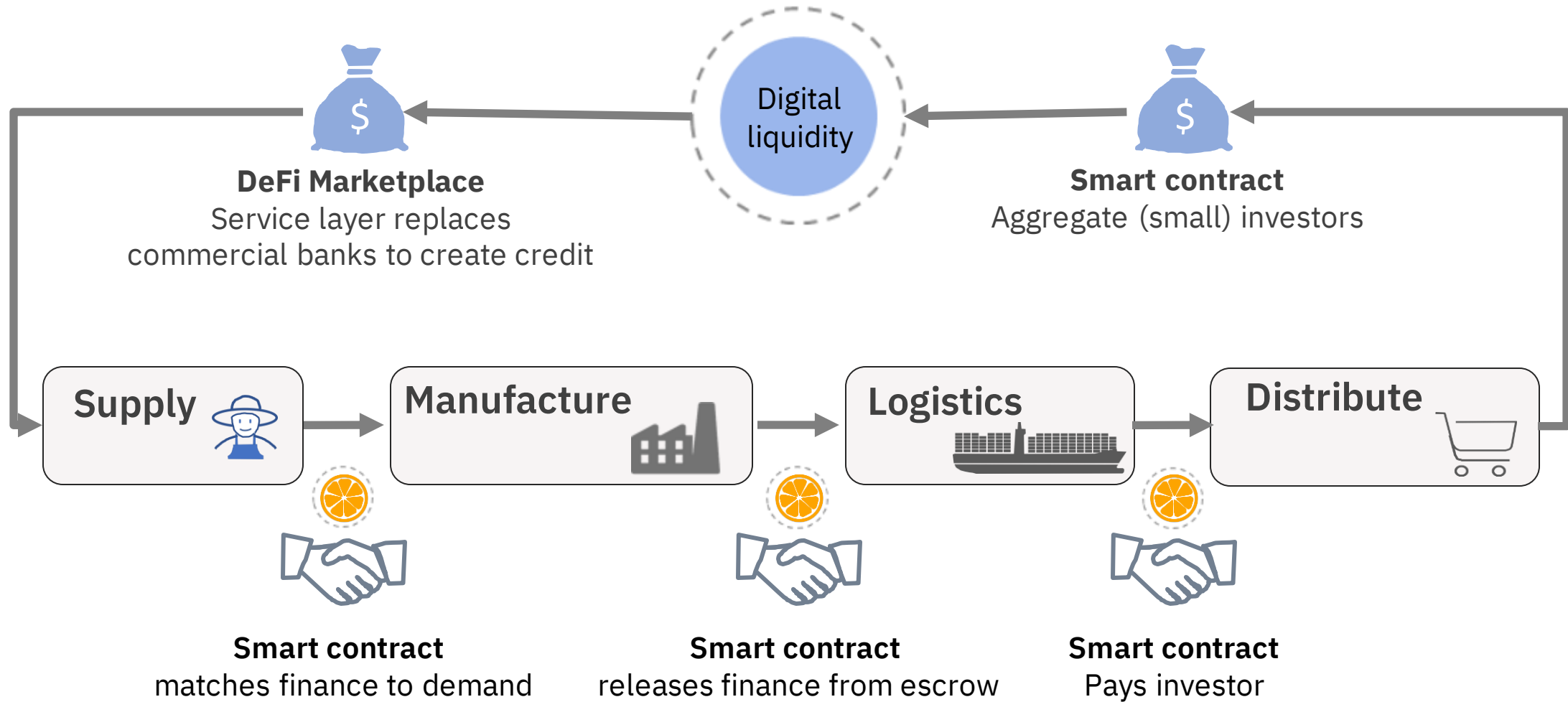
Key   Trade Finance & ST debt   Smart contract   Token, CBDC or Stable Coin or digital asset

Source, Andy Martin, IBM

web3 - Go to Market as a Network / DAO

HEALTH TOKEN

DeFi Marketplace
Service layer replaces
commercial banks to create credit

Smart contract
Aggregate (small) investors
Fiat on/off ramp

Research

Diagnose & monitor

Clinical trial

Distribution / Wellness

Data value

Data value

Service fees

App
Join Clinical Trial

App
Buy / Sell Data

App
Buy Service

Key Tokens

Source, Andy Martin, IBM
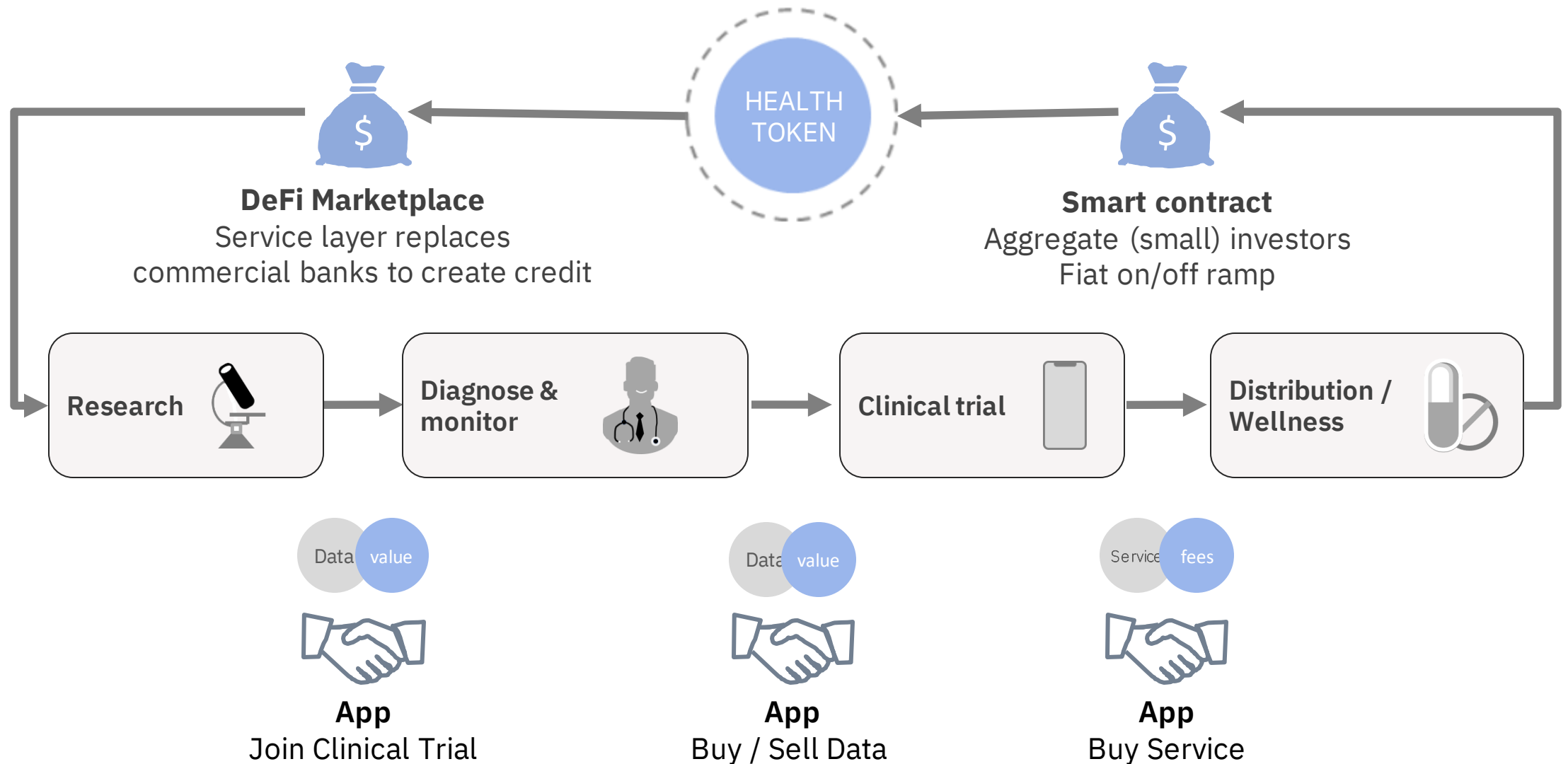
web3 - business model innovation

	Innovator	Platform	Governance
Go to market • Network effects	• As a network	• Network, market or industry	• DAO Zone of sovereignty
Products • new revenue • synergies	• Buy & sell data • App Store fees	• Fees for activity & foundation services (composability)	• Store value in the market token(s)
Tokenomics • Incentives / DeFi	• Win-win-win • Behaviours	• New funding model	• New funding / reserve model

3 Blockchain governance layers

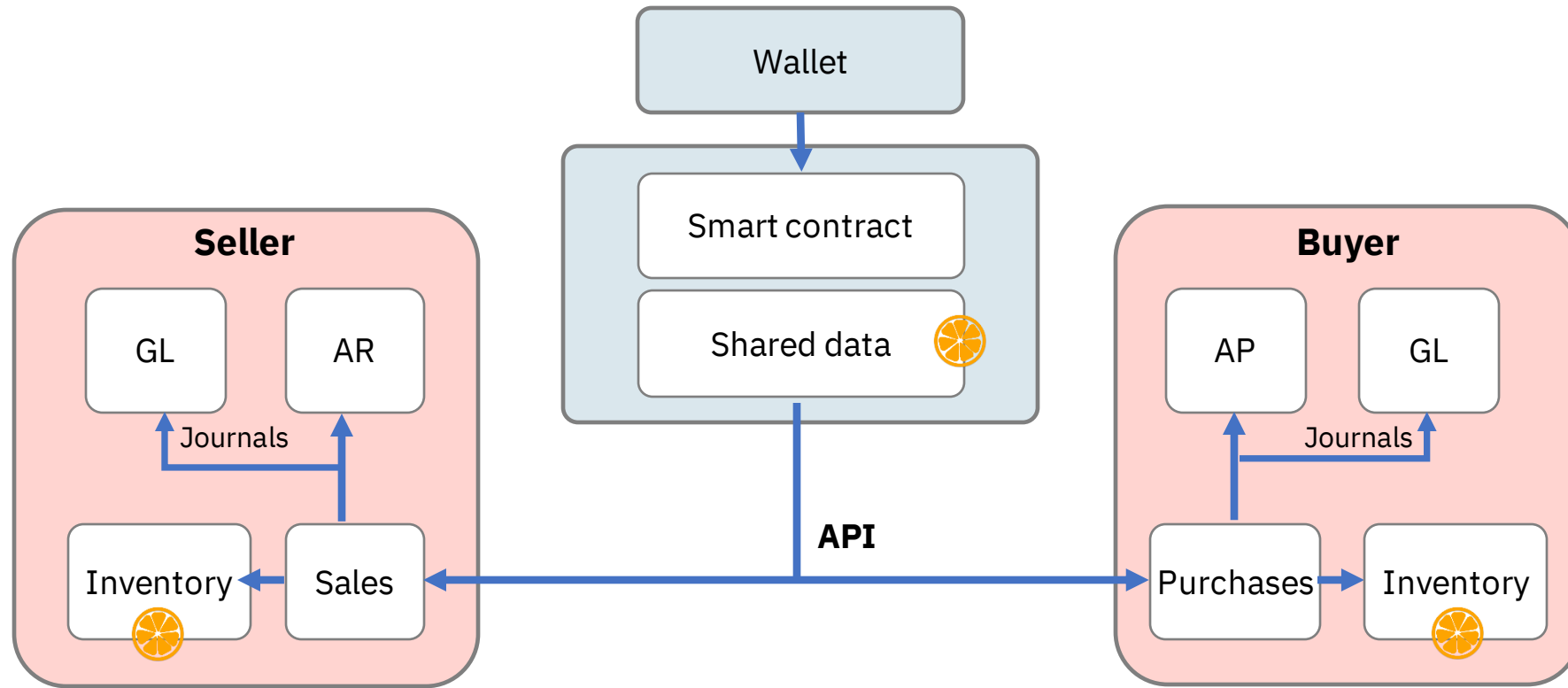| Wallet |
| :---: |
| Apps |
| DAO |
| Ledgers |

Wallet – Like the glass on an iPhone. It is the user interface layer where ownership of 100's of tokens can be accessed, and atomic swaps initiated

Apps – Like individual app. on the App Store. Many different businesses can be built on each network. App logic governs trading of tokens and are used to incentivise behaviour and denote ownership inside the app.

DAO – Like the Apple App Store before you add any apps. This is the B2B2C value chain of economic actors ("the community") who don't need to trust each other assembled to support complex tokens. This is a marketplace and has its own marketplace token that is used for payments but also governance by way of voting and access and staking rights and duties and critically as an incentive for better collective outcomes.

Internet of ledgers – Like the operating system for the network such as IOS for the Apple ecosystem. It governs activity such as atomic swaps of tokens in the network. Tokens are used to pay those who maintain the infrastructure by providing bandwidth and storage and to order and validate the ledgers

Quadruple entry system

Seller

GL   AR

Journals

Inventory   Sales

Wallet

Smart contract

Shared data

API

Buyer

AP   GL

Journals

Purchases   Inventory

Key   Shared process   Private process

Source, Andy Martin, IBM

Token economy

Key — Artificial intelligence — Internet of things

Source, Andy Martin, IBM
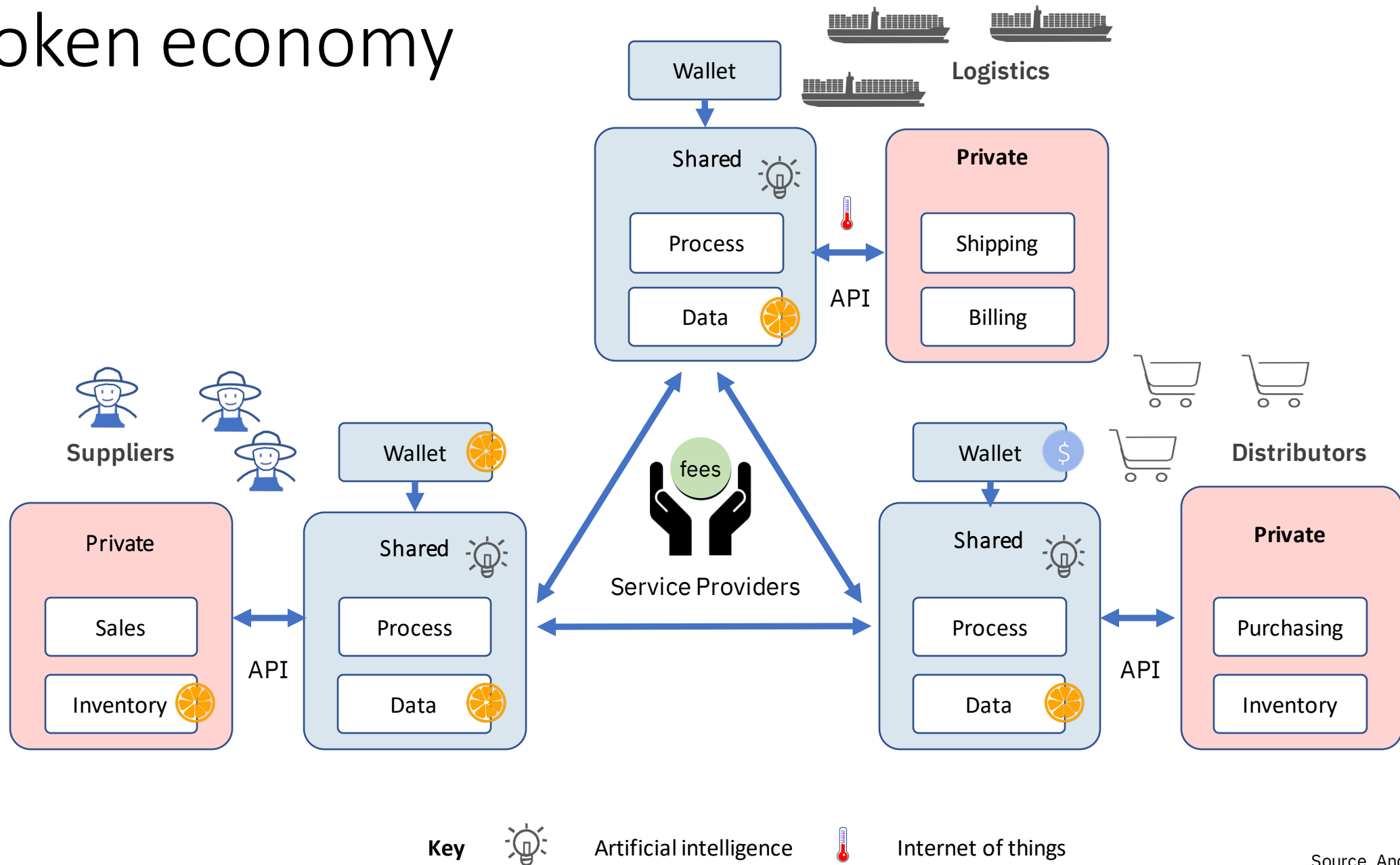
Governance model levels

					Governance
Wallet	SSI	Security / NFT	Utility	Value	Ownership
Apps.	•Patient ID •Clinical trials •Supply chain	•Global trade •Trade finance •Provenance		•Trading •Regulation •Payments	Business models
Business networks	Health	Supply chain		Finance	DAO
Internet of ledgers					Platform X-chain
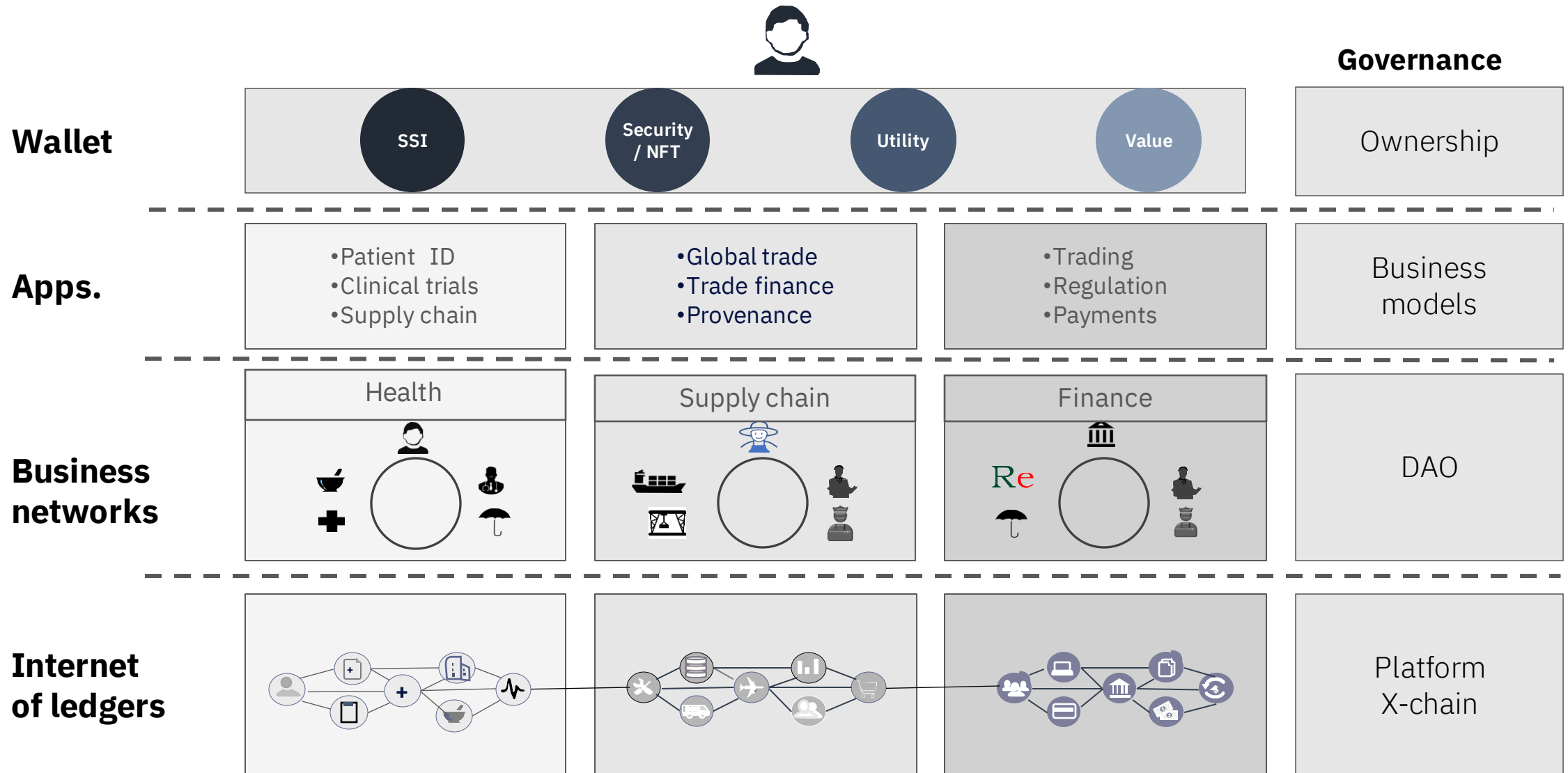
Business model parts at each level

Incentive
Behaviours

Commercial
Co-opetition

Govern
Decentralise

Benefits   Monetise   Democracy   Providers

Trade, trust & ownership

Funding

Openness

Key: Token liquidity
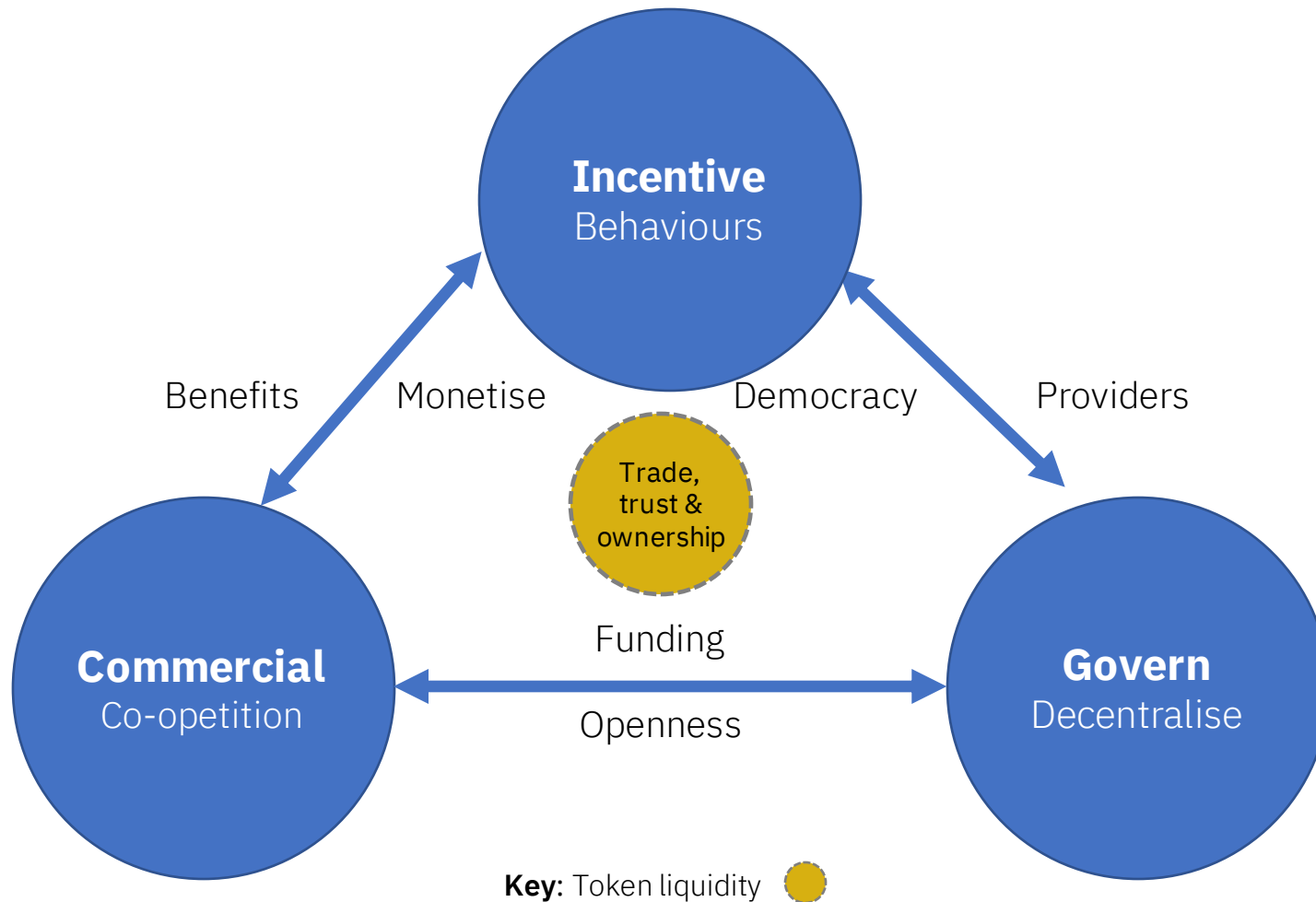
Business model
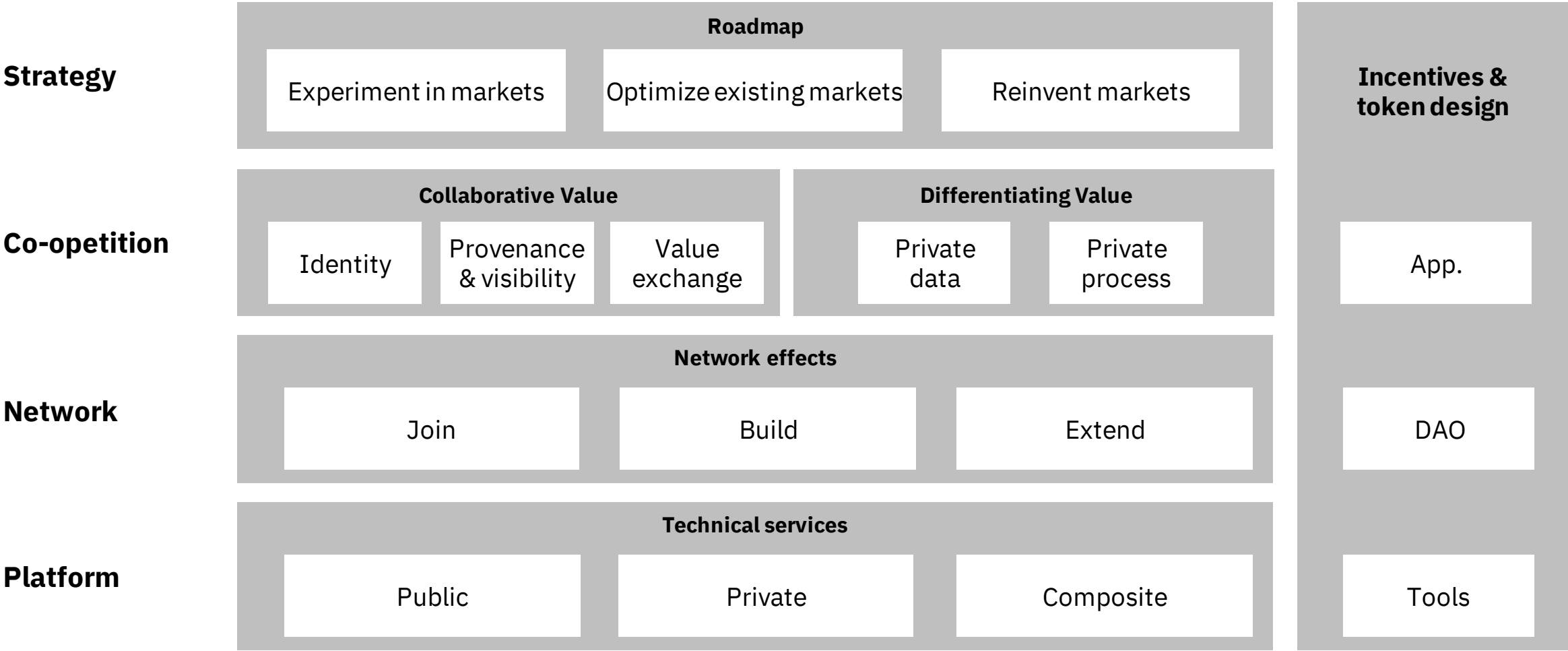
- **Economic model**, incentives, disincentives & behaviour changes
- **Governance model**, how decisions are made onchain via tokens & voting or offchain & guiding principles of fair, democratic & open
- **Commercial model**, of monetisation & fees

Source, Andy Martin, IBM

Token economy – where to start?

	Identity	Provenance & visibility	Ecosystem reconciliation	Tokenisation	Value exchange
Automotive	• Vehicle ID	• Vehicle lifecycle • Supply chain visibility	• Vehicle leasing	• Car eWallet	• Financial settlements
Banking	• KYC/KYT	• Collateral mgt.	• Post trade	• Issue, custody & service	• Payments
Energy & Utilities	• Usage on a singular entity	• Cybersecurity device provenance	• Grid balancing	• Renewable energy credits	• Peer to peer trading
Telco	• Mobile security	• Supply chain mgt.	• Roaming, fraud & overage mgt.	• Digital services enabler	• Platform services marketplace
Distribution/Consumer	• KYB / KYS / SSI	• Anti-counterfeit	• Disputes mgt. • Post trade	• Engagement e.g., recycling & loyalty	• Circular & sustainable economy
Travel & transport	• Passenger	• Baggage handling	• Multimodal tickets	• Loyalty X-industry	• Travel marketplace

Token economy – a strategic framework

	Roadmap		
Strategy	Experiment in markets	Optimize existing markets	Reinvent markets

Incentives & token design

	Collaborative Value			Differentiating Value	
Co-opetition	Identity	Provenance & visibility	Value exchange	Private data	Private process

App.

	Network effects		
Network	Join	Build	Extend

DAO

	Technical services		
Platform	Public	Private	Composite

Tools

5 Laws of the Token Economy business model design

- **Law 1:** Value by buying and selling of data tokenised into digital assets

- **Law 2:** Networked businesses' token stores this new value created by DAO members' innovation

- **Law 3:** Total value created increases through optimisation, network effects & synergies

- **Law 4:** Behaviours governed by the token are at the level of the App., DAO & ledger

- **Law 5:** Token value designed to stay inside DAO, but may be converted to fiat

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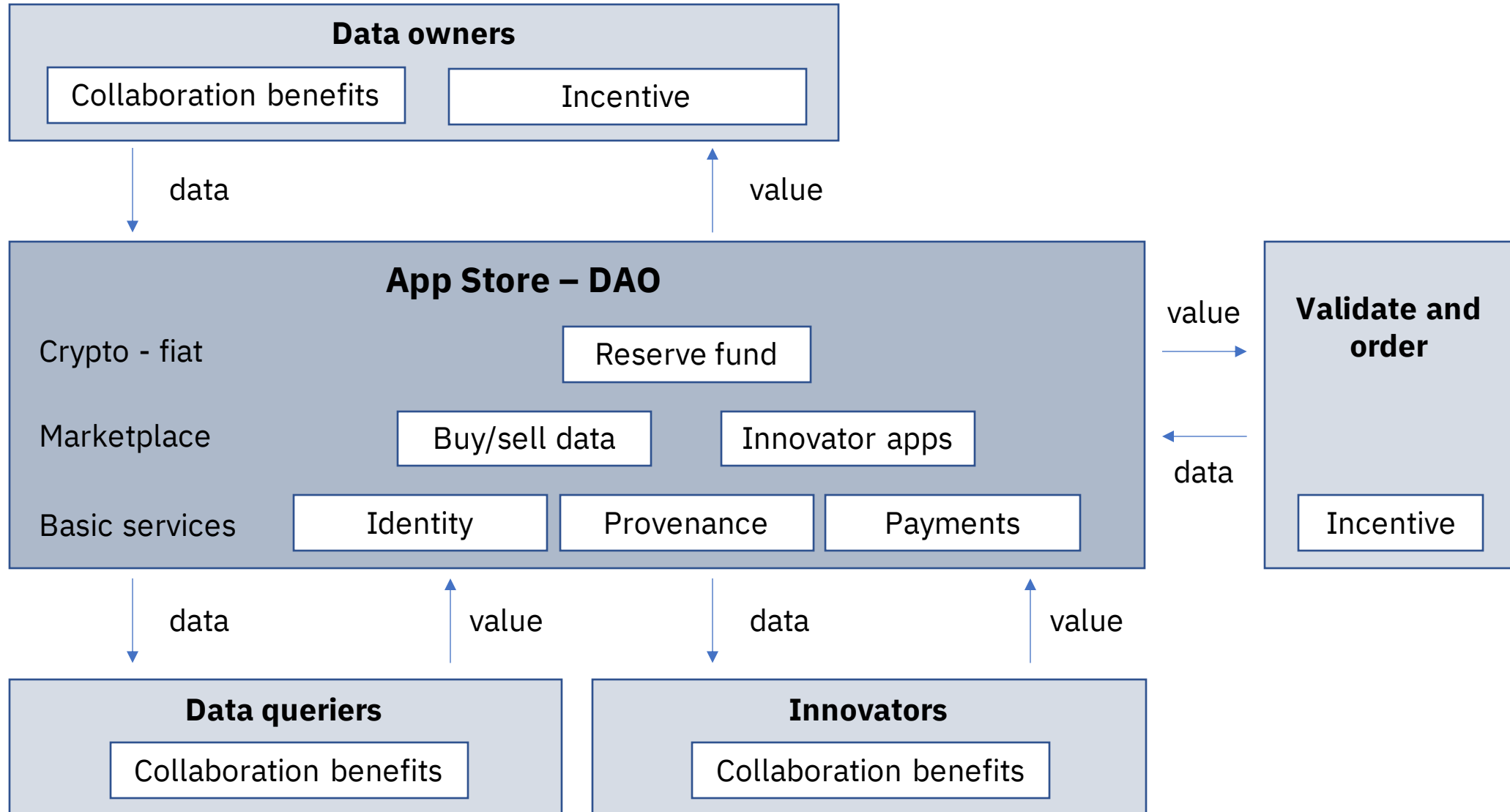- **Law 5:** Token value designed to stay inside DAO, but may be converted to fiat

Law 1: Value by buying and selling of data tokenised into digital assets

Data owners

| Collaboration benefits | Incentive |

↓ data   ↑ value

App Store – DAO

Crypto - fiat   Reserve fund   value →   **Validate and order**

Marketplace   Buy/sell data   Innovator apps   ← data

Basic services   Identity   Provenance   Payments   Incentive

↓ data   ↑ value   ↓ data   ↑ value

Data queriers

Collaboration benefits

Innovators

Collaboration benefits

Law 2: Networked businesses' token stores this new value created by DAO members' innovation

Market place TOKEN

DeFi Marketplace
Service layer replaces commercial banks to create credit

Smart contract
Aggregate (small) investors

Supply

Manufacture

Logistics

Distribute

Smart contract
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Smart contract
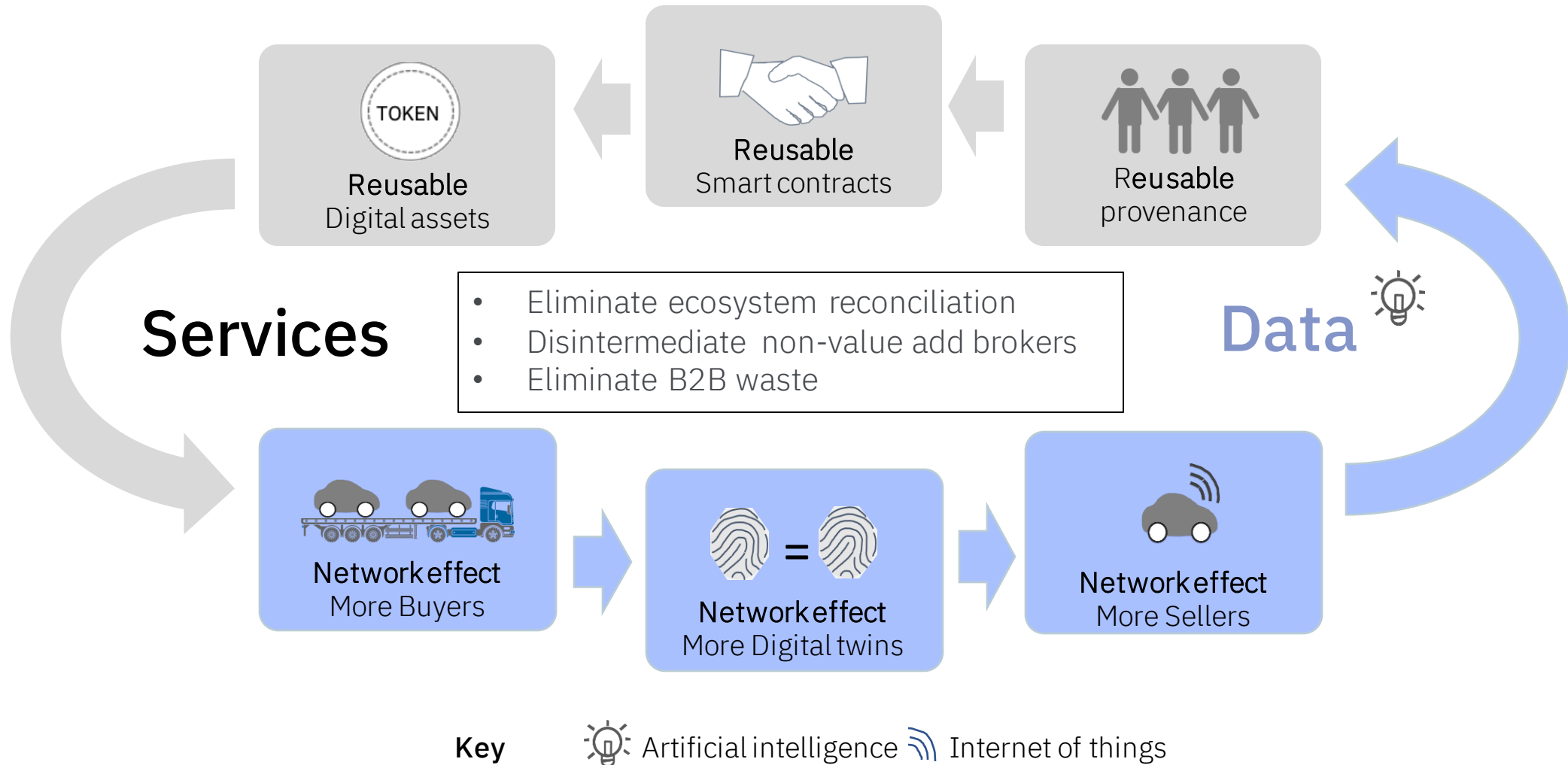Pays investor

Key   Trade Finance & ST debt   Smart contract   Marketplace Token, or tokenised asset
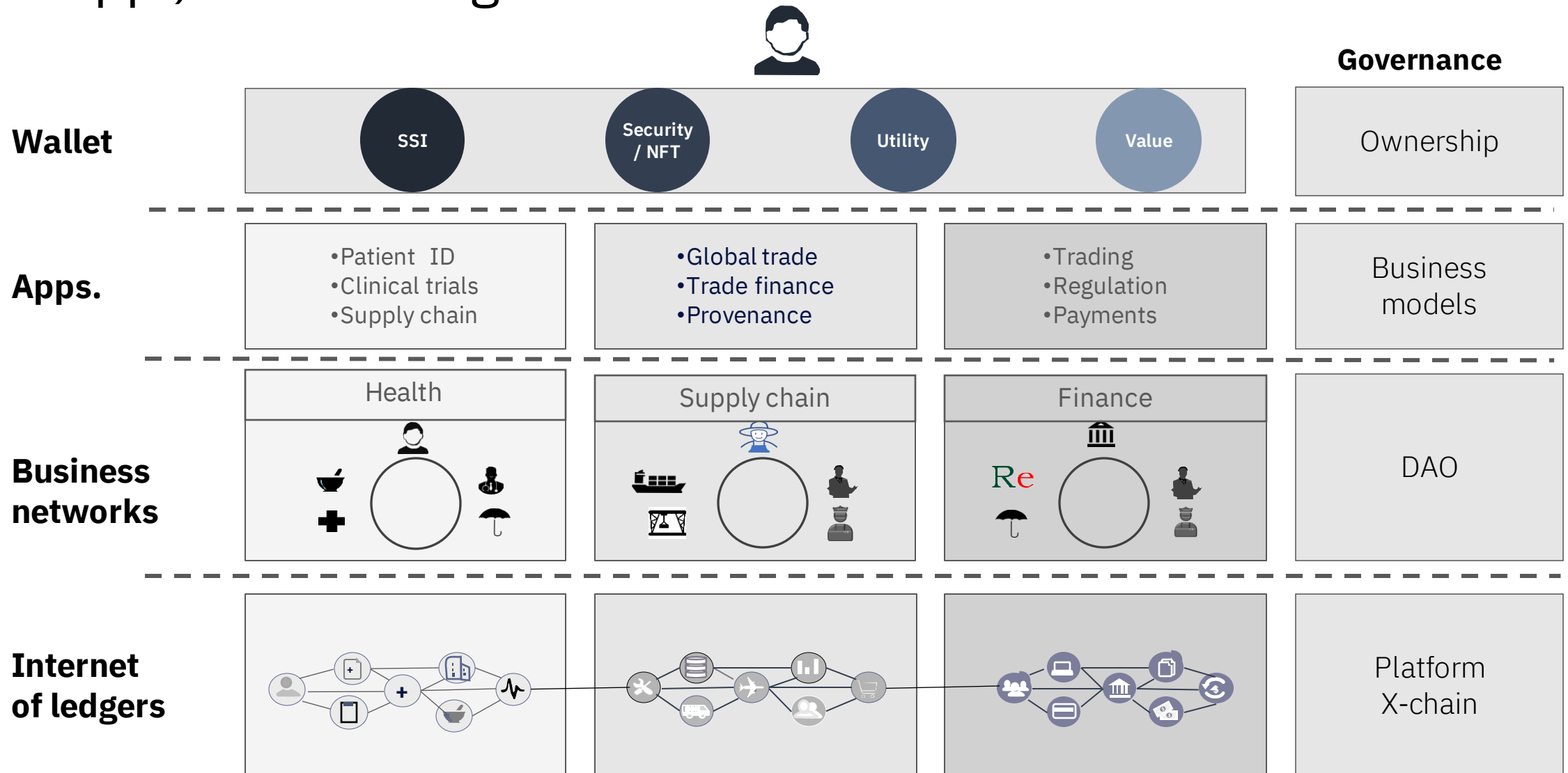
Law 3: Total value created increases through optimisation, network effects & synergies

Reusable Digital assets

TOKEN

Reusable Smart contracts

Reusable provenance

Services

- Eliminate ecosystem reconciliation
- Disintermediate non-value add brokers
- Eliminate B2B waste

Data

Network effect More Buyers

Network effect More Digital twins

=

Network effect More Sellers

Key Artificial intelligence Internet of things

Law 4: Behaviours governed by the token are at the level of the App., DAO & ledger

Governance

Wallet	SSI • Security / NFT • Utility • Value	Ownership
Apps.	•Patient ID •Clinical trials •Supply chain •Global trade •Trade finance •Provenance •Trading •Regulation •Payments	Business models
Business networks	Health • Supply chain • Finance	DAO
Internet of ledgers		Platform X-chain

Law 5: Token value designed to stay inside DAO, but may be converted to fiat (1 of 2)

Validate
& order

| | | Fee† |

Innov-
ators

Stake† → Access† → DApp fee†

Data
queries

Access†

Data
owners

Fees share†

DAO
entity

Issue†   Fee share†   Fee share†

Collateral → Tokens & Reserve fund → Redeem

Key   † All fee, access and stake value settlement in (utility) tokens   Inflow | Outflow

Source, Andy Martin, IBM

Law 5: Token value designed to stay inside DAO, but may be converted to fiat (2 of 2)

	DAO entity	Data owners	Data queries	Innov-ators	Validate & order
Tokens & Reserve fund — Inflow	Issue †	-	-	-	-
Tokens & Reserve fund — Outflow	Redeem †	-	-	-	-
Apps — Inflow	Fee share †	-	-	DApp Fee †	-
Apps — Outflow	-	-	-	Stake †	-
Data — Inflow	Fee share †	Fee share †	-	-	Fee †
Data — Outflow	-	-	Access †	Access †	-

Value flow
- Tokens & Reserve fund
  - Inflow
  - Outflow
- Apps
  - Inflow
  - Outflow
- Data
  - Inflow
  - Outflow

† All fee, access and stake value settlement in (utility) tokens

References

- Martin, Andy, The Token Economy (October 16, 2021). Available at SSRN: https://ssrn.com/abstract=3972111 or http://dx.doi.org/10.2139/ssrn.3972111

- Martin, Andy, 5 Laws of Tokenomics (January 26, 2022). Available at SSRN: https://ssrn.com/abstract=4018141 or http://dx.doi.org/10.2139/ssrn.4018141