EUROPEAN CENTRAL BANK
EUROSYSTEM

Measuring the economy

What future in the digital age?

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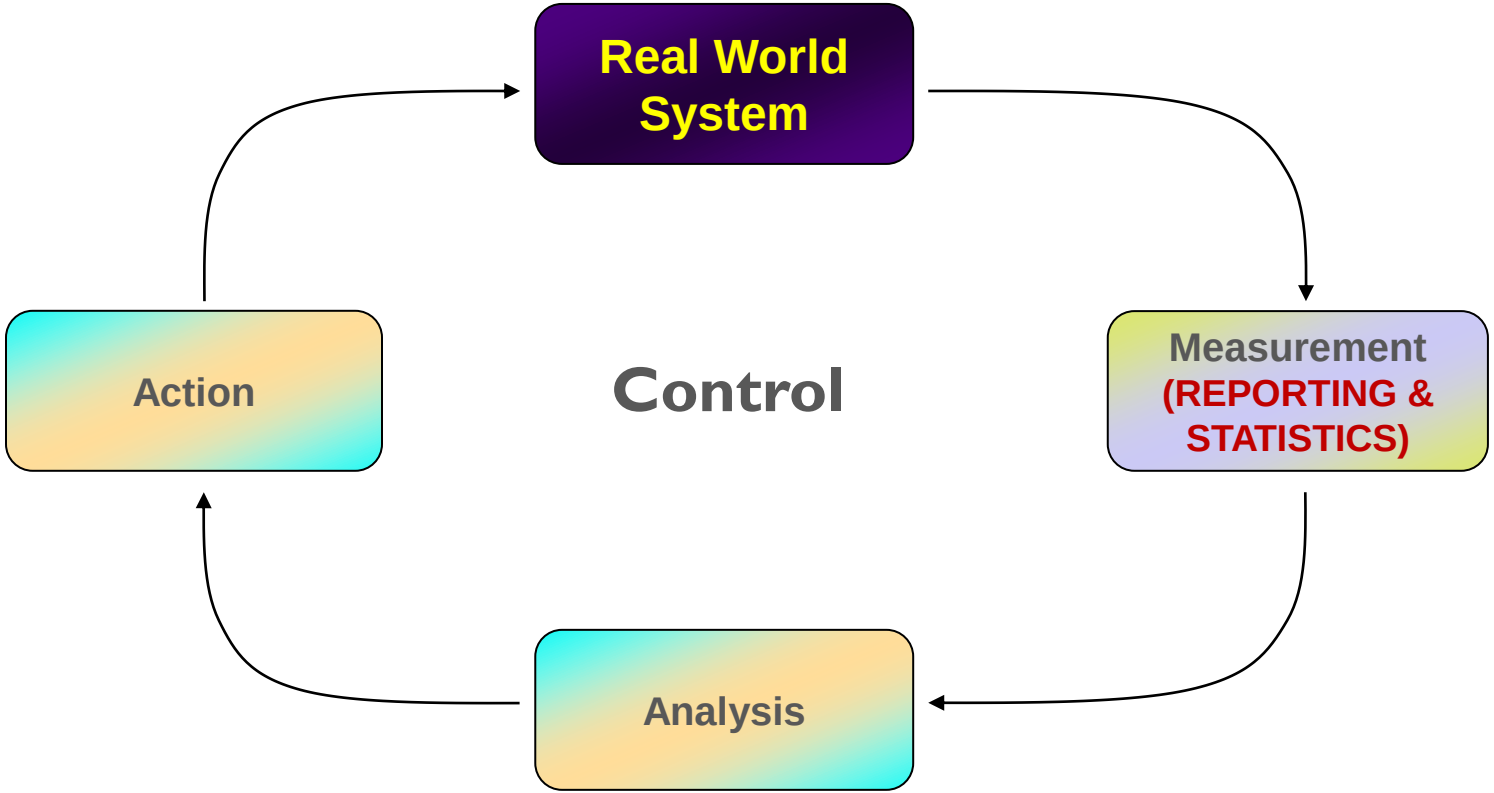
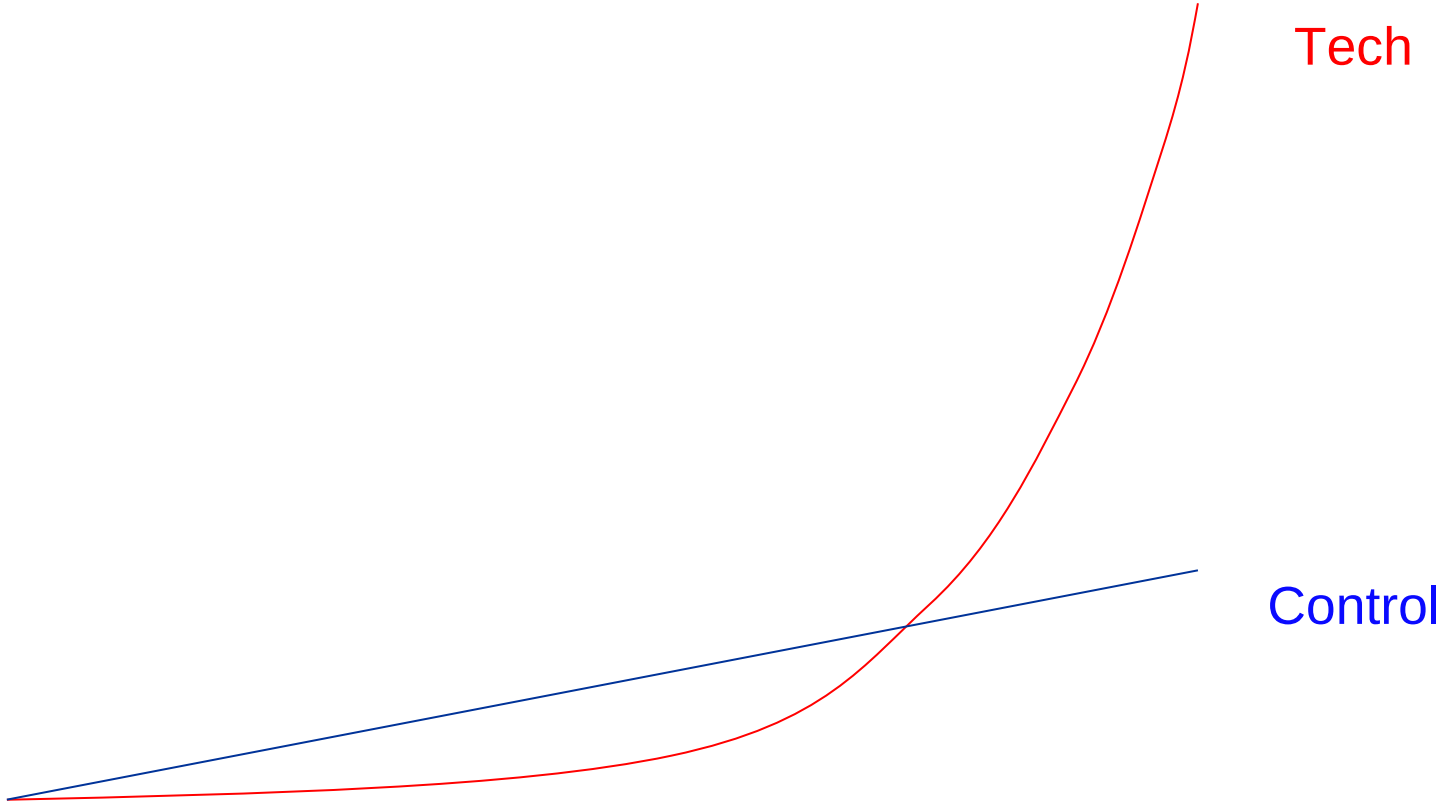
The Control Cycle



Where constraints on control come from: the Exponential Gap

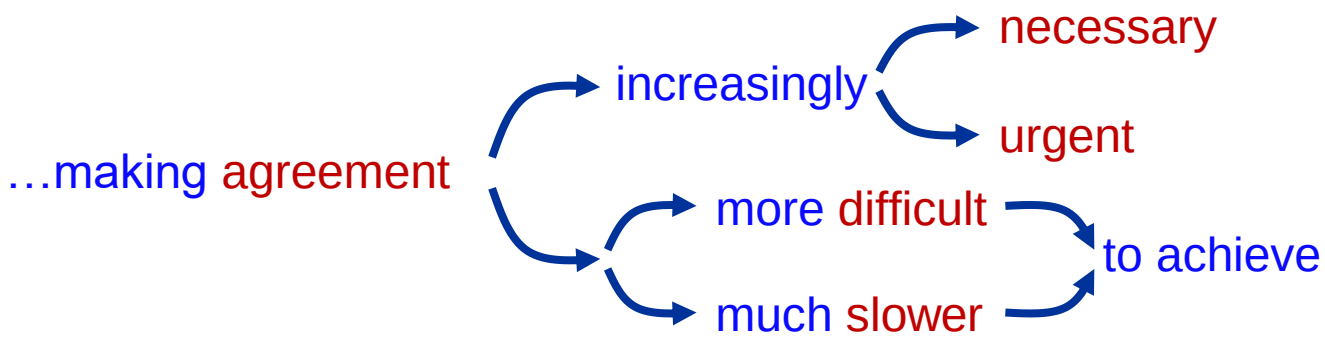


see “Exponential” by Azeem Azhar, 2021

Control – on the wrong side of the exponential gap?

As tech makes the smallest relevant system for control “global, real-time”,

social complexity increases, too: more, and more diverse people must agree…

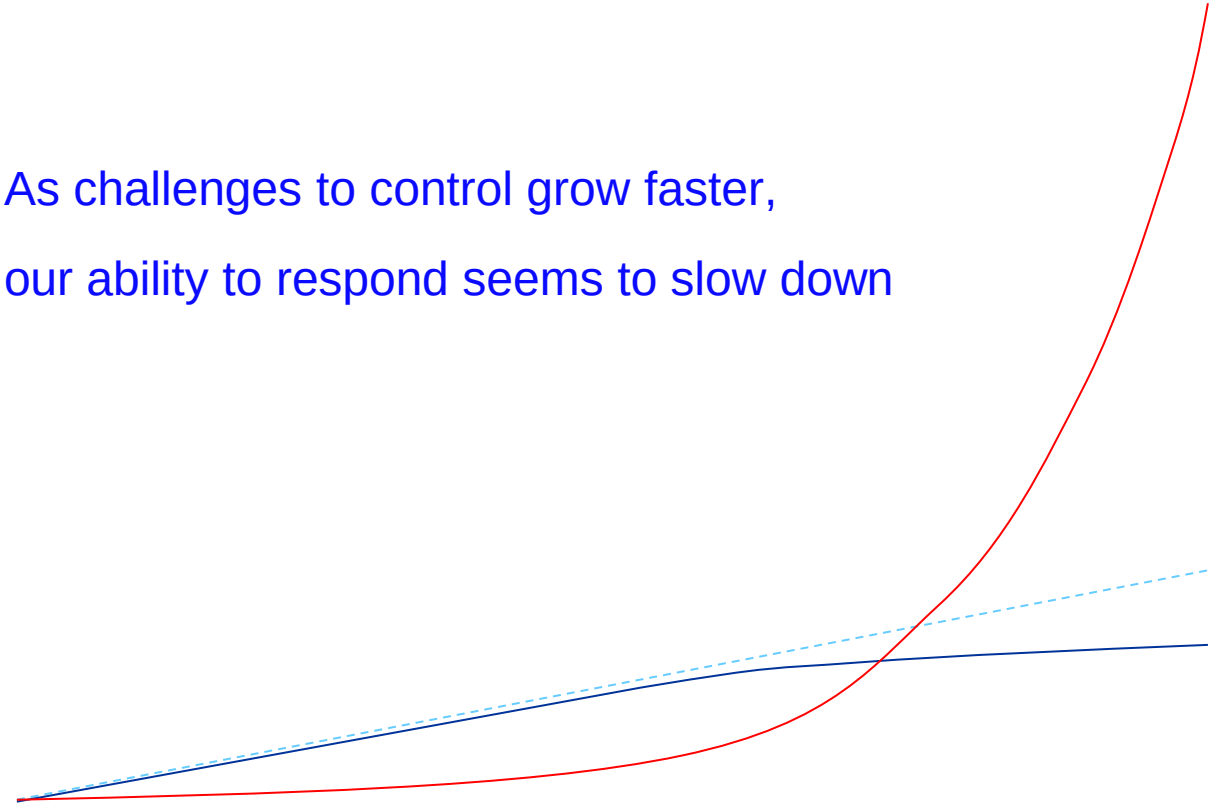


Even “worse” for standards: rigorous, global discipline will be a must for “basics”

…and it gets worse: the Exponential Gap, revisited

As challenges to control grow faster,

our ability to respond seems to slow down



Two missions for stability: Control – fast and slow

Control, fast

(survive turbulence)

ready, alert, fast, precise and fit survives

Control, slow

(stay clear of turbulence)

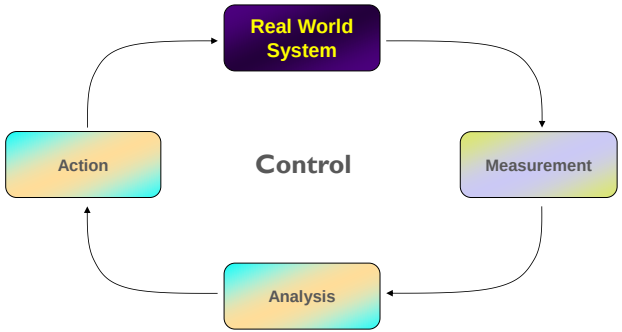
observation, sensitivity, foresight, wisdom and courage -

stay ready, anticipate, regulate wisely as the system changes

“gradually, then suddenly”

Ernest Hemingway, The Sun Also Rises, 1926

What is needed for staying in control, slow or fast?



can our current ways
deliver to the specifications
imposed by the scenarios?

if not, *what design could?*

measurement – analysis – action should
match the *scale*, *speed* and *shape*
of relevant system and events

possible scenarios we could face:

relevant system:	*global*
speed:	*instant global shock*
shape of events:	*complex & fast*

if control cannot be faster than events,
anticipation and *avoidance* are options

Specifications for Effective Measurement: what will it take to achieve them?

effective measurement will have to be *global, real-time, nimble*

Slow data can be in stock, but

"fast" and "ad hoc" data needs a

fully automated supply chain

from operations to regulators

data must be standardised

across all relevant operational

systems, worldwide

…yet the reporting supply chain *can't go* "global, real-time, nimble"

Challenge
for
systemic design

Systemic structural mismatch at a critical interface

a regulatory landscape
that maps
political geography

fragmented
along
borders and sectors

interface

a global system,

integrated by technology,

tightly coupled

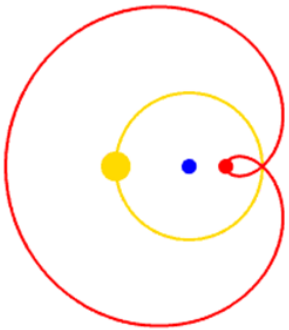
both are here to stay

we must revisit the design of the interface

blue sky

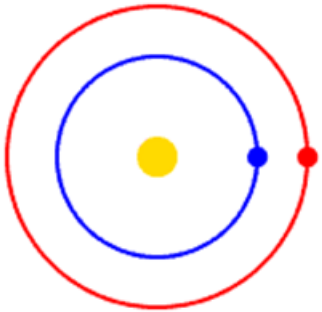
Paradigm shift: adopting a new way of viewing the world, a new vision

- A new way of viewing the world can change everything we see
- Shared, it structures and aligns our perceptions, shapes our joint action



The solar system
heliocentric (right)
vs.
Geocentric (left)

In red: orbit of Mars

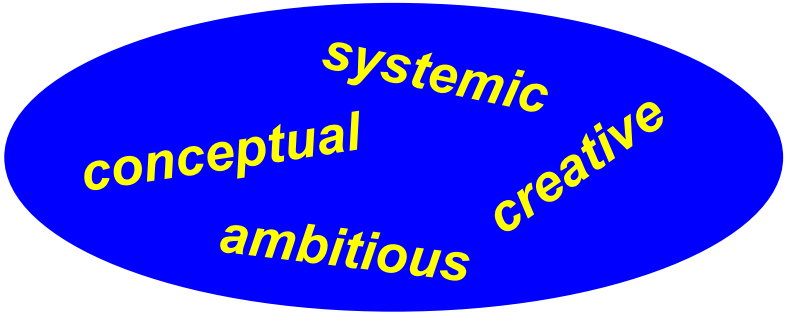


- "*All models are wrong; some models are useful*" George E.P. Box, statistician
- "*It is the theory that decides what we can observe*" Albert Einstein
- "*Combining visions gives us more possibilities*" Hans Poser, philosopher

Source http://images.google.de/imgres?imgurl=https%3A%2F%2Fupload.wikimedia.org%2Fwikipedia%2Fcommons%2Fe%2Fea%2FApparent_retrograde_motion.gif&imgrefurl=https%3A%2F%2Fen.wikipedia.org%2Fwiki%2FCopernican_Revolution&h=256&w=512&tbnid=d-2Q8WwFkk4YVM%3A&docid=_D5z93ryjK14lM&ei=YJsIWLOZBqalgAaf4KuwAg&tbm=isch&iact=rc&uact=3&dur=1353&page=0&start=0&ndsp=28&ved=0ahUKEwizydymlenPAhUmBMAKHR_wCiYQMwg8KBgwGA&bih=773&biw=1536

Accept and explicitly face the change we see coming

Think big – think design



Keep filters (*realistic, pragmatic, feasible*) for later at first

Think back from systemic design:

- migration paths for evolution
- specific action, upward compatible

A new paradigm for measurement ?

measurement sustainably effective in the tech age
seems conceptually feasible if

operations AND measurement use the SAME data

(at least for the fast parts of the system*)

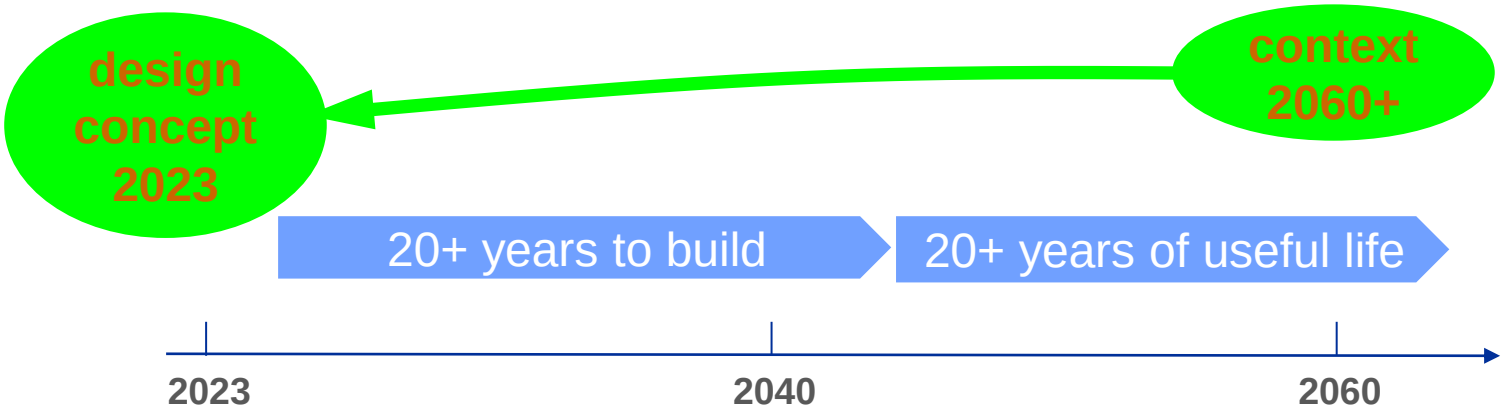
Make the system measurable !

* though we might find that more than just “fast data” must be included for “fast data” to work

consideration of **“invariants”** and **“tech 2060 = tech 2020 x 10n”**

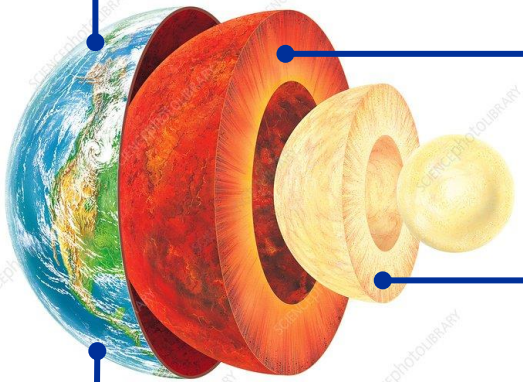
gives a solid enough frame for thinking conceptual systemic design,

also for **data infrastructure** sustainable in the **digital age**



Conceptual foundation: a four-layer model of the economic system

The human layer, where the “economic game” is played among people

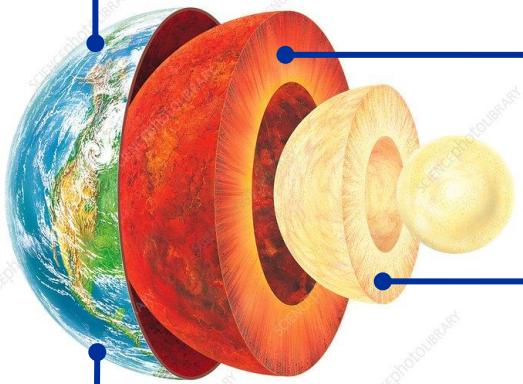


The contract layer, or network of contracts

The technology layer, where contracts and transactions are stored, executed, processed

The natural environment layer where we take, add, change things, and which can (and does) react to our doing, locally and globally

Conceptual foundation: a four-layer model of the economic system



The human layer, where the “economic … ing people

fragmented,
slow acting,
slow-changing

The contract layer, or network of contracts

The technology layer, wh… transactions are stored … ced

globally integrated,
tightly coupled,
fast-changing

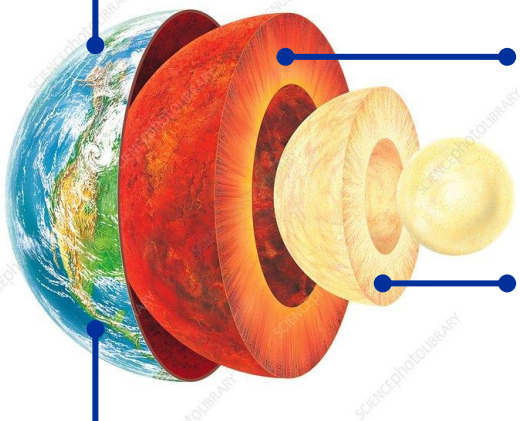
The natural environment layer where we ta… things, and which can (and does) react to our d… globally

requires attention,
requires global scale

Conceptual foundation: a four-layer model of the economic system

Background slide

The human layer, where the “economic game” between actors is played, transactions, prices, terms and agreements are negotiated, work is done, goods and services produced, exchanged and consumed.



The contract layer, where agreements among people are recorded as contracts, validated by the law of a sovereign, executed, and judged when disputed by parties and institutions. This layer is the actual technical substance of the economy.

The technology layer, where information is recorded and managed by connected machines and people who fill technical roles which machines cannot perform (yet). This layer sees data recorded, processed and generated, for operations and measurement. It determines whether the human and contract layer are observable by supervisors and businesses, at the required speed, scale and quality.

This model can be made complete with a “natural environment layer” as the system that will carry (and be modified by) the human activities we drive and organise through the human layer (economic game), the layer of contracts and the technology layer.

This model shows how the technological revolution impacts the system, layer by layer.
A system-level model can also inspire us to imagine sustainable, architectural / conceptual system design.
That can guide the search for possible migration paths and practically feasible, upward compatible first steps on the way.

Inside the complex system, a technical skeleton: a

network of contracts

that connects a

global population of parties

with each object anchored in a sovereign's law.
See the problems that way, new solutions appear

The network of contracts: a graph, made of

nodes and edges, each a **legally enshrined fact**

those invariants can be

registered, identified, computed on

in shared infrastructures that serve operations, measurement, simulation and analysis for effective control of systemic stability, while making operations more efficient an op. risk lower for all.

The LEI: a possible first step - it could be both a test-bed and a showcase

Making the **Global LEI System** a shared, global, public-good, digital infrastructure?

- A business model that feeds the LEI in bulk from official sources of identity
  - zero fee for registrants, hence no more barrier to
  - universal coverage, and automatic
  - real-time accuracy
- Legislation that establishes the LEI as infrastructure

seems easy to do?
IF THERE IS A WILL, YES!
main ingredient required?
A LITTLE LEADERSHIP

Just a few of the gains:

- tracing contract chains (exposures, UBO) and supply chains (ESG)
- enabling reliable automation of large-scale, granular data processing, across “silos”
- innovation: enable digital identity products connected to official sources of identity
- reduction of cost and risk for all (operational and reputational)

Shifting the Overton Window before we can shift paradigm

technology

innovation

Unthinkable
Radical
Acceptable
Sensible
Popular
Policy
Popular
Sensible
Acceptable
Radical
Unthinkable

regulating tech in finance

Crypto, Chat GPT

facing the “exponential gap”

building global infrastructures

as a new, global, technical institution at the interface

Questions, comments, critiques, ideas, thoughts and suggestions gratefully welcome

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