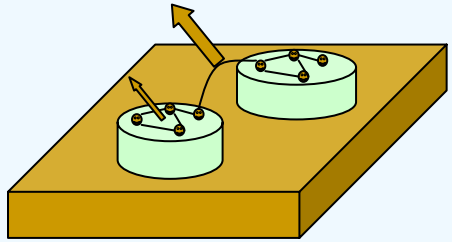
Understanding the Dynamics of the Software Sector

Jiro Kokuryo, MBA, DBA

Keio University
Graduate School of Media and Governance
jkokuryo@sfc.keio.ac.jp



At the Root: Productivity Gap

- Dramatic Improvements in Processor Capabilities

  particularly microprocessors…

1972	8bit	200KHz
2007	64bit	2GHz

- Software productivity still bounded by Mythical Man-Month
- If bottlenecks determine design of artifacts, software clearly is the key determinant of information systems design.

Business Strategies that Conserve Software Development Resources

- Compatible Machine Strategy
  - “Superset” strategy to market higher performance machines that accommodate users’ load modules originally developed for IBM machines.
- Open Architecture
  - Package software industry
  - Middleware
- Saas/ASP

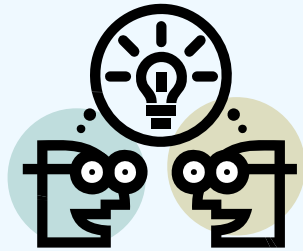
Business Models based on Software Economics

- Software economics
  - ✓ Increasingly higher fixed cost of development
  - ✓ Low marginal cost of delivery, especially after internet
- Business models that address software economics
  - ✓ Unbundled software (made to order)
  - ✓ Package software (license)
  - ✓ Subscription model
  - ✓ Pay per use (service model)
  - ✓ Advertisement model (free for end users)

Emergence:
Value Creation Beyond Cost Efficiencies

Emergence

Unbundled, layered and modular structure gave opportunities for emergent value creation in ecosystems. → Snowballing innovations based on network externality effects.



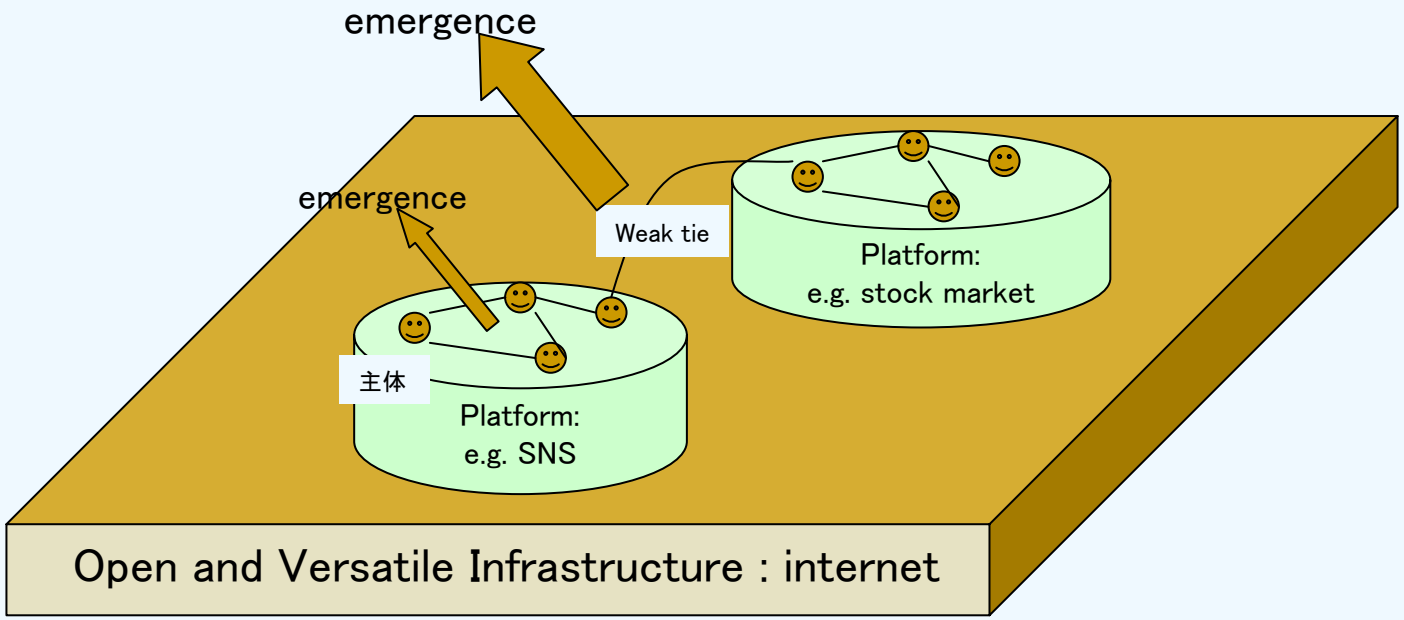
Emergence

- Interaction among many elements
- Self organization of interactions
- Leading to unexpected outcome
- Creating new initial conditions for the elements

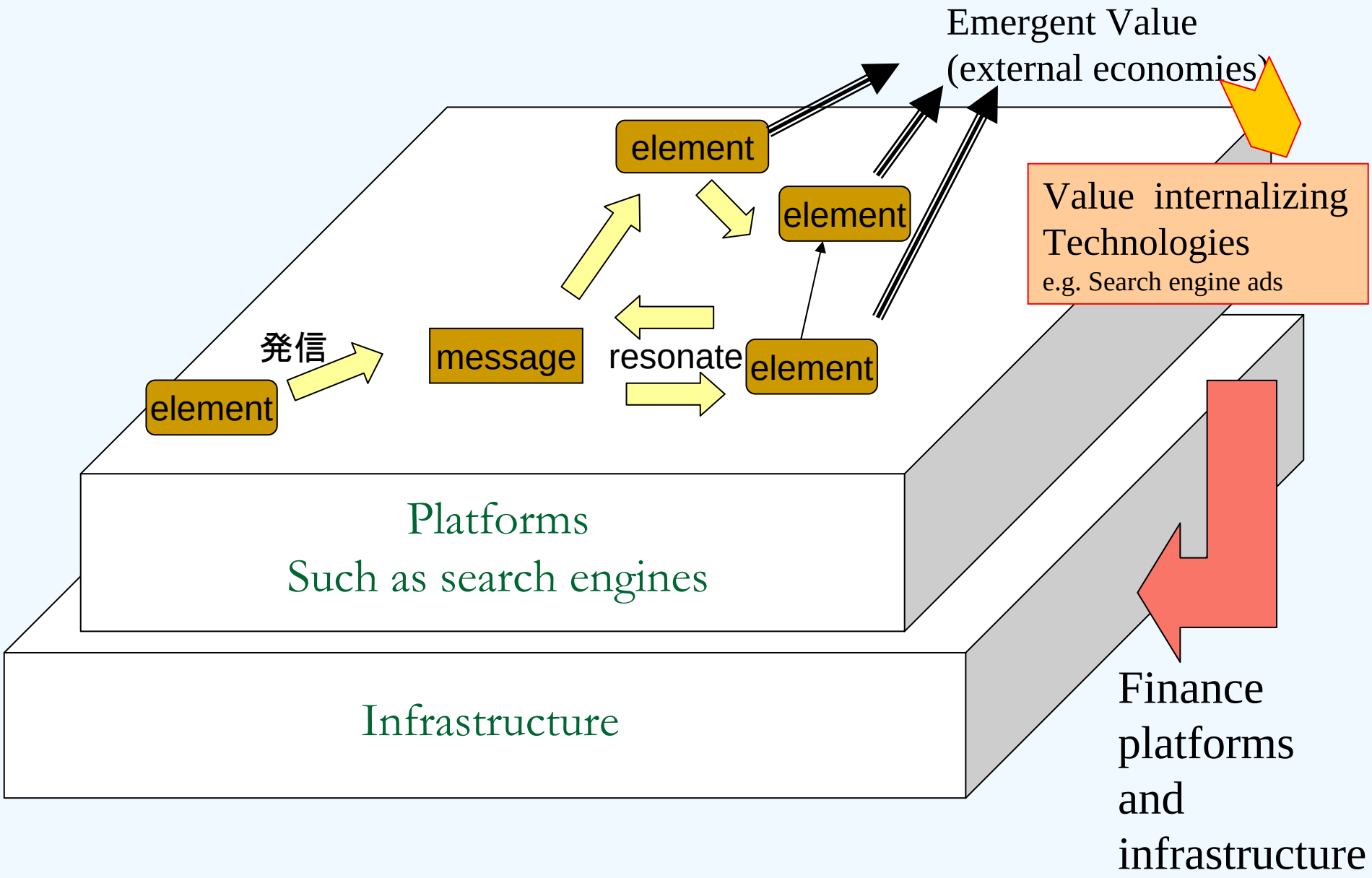
Platforms that Host Emergence on the Internet
A Two Layer Model

(1) Open infrastructure (internet) that offer cheaper and diverse market access for various platforms. Openness and versatility is the key design concept.

(2) Platforms that provide semantics, syntax, context, and norm in communication to platform adopters. Adequate constraint stimulates communications and integrations.



Internalizing Emergent, User Generated Values



Giving Context (and thereby Meaning) to Randomly Generated Information

Ubiquitous Data Capture

Ubiquitous Network

anytime, anywhere, anyone, anything

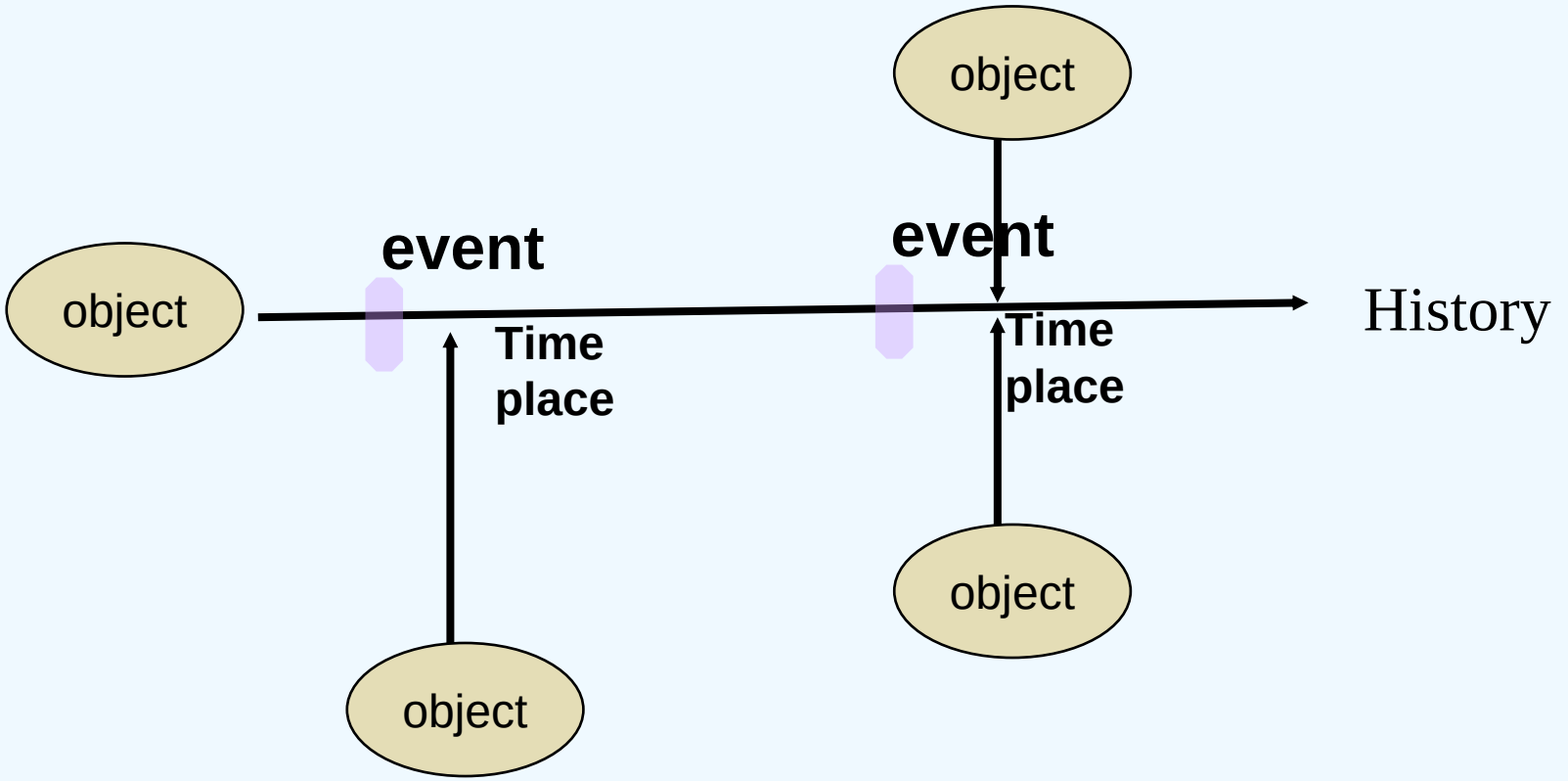
+

Sensors

+

IDs

Events: Objects (ID) in Time and Place

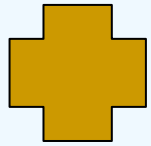


History of everything → context.
Information bears meaning when put in context.

Context based Market Opportunities

Ubiquitous network

Whenever, Wherever, Whoever, Whatever



Identification

Only now, Only here, Only YOU

Not only intelligent, but also kind and considerate machines

Building the 21st Century Information Society

Being Mature Economies in the World of Growing Emerging Economies

- **Strategy 1**

  Use 20th century style strategies to win pursue Emerging markets that are showing 20th century type quantitative growth.

- **Strategy 2**

  Be a leader in providing 21st century solutions to curing the vices/aftermaths of the 20th century such as the environment destruction and aging society.

→Japanese economic recovery was accomplished by strategy 1… but is that sustainable?

Let us think about succeeding with strategy2!

21st Century Model

20th Century

- Hardware (natural resource) economics determines structure
  - Scale economies
  - Ownership transfer model
- Volume growth
  - High fixed cost
  - Bigger input/output
    - ✓ Environment constraint
- Enclosure/Exclusivity
  - ✓ Large investment
  - ✓ Monopoly

21st Century

- Software (knowledge) economics determines structure
  - ←low productivity growth makes software the bottleneck process
  - Low marginal (copy) cost →high margin
  - Usage license model
- Network externality growth
  - Explosive dissemination
- Modular/Open structure
  - Born small, grow big
  - Reuse and recycle
  - Sharing economy

Connecting Fragmented Information

Overcoming the inefficiencies of the low visibility

- Products that goes out of sight as they are shipped from the factory…
- Service industry that give monotonous service to everyone disregarding individual necessities.
- Overlap, waste…
- Failure to generate public good with market mechanism

With greater visibility, we aim at:

- ✓**Sustainable growth**
- ✓**Vigorous aged society**
- ✓**Safe AND creative society**
- ✓**Generate common good through market**
  - internalize external (dis)economies