

**Keynote Address:**

# **Blockchains in Healthcare: Transforming Strategy & Business Models?**

**The Healthcare Blockchain Summit  
Washington, D.C.  
March 2017**

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**Handout  
version with  
extra slides  
and  
annotations.**

# **"...like 3-D Chess"**

**Prof. Marshall Van Alstyne**



# Overview

## **I. Background and Trends**

- Decentralization**
- Industrial Era Business Strategy**
- Platform Economy/Digital Strategy**
- Healthcare Megatrends**
- Blockchain Tech in Healthcare**
- Patient Records Case Study**

## **II. Implications**

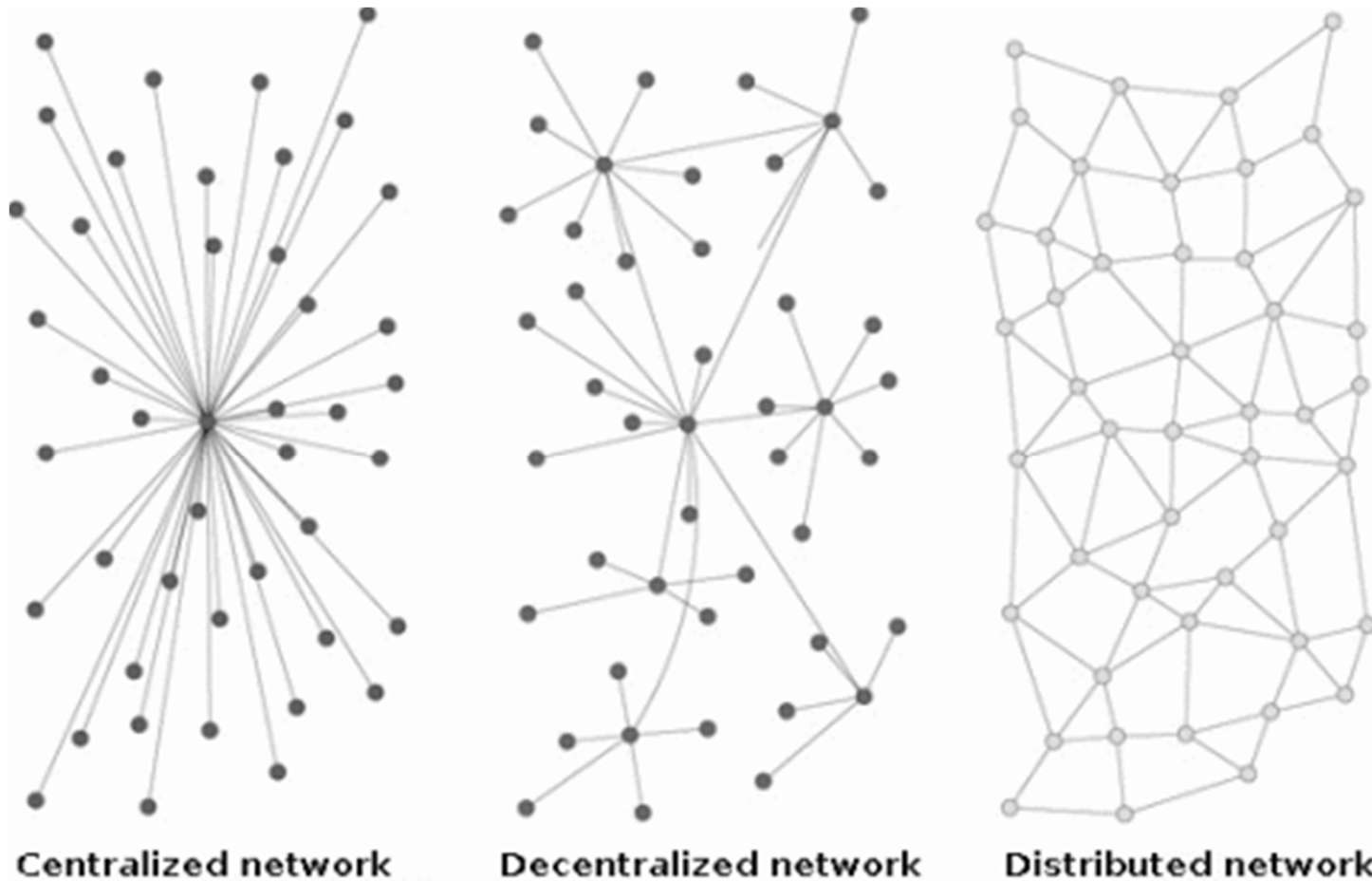
- 1) Yellow Flag Terminology: "Could", "Possible", "Promising"**
- 2) Digital Strategy is Different**
- 3) Growth Scenarios for Blockchain Tech**
- 4) Most Promising Initial Use Cases**
- 5) Blockchain world MUST understand platform economy structure, rules, strategy**
- 6) Incumbents Can Use Blockchain Tech to Their Advantage**
- 7) Anticipate Cross-Industry Competition**

# **I. BACKGROUND & TRENDS**



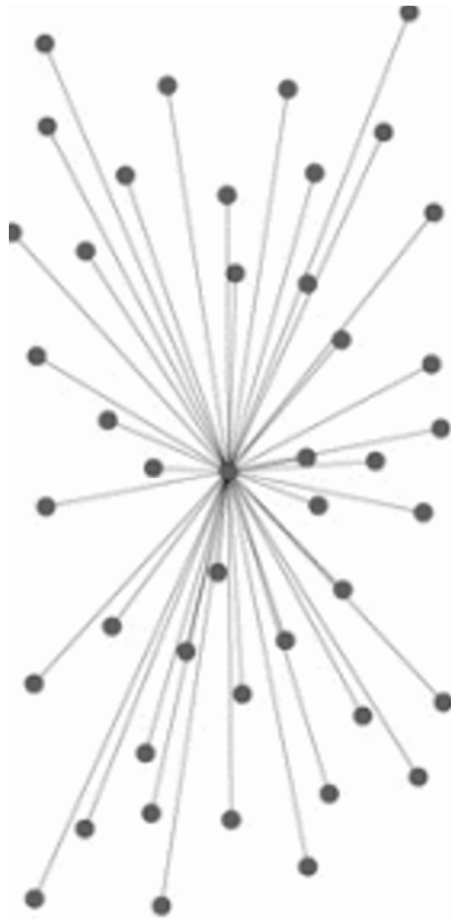
# Decentralization Is a Major Trend Driving of Blockchain Tech (and lots of other things)

## A Widely Used and Somewhat Misleading Diagram



# Reframe As A Continuum of Network Design Options

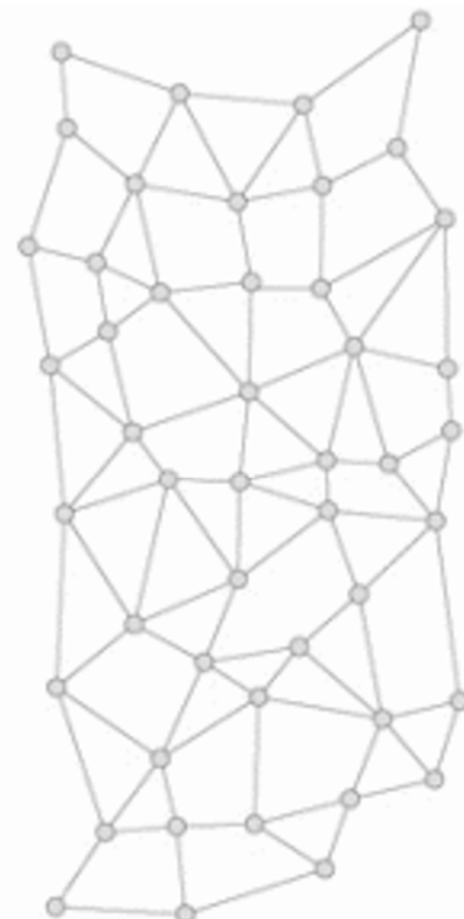
Highly Centralized ← → Highly Decentralized



**Industrial Era  
Corp/Government**

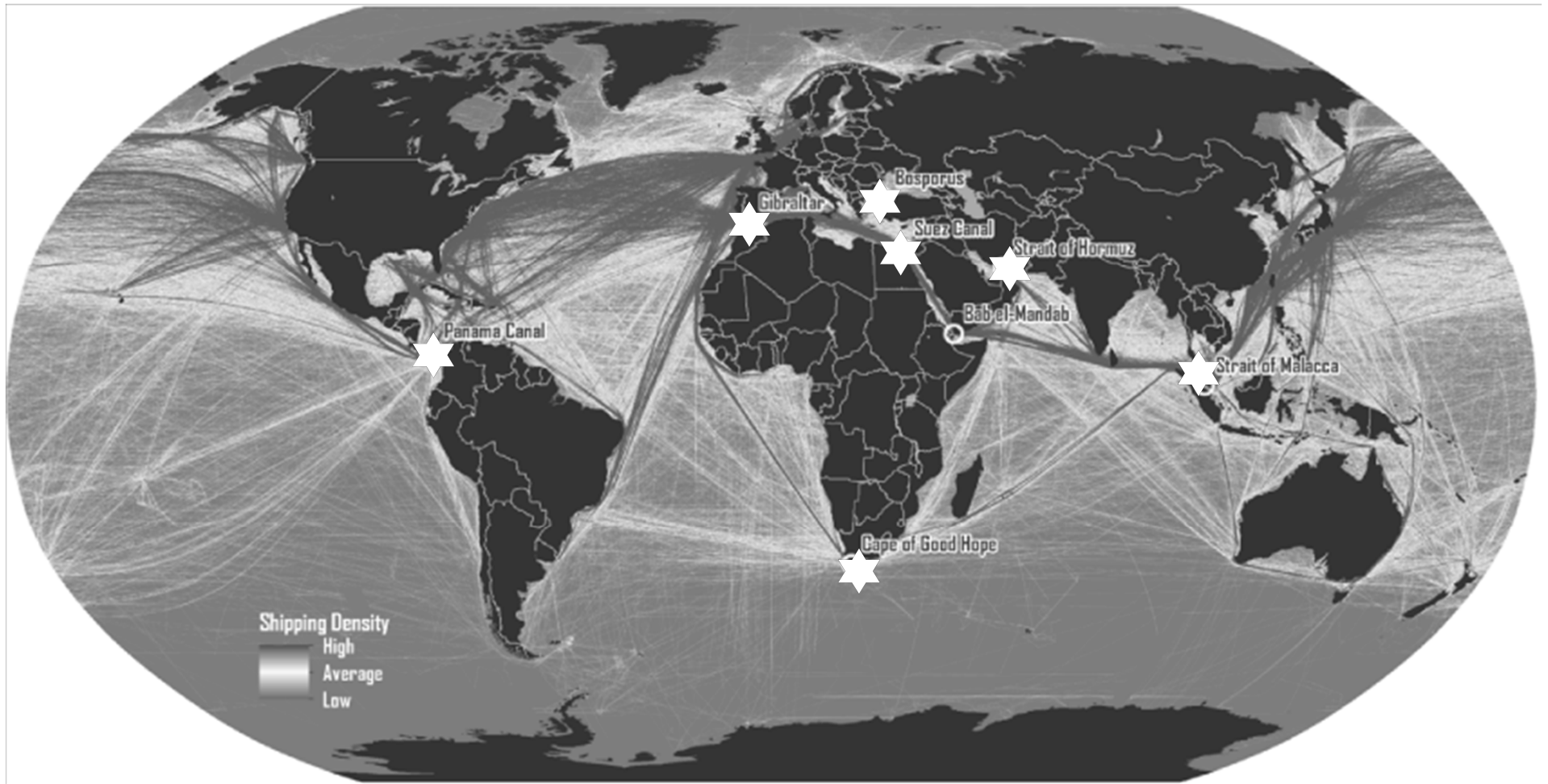


**Platform Mediated  
Network/Ecosystem**

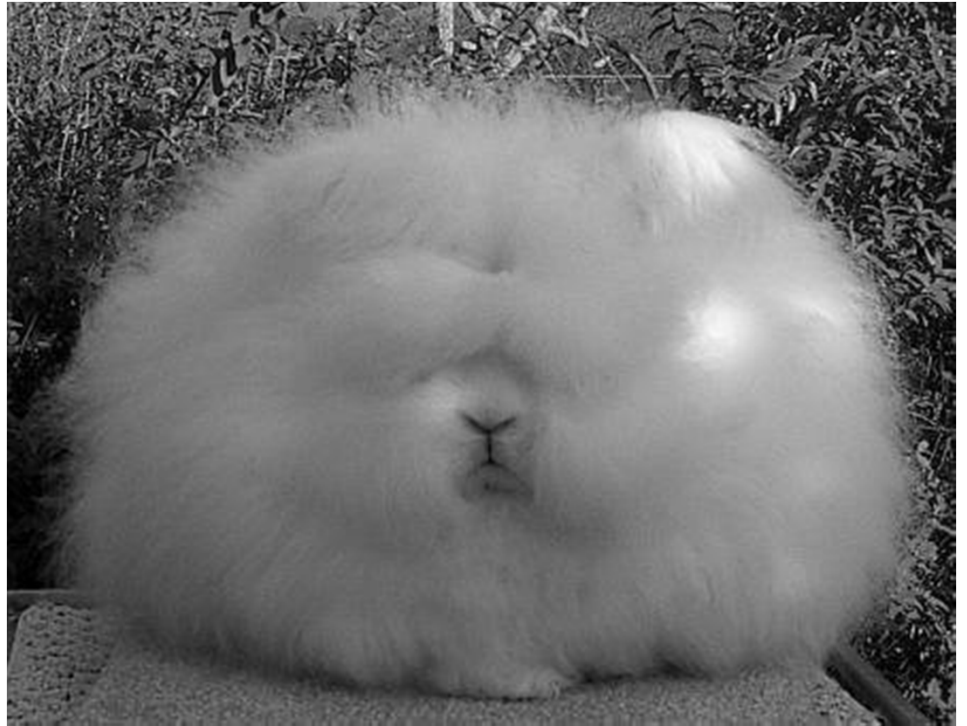


**P2P/Distributed  
Network**

# Strategic Chokepoints ☆



# Observations About Decentralization



- **Fuzzy: differing meanings of decentralization**
- **POV depends upon where you're standing**
- **See Appendix for examples of emerging Decentralization Frameworks**

# Decentralization – What Does It Look Like?

- **Speed in settlements**
- **No intermediary delays**
- **Upfront identification and reputation**
- **Flat structure with no overhead**
- **Permission-less user access**
- **Trust build inside the network**
- **Resiliency against attacks**
- **No censorship**
- **No central point of failure**
- **Governance decisions by consensus**
- **Peer-to-peer communications**

Source: William Mougayar, [The Business Blockchain](#)

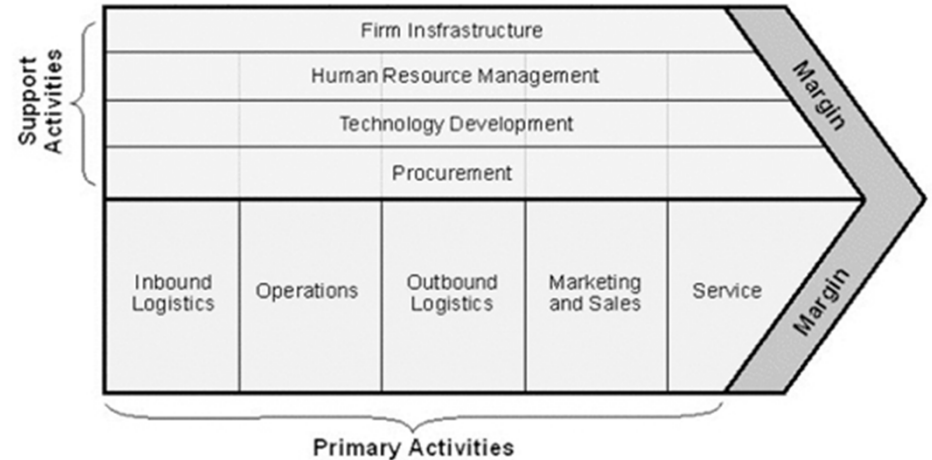
# 2 Big Ideas of Industrial Era Business Strategy

## BCG Experience Curve



**Assumption: increasing returns from supply-side economies of scale, experience**

## Porter's Value Chain

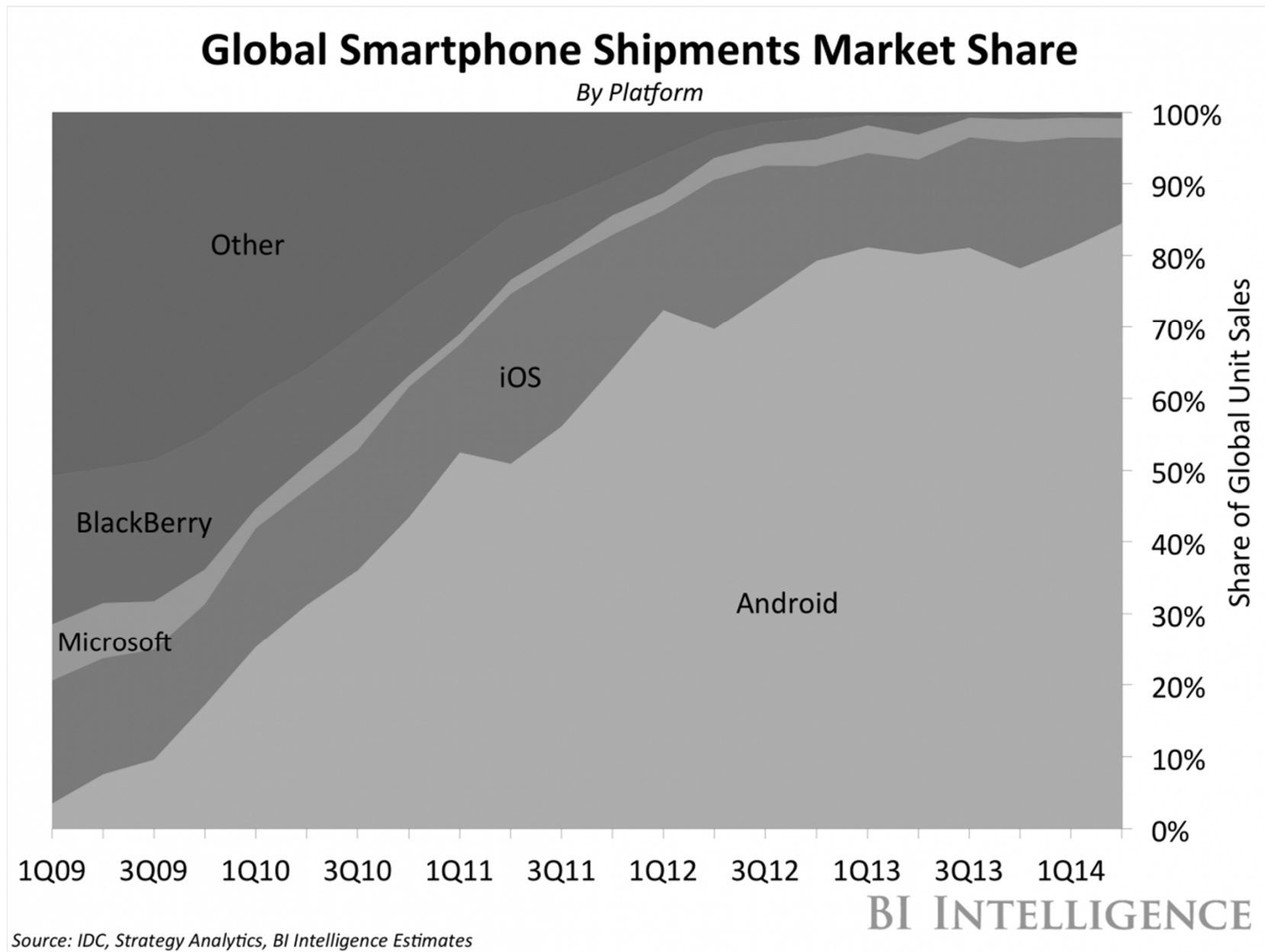


**Assumption: Transaction costs are the glue that holds together value chains**

# What Are Transaction Costs?

- **aka**
  - **Cost of participation in a transaction**
  - **Coordination costs**
  - **"Pain in the ass costs"**
- **Types:**
  - **Search & information**
  - **Bargaining costs**
  - **Enforcement costs**
- **Technology (generally) reduces transaction costs**
- **Boundaries of the corporation determined by transaction costs**

# Digital Platforms Can Reshape Industries: Android & iOS = 95% Market Share

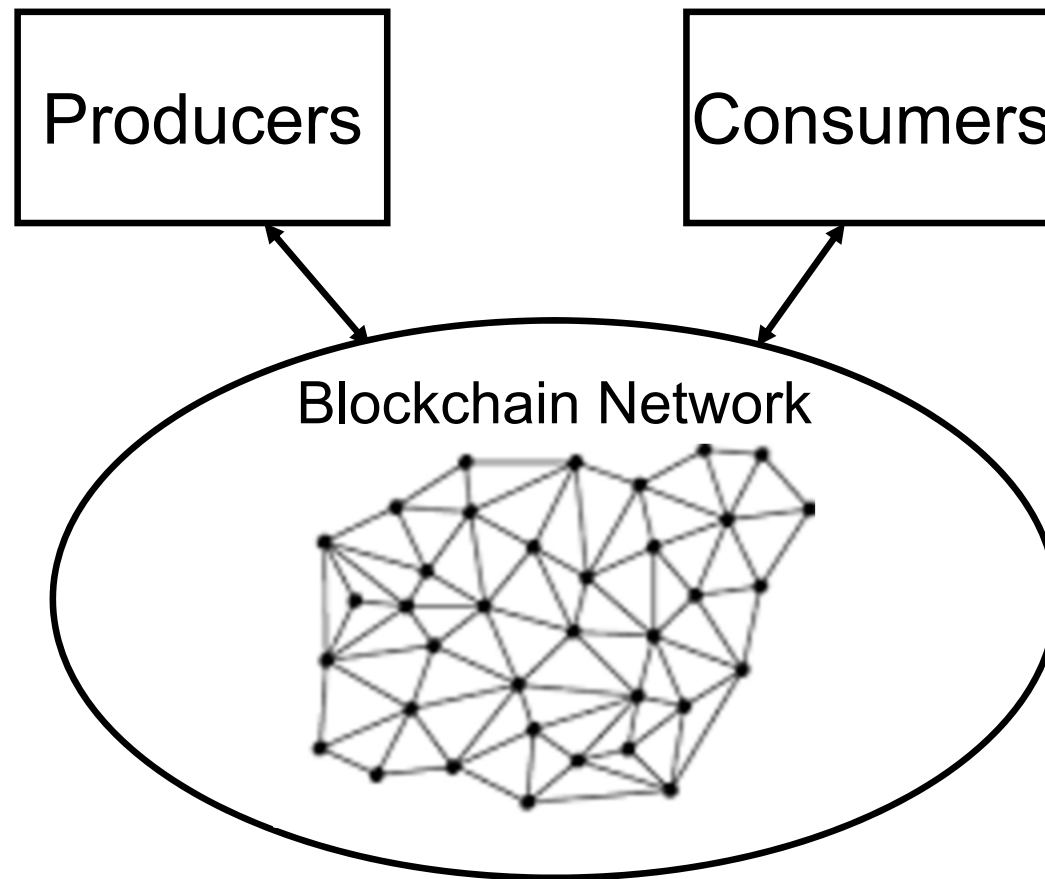




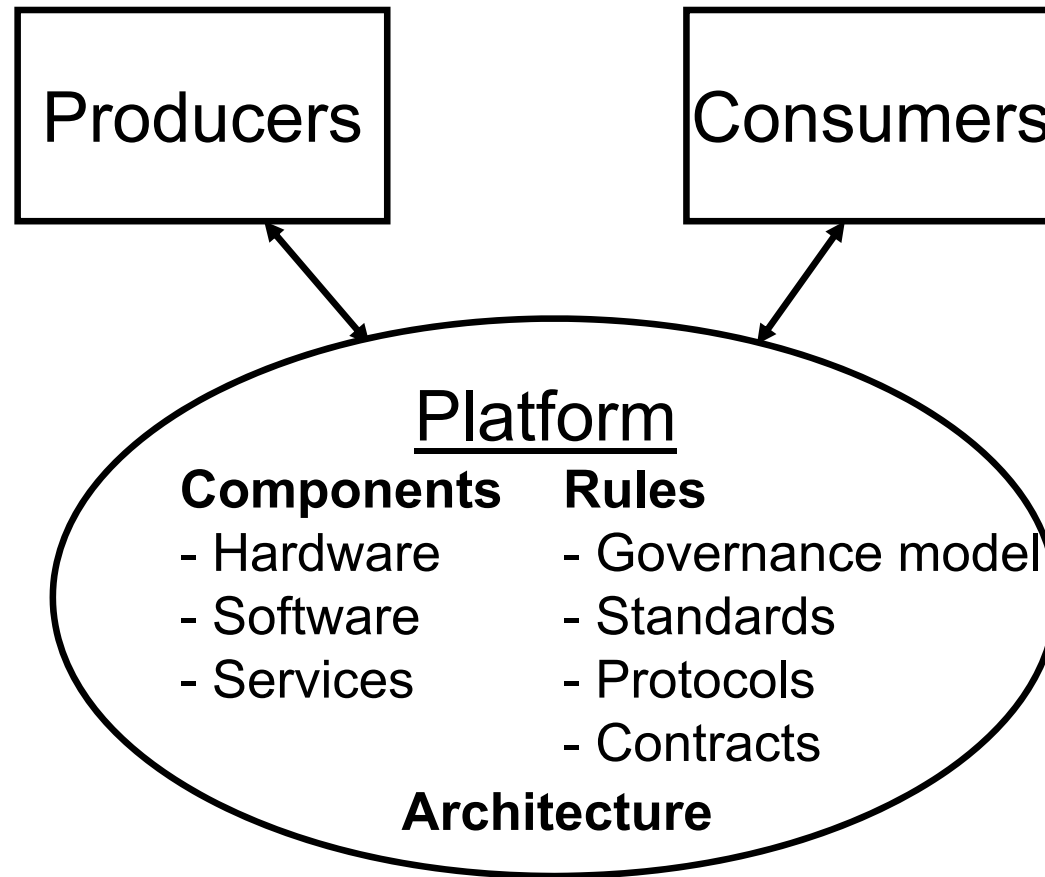
# **Digital Platforms–A Large and Growing Share of the Global Economy**

- **The 4 largest tech co.s are platforms (Google, Apple, Amazon, Facebook)**
- **60 of the world's 100 largest companies earn most of their revenue from platforms**
- **What's new about modern digital platforms?**
  - **Rapidly scalable tech**
  - **Data/analytics**
  - **Innovation (API)**

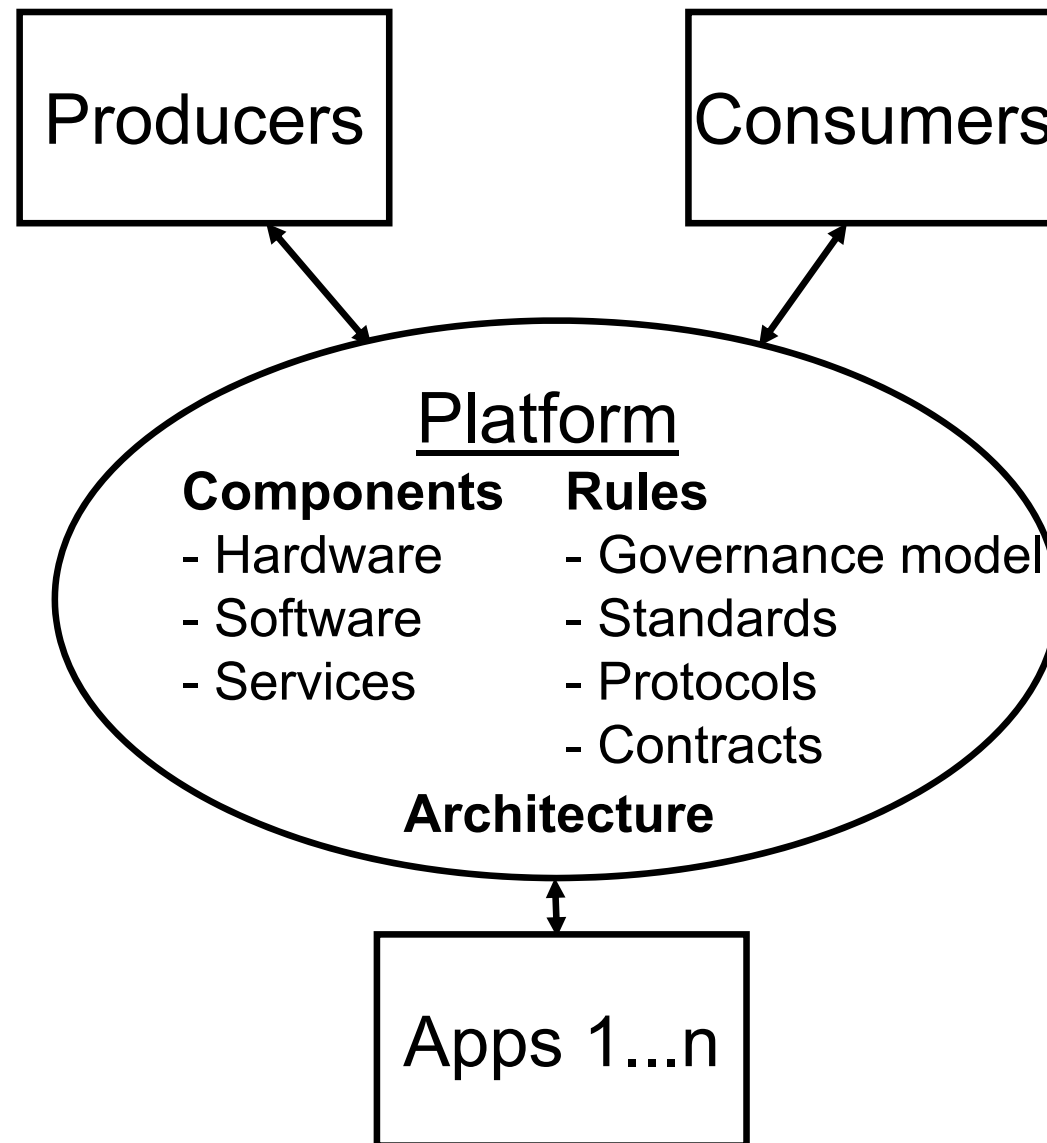
# Blockchain & Platform Commonality: Both Enable Decentralized Networks



# Elements of a “Platform Mediated Network”



# Elements of a “Platform Mediated Ecosystem”

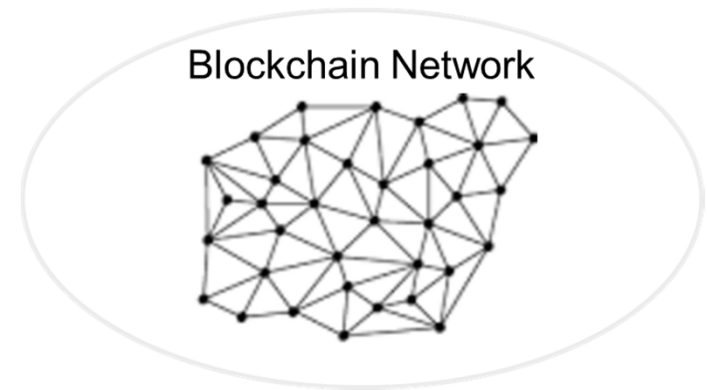


# Blockchains Have Many Facets/Capabilities

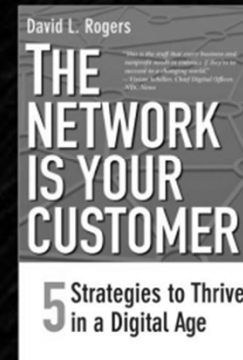
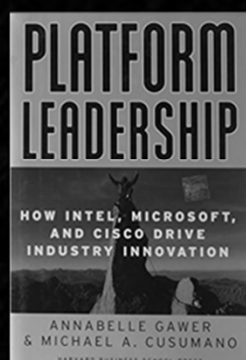
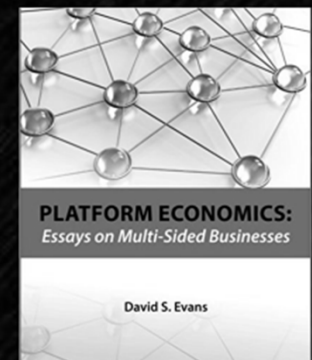
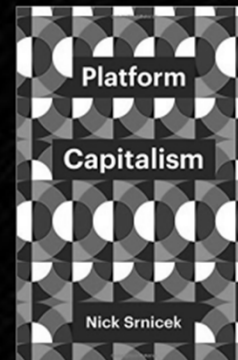
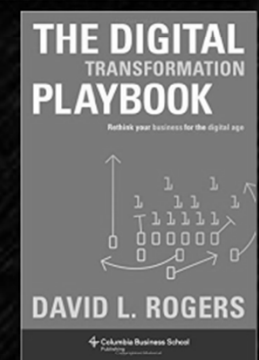
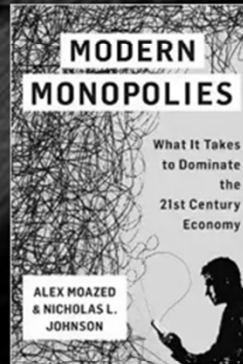
## Not just a "distributed ledger"

- **Cryptocurrency**
- **Computing Infrastructure**
- **Transaction Platform**
- **Decentralized Database**
- **Distributed Accounting Ledger**
- **Development Platform**
- **Open Source Software**
- **Financial Services Marketplace**
- **Peer-to-Peer Network**
- **Trust Services Layer**

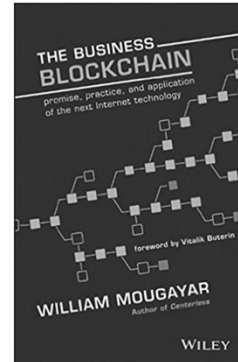
Source: William Mougayar, [The Business Blockchain](#)



# Platform Business Models/Strategy



# Blockchain Business Models/Strategy



# Very Few Healthcare Blockchain Startups

Technische University, 12/16

Sector	VC funding, in million USD	Number of startups	Avg. VC funding in million USD
Agriculture, Forestry & Fishing	-	2	-
Arts, Entertainment & Recreation	9.80	38	0.26
Education	-	6	-
Finance & Insurance	805.60	483	1.67
Food & Beverages	-	1	-
Healthcare	-	5	-
Information & Communication	694.33	416	1.67
Other Service Activities	0.18	13	0.01
Professional Service	20.11	46	0.44
Public Services	1.11	31	0.04
Real Estate Activities	1.30	7	0.19
Telecommunications	-	1	-
Transportation & Storage	-	5	-
Venture Capital	6.30	17	0.37
Media Industry	0.55	30	0.02
Energy	-	13	-
Tourism Industry	0.18	3	0.06
Aviation & Space	-	1	-
Retail & Consumer	7.62	22	0.35
<b>Grand Total</b>	<b>1,547.08</b>	<b>1,140</b>	<b>1.36</b>

Table 1. *Venture capital funding of blockchain startups in total.*



# Examples

## Healthcare Blockchain Co.s/Initiatives

- **CapitalOne**
- **Chase**
- **Clinical Blockchain**
- **Gem**
- **Estonia medical records**
- **Factom**
- **Guardtime**
- **Health Nautica**
- **Hashed Health**
- **Healthcoin**
- **Hyperledger Health Group**
- **IBM**
- **MedRec**
- **Philips**
- **PokitDok/DocChain**
- **SimplyVital Health**
- **Tierion**
- **YouBase.io**
- **Others...**

# Modern Health Information Exchange



# MedRec Blockchain Prototype

**Harvard  
Business  
Review**

TECHNOLOGY

## **The Potential for Blockchain to Transform Electronic Health Records**

by John D. Halamka, MD, Andrew Lippman, and Ariel Ekblaw

MARCH 03, 2017

# Healthcare Data is Complex

TABLE 1 Comparison of Health “Data” and Banking Data

	Banking Data	Health Data
Concepts and descriptions	Precise <i>Example</i> Account 123 balance = \$15.98	General, subjective <i>Example</i> Sick patient
Actions	Usually (not always) reversible <i>Example</i> Move money A → B	Often not easily reversible <i>Example</i> Give a medication Perform a procedure
Context	Precise, constant, or irrelevant to the task <i>Example</i> US \$	Vague, variable <i>Example</i> Normal lab values differ by lab. No two cells, organs, tumors, or patients are identical.
User autonomy	Well-defined and constrained <i>Example</i> What I can do with my checking account = what you can do with yours	Variable and dependent on circumstance <i>Example</i> Clinical privileges depend on training, changes over time, and circumstances
Users	Clerical staff, account holder	Varied, including highly trained professionals
Workflow	Well-defined, documented, and explicit	Highly variable, implicit with many undocumented tasks and exceptions

# **II. IMPLICATIONS**

# 1) Yellow Flag Terminology: "Could", "Possible", "Promising"



- Tech "push" or "customer pull"?
- Lack of understanding of healthcare idiosyncrasies, irrationality
- Data complexity
- Other interop issues:
  - Other HIT infrastructure (e.g., patient ID)
  - Syntactic/semantic interop
  - Incumbent interests
- Beyond data: Workflow interop

## **2) Digital Strategy is Different**

- **From "Economies of mass" to "Small is beautiful"**
- **From supply-side economies of scale to demand-side economies of scale (network effects)**

"There are only two ways to make money in business: One is to bundle; the other is to unbundle."

Jim Barksdale, CEO, Netscape



- **Transaction costs are the glue that holds together the value chain**
  - **Technology reduces transactions costs**
  - **Value chains break up**
- **Lowering transaction costs as key to business success**
- **Focus on transactions that ARE NOT taking place today Reduce transactions costs, create critical mass, network effects take over**

# **3) Growth Scenarios for Blockchain Tech**

## **1) Fizzle**

## **2) Slow, steady growth (most likely, IMO)**

- Reach critical mass & tipping point**
- Accelerated growth**

## **3) Rapid adoption scenarios**

- Large tech companies play ecosystem sheriff**
  - Sets defacto, proprietary standards**
  - Akin to Google, Apple in smartphones and OS**
  - Bring \$\$, capital, brand**
- Consortia standards widely adopted**

## **4) Most Promising Initial Use Cases**

- **Focus on administrative efficiency/cost**
- **Company/consortia controlled networks**
- **Niche applications, e.g.,**
  - **Clinical trials**
  - **Marketplaces (healthcare OpenBazaar)**
- **Horizontal industry functions (many could be winner-take-all), e.g.**
  - **Trust**
  - **Identity**
  - **Data**
  - **Payments**
- **NOT disruptive use cases (initially)**
- **NOT clinical use cases**

# **5) Blockchain World MUST Understand Platform Economy Structure, Rules, Strategy.**

- **Industrial Era Strategy:**
  - **Dominate markets through economies of scale**
- **Digital Strategy:**
  - **Dominate markets by controlling networks & ecosystems**

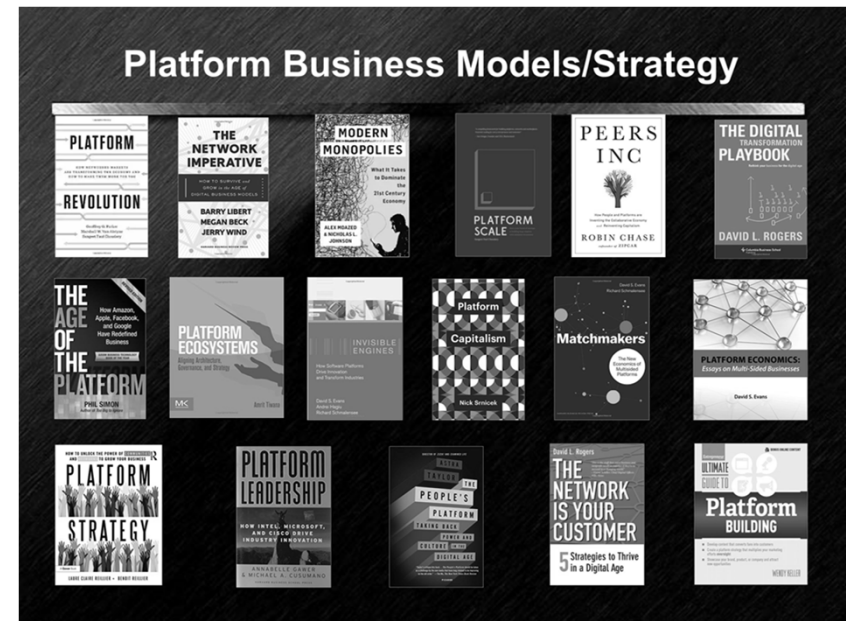
**Blockchains & Platforms:  
2 Sides of the Same Coin**



# Examples

## Platform Terminology

- **Network effects**  
(positive & negative)
- **Adjacency strategies**
- **Winner-take-all dynamics**
- **Minimum viable platform**
- **Core transaction**
- **Growth hacking**
- **Chicken/egg dilemma**
- **Platform Thinking**
- **Multi-homing vs. single-homing**
- **Value creation at the edge of the network**
- **Value creation vs. value capture**
- **Identify & control strategic chokepoints**
- **Supply-side vs. demand-side economies of scale**
- **Platform monetization**
- **Governance models**
- **Single vs. multi-homing**
- **Platform metrics**
- **...many more**

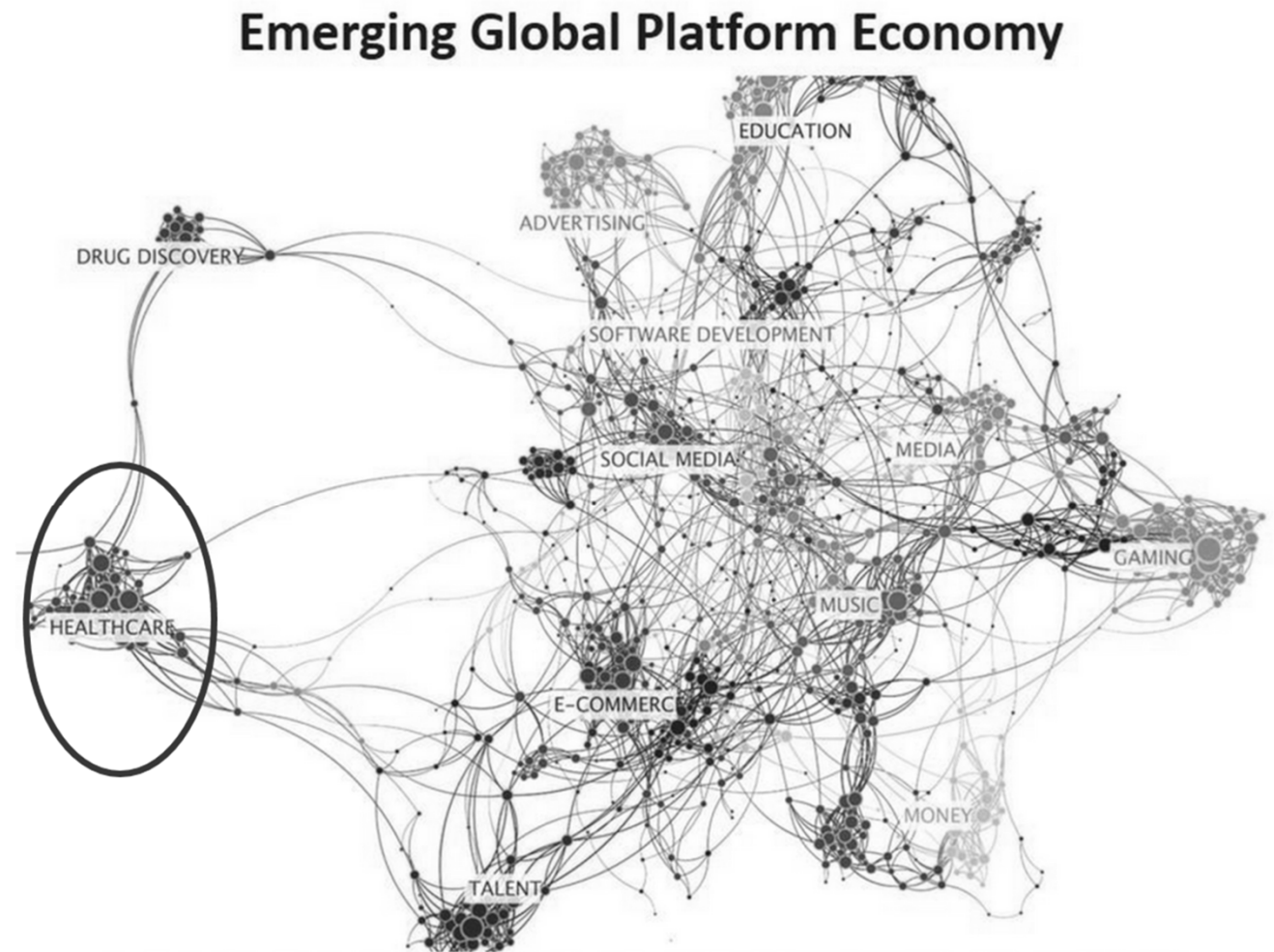


## **6) Incumbents Can Use Blockchain Tech to Their Advantage**

- **Consider defensive POV — how might others disrupt you?**
- **Efficiency value propositions**
- **Consider platform strategies**

# 7) Anticipate Cross-Industry Competition

- **Conventional wisdom: solutions arise within healthcare**
- **From vertical to horizontal, e.g., identity, verification, trust**



Source: P. Evans, Center for Global Enterprise with data and visualization from Quid, 2015

# "...like 3-D Chess"

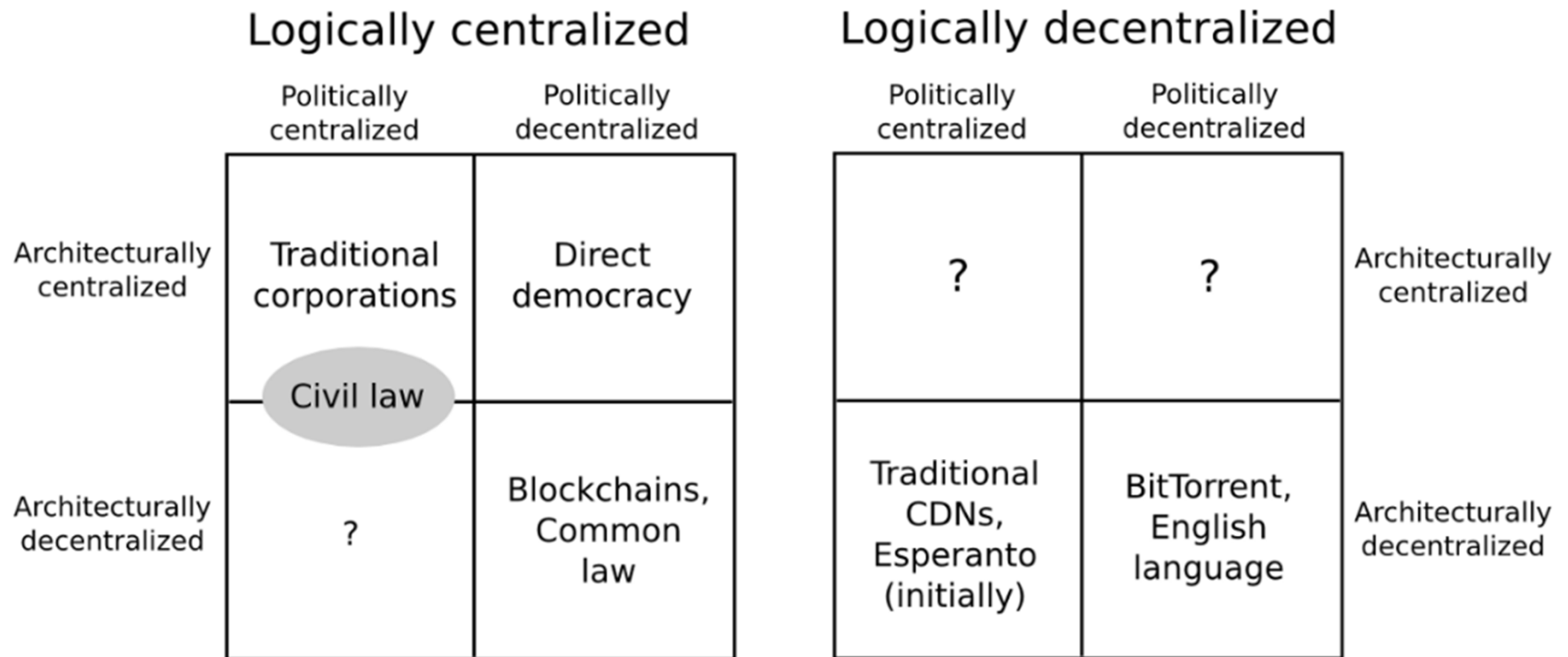
Prof. Marshall Van Alstyne





# APPENDIX

# Vitalik Buterin's Framework for Decentralization



Source: Vitalik Buterin, "The Meaning of Decentralization", 2017