Data Platforms?

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Popular on eBay

"*The fundamental feature of a platform architecture is that certain components remain fixed over the life of the platform, while others are allowed to vary or change over time. Thus either by design or simply because it is the longest-lived component in the system, a platform embodies a set of stable constraints, or design rules, that govern the relationships among components.*"

Baldwin and Woodard 2009.

Telecom network architecture
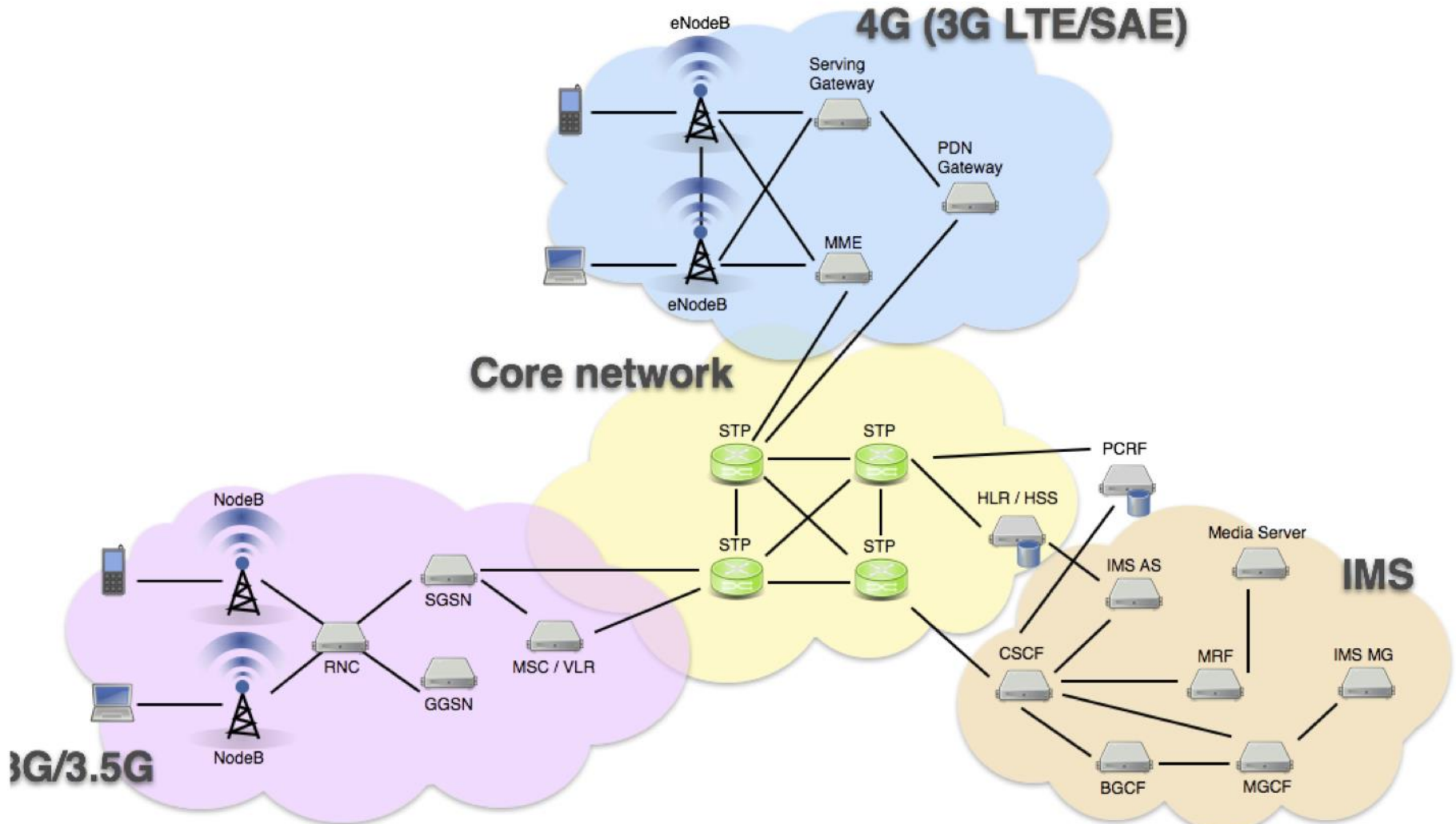
Benefits of platforms – efficient exchange?

Creating value to users by helping individuals or organizations **connect** and **transact/interact**

1. **Reduce search costs**
   - Brand, reputation
   - Search engine
   - Profiling

2. **Reduce transaction (contracting + enforcement) costs**
   - Standardized interfaces
   - Automated transactions
   - Secure transactions
   - Monitoring past transactions
   - Liquidity of markets

3. **UNPRECEDENTED SCALE ECONOMIES**

The effects of digitalization on competition

1. **Product information, information products**
   - More information about all products
   - Distribution of information products

2. **Pricing mechanisms**
   - Auctions (reverse or standard)
   - Information (search engines, shopbots, clickstream)
   - Dynamic pricing, personalized pricing (menu costs $\downarrow$)

3. **New marketplaces – digital platforms**
   - Auctions
   - Portals
   - Multisided markets
   - Social aspects of commerce

Generally speaking

- Who gains market power because of digitalization?
    - Power mostly shifts downstream, except where increasing returns are strong (networks, platforms)

- How does that affect…
    - Competition? – tougher price competition
    - Welfare? – greater consumer surplus

- How should digital businesses account for this in strategy?
    - Achieving profitability is tough in many services
    - Value configuration/business model matters
    - Careful attention to **pricing, lock-in, blocking**

Not so with platforms!

- Due to entry barriers created by indirect network effects, platforms concentrate market power – **monopoly cost** to society
  - Google – access to all of your information
  - Facebook – access to all of your friends
  - Uber – access to all of your mobility
- If a platform becomes an unique enabler of any (economic) activity, it will accumulate tremendous power over users & service providers
- **Essential facilities should generally be regulated**
  - **How to regulate US platforms?**

Digital innovators

➡ Try to become a platform if you can

➡ Try to become unique if not a platform

➡ Or else...

– Platform provider will take ~30% cut of all your revenues
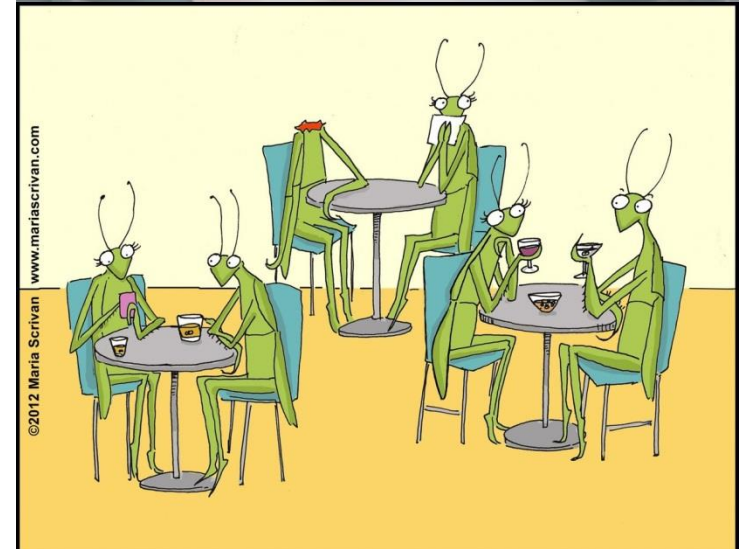
Two-sided/multi-sided markets

A two-sided market is one where firms serve:

> Two (or more) distinct types of customers…

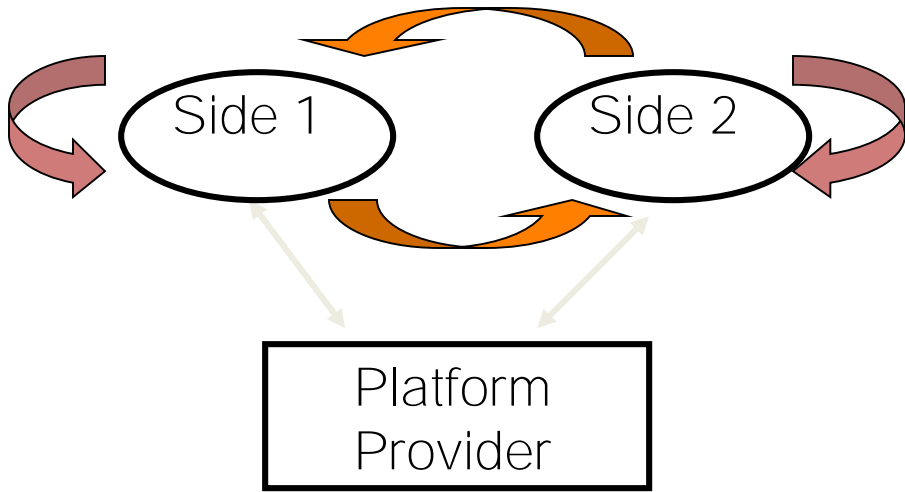> …who depend on each other in some important way

> … and whose joint participation makes the platform more valuable

$\Rightarrow$ **Indirect network effects** between different groups

Meeting "platform"

©2012 Maria Scrivan www.mariascrivan.com

Speed Dating

A two-sided network has *four* network effects

Side 1

Side 2

Platform Provider

Speed Dating

- A ***same-side*** effect for each side, i.e., preference regarding number of other users on *own* side

- A ***cross-side*** effect in each direction, i.e., preference regarding number of users on *other* side
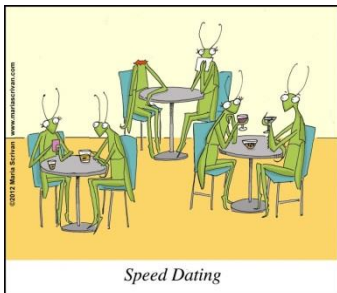
Each network effect can be positive or negative
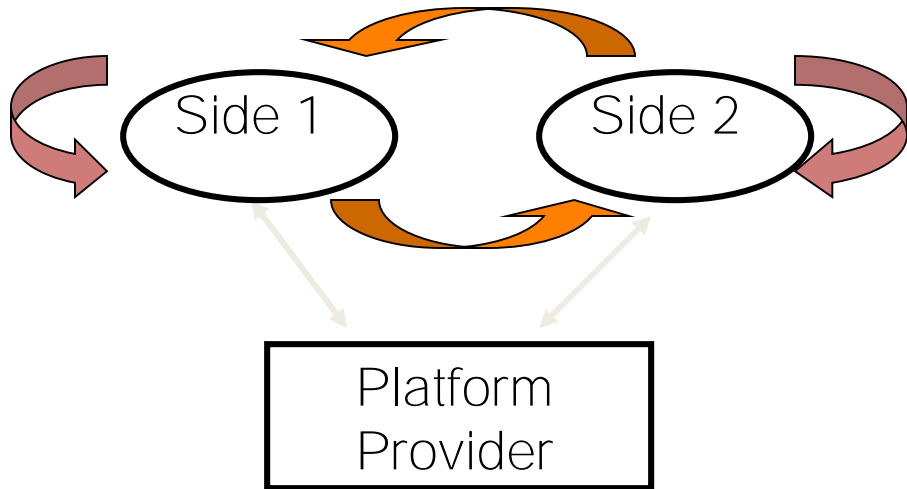
+ *same-side* : Player-to-player contact in Xbox MMOG, end-user PDF sharing.

- *same-side* : competing suppliers in Covisint auction, competing dates on Match.com

+ *cross-side* : merchants & consumers for Visa, developers & end-users for Windows

- *cross-side* : Digital Rights Management costs to consumers. Advertising clutter to viewers.

The "Chicken and Egg" problem

- How to get both sides on board?
  - Network effects create a 'critical mass' problem
  - The higher the price, the greater the critical mass needed

- Some solutions:
  - **Pricing/subsidizing**
  - **Integrate** your own complements
  - Find '**marquee**' customers

- Why were *Facebook* and *Google* able to raise so much money despite low/negative profits?

Examples

GENERAL	?	?
Social gatherings	Celebrities	Other participants
Shopping malls	Consumers	Shops
PORTALS AND MEDIA		
Portals	"eyeballs"	Advertisers
Newspapers	Readers	Advertisers
SOFTWARE		
Video game consoles	Gamers (consoles)	Game developers
Operating systems	Application developers	Servers
PAYMENT SYSTEMS		
Credit cards	Cardholders	Merchants
Settlement systems	Receivers	Senders

Pricing platforms

- Balance demand on both/all sides
  - Make platform attractive for different customer groups

- Asymmetric price structure

  Charge more if:
  - Higher willingness to pay / lower price sensitivity
  - Stronger valuation of the other side

- Negative price (subsidy) on one side can sometimes make sense
  - One side (*loss leader*) is treated as an 'input' to attract the other side *(profit center)*

Speed dating again!

Speed Dating

Girl

	Go	Not
Go	5,1	-1,0
Not	0,-1	0,0

Boy
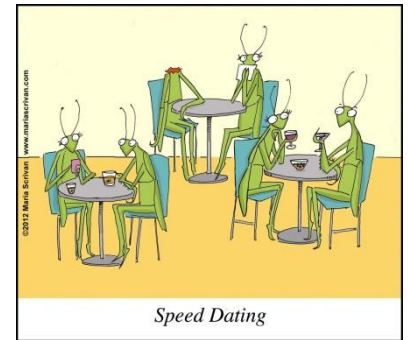
Multiple equilibria

Girl

	Go	Not
Go	5,1	-1,0
Not	0,-1	0,0

Boy

- Socially optimal: (Go, Go)

- But two possible equilibria: (Go, Go) and (Not, Not)

- "Chicken & Egg" = a coordination problem

Dating *platform* strategy

- The match maker can charge an entry fee to BOTH sides:

  P_B for boys and P_G for girls.

  How much?

		Girl	
		Go	Not
Boy	Go	$5-P_B$, $1-P_G$	$-1-P_B$, 0
	Not	0, $-1-P_G$	0, 0

Monopoly pricing

- We know that $P_B < 5$, $P_G < 1$
  $$\Rightarrow P_B = 4.99$$
  $$\Rightarrow P_G = 0.99$$

- But for any P_B, $P_G > 0$, the Chicken & Egg problem persists!

$P_B = 4.99$
$P_G = 0.99$

		Girl	
		Go	Not
Boy	Go	0.1, 0.1	-5.99, 0
	Not	0, -1.99	0, 0

Solution: "Divide and conquer"

- Assume: $P_G^* = -1.01$
  $\Rightarrow$ 'Go' is now Girl's dominant strategy

		Girl Go	Not
Boy	Go	5-P_B, 2.01	-1-P_B, 0
	Not	0, 0.01	0, 0

Solution: "Divide and conquer"

- Assume: $P_G^* = -1.01$
  $\Rightarrow$ 'Go' is now Girl's dominant strategy

Girl

	Go	Not
Go	5-P_B, 2.01	-1-P_B, 0
Not	0, 0.01	0, 0

Boy

- Boy can then be charged $P_B = 4.99$
- Profit $= P_B + P_G = 4.99 - 1.01 = 3.99 > 0$

Integration/bundling strategies

End users

Content

Applications

Peripheral equipment

Basic hardware
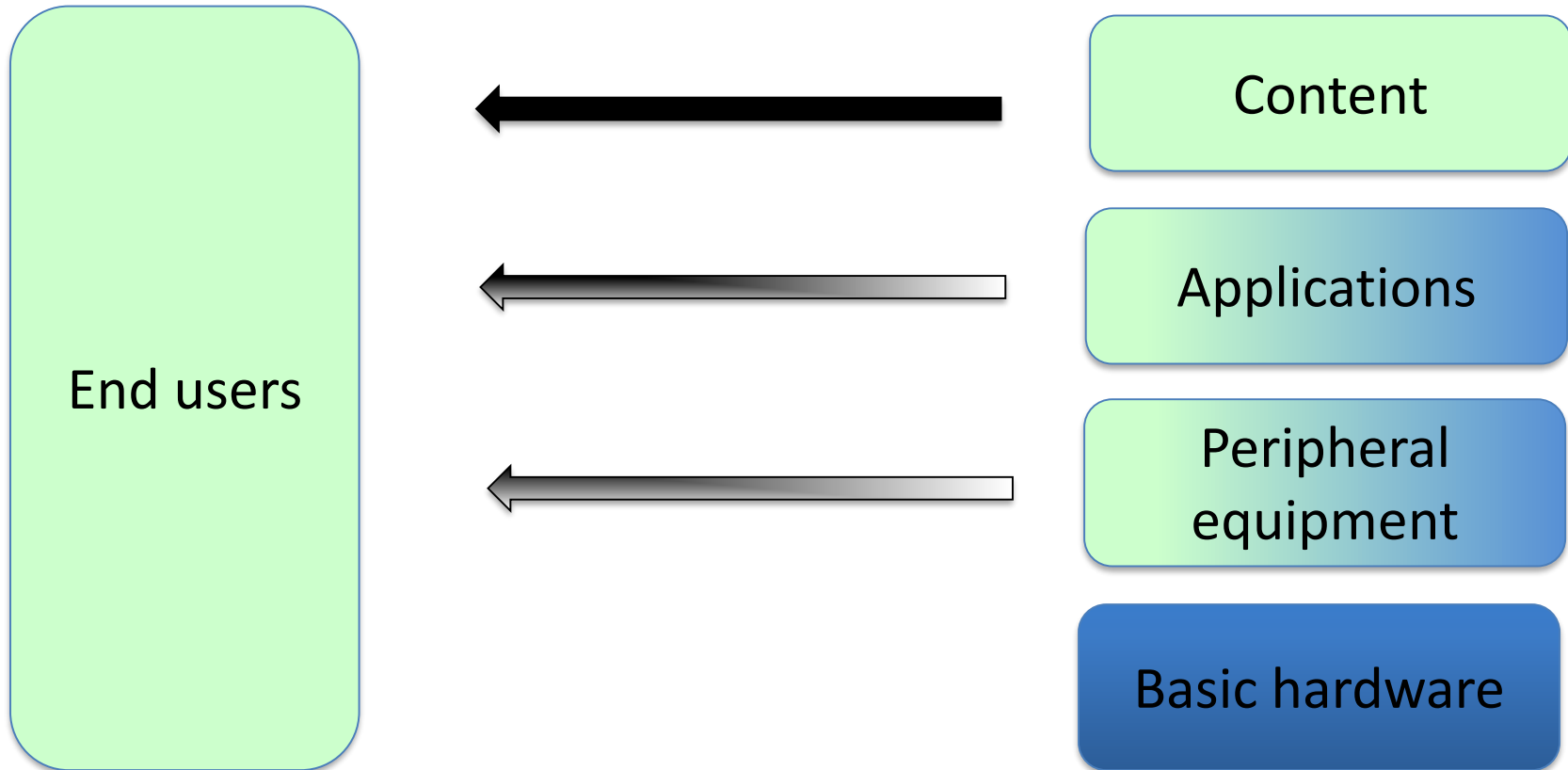
PLATFORM

Basic trade-off

	Integration	Multi-sided solution
Special advantage in production	YES	NO
Competitive supply of complements	NO	YES

Integrate vs. commoditize the complements

Controlling the bottleneck is what matters
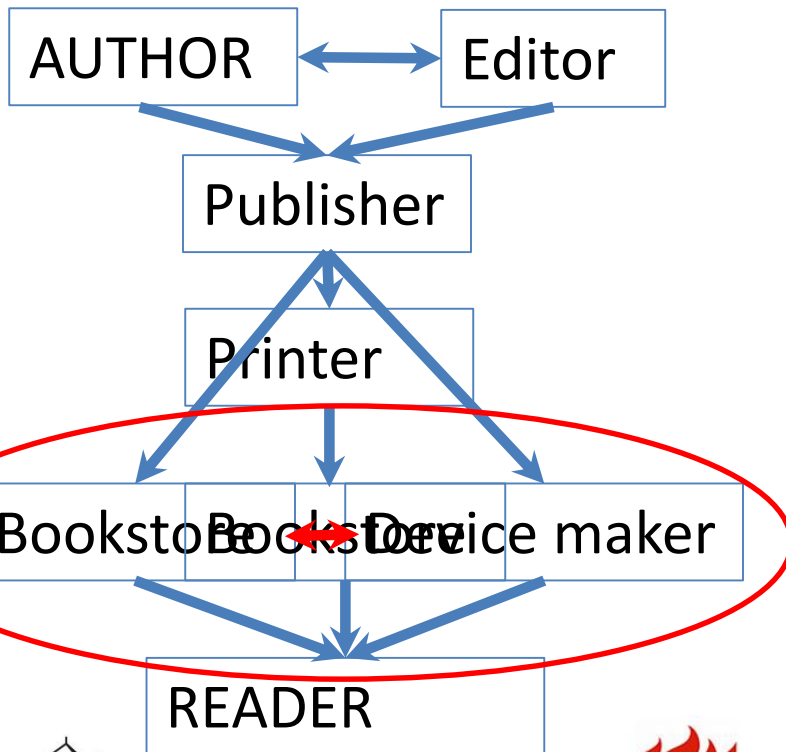- *Windows, Qualcomm* (CDMA technology for wireless)

$\Rightarrow$ Open up if markets for complements are competitive

$\Rightarrow$ Otherwise integrate to keep control
- Avoids *double-marginalisation* (two or more separate monopolists in a value chain → excessive margins, low volume – inefficient)

Example: eBooks (US)

Book industry value network

Competing for dominance

Who will be platform provider?

- Author creates content

- Publisher controls content

- Printing is wiped out

- Bookstore has the customers

- Device maker controls the format, DRM

Digitalization…

Bloomberg March 7, 2016:

Apple Rejected by U.S. Supreme Court in $450 Million E-Book Case

Apple Inc. must pay $450 million to end an antitrust suit after the U.S. Supreme Court refused to question a finding that the company orchestrated a scheme to raise the prices for electronic books.

Example: Big Data

- Capacity to capture and store information growing exponentially

- Sensor networks, social networks, admin data, health records

- Boon for social science… and business innovation?
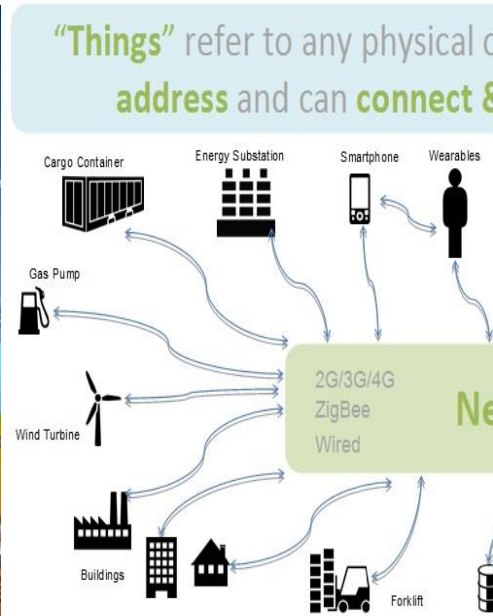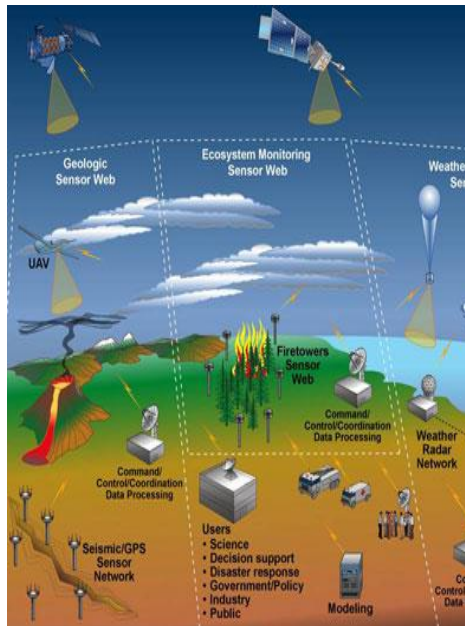
Common Pool Resources (Ostrom 1990)

- Costly but not impossible to exclude potential beneficiaries from obtaining benefits from use

- CPR → Tragedy of the Commons

- Collective action resolves TOTC and maintains resource if
  - Clearly defined boundaries identify legitimate users
  - Rules define how CPR should be used; metarules to change rules
  - Effective monitoring to enforce rules, boundaries

Types of market matching mechanisms

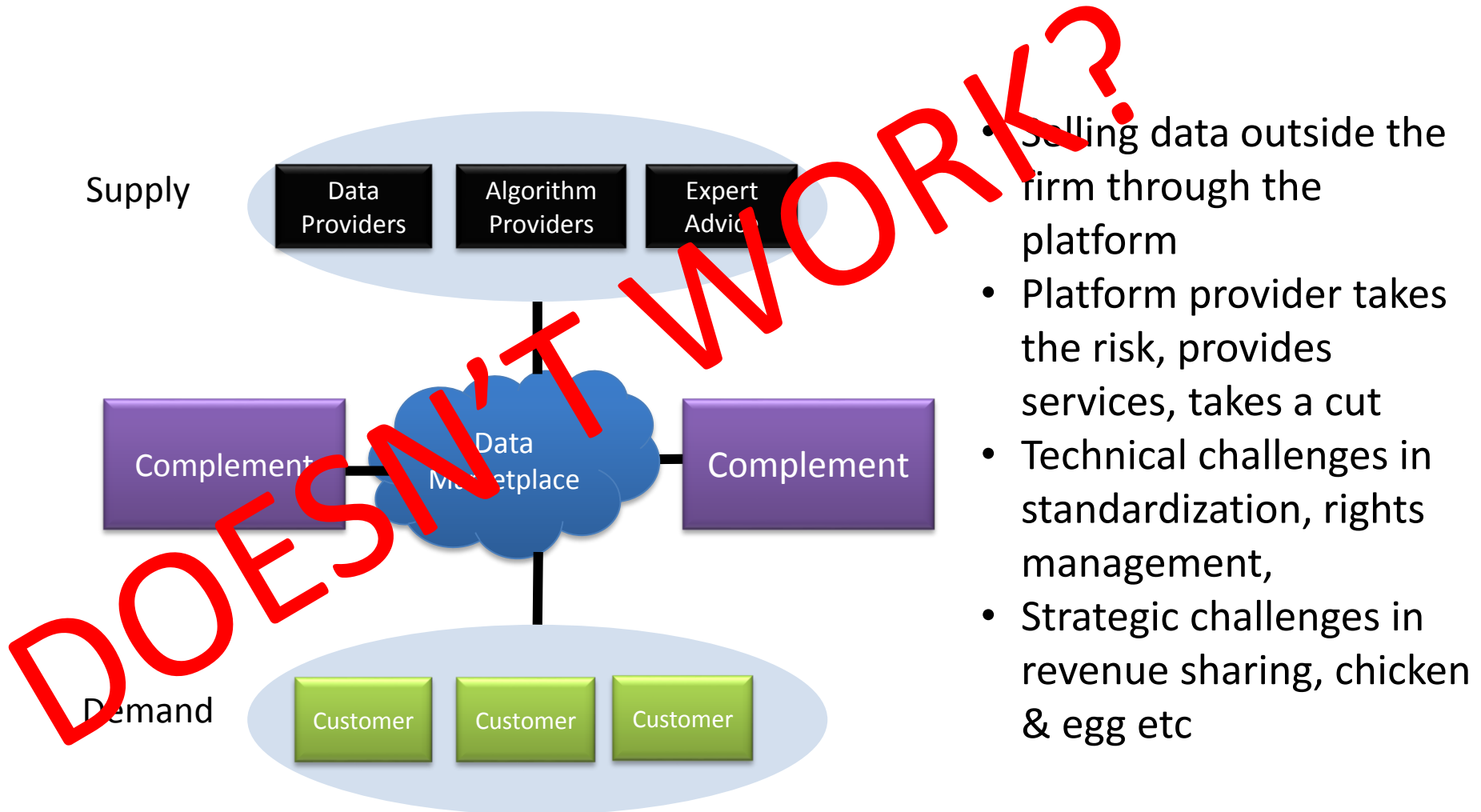| Matching	Marketplace design	Terms of Exchange	Examples
One-to-one	Bilateral	Negotiated	Data brokers
One-to-many	Dispersal	Standardized	Twitter API
Many-to-one	Harvest	Implicit Barter	Google Services
Many-to-many	Multilateral	Standardized or negotiated	InfoChimps, Microsoft Azure

"The (unfullfilled) promise of Data Marketplaces", P. Koutroumpis, A. Leiponen, L. Thomas
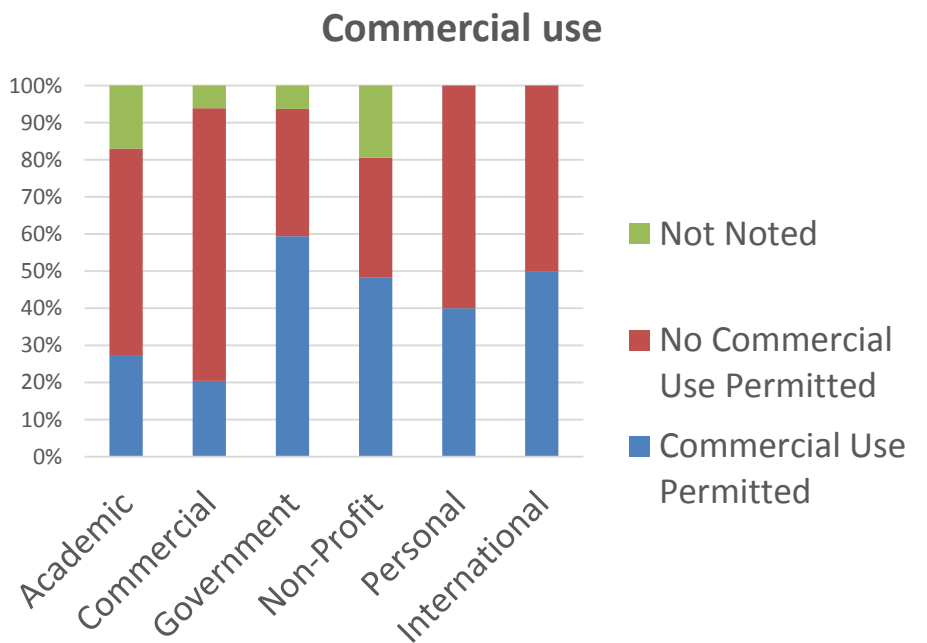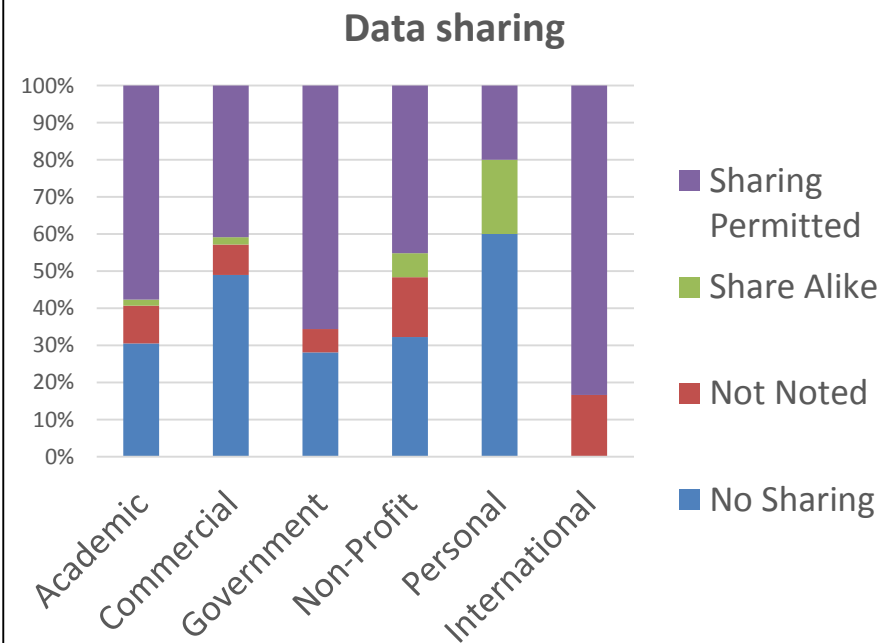
Proprietary data vs. other IP licenses

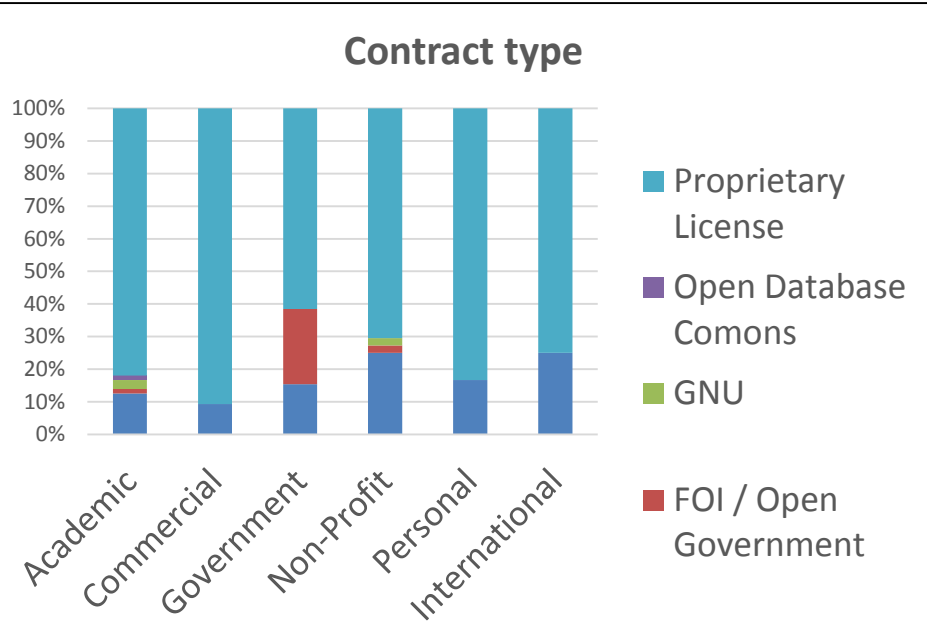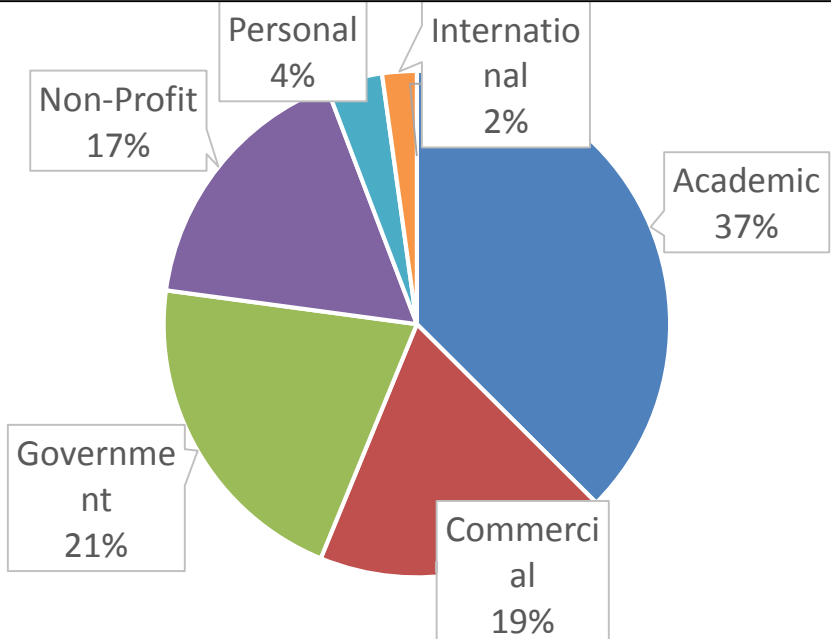|	Data	Patents	Trademarks	Copyrights
License duration	1-2 years	10-20 years	Up to 20 years	1-5 years
Exclusivity	Rare	Frequent	Often regional	Rare
Confidentiality	Frequent	Rare	Rare	Rare
Use restrictions	Abundant	Concise	Specific	Concise
Warranty	'As is'	Frequent	--	--
Obligation & remedy	Correct/refund/replace/ update	--	--	--
Audit	Frequent	--	--	--
Modal fee schedule	Annual subscription	% of sales or flat fee	NA	Per device

"Data Contracts", P. Koutroumpis, A. Leiponen & L .Thomas (2016)

Centralized Data Platform

Supply

| Data Providers | Algorithm Providers | Expert Advice |

Complement — Data Marketplace — Complement

Demand

| Customer | Customer | Customer |

DOESN'T WORK?

- Selling data outside the firm through the platform
- Platform provider takes the risk, provides services, takes a cut
- Technical challenges in standardization, rights management,
- Strategic challenges in revenue sharing, chicken & egg etc
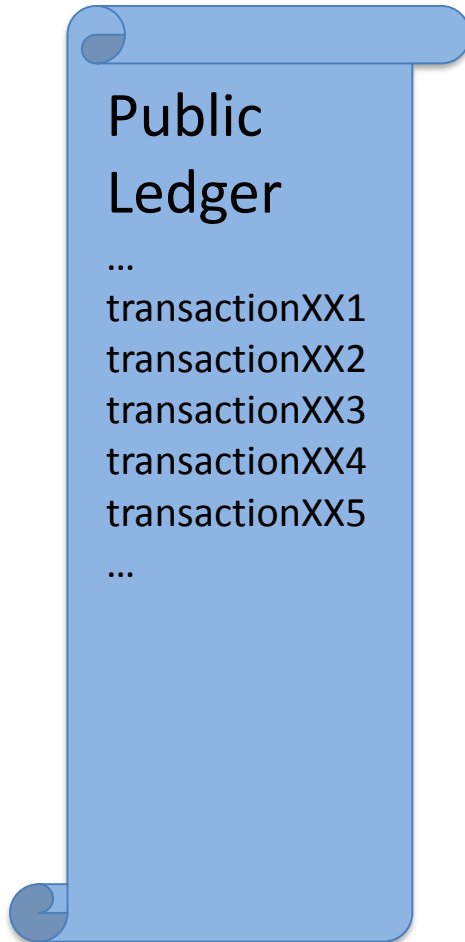
366 Open Data Contracts (T&C)

Decentralized Data Platform – blockchain for data?

User content & sensor data

Tagging & Cleaning

Public Ledger

…
transactionXX1
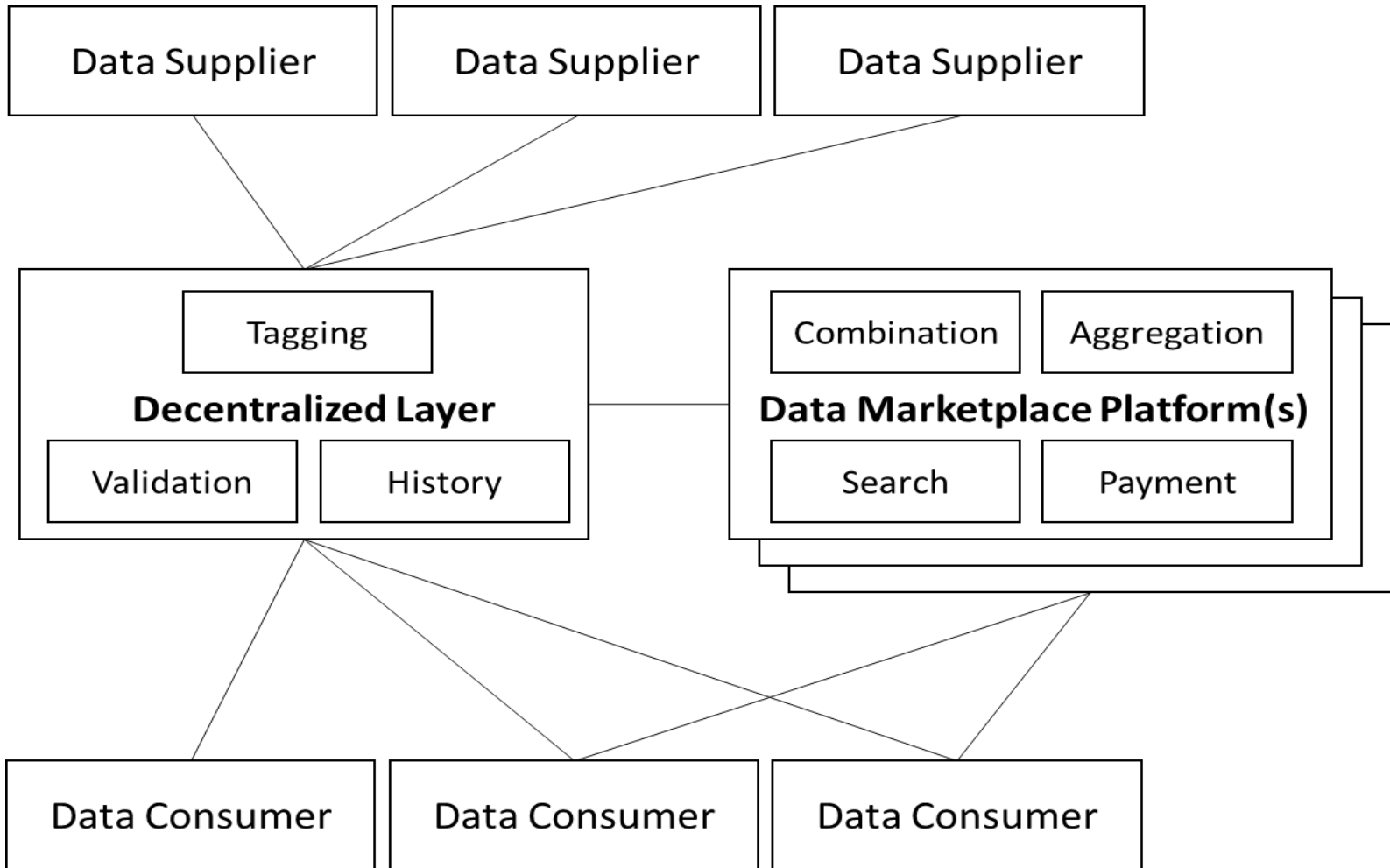transactionXX2
transactionXX3
transactionXX4
transactionXX5
…

Aggregators
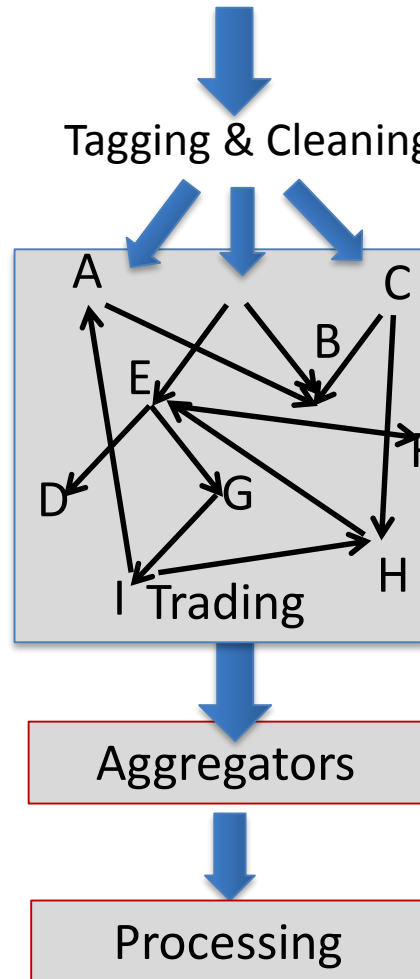
Processing

- "Bottom-up" approach in information exchange
- Users and sensors collect data
- Aggregators can buy/sell data for profit; data owners get paid and have control over future uses
- Processing, analysis and insights are separate

"The (unfullfilled) promise of data marketplaces", P. Koutroumpis, A. Leiponen & L .Thomas (2016)

Decentralization tasks

Marketplace and data typology

Matching	Marketplace design	Transaction costs	Provenance	Boundary definition	Rules definition	Effective monitoring	Characteristics of data
One-to-one	Bilateral	High	High	High	High	High	High value, High privacy
One-to-many	Dispersal	Low	Low	Low	Low	Minimal	Low value, Low privacy
Many-to-one	Harvest	Low	Low	Low	Low	Minimal	Low value, Low privacy
Many-to-many	Multilateral Centralized	Low	Medium	Medium	Medium	High	Medium value, Medium privacy
Many-to-many	Multilateral Decentralized	Medium	High	Low	High	High	High value, Medium privacy

Data is no longer a Common Pool Resource!

Performance of centralized and decentralized market designs

	Centralized	Decentralized
Thickness	Variable depending on the rules and membership/usage fees	Assumed to have full participation
Congestion	Assumed to have minimal effect	Assumed to have minimal effect
Transaction costs	Very low	Increased friction for each transaction (can be limited by using trusted third-party licensing)

Conclusions

- **Platforms/multisided markets** bring together multiple different types of parties
- There are **complementarities** among the parties
  - Need to engage the different sides
  - **Pricing and integration** strategies may help in reaching critical mass for the platform
- Successful platforms benefit from strong **network effects** and **scale economies** and can become very profitable …and very powerful
  - *Monopolization of communication and information platforms can be societally harmful*
  - *Algorithmic transparency/monitoring will be necessary*
- How digital platforms are **operationalized** depends on the nature of the service/good provided, institutional setting, Digital Rights Management – **IoT**

What have we learned?

- Data really is a different kind of an intellectual asset
  - Careful attention to technical, institutional detail is required!
- Trading regimes: secrecy & trust or verification technology (blockchain?) – or 'FREE'
  - *Bilateral* trading sets up a relationship with remedies, audits, subscriptions as contractual features
  - *Multilateral* based on verification tech could be anonymous and one-off – probably for more high-value data due to computing cost
- Continuing evolution in control technologies and Artificial Intelligence will be the "invention machines" of the 21st century – data will be the lubricant