

# Information as an economic good in the future internet

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## Outline

- Introduction
- What makes information an economic good?
- What kind of good is it?
- How does this relate to the future internet

# Introduction

- Information is both a good in its own right (given suitable property rights) and a complement to economic activity (production, innovation, search)
- Information is intangible
- The ‘economic’ (scarce, value-creating) aspects derive from creation, sharing, storage, access, utilisation, etc. Contrast with ‘normal’ cycle of production/exchange/consumption
- Its hedonic qualities (accuracy, completeness, objectivity, timeliness, etc.) may be hard to verify, unstable and subjective.
- It need not be true to be valuable.
- Levine and Boldrin note that the enormous difference between the ‘fixation’ of information in IPR and other property rights makes little sense
- Games of incomplete information show the distinctive role played in strategic interactions
- The enormous amount of communication that involves no new information shows that it ‘works’ as a form of social contact rather than ‘mere content’

## Information as a 'public' good?

- Generalises 'Samuelsonian matrix'
- Value may be increased or decreased by use or sharing
- High degree of complementarity with other information – major problem for markets (which work better with substitutes)
- 'Standard' nonexistence of equilibrium and interim inefficiency problems: how can I buy it unless I know what it is?

Self	Other	Negative	Zero	Positive
Y	Y	Private	Club good	?
Y	N	Congestible	Big Commons	?
N	Y	Public service	Pure public	?
N	N	Environmental goods		

## Information and the network

- Often, value depends on distribution – special case: common knowledge – this is a form of linking (who knows what, who knows that they know it, etc.
- Markets (another form of network) elicit, integrate and price information – Fama's efficient markets hypothesis clarifies this.
  - Wisdom of crowds is an example of emergent informational efficiency
  - The future Internet (esp. high speed trading, mass data retention, sharing and analysis) changes the mechanisms by which an efficient market works
    - A market may cease to be efficient because it no longer profits stakeholders to bring their information to the market
    - The results may be observationally equivalent – both efficient and 'blind' markets look like random walks
    - The market may simply process purely endogenous information and ignore fundamentals
- The combination of FI and financial markets is doubly *complex*
  - Emergence
  - Synchronisation (e.g. flash crashes)
  - Endogenous discrimination
  - Self-organised criticality

# Search

- Markets depend on competition, which depends on *search*
  - Identification, realisation and sharing of gains from trade
  - Emergence of intermediaries
- Job search networks make labour markets (and macro performance) notably better
- They can even change business models (e-lancing)
- This points up the importance of social networks – by extension the intangible networks of shared and flowing information that spring up on top of the (past, present and future) internet
- Changes in the physical/logical internet and changes in reachability (BGP) will change these intangible networks

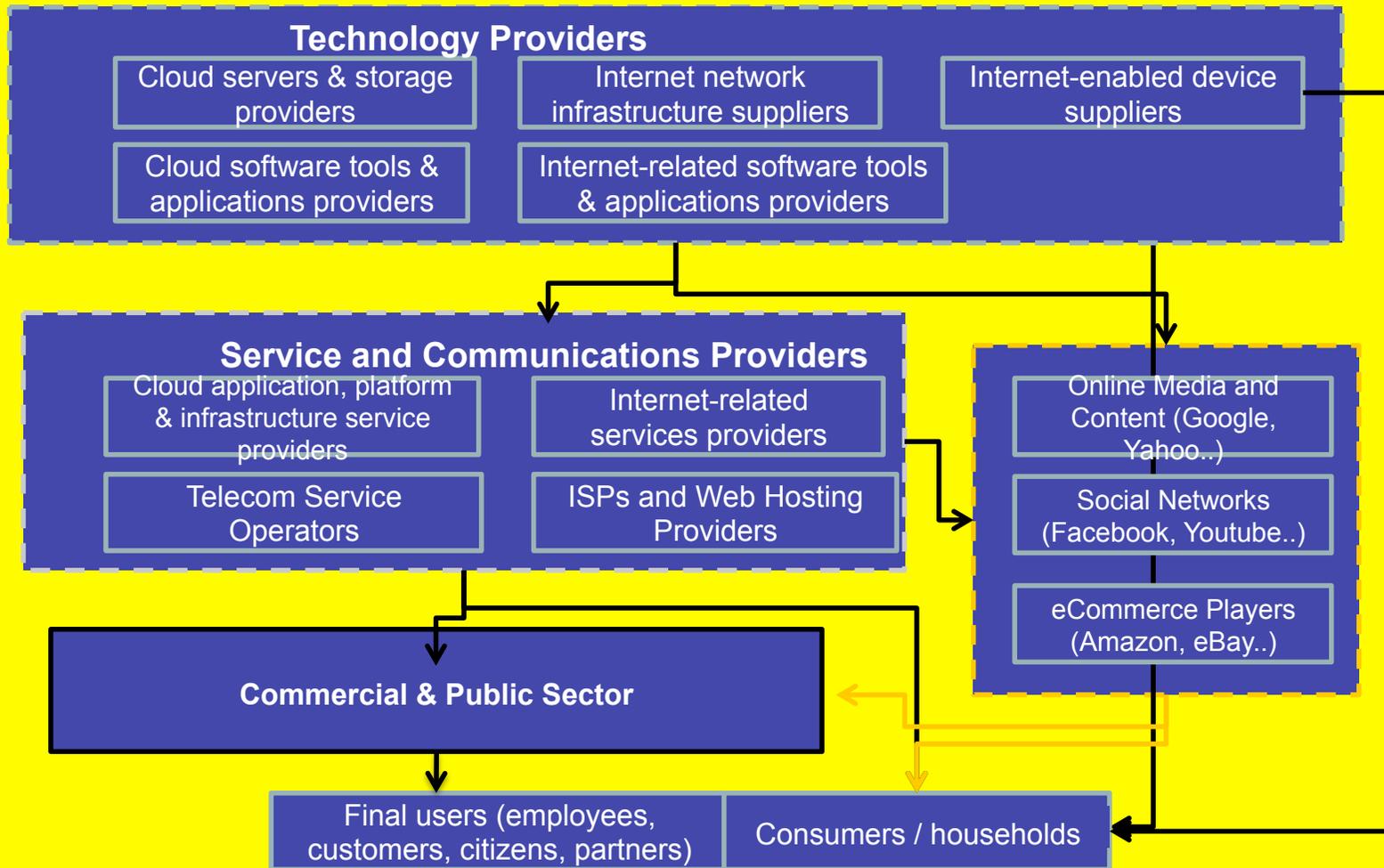
## FI3P

- Study in support of a Future Internet Public-Private Partnership (FI3P)
  - Ongoing study to identify in quantitative and qualitative terms the potential economic and societal longer-term impacts of the application driven public-private partnership on Future Internet
  - Core institutions: IC Focus, IDC, ISMB, *RAND Europe*, WIK Consult



- [Operational definitions of FI]
- Assessment of current European Internet industry, sector, economy
- Analysis of near-term and post-2013 FI PPP policy options
  - Rendition in models
  - Development of scenarios
  - Impact Assessment
- Next slide: brief introduction to last two items

# European Internet Industry Structure



## Current European Internet industry (EII)

- 2009 Internet technology and service revenues were €121.9 B;
- 60% from (Internet-related) telecom services spending, but Internet IT and Networks will grow faster (and also drive other parts of IT budgets)
- This is 23% of ICT market but will grow to 31% by 2014.
- EII Top 100 had combined revenues of €110.7 B in 2009 from Internet-related activities in the EU alone. However, this covers considerable asymmetry : the largest company generated more than €12 B; 100<sup>th</sup> generated only €22 M. This indicates strong fragmentation in the industry and considerable market power.
- Also asymmetric as to country of establishment (Fr, UK, Nordic), segment (telecom = 44%, software = 20%, service providers = 13%) and reach (55 global, 25 local)
- Continuing business model evolution

## Implications for the future

- Contribution to ICT impacts on productivity, sustainable growth, equity and economic efficiency is hard to separate.
  - Need better tools, models and data to handle dynamics of the Internet economy
  - ICTs are traditional source of economic growth and recovery, but hard to ‘embed’ – this is probably more true of the FI as a “glocal” commons than of ICTs *per se*.
  - EU firms dominate EU telecom and IT services, but US/global firms dominate the innovation-friendly elements
  - Struggle for dominance between technology, application, service providers likely to be critical
- The provision, maintenance and regulation of the Internet itself is likely to remain a subject of acrimonious debate, e.g.
  - As recession erodes public and political support for large infrastructure projects, public funding may drop; private parties will continue to provide infrastructures, but attempt to assert control at all layers (e.g. aspects of NGNs, Walled Gardens)
  - As economic value-creation and innovation move into the service and application layers, profitability will drop for infrastructure providers and the sector as a whole; this may limit or distort FI development

## Regulatory challenges

- While core technologies are developing rapidly
  - Implementation (esp. in Europe) is lagging
  - Complementary technologies are yet to take off
  - Other problems of privacy, security, liabilities, etc. remain unsolved
  - Small innovations (esp. in the EU) face steep and increasing hurdles in scaling up and spreading out without takeover or relocation
- The EU telecommunications regulatory framework has led the world
  - It may not generalise to the Internet
  - The regulatory approaches from affected domains are inconsistent
  - The scope and implications of e.g. technological, content, service, network ‘neutrality’) remain unclear – see latest EU survey on NN
- Stakeholders have proposed regulatory holidays and support for collaboration, standardisation, exploitation, community building & outreach, research on regulatory issues, but these may have ‘rebounds’
  - Temporarily tip playing field in traditional markets and business models in favour of incumbents, and encourage them to rest on their laurels.
  - Reinforced by natural reluctance of hard-pressed EU governments to put any strain on their ‘national champions’