Regulation, market structure and incentives to innovate in IoT markets

WSIS Forum 2017

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Outline

• Is ICT innovation "different"?
• Does ICT innovation create "new" challenges for regulators?
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Context

- ICT innovation affecting all sectors of the economy (IoT, AI, digitisation).
- This is happening worldwide.
- Premature de-industrialization: sooner and at lower levels of income (D. Rodrik)

Is ICT innovation "different"?
The decline of productivity growth since the 1990s

Annualised growth of labour productivity (output per hour worked)

ICT vs Manufacturing

• **Alphabet:**
  Operating revenues: 90,272,000 Th. USD
  Employees: 72,053
  Ratio: **1253** Th. USD per employee

• **Facebook:**
  Operating revenues: 27,638,000 Th. USD
  Employees: 17,048
  Ratio: **1621** Th. USD per employee

• **Volkswagen:**
  Operating revenues: 237,564,000 Th. USD
  Employees: 626,715
  Ratio: **379** Th. USD per employee

• **Johnson & Johnson**
  Operating revenues: 71,890,000 Th. USD
  Employees: 126,400
  Ratio: **568** Th. USD per employee

Source: ORBIS, Bureau Van Dijk. Data refers to 2016

Champions of productivity or simply **Scale without Mass?**
Can current innovation undermine future incentives to innovate?

For example: Scale without Mass

- **WhatsApp**: 300 M users, 50B message/day, 55 employees
- **Netflix**: USD8.8B revenue, 3500 employees
- **Dropbox**: 500M users, 1.2B files stored/day, 1200 employees

Challenges policies that target firms by measure of mass (e.g. employees) as well as competition policy, may contribute to productivity divergence across firms.
Does ICT innovation create "new" challenges for regulators?
Example: Smart home system

Two different scenarios:

1. **Closed bundles**: Producers sell the whole system, i.e. components are compatible only with other components produced by the same company.

2. **Compatibility**: other producers can sell separate components that enrich the smart home system.

What can determine the prevalent scenario?
The usual suspects

- Competition policy
- Initial market power
- Quality
- Technological constraints
- Patent ownership
- Reputation
- etc...

Vast related literature

But regulators may need to protect citizens against "new" threats
Ex. 1: Strict Liability

- **Consumer protection**
  - Liability
    - Crucial for compatibility decision
    - Impact on market structure
    - Impact on Innovation

- **Strict liability?**
  - Control unit producer
  - Data provider
  - Software provider

- **Trust**
  - Cost of monitoring
  - Contract law
Ex. 2: Data portability

Privacy and Control

Data portability

Competition or network externalities?

Impact on market structure

Impact on Innovation

Control your data

Switch hardware

Switch Data service provider

Block access

Low entry costs

Direct network externalities

Indirect network externalities
Ex. 3: Access to data

Environment
al protection

Data available
to public bodies

What remuneration?

Impact on investments

Impact on Innovation

Anonymisation?

Electricity consumption
Water consumption
Lifestyle?

Risk of abuse

Mandatory disclosure
Remuneration
Conclusions

• Balancing public interests and market economy
• Public – Private partnerships
• International harmonisation of regulation