



EUROPE



FI3P: The Impacts of the PPP on the Economic Contributions of the Future Internet

Jonathan Cave

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The project

“The many, seemingly unrelated, changes in technology development and services generation are now coming together and have the potential to unlock unprecedented user value for businesses and citizens alike. Understanding the future societal and economic impact future Internet services and applications will enable, is the key to strengthen their development today”

- **Peter Fatelnig, Deputy Head of Unit, DG Information Society, European Commission.**
- **FI3P (Study in support of a Future Internet Public-Private Partnership) is funded by the European Commission, DG Information Society and Media.**
- **Its objective is to identify potential economic and societal longer-term impacts of the public-private partnership proposed in the Commission communication “A public-private partnership on Future Internet.”**
- **Coordinator: RAND Europe**
- **Partners: IDC; WIK Consult; IC Focus; Istituto Superiore Mario Boella**

Message: the Internet is a complex, layered and evolving social construct. The world has piled in sharp economic challenges, but the underlying forces and trends have not disappeared. This economic urgency threatens to divide us:

- Governments seek cost and expenditure reduction
- Businesses are desperate to sustain themselves

The medium-term consequences may be severe unless we

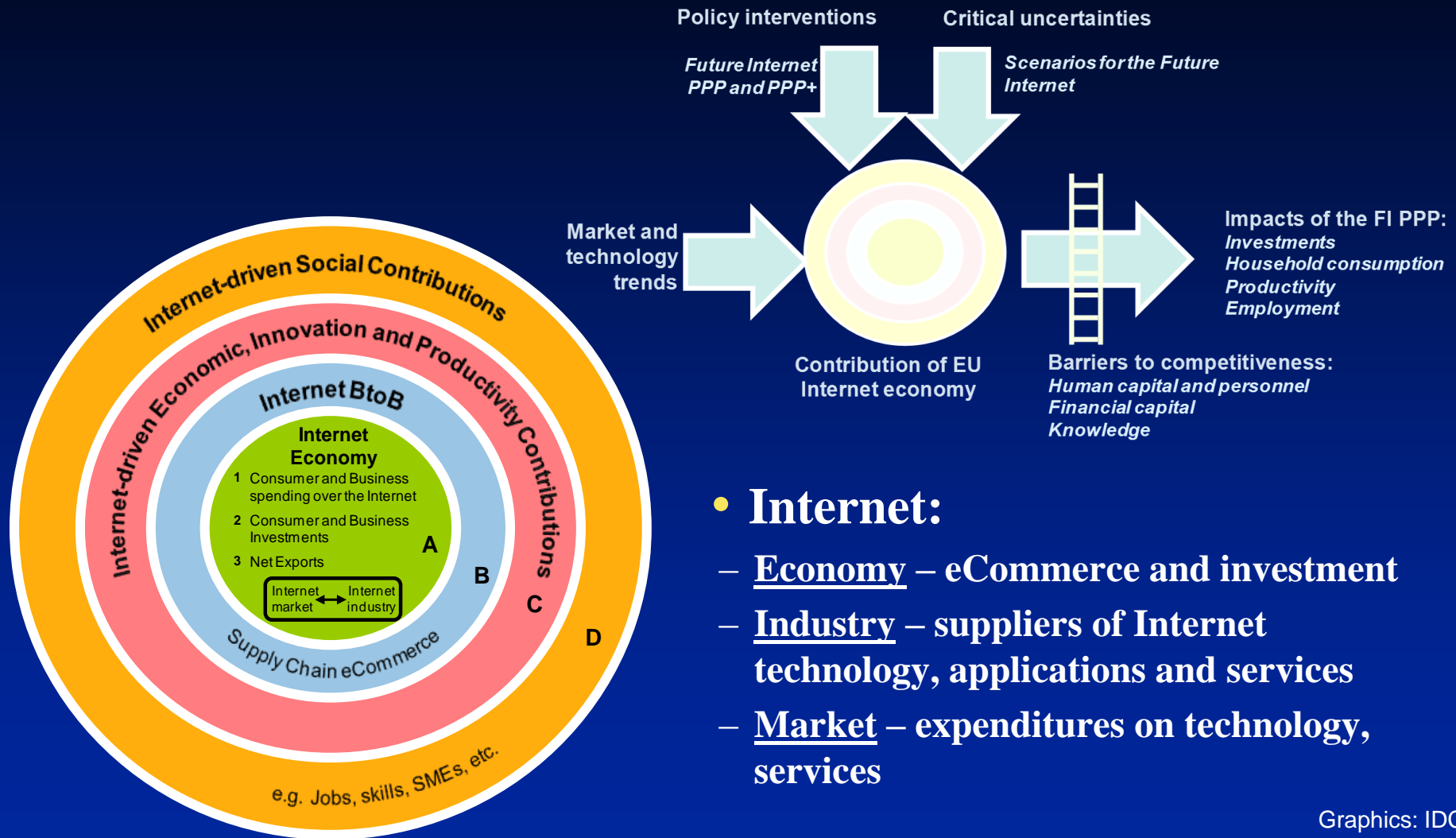
- Bring together all parts of the Internet Society in competition as well as cooperation
- Remember the opportunities as well as the threats
- Think clearly about the changes as well as the challenges and
- Recognise the complexity of the Future Internet

- **Economic contributions of the Future Internet**
- **Impacts of the Future Internet Public Private Partnership on those contributions**
- **Implications for successor and related activities**

Economic contributions of the Internet

- 1. The Internet's economic contributions – and challenges to their sustainability – are not always obvious, but they are profound, pervasive and complex**
- 2. The FI3P study mapped the European Internet industry, sector and economy and assessed their current and future contributions to revenues, GDP, employment, etc.**
- 3. This revealed substantial contributions, unevenly spread across the Internet ecosystem and of uncertain sustainability**
- 4. Contributions to the broader European economy are likely to play a crucial role in the challenging times ahead**
- 5. The future is considered in terms of scenarios reflecting the pace and breadth of adoption of new Internet-based services and exogenous macroeconomic uncertainties.**

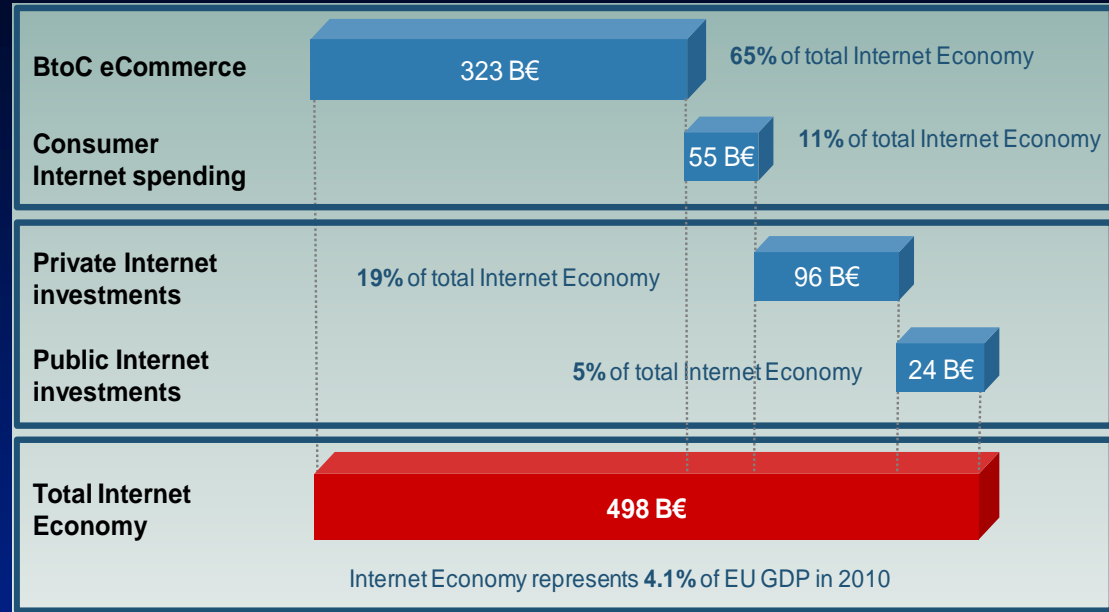
Overall framework and Internet economy



- **Internet:**
 - Economy – eCommerce and investment
 - Industry – suppliers of Internet technology, applications and services
 - Market – expenditures on technology, services

Graphics: IDC

The European Internet Economy in 2010



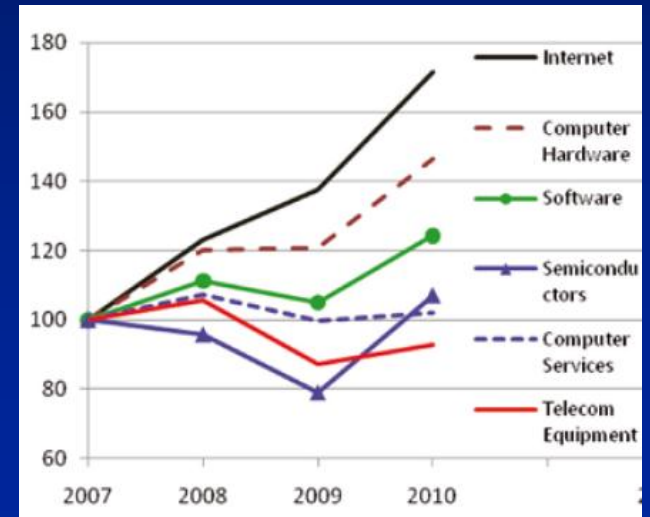
	Size in Billion €	Proportion of GDP
UK	105.9	6.2%
Germany	117.6	4.7%
France	89.2	4.6%
Italy	57.8	3.7%
Rest of EU	95.2	3.0%
Spain	27.0	2.5%
Poland	5.6	1.6%

Graphics: IDC

25th October 2011

Near term prospects: the Internet economy in the global economic crisis

- Globally, the combined ICT and Internet sectors experienced a short, sharp recession compared to the overall economy
- The Internet component was far less affected than ICT
- Some aspects such as eCommerce may benefit in the short run
- The Internet economy may lead the recovery; difficult parts may be
 - Sustaining this lead
 - Stimulating employment and R&D
 - Increasing diffusion to other sectors
 - Key applications and services (e.g. cloud)
 - Maintaining access to capital



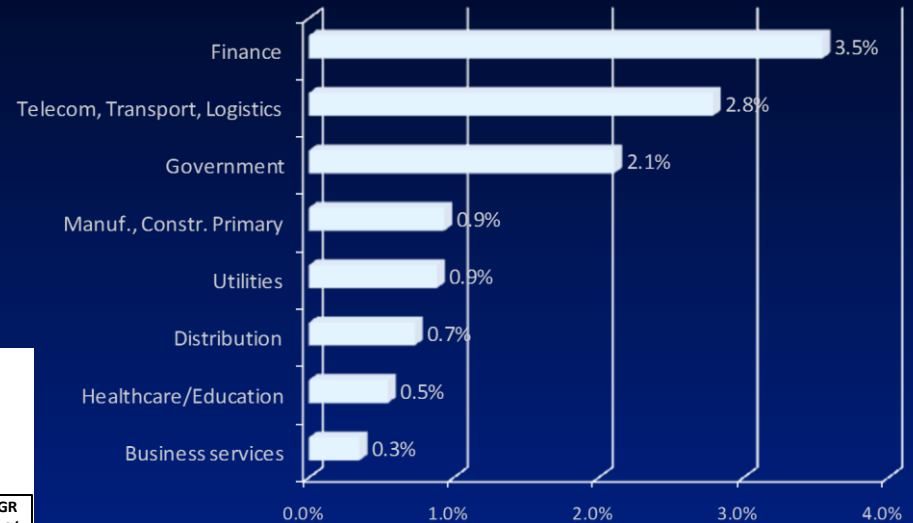
Graphics: IPTS

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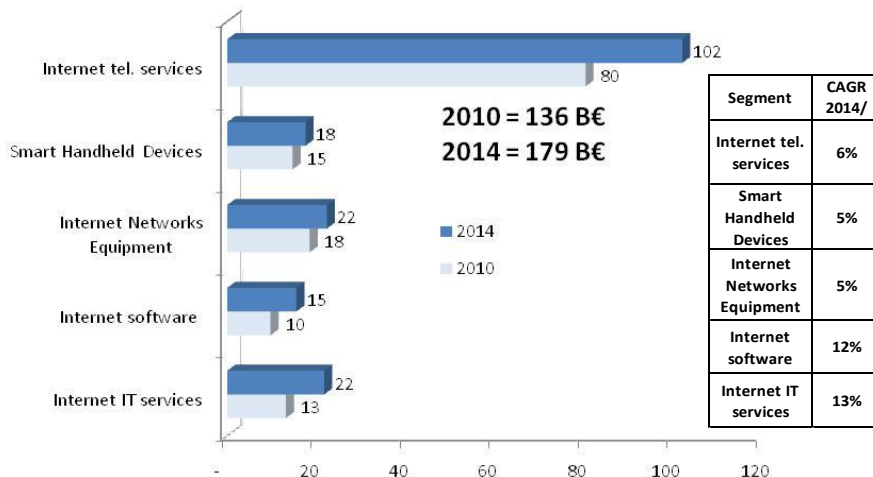
Further out: spending and projected revenues by sector

Big Internet spenders may not be the most innovative

Intensity of Internet spending by Sector



Core European Internet Industry Revenues, 2010-2014



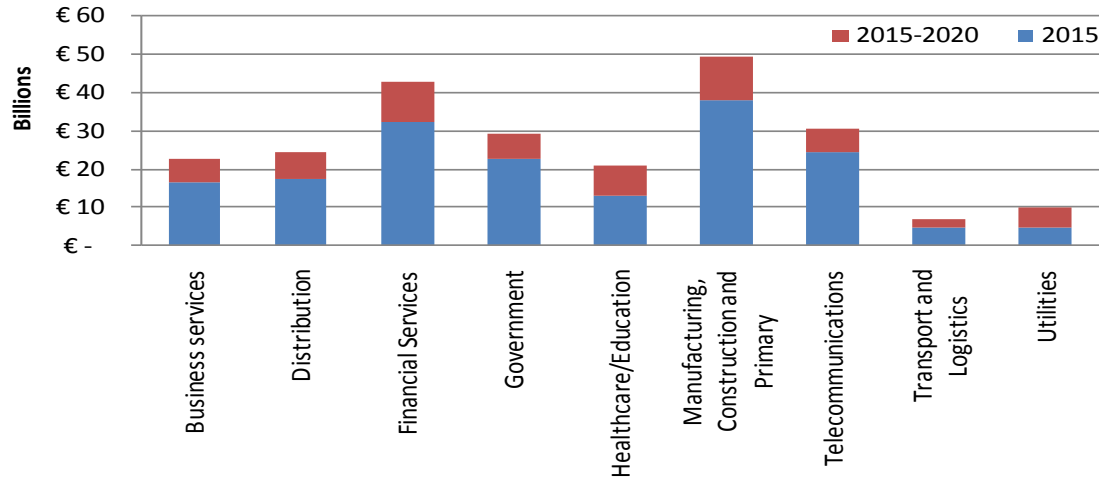
Segment	CAGR 2014/
Internet tel. services	6%
Smart Handheld Devices	5%
Internet Networks Equipment	5%
Internet software	12%
Internet IT services	13%

Telecom services continue to dominate, but grow more slowly and are less 'globalised'

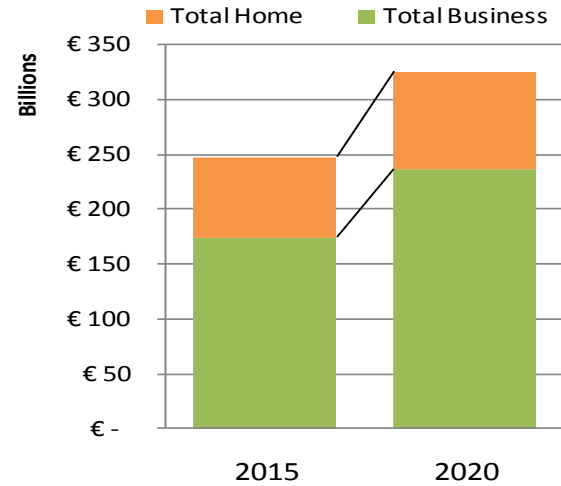
Graphics: IDC

Projected size and composition of Internet economy

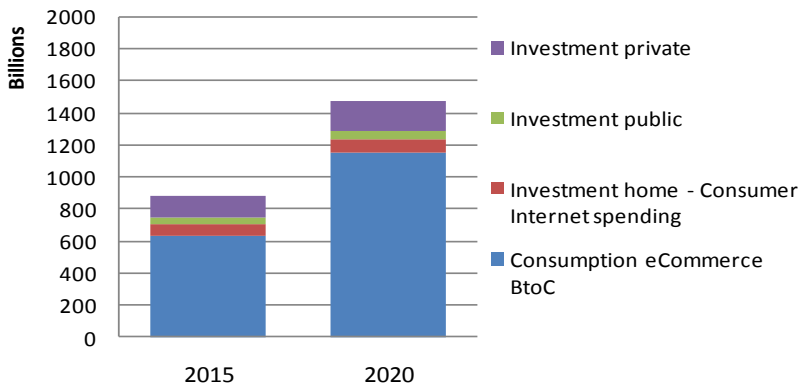
a) Internet market value by sector



b) Total Internet market value



Projected size of Internet economy



- We constructed 3 scenarios; this corresponds to the central (“realistic”) scenario
- Diffusion effects are increasing
- B2C will see the next wave of innovation uptake
- Private investment will strengthen

Graphics: IDC

Drivers and key players will change

- Internet economy adds 4.1% to EU GDP; projected to grow **7 times as fast**
- Growth
 - Currently more **demand-pull** than investment-push
 - Contributions' size and (EU) embedding are therefore uncertain
 - **PPP will rebalance** driving force from consumption towards productivity
- Pending **clash of IT-based and telecom-based titans**
 - Revenues currently dominated by telecoms, but these continue to drift down
 - Plans indicate horizontal and vertical diversification, return-targeted innovation
- **Rise of the mammals:** technical/service changes favour Internet-based entrants
 - Cloud computing weakens end-user OS and hardware lock-in
 - Apps dominated by small and user/application-based suppliers
- **Measured revenues understate** true contributions
 - Inframarginal gains, unmonetised benefits, indirect productivity improvements and broader societal contributions

European perspective

- **European firms do well in European markets**, esp. ICT and telecoms
- Europe is a **leading advanced demand-side player**, but remains fragmented
- Europe's performance is **less strong in services** and other rapidly-innovating sectors
 - no ISPs in top 20, only one global business service front-runner
- **Largest EU Internet economy sectors have lowest intensity** of advanced Internet services
 - this is linked to the 'productivity gap' and is expected to reverse
- **SMEs:**
 - 99% of businesses, 35% of Internet market
 - Known barriers to adoption of new technologies and services persist
 - SMEs are not all the same (regular, gazelle, seedling): composition expected to change
 - Some **pathfinder segments dominated by SMEs** (500K iOS + 350K Android apps, avg. 3 per supplier!)
- **High costs** of start-up, transactions, risk
 - Coming down in some areas
 - New architectures (cloud), business models (collaborative innovation), network structures (virtual firms)
 - New policy initiatives
- **But costs of failure remain very high**

Human and knowledge capital, rebounds

- **Skills and employment**
 - **Transitory** skills shortages
 - **Quality** of jobs a more substantial concern
- **Invention**
 - European and US R&D and **patenting** have levelled off; Asian countries accelerating sharply
 - Internet- and service-sector R&D expenditure is mainly **pro-cyclical**
 - This threatens **sustainability of growth** and strength of R&D base
- **Not all indirect innovation impacts are positive**
 - E.g. High-speed financial trading
- **Future challenges:**
 - **Domestic presence** in innovative service layers
 - Increase **competitiveness**
 - Strengthen **innovation-friendliness**
 - **Rebalance returns** towards end-user-facing part of value chain
 - Increase the **societal contributions** needed for recovery – and beyond.

Modelling the impacts of the PPP

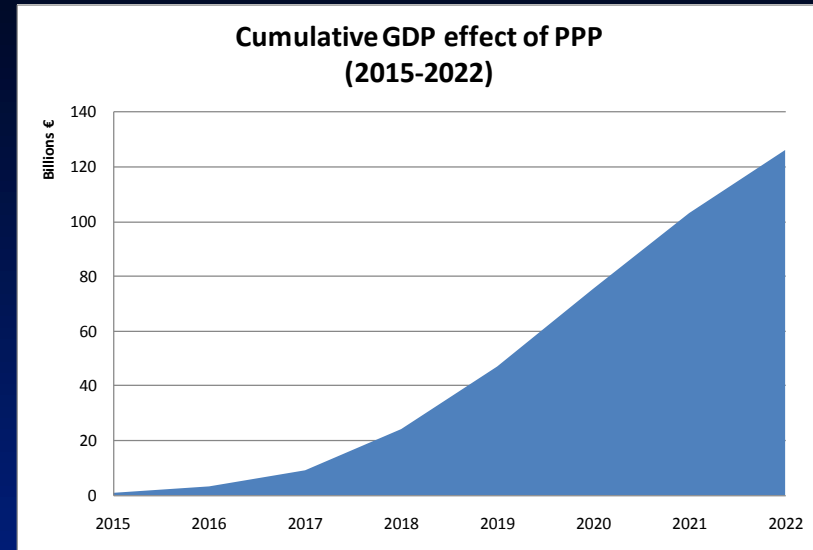
- **PPP activities: Core architecture, Use cases, Infrastructure**
- **Current (“PPP”) and successor (“PPP+”) phases stimulate**
 - investment,
 - private household consumption
 - (labour) productivity
- **PPP modelling reflects**
 - Current functionalities planned for Core Platform and Use cases
 - Continuation of near-term secular trends
 - Some impacts require medium-term follow-up and consolidation
- **PPP+**
 - Additional use cases, possible rival technologies
 - Extended forecast period
 - More extensive diffusion and spillover effects

Three overall scenarios

- **Dimensions: European recovery, diffusion of innovation, geographic balance**
- **Realistic**
 - ECFIN baseline, Internet prominent but not dominant,
 - Mixed innovation uptake, no clear winner
- **Tipping Point**
 - Demand-led recovery across sectors, competition on open platforms
 - Wide and balanced diffusion, triumph of the mammals
- **Slow Motion** –
 - Faltering recovery strikes consumer and home market spending
 - Investment is weak and fragmented
 - Clash of titans won by risk averse telcos, competitiveness wanes

Impacts of PPP on GDP

- Concentrates on whole-economy impact – these figures are for the Realistic Scenario
- Annual positive impact on European real GDP reaches 28 €B in 2020
- Cumulative effect by 2020 is €126 bn
- Increases contribution of Internet economy by 5.7%
- Proportionate effect greatest in CR, Hu, Lu; low in It, Fr, At (rapid modernisation)



Impacts of PPP: Productivity drive

Relative consumption, investment, and productivity effects by Member State (2020)

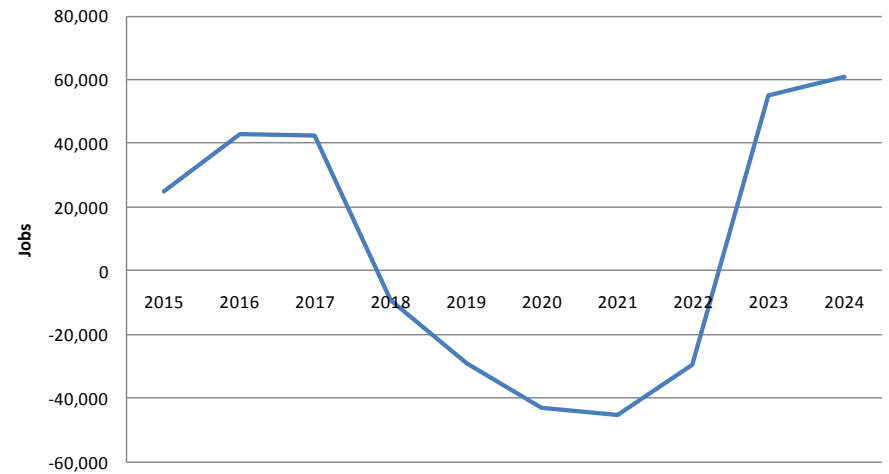


- In realistic scenario, PPP raises production through (primarily) productivity and investment
- The productivity increase reduces factor demand, costs; raises competitiveness
- May reduce sales and employment in most-affected industries

Complex impact on employment

- Near term consumption, investment increase employment
- Medium term productivity effect raises real wages, cuts employment
- After these bed in, employment bounces back to higher level

Annual effect of PPP on employment



Impacts of PPP+ on Internet economy

• Realistic scenario

- Widespread adoption; SMEs still lag; economic growth punctuated by crises;
- Benefits produce one-off increases in economic contribution

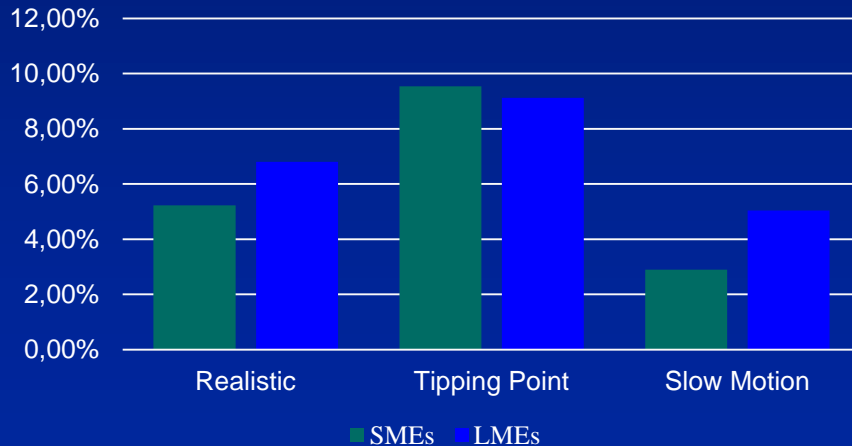
• Slow motion

- Narrow and slow adoption; SMEs marginalised; slow economic recovery and sustained vulnerability
- Contributions weakened, esp. for SMEs

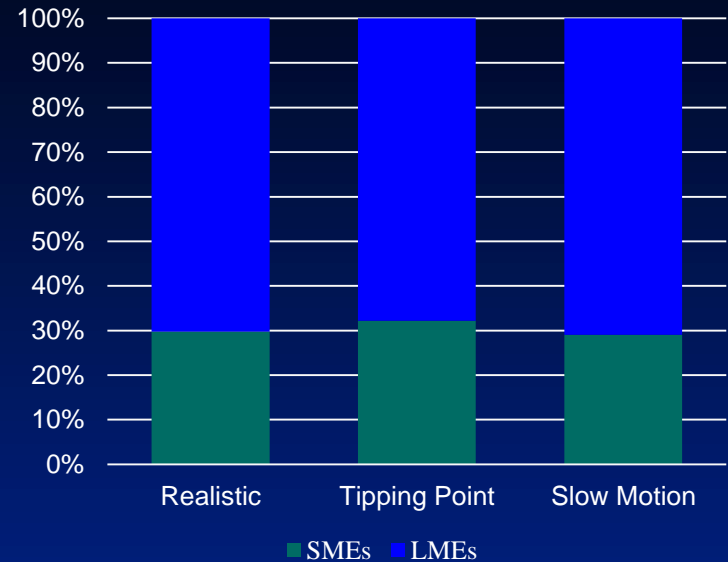
• Tipping point

- Widespread adoption by all sectors, sizes; rapid growth
- Global networks of service-orientated SMEs

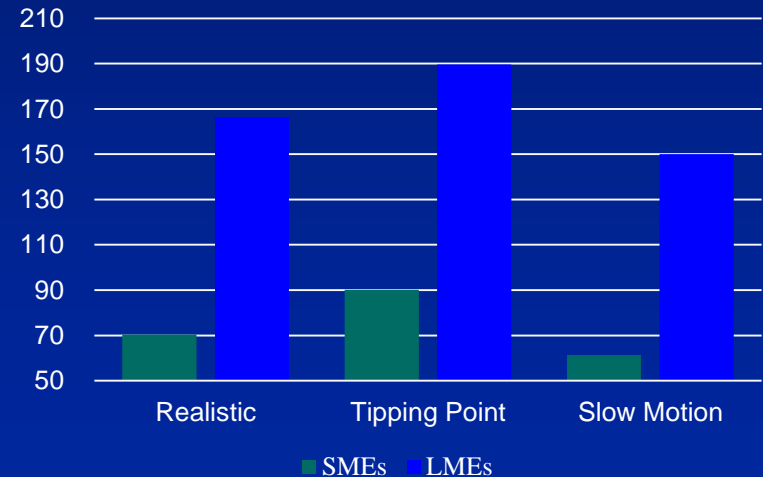
CAGR



Market share



Internet investment 2020 (€B)



PPP+ Impacts on macro economy

- **In the Realistic scenario, the PPP+**
 - Raises European real annual GDP by 48 €B in 2025 compared to baseline without PPP
 - Produces a cumulative increase of 270 €B over 2015 - 2025
 - Increases contribution of European Internet economy to overall European real GDP by 10%
- **In the Tipping Point scenario, the PPP+**
 - Raises European real annual GDP by 58 €B in 2025 compared to baseline without PPP
 - Tipping Point Increases PPP+ Impact by 10 €B compared to Realistic Scenario
 - Produces an extra 88,000 jobs in 2025 compared to baseline (more than in Realistic scenario)
- **In the Slow Motion scenario, the PPP+**
 - Raises European real annual GDP by 37 €B in 2025 compared to baseline without PPP (despite overall contraction of 570 €B – hence “FI-Keynesianism”).
 - Slow Motion decreases PPP+ Impact by 11 €B compared to Realistic Scenario
 - Slow Motion scenario leads to a contraction of 16,000 jobs in 2025 compared to baseline
- **Demonstrates the complementarity of the PPP+ and economic recovery policy**

PPP and PPP+

- PPP raises Internet contribution to GDP by 5.7%
- Impacts strongest in recently-modernising countries
- Growth rebalanced from consumption to productivity
- Globally, rival nations may experience greater gains from similar stimuli, but competitiveness picture is not simple
 - China, India led by exports and IPR returns
 - ICT investment productivity higher in US
 - Global economic picture depends on comparative advantage
- PPP+ is necessary to sustain PPP benefits, but must be evaluated as a “real option” including governance impacts
- Job quality may rise
- Business models likely to evolve towards: personal information assets, networked relationships, etc.

Tentative conclusions and recommendations

- 1. There's no success without failure**
- 2. Old models and roles die hard**
- 3. The Darwinian hive**
- 4. Beyond money and content**
- 5. How to grow weeds**
- 6. Grand challenges in a time of existential panic**
- 7. The PPP as a well-regulated tussle**

Tentative conclusions and

recommendations

- **(The possibility of) failure is essential to innovation, at least upstream and/or at individual firm level**
- **Scale and breadth of PPP allows ‘portfolio success’**
- **Regulation can provide a useful structure**
 - **Complement competition by protecting consumers**
 - **Prudential regulation to protect investors**
 - **Macroprudential regulation to enable system to function**

2. Old models and roles die hard

- **Incumbents from both IT and telecoms seek to protect business models**
- **Products, sectors, services, firms and markets may be misleading concepts**
- **Agency relationships and trust may be undermined by e.g. austerity measures, excessive monetisation, IPR wars, etc.**
- **Dual roles: governments as cloud providers, users as inventors**

Tentative conclusions and recommendations

- **Internet ecology is a complex adaptive system:**
 - **Self-organisation towards the boundary of discontinuity**
 - **Robust-yet-fragile stability**
 - **Collective intelligence (and stupidity)**
- **Development cycles between large/slow and small/‘smart’**
 - **Big IT, telco firms -> start-ups -> Big ISPs and social networks**
 - **Dumb terminals/mainframes -> PCs and E2E networks -> tablets using cloud apps and data centres**
- **Long waves in hardware, usage and societal interaction**
 - **Internet based on PCs and fixed networks**
 - **Mobile and convergent devices using hosted computing**
 - **M2M, IoT, sensor nets, etc.**
- **Internet cannot be wholly designed or controlled, only influenced: PPP acts as a natural experiment through dispersed participation, funding, etc.**

Tentative conclusions and recommendations

4. Beyond money and content

- Monetisation drives some actors at some points, but the history of the Internet reminds us that money is a signal, often encrypted
- Internet takes us from (tele)communication to content, but
 - Co-location is essential to innovation, but not to content exchange
 - Much content is available from many sources, repetitive and even trivial
- PPP use cases and horizontal core functions can empower end-users

5. How to grow weeds

- Innovation sits at the top of the value chain
- Services exist to support applications
- Old models try to restrain ‘young Turks’ – in failing, they encourage them
- But Europe’s youngest firms tend to be the least R&D intensive
- PPP does not replace secular innovation and other trends

Tentative conclusions and recommendations

6. Grand challenges in a time of existential panic

- The Future Internet is a Grand challenge, like the space race
- Its success depends on an imperfectly-shared vision
- Most importantly, it must be open to – and positively encourage – the participation of all stakeholders
- For maximum sustainable impact, its monetary and intellectual fruits should flow through leaky pipes

7. The PPP as a well-regulated tussle

- The structure covers many parts of the (commercial and other) value chain
- The components are separated for coherence but collectively governed
- Participation should stay fluid and the system is designed for openness
- But development is not (should not be) wholly collaborative

Contact details

- Jonathan Cave: cave@rand.org
- Project website: <http://www.fi3p.eu/>
- RAND Europe: <http://www.rand.org/randeurope.html>