



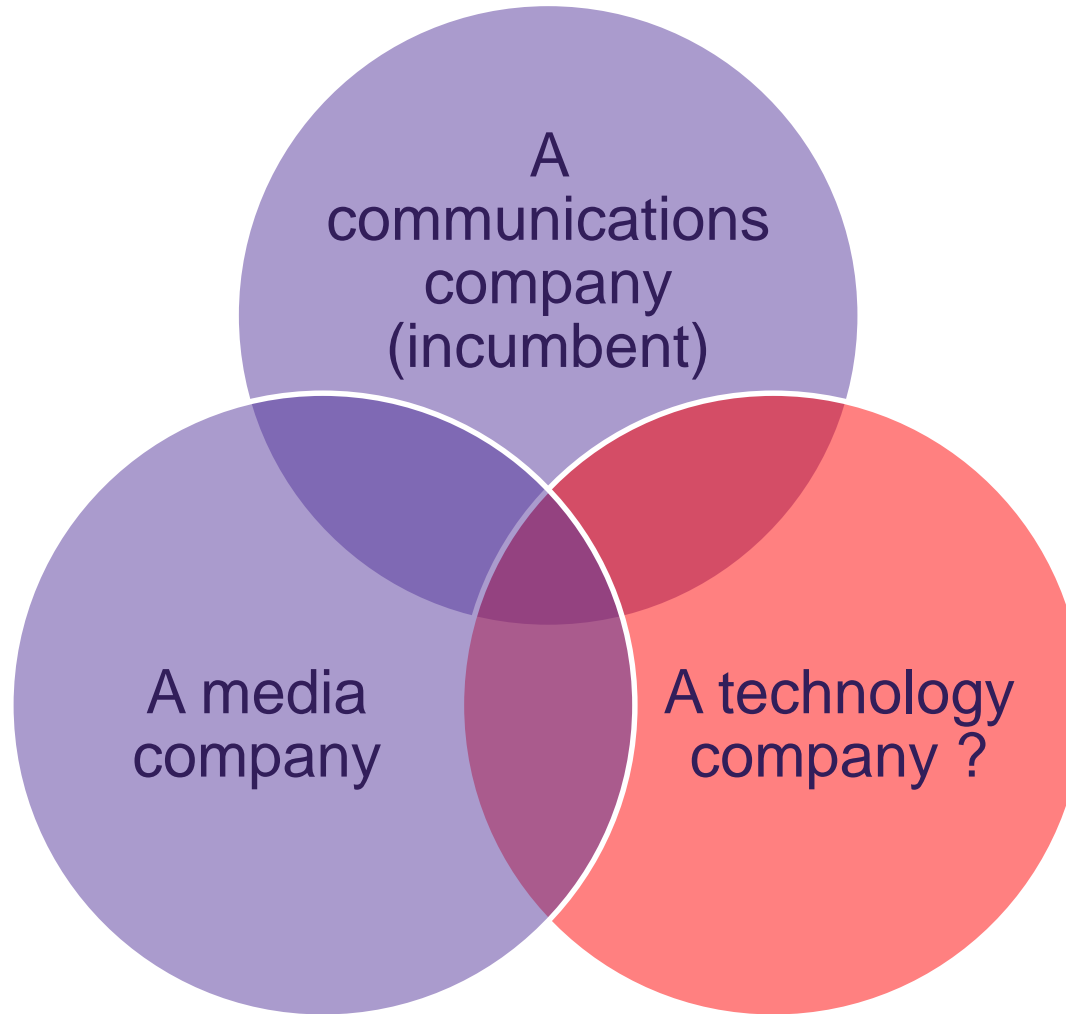
RPI Conference

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3 May 2017



Perceptions of BT



Is BT an innovative technology company?

3rd

largest investor in R&D in the UK over past ten years*

2nd

largest investor in R&D in the fixed line telecoms sector over past ten years*

35

Direct university research relationships

102

Number of inventions filed in 2016/17

4th

highest number of patents filed with the European Patent Office of UK-based companies

£2.6 billion

spent on R&D over the last five years

1025

Graduates and Modern Apprentices recruited by BT in 2015 (128 at Adastral Park)

4900

patents in our portfolio

BT Research themes

Further, faster,
cheaper

*New
Paradigms*



Security



TV & Content



**Mobility, Wireless
& Convergence**



**Operational
Transformation**



Customer Service



Our Customers



Internet of Things



**Future Analytics &
Big Data**

*New
Products*



Networks



Future Comms.

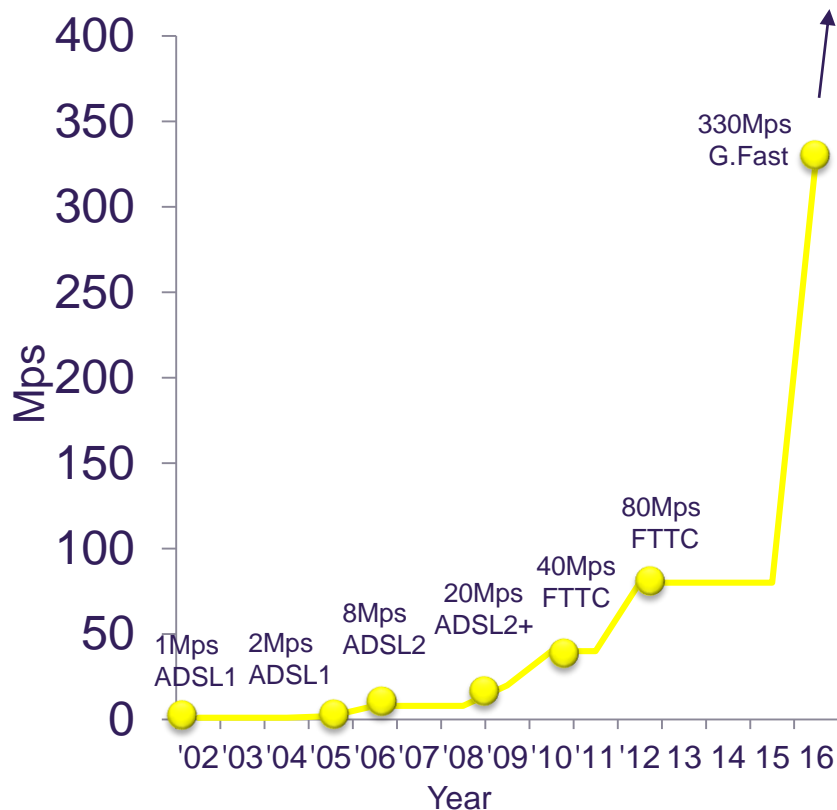


**Software, Systems
& IT Services**

*New
Technologies*

**Insight
driven**

BT Technology Deployments Scale & Speed



Source: BT historic announcements

- “In 2005, ADSL-based broadband delivered speeds of 8Mbit/s. BT has recently announced its intention to invest in the next generation of copper broadband technology (called G.Fast) which is expected to deliver speeds of 500Mbit/s.” (Ofcom)

What drives innovation by BT?

Ofcom sees competition as being key enabler

- **Access based-competition**

- role of local loop unbundling driving improvements in exchange-based ADSL broadband technology
- competitive investment in ultrafast broadband supported by passive infrastructure access (e.g. ducts, poles, in-building wiring)

- **End to end competition**

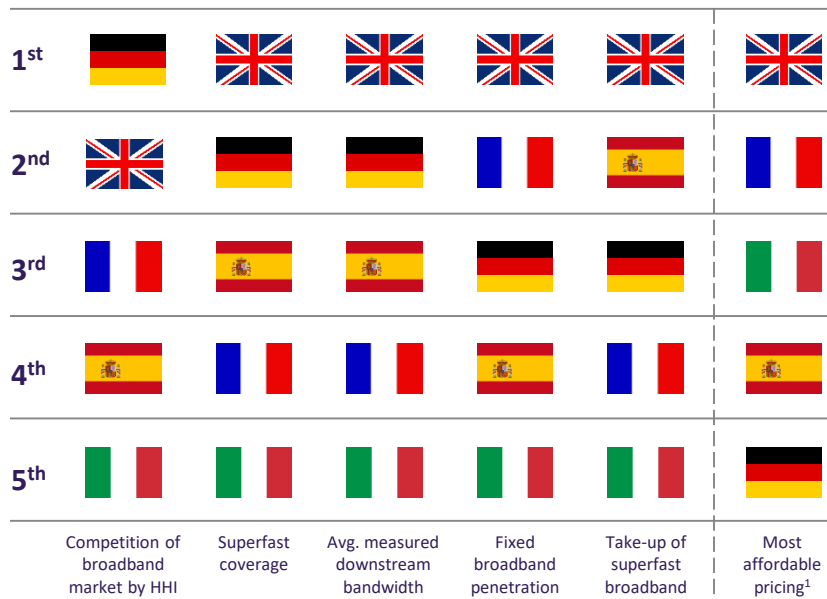
- in fixed, competition from cable networks driving superfast broadband
- in mobile, competition between rival MNOs, driving rapid deployment of BT

But tensions must be acknowledged

- Innovation often driven by a desire to escape competition
- Challenge facing competition authorities/regulators described as “knife edge”
- Balance particularly delicate in telecoms
 - Investment/innovation is market led (less “central planning” than in other sectors)
 - Returns are uncertain: e.g. demand for upgraded services, willingness to pay
 - Interactions with regulation (e.g. prices for legacy services)
- Balance struck for investment in superfast
 - Regulatory environment conducive to investment/innovation

Market outcomes support this

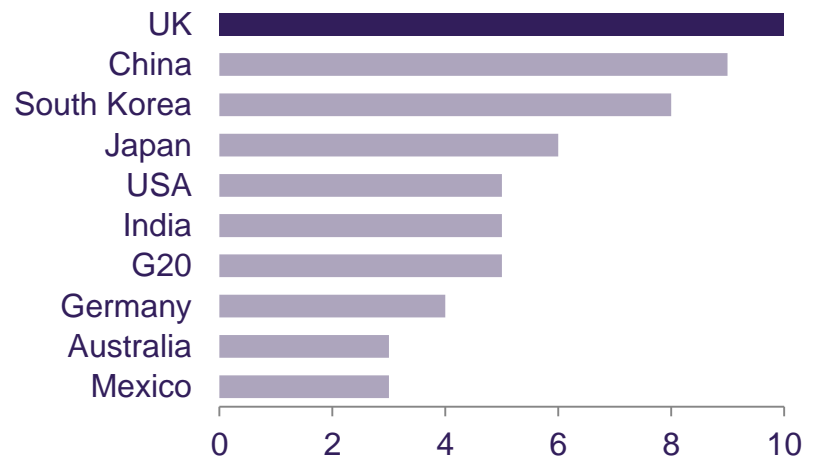
No.1 of major European countries



Source: Analysys Mason, International benchmarking report, October 2016

4th out of 167 countries (ITU Development Index)

% of GDP driven by internet (eGDP)



Source: Ofcom ICMR 2015

Source: BCG UK eGDP, May 2015

¹ 'Weighted average' bundled service pricing for a family household with multiple needs

Next wave of network investment / innovation: has balance been struck?

Then	Now
Technology agnostic	Emphasis on “full fibre”
Pricing flexibility	Yes but fair bet now crystallised
Regulation of substitute products	Less favourable
Technology risk	Remains
Regulatory/policy stability	Less clear

- regulation at every layer (VULA, dark fibre, duct access)
- and cross-cutting proposals – e.g. oligopoly regulation
- visible hand of policy/regulation rather an invisible hand of markets

“...to make progress, one must leave the door to the unknown ajar”
Richard Feynman