

# Tomorrow's telecoms networks

## GETTING INVESTMENT INCENTIVES RIGHT

A European visitor to Asia can only marvel at the speed of broadband. In Singapore fibre access is available to every home. In South Korea dense mobile networks allow users to watch high definition video. By contrast, in the UK, as in many other countries, there is concern that investment has been insufficient to fully meet the quality of service and extent of coverage demanded by end-users. Policymakers are considering what incentives for telecoms operators might address the problem. Looking at the level of past investment can provide valuable information on what spurs capital spending, what might be holding it back and the link between policy and the level of investment.

### Pricey fibre

The UK government believes that “the future of high-speed and high-quality connectivity lies in deeper, more extensive fibre networks” and wants “the UK to take a leading role in the development and roll-out of 5G”<sup>1</sup>.

Meeting these goals will require significant investment in new telecommunications infrastructure in the shape not only of expanded fibre networks but also a framework of radio “small cells” bringing fibre and mobile networks closer to end-users.

This will not come cheap. Rolling out a full UK-wide fibre network alone will cost an estimated £20bn-25bn<sup>2</sup>; actually connecting customers to the shiny new networks will add to the bill.

### Nothing to write home about

Investment – or, more precisely, gross domestic fixed capital formation - is a key component in the calculation of gross domestic product (GDP). Helpfully, the Office of National Statistics publishes a time series breaking down total investment by industry.

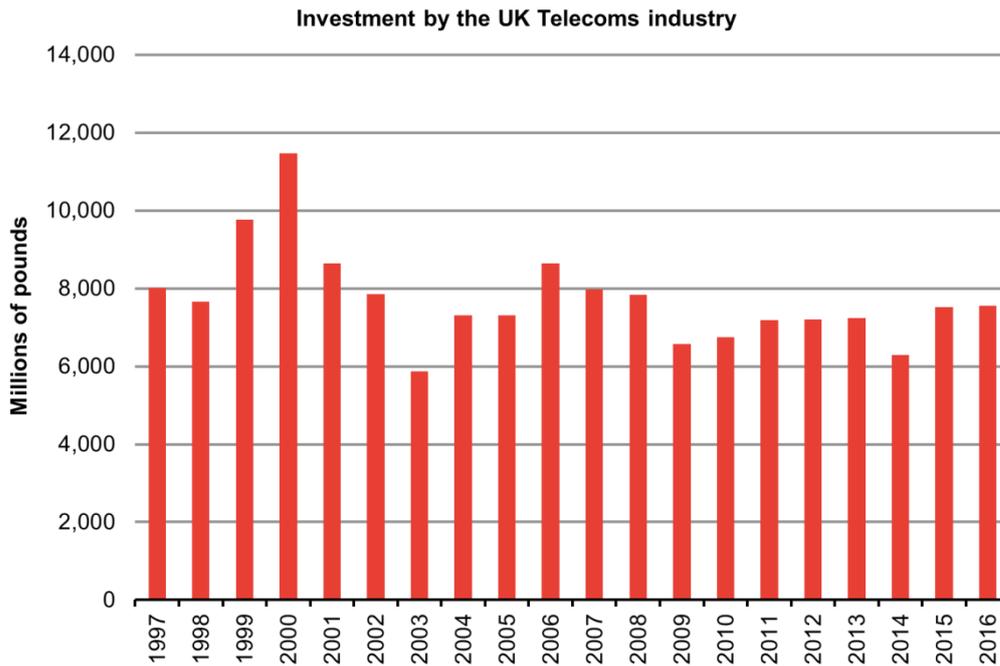
The series covers the last 20 years, broadly the period since the full liberalisation of the telecommunications sector. In this time, fixed services have migrated from voice and dial-up internet access to superfast broadband throughout most of the UK. Similarly, mobile services have migrated from voice-centric 2G through 3G technology to today's 4G broadband networks.

However, the level of investment over the 20 years has been relatively flat in nominal terms. The only significant variation around the trend reflected the dotcom boom in 2000 and subsequent bust, and a similar if smaller rise and fall either side of the 2008 global financial crisis.

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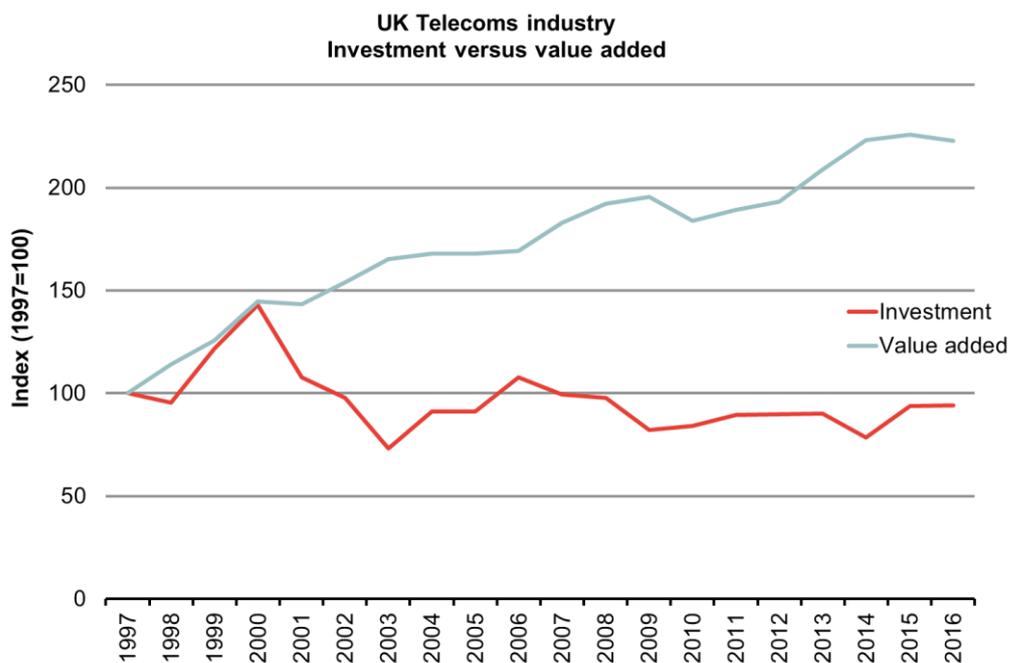
<sup>1</sup> <https://www.gov.uk/government/publications/uk-digital-strategy/1-connectivity-building-world-class-digital-infrastructure-for-the-uk>

<sup>2</sup> <https://www.nic.org.uk/wp-content/uploads/Cost-analysis.pdf>



This degree of stability is surprising: rapid technological developments might have been expected to lead to greater investment spending. After all, the overall output of the industry, measured by gross value added (GVA), has increased significantly over the same period.

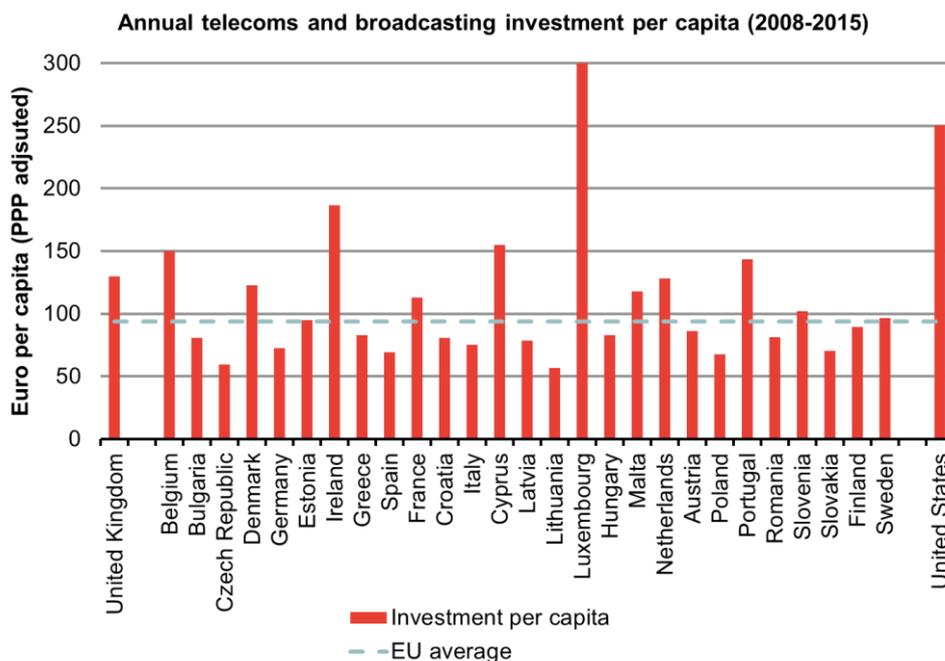
This stability in investment, despite rapid growth in output, is consistent with increased demand being met by ‘sweating’ existing assets rather than significantly expanding the capital stock. It also indicates that investment has not been constrained by a lack of industry growth or expectations of growth.



## Is UK falling behind?

An oft-voiced concern is that the UK is falling behind other countries in the quality of fixed and mobile networks. Former Prime Minister David Cameron complained that he struggled to stay in touch with world leaders when he was on holiday in Cornwall because his mobile phone signal was too poor. Shoddy broadband service in some areas is a serious obstacle to small-business owners. Can international comparisons shed light on whether the lack of growth in telecoms investment has caused the UK to fall behind other countries?

In fact, investment per head by UK telecoms operators is well above the EU average, according to estimates by Eurostat. Adjusted for purchasing power, capital spending on telecoms has varied considerably. However, the UK, along with all other EU countries except for Luxembourg, shows much lower rates of investment than the US.



At first sight, the degree of variation is surprising. Some of it can be explained by local factors. In Luxembourg, for example, the cost of rolling out an extensive fibre network has been quite high due to planning restrictions; at the same time, demand is high relative to the size of the resident population due to the concentration of service industries and cross-border commuting.

However, other differences are harder to explain. Spain's below-average investment is a case in point. The period 2008-2015 saw the installation of competing full-fibre networks covering a large proportion of Spanish homes. Factors such as the high density of multi-dwelling units and regulated access to the incumbent's duct network will have significantly lowered the cost per home, but this rapid roll-out would have been expected to generate a high level of investment.

The variation across EU member states may reflect a number of things:

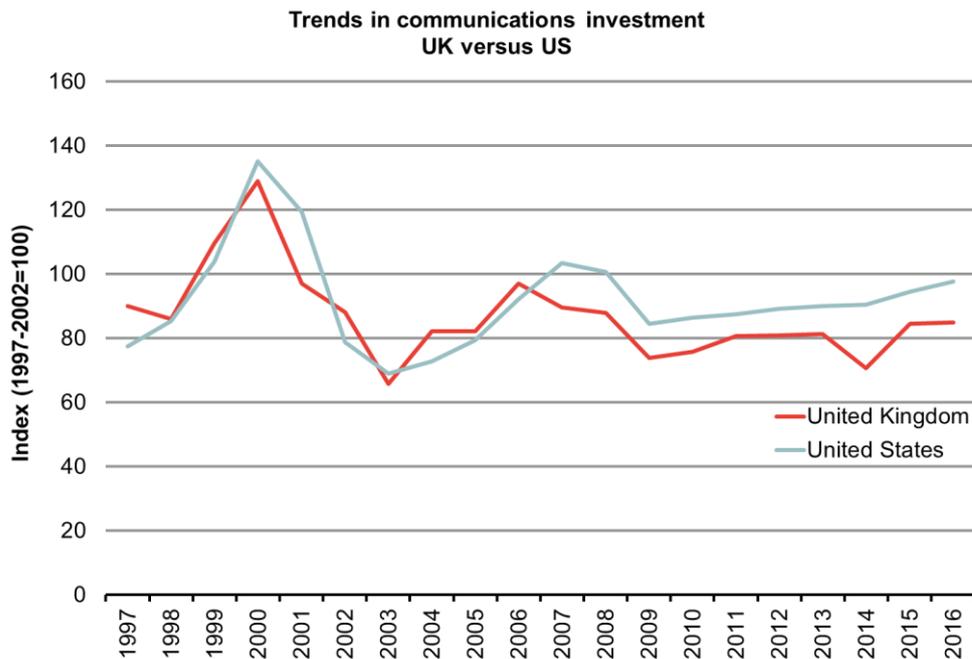
- Difference in outputs, e.g., the quality, coverage and capacity of networks in each country;
- Differences in network investment costs because of, e.g., varying input costs, geographical conditions or planning regulations; or
- Statistical artefacts, i.e., inferences that result from bias in the collection or manipulation of data. These might be due to a range of structural factors, such as network outsourcing, or to differing approaches to capitalisation of costs.

Clearly, the critical issue is the degree to which differences in investment reflect differences in output. If higher investment is solely due to differences in input costs or is a reflection of statistical artefacts, then consumers fail to benefit from it. Indeed, to the extent that planning regulations and other policies push up costs, high investment could be an indicator not of success but of failure.

### Is deregulation the answer?

A crucial policy question is the degree to which regulation may affect outputs by changing investment incentives. In this respect, divergence in the approaches of the EU and the US constitutes a natural experiment. Until 2003, the EU and US frameworks were similar, with incumbents in both jurisdictions required to offer access to unbundled local loops. But regulation diverged after 2003. From that point on, the FCC did not require incumbent operators to grant access to next generation access (NGA) networks such as fibre to the curb/cabinet (FTTC) and fibre to the premises (FTTP). The EU, by contrast, maintained access requirements. Thus Ofcom, for example, required BT to provide other operators with access to its FTTC network as it was rolled out.

Telecoms investment in the US has been much higher recently than in the UK. From a simple comparison of **levels**, we cannot say for sure whether this reflects differences in regulation or other factors. However, if US deregulation spurred additional investment, we would expect a divergence in investment **trends** from 2003, with the US outpacing the UK. In the event, the chart below shows that investment trends in both countries have broadly tracked each other since then, consistent with relaxing access requirements not triggering a spurt in telecoms investment.



### Don't blame investment

An analysis of total industry investment alone cannot provide the fine-grained detail needed to assess the relative merits of different policy interventions. However, three main messages can be drawn:

1. If the UK government is to meet its telecoms policy goals, increased overall investment will be needed. For that that reason alone, it is crucial to get to the bottom of why capital spending has been subdued.
2. There is little evidence that the perceived shortcomings in network coverage and service quality are due solely to a low level of investment relative to the UK's EU peers. Other countries, such

as Spain, have rolled out extensive fibre networks with an apparently much lower level of investment. Again, a deeper understanding of the link between investment and outputs is needed.

3. A number of studies have suggested that the higher **level** of investment in the US is due to deregulation in the mid-2000s. However, analysis of trends shows clearly that deregulation in the US did not lead to significantly faster **growth** in investment in the US compared to the UK. This suggests that the consistently high level of capital spending in the US, both before and after deregulation, may be driven by other factors.



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