
Impact at a local level of full-fibre and 5G investments

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Foreword from the BSG

Context

Local government is pivotal to the ability of telecoms operators to deploy the networks and infrastructure that will be essential to the UK in both its current and future connectivity needs. The telecoms sector is used to engaging with local authorities the length and breadth of the country and as such understand the competing pressures and obligations that they are under. Their cooperation in playing an active role in deploying our future communications networks is a critical one and whilst the BSG has previously commissioned research¹ into how they can best engage with operators, to date we hadn't set out the 'why' they should.

We know that connectivity is the foundation upon which our digitising economy rests. The successful adoption of Fourth Industrial Revolution technologies from AI to robotics rests on the underlying digital networks. These future networks will be very high capacity, generally considered fixed full fibre and wireless 5G – the defining characteristic will be the ability to deliver Gigabit speeds. Local authorities themselves understand the importance of connectivity but not necessarily the benefits that these networks deliver at the local level. This report seeks to remedy that.

Industry is committed to delivering the Government's stated aims of nationwide Full Fibre by 2033 and 5G to the majority of the population by 2027². These are ambitious timescales under the current policy and regulatory landscape and are intended to be delivered with minimal public funds. The scale of the task should not be underestimated. It needs to be seen for what it is – a strategic civils and digital infrastructure deployment. This upgrade in our national digital infrastructure will not happen without close engagement between Government and the private sector. It will require capital, labour support as well as cooperation with every local authority in the country.

There are a range of reports which estimate the benefits that Full Fibre and 5G can bring to the UK economy. To take just two; the National Infrastructure Commission³ estimate that the additional use-cases that full fibre enable could deliver from £15-28bn in economic output by 2050 whilst 5G is estimated to generate £173bn of incremental GDP growth between 2020 and 2030⁴. These reports are incredibly useful for making the overall business case for Full Fibre and 5G as well as ensuring that central government plays its role in facilitating this investment. But what does it mean for Manchester, Merthyr Tydfil or the Midlothian hills? Without knowing the answer to this question, it is understandable why there is a disparity amongst authorities in how they engage with and approach builders of digital infrastructure.

Local Benefits

This report sets out a framework, with six different stylised areas, with which local authorities can understand what these economic benefits mean for their locality. The benefits from deployment of these technologies are both indirect and direct to the authority.

Indirect benefits to the local authority come in the form of a more vibrant and attractive business environment.

We have purposefully not set out a large, attention grabbing headline about the economic impact that Full Fibre and 5G can deliver to local areas. Firstly, this is realising that the benefits, whilst always positive, will be different between localities.

¹ <http://www.broadbanduk.org/publications/publications/>

² <https://www.gov.uk/government/publications/future-telecoms-infrastructure-review>

³ <https://www.nic.org.uk/wp-content/uploads/Benefits-analysis.pdf>

⁴ https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/582640/FCCG_Interim_Report.pdf

Secondly, we're being honest that for 5G in particular, we don't yet have the experiences to always put an accurate figure against it. What we commissioned Oxera to do was develop and build a framework and model into which we've put the best possible data that we have today.

We believe that the true value of this work will be in revisiting the model with better data as empirical evidence and case studies develop alongside the deployment of Full Fibre and 5G. That is not to say that we have not found significant and material benefits for local areas:

Existing businesses will see an increase in productivity which should result in an expected increase in turnover per worker of up to 3.8% per worker per annum.

New businesses will be attracted to the area with a growth in total business of at least 0.4%, rising to 3.2% in other areas. This will result in increased tax and business rates for the local authority.

Both of these benefits will result in **new jobs being created** in the local area. Areas can expect to see 0.7-1.7% more jobs.

As an example of **direct benefits**, York Council have invested in and incentivised full fibre build. They are reaping the benefits as a local authority through their own productivity savings as well as through new applications of technology enabled by their full fibre network such as smart traffic management systems.

How to attract investment

The BSG has worked closely with industry on how to remove barriers to network deployment. Many of the levers for lowering these barriers are held at a local level. All deployments are different but the key for positive engagement between local authorities and telecoms operators remains largely the same. They require leadership at a Cabinet level through to operational support at the official level; this can be in the form of network and local authority planners working in the same physical location through to joint-departmental groups within local authorities.

There is a wealth of guidance for local authorities on the Government's Digital Connectivity Portal⁵. Industry has committed to mirroring this best practice so that local authorities themselves have a consistent experience when dealing with the sector.

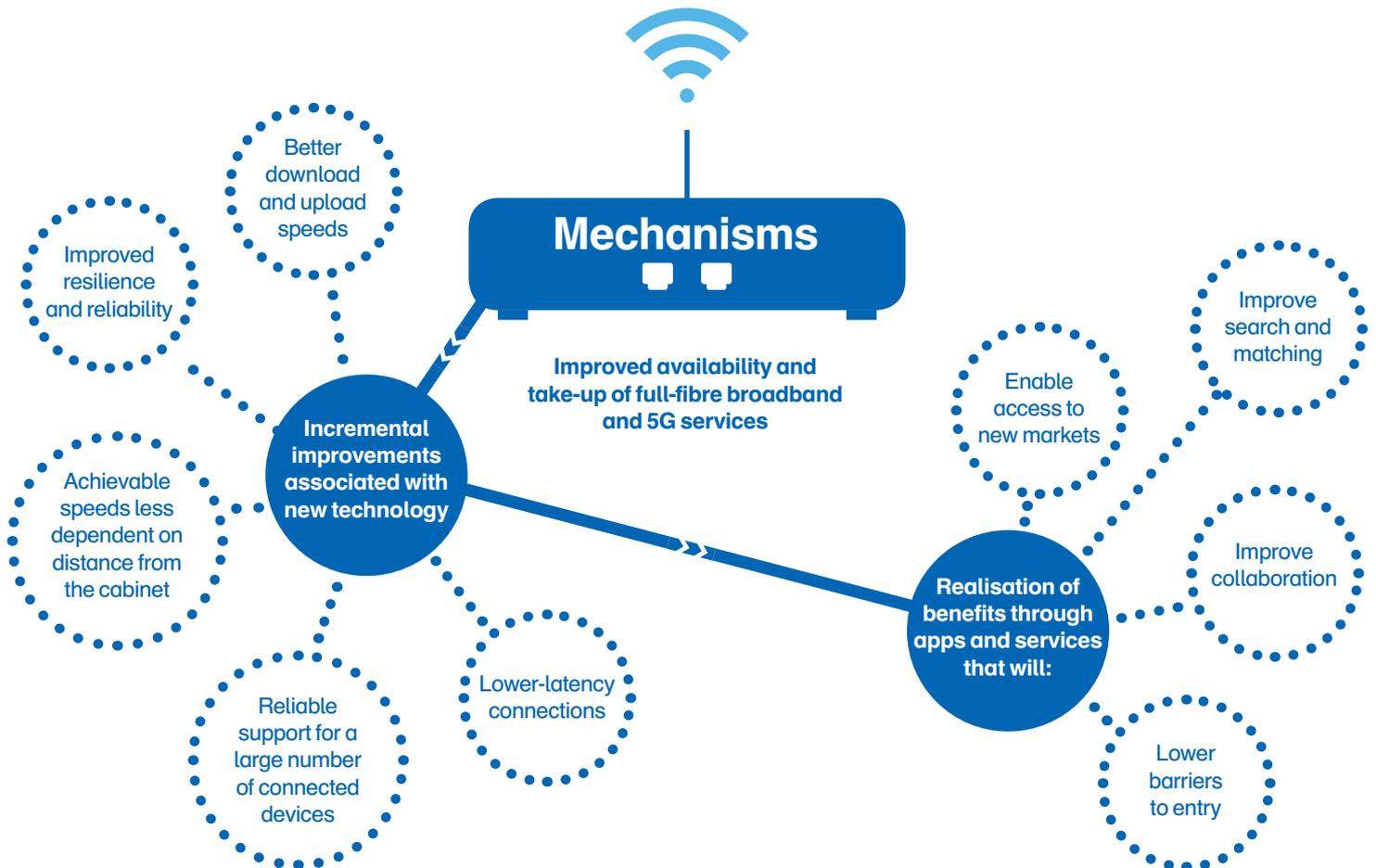
Industry needs to continue to review its own processes to ensure a smooth relationship with local authorities. Operators will allocate significant amounts of capital for new digital infrastructure not only where there is an economic return but also where it is easiest to do so.

This report demonstrates that even at this nascent stage of the UK Full Fibre and 5G market there are very real positive benefits for local areas which local authorities should want to take advantage of by ensuring that their locality is easy to invest in and for digital infrastructure to be deployed. We look forward to working with both industry and local authorities to make it easier to deliver the economically essential Full Fibre and 5G networks.

⁵ <https://www.gov.uk/guidance/resources-for-local-authorities>

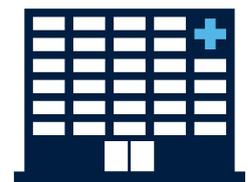
Deployment

Deployment of local fibre and 5G networks supported by Local Authorities



Improved employment opportunities

- Increased labour market participation and reduced unemployment
- Increasing employment by between 0.6% and 1.7%



Benefits to Local Authorities

- Cost savings in the delivery of public services
- Option value



Benefits for existing businesses

- Productivity improvements
- Increasing turnover per worker by up to 3.8%



New business start-ups

- Genuinely new businesses
- Migration of businesses into the area, resulting in an increase in the number of businesses of between 0.4% and 3.2%



Private benefits to consumers

- Access to improved and new services
- Improvements in subjective wellbeing



Benefits to wider society

- Greater digital inclusion
- Online access to public services
- Externality impacts

Executive summary

The importance of infrastructure for the future

Infrastructure at both the local and the national level is crucial for enabling interconnection between areas, industries and individuals. It is important for facilitating interaction, collaboration, trade, and the social and economic benefits that come with it. In today's connected world, having up-to-date and future-proof digital and telecommunications infrastructure is a key strategic priority for the UK government.⁶

In 2018 the UK government announced ambitious targets for full-fibre⁷ coverage in its Future Telecoms Infrastructure Review: by 2025, 15m premises are to be connected to full-fibre networks, with nationwide coverage to be achieved by 2033.⁸ According to the latest Ofcom figures, only 7% of UK premises currently have access to full-fibre services.⁹

The government also wants the UK to be a world leader in 5G, with the majority of the population to be covered by 5G networks by 2027.¹⁰ Some 5G networks have been deployed in a number of UK towns and cities in summer 2019 and early 5G services have become available to customers in these areas. However, much more investment will be needed to cover the entire population within the expected timeframe.

Cooperation between Local Authorities (LAs) and industry will be crucial to enabling deployment of new infrastructure and helping to remove barriers to infrastructure roll-out.¹¹ This report describes the range of positive impacts on LAs, businesses and consumers at the local level arising from the improvements in connectivity that very high capacity networks—for which full-fibre and 5G are the main (but not sole) delivery technologies—will bring.

The value of full-fibre and 5G connectivity

Full-fibre and 5G networks will bring technological and service quality improvements over previous generations of fixed and mobile networks. They will provide faster and more reliable connectivity, as well as a conduit for new applications and services that can take advantage of the technological improvements these new connections will bring.

These new services and applications will enable new and improved business practices and end-user services such that increased availability and take-up of full-fibre broadband and 5G will lead to positive outcomes for businesses, consumers, local government and wider society.

The evidence from existing empirical studies and reports on the impact of full-fibre and 5G connectivity, and increases in broadband speeds more generally, demonstrates that businesses, individuals, government and wider society are

⁶ Department for Digital, Culture, Media & Sport (2018), 'Future Telecoms Infrastructure Review', July.

⁷ Full-fibre or 'fibre to the premises' (FTTP) refers to a telecoms access network that uses optical fibre to provide the connection between the local exchange all the way to the end users' houses or business premises.

⁸ National Infrastructure Commission (2018), 'National Infrastructure Assessment', July.

⁹ Ofcom (2019), 'Connected Nations Update: Spring 2019', May.

¹⁰ National Infrastructure Commission (2018), *op. cit.*

¹¹ The BSG published a report in July 2018 on 'Lowering barriers to 5G deployment' and the Department for Digital, Culture, Media & Sport's 'Barrier Busting Taskforce' has launched a Digital Connectivity Portal as an online resource for LAs and communications network providers with guidance to support investment in broadband and mobile networks.

all expected to benefit from increased coverage and take-up of full-fibre and 5G:

Benefits for existing businesses

Existing businesses can expect to benefit from business expansion, improved productivity and greater turnover, as a result of improved access to existing markets, entry into new markets enabled through improved communication and distribution channels, and the ability to offer innovative new services.

The evidence shows that, on average, **existing businesses** will see **increased productivity**, with an expected impact of between 0.3% and **3.8% increase** in turnover per worker per annum.¹²

New businesses

Significantly improved connectivity can encourage **new business start-ups**, enabled by easier access to markets, lower barriers to entry and the development of new business models that are digitally dependent and more flexible than established businesses.

At a local level, if speeds are higher relative to other surrounding areas (or similar, competing areas), new or established businesses may also be attracted into the area from elsewhere, thereby boosting the level of business activity in the local area.

The evidence shows an expected impact of between 0.4% and **3.2% increase in the number of businesses** operating in the area.¹³

Improved employment opportunities

Evidence shows that improved broadband speeds and greater penetration of fibre in an area will lead to increased participation in the labour market and higher employment levels linked to the creation of new jobs.

Furthermore, as a result of improved communication channels and opportunities for remote working, there will be new employment opportunities or a reduction in migration away from the area that might otherwise have been at a disadvantage in terms of broadband availability/speeds (this is referred to as 'safeguarding jobs').

The evidence shows that there could be an **increase in employment** in the area (new jobs, inward migration and safeguarded jobs) of around 0.6–1.7%.¹⁴

¹² Upper bound estimates based on the findings of Ipsos MORI (2018), showing the impact of an increase in connection speed of greater than 200 Mbit/s. 0.3% based on SQW (2013), which estimated productivity gains based on an assumption of the impact of a doubling of speed, for which the central estimate is 0.3%. See Ipsos MORI (2018), 'Evaluation of the Economic Impact and Public Value of the Superfast Broadband Programme – Final report', prepared for the Department for Digital, Culture, Media & Sport, August; and SQW (2013), 'UK Broadband Impact Study', November.

¹³ Ipsos MORI (2018), based on an increase in connection speed of 100–200 Mbit/s; and Hasbi (2017), which estimated the impact of very high speed broadband availability in the local area. See Ipsos MORI (2018), op. cit.; and Hasbi, M. (2017), 'Impact of very high-speed broadband on local economic growth: Empirical evidence', 14th International Telecommunications Society (ITS) Asia-Pacific Regional Conference: 'Mapping ICT into Transformation for the Next Information Society', Kyoto, Japan, 24–27 June, International Telecommunications Society (ITS), Kyoto.

¹⁴ See Ipsos MORI (2018), op. cit.; and OECD (2015), 'Development of High Speed Networks and the role of municipal networks', 9 November.

**Private
benefits to
consumers**

There will be **private consumer benefits** in terms of access to a greater number of services. These benefits will be reflected in increased consumer surplus, i.e. the difference between willingness to pay (value) and the actual price. Consumer surplus will increase where price declines as a result of increased competition and/or willingness to pay rises as a result of increased connectivity and enables access to new and valuable services.

Consumers may also experience improvements in subjective personal wellbeing, for example from the greater range of entertainment or education options or increased social inclusion.

**Benefits to
LAs**

At the local level, public service providers, such as LAs, could benefit from cost savings in the delivery of public services and benefits associated with the improved economic environment.

Increased economic activity can have a number of benefits for a local area, both directly through some additional income (for example through business rates) and indirectly (through assisting with a range of other LA objectives facilitated by increased economic activity such as reduction in antisocial behaviour or deprivation).

There is also a significant 'option value' associated with deploying physical infrastructure that is 'future-proof', thereby reducing the costs associated with civil engineering in the long run and the trialling of new services in a more cost-effective way.

**Benefits to
wider society**

Wider society may benefit through network externalities, or positive spill-overs. As more people are connected, further developments have a greater impact, and benefits might also accrue more widely than just to the subscribers and producers of such services. This could also deliver important, but often unquantifiable, **social benefits** such as greater social inclusion.

However, these impacts and outcomes will not apply uniformly across all local area types. There will be differences in the impacts and outcomes depending on the specific characteristics of the area, as outlined in the figure below.

Differentiating area characteristics



Source: Oxera.

Conclusions

LAs and the businesses and individuals operating, living and working in a local area stand to experience significant benefits from greater access to very high capacity networks, including full-fibre and 5G, in their area. While the roll-out of new full-fibre and 5G networks may lead to some short-term disruptions, the economic and social benefits that could be realised should provide LAs with the motivation to support and cooperate with operators and help remove any barriers to infrastructure roll-out.

There is a strong case for any investment in full-fibre and 5G networks to be evaluated and assessed for its impact against the key outcomes defined in the framework above. To measure the impact, it is therefore important to ensure that the data necessary to measure these outcomes is collected before, during and after the investment project. Furthermore, data on the local area's characteristics, as identified above, should also be collected to allow future evaluations to compare across area types to distinguish which area characteristics have a significant impact on the relative success of the investment.

The data collected to measure outcomes can then be used to compare changes from before and after the investment for the treatment group (where

the investment has taken place), accounting for how those factors have changed in a control group¹⁵ (where the investment has not taken place).¹⁶

Conducting evaluations in this way will add new and robust evidence to the literature on the economic impact at a local level of full-fibre and 5G, which can be used to shape future policy.

¹⁵ The more data that is available on the characteristics of the area being investigated, the greater the scope for identifying an appropriate control group (i.e. an area with similar characteristics that has not yet invested in improved connectivity).

¹⁶ Best practice guidance for evaluations is outlined in HM Treasury (2011), 'The Magenta Book Guidance for evaluation', April.

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