Network failure: How the UK can meet its 5G ambitions

TWO MINUTE SUMMARY

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SMF Social Market Foundation

Widespread, high-quality 5G could boost the UK's economy by £159 billion by 2035. That is more than £529 per person. However, the UK lags a long way behind the "global frontier" on 5G rollout and is at risk of missing out on much of the potential social benefits and prosperity it could help generate. Our report looks at the issues holding the UK, and set out a 'new deal for 5G' – a suite of proposals needed to address them.

The challenge

Since 5G emerged as the next generation of mobile technology, the UK has been slow to roll coverage out. For instance, the UK ranks 30th out of 39 countries for the proportion of time that 5G is available to users (see Figure 1).[1] 5G download speeds are also poor, with the UK ranked 37th out of 39 countries on this metric (see Figure 2).[2] This poor performance is in stark contrast to the stated ambition of the UK government to have high quality 5G available in all populated areas across the UK by 2030. Current performance suggests the UK will fall far short of this.

The 5G "investment gap"

The underlying reason behind the UK's struggles is the significant "investment gap" in 5G infrastructure. Although there are different estimates depending on the anticipated scale and quality of 5G coverage, the "investment gap" is thought to be in the range of £20 billion to £37 billion.

The consequences of the "investment gap" are evident in the UK's low number of 5G base stations, per 100,000 of the population (see Figure 3). Mobile Network Operators (MNOs) are not investing at the scale needed to ensure that the UK can reap the full benefits of 5G as soon as possible.

5G requires such a significant amount of investment, largely because there is a need for much more infrastructure in order to have high-quality 5G networks which span the UK, compared to 4G. Some estimates suggest perhaps double the number of macro and micro cells will be needed. Further, the investment requirements are also greater because existing passive infrastructure may need to be replaced or at least extensively modernised, so that high quality 5G can be delivered.

The causes of the "investment gap"

There are multiple causes of the "investment gap". Our previous paper, "*Growing Connections*", briefly outlined the most salient obstacles. These are:

- Uncertainty over demand for 5G services.
- The structure of the mobile market.
- The current approach to spectrum.
- The supply of land and property for infrastructure sites.
- The operation of the planning system.

Uncertainty over demand for 5G services

A significant factor inhibiting investment in 5G telecoms infrastructure is the uncertainty over whether there will be sufficient demand for 5G services and therefore, if MNOs will

[1] Figure 1 can be found in the Annex.
[2] Figure 2 can be found in the Annex.

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ultimately be able to monetise 5G sufficiently to deliver a good return on any large-scale investment in next generation infrastructure and therefore make it worthwhile.

The one-third decline in MNO revenues since 2012 and the comparatively low return on investment that UK MNOs face makes it difficult for them to justify the level of investment needed for widespread 5G by 2030. Therefore, they need to see a realistic prospect of adequate future demand from consumers and businesses, including a willingness amongst users to pay for new 5G services. However, evidence suggests some reluctance to adopt 5G amongst both business and consumers. For example, one 2019 survey of UK manufacturing executives found that a quarter reported that "existing network solutions cover my needs", whilst other research suggested that many business leaders believe 4G delivers around 80% of what 5G could offer. Similarly, more than 8 in 10 consumers are content with the speed at which their current mobile service operates. Similarly, more than 8 in 10 consumers are content with the speed, at which their current mobile service operates, whilst the latest Ofcom data shows that 4G accounts for 78% of monthly data traffic in the UK.

To address what the government terms the "chicken and egg" problem, government intervention promoting the use of 5G in public services in particular could prove helpful in further demonstrating the use cases for 5G. Through an effective public procurement strategy, government could also act as a direct demand stimulant for 5G services and therefore kickstart a virtuous circle of 5G derived revenues for MNOs which can then be invested in more 5G infrastructure.

Market structure

There is debate over what the most appropriate market structure is in the mobile telecoms sector. Proponents of a more concentrated industry argue that fewer MNOs would help facilitate greater long-term investment, especially when MNOs have seen their revenues fall significantly in the last decade. On the other hand, advocates of a less concentrated market suggest only the incentives created by more players can deliver the best outcomes. On the whole, the orientation of mobile sector policy has leaned towards the latter. However, the debate has been somewhat superseded by the recent Vodafone–Three merger decision from the Competition and Markets Authority (CMA). The UK will now be an industry of three rather than four MNOs. Certainly one of the arguments made by the emerging firms was that it would deliver £11 billion of additional investment. Time will tell if this additional investment is realised.

The growth of WIPs

The relationship between market structure, MNO revenues and infrastructure investment has become even more complex in recent years, with the rise of Wireless Infrastructure Providers (WIPs – "tower companies") who control a growing proportion of the UK's passive mobile infrastructure. Evidence suggests that roughly 70% of macro mobile infrastructure sites are now controlled by WIPs that are entirely independent of MNOs. These companies lease back the infrastructure typically in the context of long-term arrangements with MNOs, and their emergence means that WIPs are fast becoming as important to the debate over how to boost mobile infrastructure investment as MNOs. On the one hand, there are concerns that splitting out infrastructure delivery from mobile services could undermine the incentives for investment and create new costs. On the other, many European countries have a highly developed WIP sector and notably, a lot of those countries are rolling out 5G faster and further than the UK has managed. This indicates there is unlikely to be any inherent obstacle to greater investment from such a split. Indeed, the growth of WIPs perhaps increases the opportunities for infrastructure sharing. Whilst this is far from a panacea for

facilitating the rollout of high quality 5G across the whole UK, it can make a contribution. For instance, one modelling exercise suggested that it could save as much as £15 billion in 5G capital expenditure costs.

However, at the moment, there are no definitive conclusions to be drawn about what ultimate impact WIPs will have. Nevertheless, what seems clear is that policymakers and regulators concerned about how to encourage more investment in 5G infrastructure must consider how the WIP sector in the UK evolves and how this might impact 5G infrastructure investment.

The current approach to spectrum

The connection between the cost of spectrum to MNOs and 5G infrastructure investment

The available evidence indicates that high spectrum costs, i.e. the costs incurred by MNOs to obtain a licence to use a portion of the UK's electromagnetic spectrum in the form of auction prices and annual fees, tend to have a detrimental impact on MNO investment in connectivity. If there were no annual fees required to be paid by MNOs and the first tranche of 5G spectrum had not been allocated through an auction in 2018, together, perhaps as much as £4 billion could have been available for closing the "investment gap".

The duration of spectrum licences and the effect on MNO infrastructure investment

There is some research to suggest that the length of time a MNO has a spectrum licence for can also influence investment levels. For example, one study estimated that every extra year of spectrum licence boosted investment by around £1.30 per capita. This implied that, extending the typical licence by a decade could see infrastructure investment in the UK higher by about £850 million over that time.

The extra certainty of a long period of control over spectrum for an MNO can be expected to help with investment planning. Certainly, a long licence is an asset for a MNO and can be used to raise external capital potentially increasing the amount of finance available for investment. Indeed, the EU has moved in the direction of more certainty in licence duration with requirements on Member States to provide MNOs with minimum 20-year long licences. The international mobile industry body GSMA is supportive of this kind of length for spectrum licences.

However, there is some counter-evidence indicating licence duration is not a strong driver of investment levels. At the same time, longer-licences have not been found to be detrimental. Therefore, experimenting with a shift to standard fixed period licences of two decades or more could be worthwhile, especially in conjunction with the elimination of the costs associated with auctions and fees.

Supply of land and property for mobile infrastructure sites

The counter-productive effects of efforts to reduce the costs of accessing land

Mobile infrastructure is typically installed on third-party land. Therefore, access to such land for both building new and upgrading existing infrastructure is vital.

To encourage MNOs to invest more in infrastructure, changes to the Electronic Communications Code (ECC) were made in the Digital Economy Act of 2017. These regulated the rents that landowners can charge for the siting of mobile infrastructure with a valuation framework that aligned with the rules for other utilities. The aim was to cut the rental cost of using private land for MNOs and free-up resources for investment. However, the government's changes ignored the Law Commission's 2013 recommendation to allow the market primacy in determining appropriate rents. One outcome of the reform has been of a dramatic fall in the rents that providers of land can now obtain. One analysis suggested those supplying land for mobile infrastructure may have lost £209 million a year. This has led to a substantial deterioration in the relations between some landowners and infrastructure providers (i.e.

MNOs and WIPs). This effect has been observed by a number of organisations such as the Law Society of England and Wales and acknowledged by the previous government. This is perhaps most evident in the 109% increase in the number of disputes being referred to the Upper Tribunal Lands Chamber in England and Wales between 2018 and mid-2023. Issues with supply are particularly problematic for the rollout of 5G because of the need for much more land and other property on which to place the additional infrastructure that 5G needs to deliver the low latency, additional capacity and high speeds that it is capable of.

Certainly, for many, the value to be gained from renting the land to MNOs or WIPs and therefore the attraction of doing so, has significantly reduced. There has been a consequent "chilling effect" on the supply of land for mobile infrastructure. One analysis suggested that negotiations between parties can now take as long as 11 months instead of the expected six, while another indicated that in many instances they are taking 18 months.

While there is some debate over whether the worst of the disruption caused may now have passed, the balance of evidence suggests this remains a problem. For instance, there are predictions that the planned extension of the ECC's land valuation rules to around 15,000 more rental agreements between operators and site providers that currently governed by the Landlord and Tenant Act 1954 and the Business Tenancies (Northern Ireland) Order 1996, could result in many more disputes in the tribunal system.[3]

The growth of WIPs raises questions about the extent to which rent savings will be reinvested

In the context of the growth of WIPs as owners of mobile infrastructure, a significant portion of the savings on land rents is, in the first instance, going to tower companies and not the MNOs. To what extent that extra margin will be recycled into lower infrastructure lease prices for MNOs or be invested by WIPs in new sites or upgrading existing ones is an open question for regulators that needs to be looked at. While it is not possible to yet know how the dynamics of the sector will develop, policymakers and regulators will no doubt want to observe closely whether the structure of the WIP sector i.e. a small number of players often with long-term arrangements with MNOs, will prove to be a boon or detrimental to 5G investment.

The operation of the planning system

Planning capacity is a constraint on building 5G infrastructure

The need for an expanded and upgraded network of infrastructure for widespread and high quality 5G is going to put more strain on the planning system. However, planning authorities are already short on capacity. In English local authorities for example, between 2010 and 2023, planning resourcing has been cut by a seventh. Scotland and Wales have experienced even larger reductions.

The average amount of time it takes for a mobile infrastructure application to be decided is six months. The median length of time is four months. Overall, it can take between 12 and 18 months to make mobile infrastructure fully operational. Speeding up the planning process, e.g. cutting the mean amount of time an application takes to receive a decision, from 6 months to 3 could see more than 300 new cell sites given planning permission each year, or around 1,600 5G cells in place by 2030 than would otherwise be the case.

Many local authorities fail to prioritise digital issues such as mobile infrastructure

Further, as the mobile industry has observed, many planning authorities do not have sufficient internal digital technology expertise and therefore, key technical as well as topographical factors and other constraints on where infrastructure can be suitably placed are not always sufficiently taken into account by planners in their

[3] Product Security and Telecoms Infrastructure Act 2022 enables the extension of the ECC land valuation provisions to these other agreements.

decisions. There is also a concern that they often fail to consider mobile site applications in the wider economic context. As a result the importance of mobile infrastructure to the local, regional and national economy is not always a significant enough influence on application decisions. This is a consequence of many local authorities failing to take a more strategic view on digital issues. For instance, a survey of UK councillors discovered that less than a third reported that their authority had a Digital Champion. The presence of such a role in a local council is associated with local authorities placing greater priority on mobile connectivity and higher planning approval rates for the installation of mobile equipment.

Uncertainty in the planning process deters investment in mobile infrastructure

Uncertainty over the speed and predictability of the planning process between local authorities and across the nations of the UK, is a key concern for those building and operating mobile infrastructure. It is perhaps most clearly reflected in the substantial geographical differences in the proportion of permissions granted. For instance, in London the approval rate is around 4 in 10 applications. This is in stark contrast to some other cities where the rate is as high as 8 in 10.

According to experts spoken with for this research, to date, attempts to reduce some of the uncertainty in planning through the extension of permitted development rights for mobile masts, which are up to 30 metres tall, do not appear to have made the kind of difference that was originally hoped for. Therefore, policymakers may benefit from looking at lessons from other jurisdictions, in order to identify more effective approaches. For example, the EU's Gigabit Infrastructure Regulation is unambiguous in its aim of getting more mobile infrastructure constructed, and sets out the need for clarity and consistency in Member State planning process which. A more certain planning system that, for example, raises the proportion of planning applications that are accepted by 10 percentage points from 8-in-10 on average to 9-in-10, could see an extra 160 cell sites built each year, or over 800 more between 2025 and 2030.

Recommendations

A **"new deal for 5G"** is needed to tackle the causes of the investment gap and catapult the UK to the global frontier for 5G connectivity. The "new deal for 5G" should be a package of complementary measures which, if implemented together, can deliver the high-quality 5G network the UK needs in order to reap the full economic and social benefits of this new technology.

Uncertainty over future demand

Recommendation 1: The government should use public procurement as a tool to stimulate investment in 5G infrastructure.

Recommendation 2: The government should revamp the 5G Test Beds and Trails programme and provide the relatively small amount of funding needed to continue to demonstrate use cases across different sectors.

Concerns over the market structure of the mobile telecoms sector

Recommendation 3: Policymakers and Ofcom should do more to consider the longer term 'dynamic' impacts on the economy that arise from low investment in key infrastructure such as 5G, and pay particular attention to the potential effects on investment and competition caused by the alteration of the telecoms value chain with the divestment of mobile infrastructure by MNOs to WIPs.

Problems with the UK's approach to spectrum

Recommendation 4: The government should overhaul spectrum policy by eliminating annual fees levied on MNOs in exchange for clearly defined 5G investment guarantees, replace future auctions for a system of spectrum allocation based upon agreed investment plans and licences that are at least 20 years in length and which are renewed on the grounds of past performance and future promises.

The supply of land and property for infrastructure

Recommendation 5: The government should reform the ECC valuation regime so that there

can be a fair distribution of the economic gains from the use of land for mobile infrastructure between land providers and MNOs and WIPs.

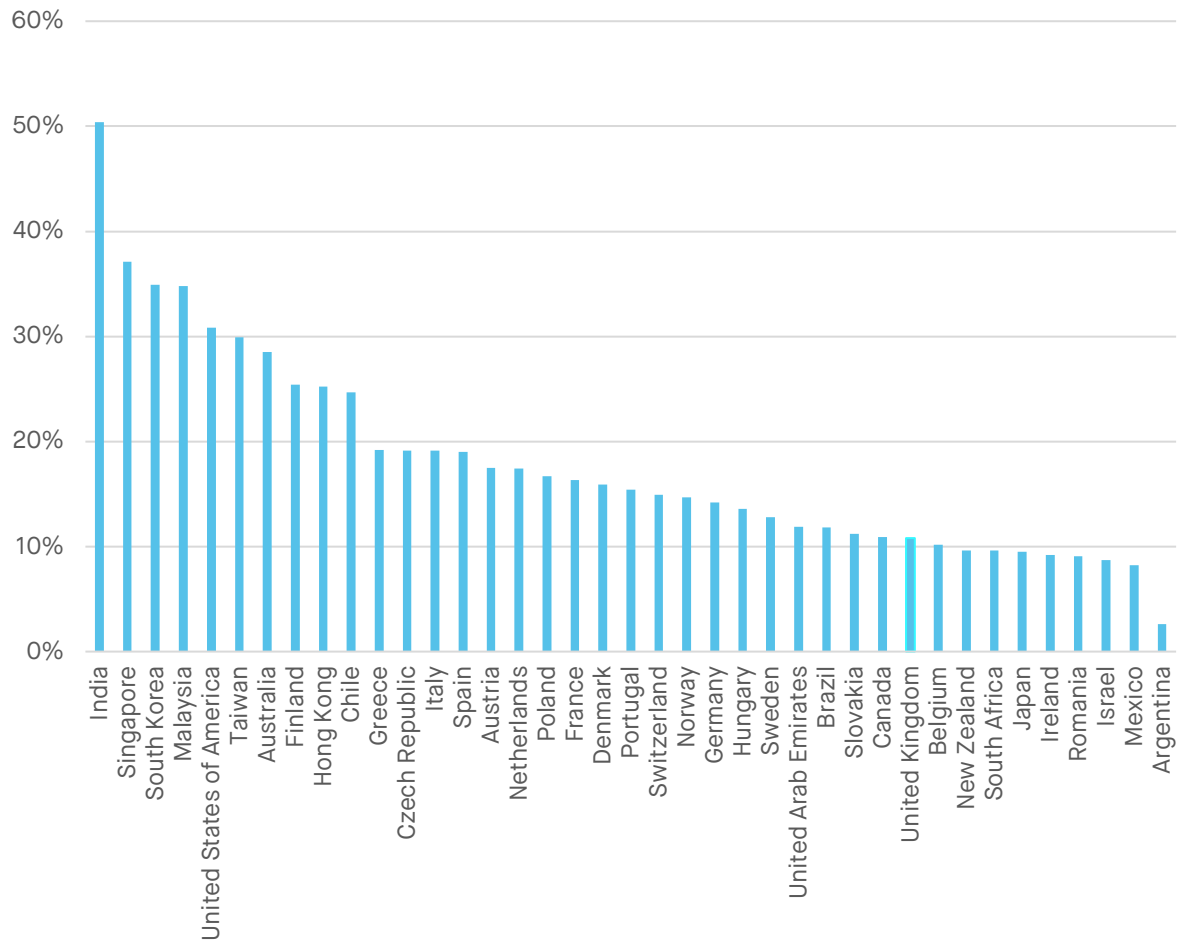
Recommendation 6: The government should commission a mapping exercise of public and private land in the UK to identify suitable places for potential mobile infrastructure and for public land, buildings and other physical assets create a "presumptive permission" status for it.

The operation of the planning system that constrains investment

Recommendation 7: The government should introduce a package of measures to overhaul those aspects of the planning system that hold back mobile infrastructure development.

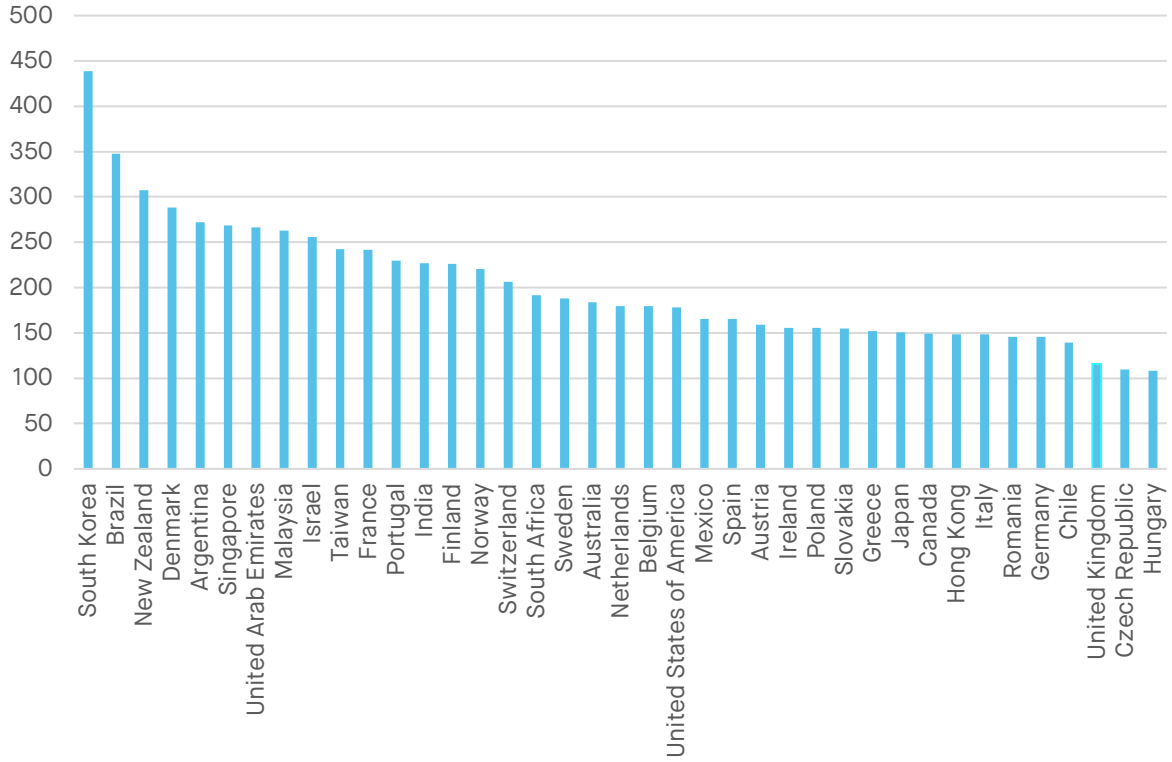
Annex: Comparative charts showing 5G availability, average download speed and the number of 5G base stations

Figure 1: 5G availability (% of time) in selected countries – July to September 2024



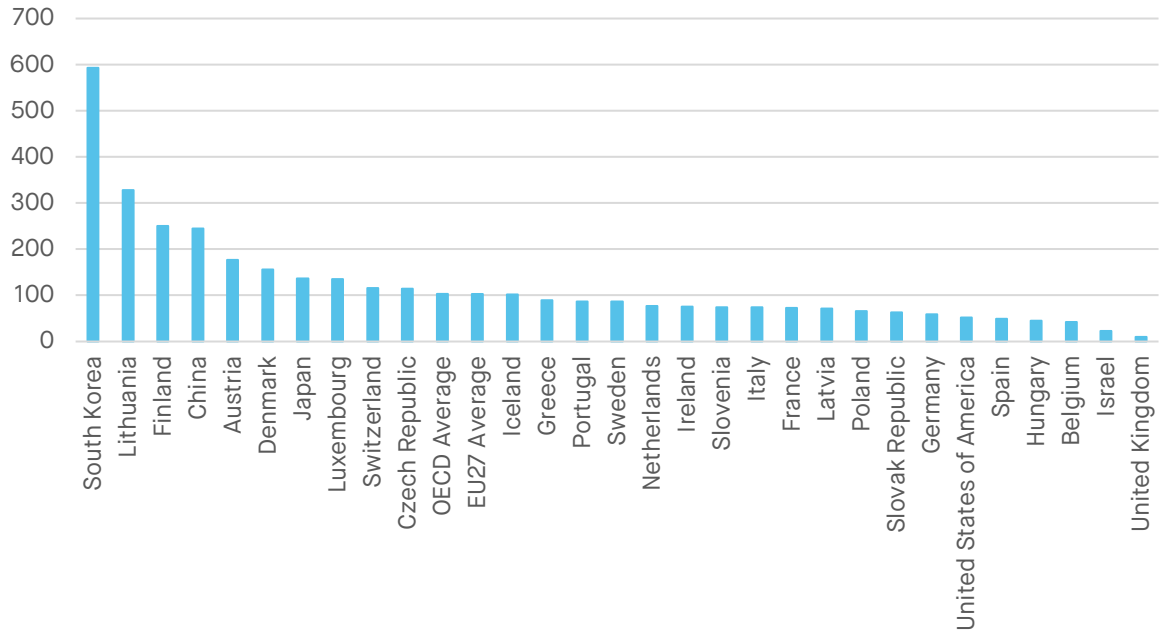
Source: OpenSignal (2024)

Figure 2: 5G download speed (Mbps) in selected countries – July to September 2024



Source: OpenSignal (2024)

Figure 3: 5G base stations per 100,000 inhabitants in selected countries in 2023



Sources: OECD (2024), Ofcom (2021) and SMF calculations

N.B. Please note the UK figure is based upon publicly available 2021 data