Virgin Media O2 response to Ofcom's mobile strategy Discussion Paper

Non-confidential version

8 April 2022

Executive Summary

Virgin Media O2 (VMO2) welcomes the opportunity to respond to Ofcom's mobile strategy Discussion Paper. Driven by competition, UK mobile markets have delivered good outcomes over the past years, including very wide 4G coverage, excellent value-for-money, increased capacity to accommodate steep traffic growth and high levels of customer satisfaction.

Notwithstanding these achievements, Ofcom's decision to initiate this review is timely. Whilst mobile markets have delivered good outcomes to date, there is a significant risk they will not going forward. Emerging challenges in the wider mobile value chain, stagnant or declining revenues and limited investment returns mean that mobile network operators (MNOs) *absent a pro-investment regulatory approach* will not invest at the scale required to support the higher quality and secure mobile connectivity that UK plc needs for our economy to be globally competitive.

In the Discussion Paper, Ofcom demonstrates a thorough understanding of mobile markets to date and identifies relevant changes that can occur over the next decade. Its premise is that competition will support enough investment. This provides the basis for Ofcom concluding that continuation of its current regulatory approach will suffice. We consider this a serious mistake. Our response challenges Ofcom's premise and we hope this will prompt Ofcom to revisit its premise and the merits of an alternative pro-investment regulatory approach. Whilst "more regulation" isn't the answer either, a change of emphasis towards securing adequate investment incentives is required to moderate an uncertain future.

Future mobile connectivity involves <u>and requires</u> a step change in quality and wider support for use cases

The main mode of delivering mobile connectivity will shift from 4G to 5G non-standalone (NSA) to 5G standalone (SA) over the next years. Whilst 5G SA will become very widely available, there will be geographic variation in how 5G SA will be delivered and the connectivity this will support. We distinguish between higher quality versus basic 5G. Higher quality 5G involves a step change in quality and use cases supported compared to 4G. The very high costs of deploying this type of 5G means that MNOs can only justify its deployment in limited (typically urban) areas. Elsewhere, they will deploy basic 5G which whilst an improvement on 4G will not support the same quality and use cases as higher quality 5G.

This emerging divide between areas where the market supports higher quality 5G, and other areas where it will not is eminently predictable today. Policymakers have a role to play in deciding what the right ambition for future mobile connectivity in the UK is and then developing policies that would support that ambition. Ofcom implicitly adopts the Government's target of basic 5G available to most of the UK's population by 2027 as its ambition. This is not a stretching ambition as the market will deliver against this basic 5G target. We believe that wide availability of higher quality 5G is the more appropriate ambition. After all, it is this connectivity that can deliver the widest set of benefits to people and businesses across the UK. [1] Furthermore, a higher ambition would contribute to the goal of limiting the otherwise worsening geographic divide in mobile connectivity.

A higher ambition means that Ofcom must go further in pursuing good investment outcomes. The more investment MNOs can secure for higher quality mobile connectivity, the more extensive deployment of such connectivity, the more secure and resilient the networks and, consequently, the greater the benefits available to users of mobile connectivity in the UK.

Ofcom's assessment of mobile markets and potential changes is thoughtful

Driven by competition at the network level, mobile markets delivered good outcomes to date. Performance on value-for-money is particularly impressive: average data consumption increased by 369% whilst average prices reduced with 22% over 2015-2020. Furthermore, consumers tend to be satisfied with their mobile providers, the services offered and the network quality available to them. As such, we do not share Ofcom's potential concerns in relation to service quality and price dispersion.

Ofcom identifies relevant changes that may occur over the next years and acknowledges these will make the value chain more fragmented. But it does not establish what the potential joint impact of such changes could be for the ability of MNOs to invest. We believe this impact will be to intensify the investment challenges that MNOs already face thus increasing the risk that markets will not support the investment required to deliver the desired future mobile connectivity.

We foresee a significant risk that competition alone will not deliver enough investment

Ofcom relies on competition delivering the investment required for mobile markets to deliver its view on what constitute good outcomes. We believe this expectation is incorrect. Evidence on historical returns does not provide an encouraging picture of supporting future investment, with performance poor compared to other countries and seemingly challenging for some individual

[1] The benefits we refer to include both private benefits that the market can be expected to deliver and public benefits (ie, positive externalities) that the market will not deliver because of missing monetisation prospects.

MNOs. Whilst MNOs will have some short-term commercial considerations and plans to invest, this does not mean that their actual investment will be enough to support good outcomes in the long run. This is not something that Ofcom can conclude on based on its current analysis, as it does not establish the investment required to support the desired future mobile connectivity.

We welcome Ofcom clarifying that it does not have a fixed position on mobile consolidation

Whilst supportive of proposals for providing greater clarity on its regulatory approach, we regard these as a complement and not as a substitute to a pro-investment regulatory approach. Of the three proposals, the one on mobile consolidation is most important. It is opportune for Ofcom to make it clear to management and shareholders of UK MNOs, and to potential investors, that its stance on a potential merger will be informed by that merger's specific circumstances and that it does not have a negative predisposition toward mergers that reduce the number of MNOs from four to three. Any merger proposal needs to be assessed on a case-by-case analysis.

To assist Ofcom, we set out how a pro-investment regulatory approach can be designed

Ofcom proposes to continue its current regulatory approach yet in doing so has no regard to what the alternative of a pro-investment approach could look like. This is problematic as it means that Ofcom was not able to compare the benefits and costs of its proposed approach against that of a reasonable alternative. To assist Ofcom in conducting such a comparison, we identify the principles that can underpin a pro-investment approach and describe future policy actions available to Ofcom when implementing such approach in practice.

Ofcom is right to be attentive to the increasing presence of digital companies in the wider mobile value chain

Ofcom identifies concerns that exist and may exacerbate in the context of the presence of digital companies in the wider mobile value chain. Whilst it is uncertain how these concerns will play out, we support Ofcom identifying these concerns and monitoring the potential risks they pose to delivery of good outcomes in mobile markets. It is important that Ofcom is ready to engage where necessary and continues its collaboration with CMA and DMU (including through its participation in Digital Regulation Cooperation Forum) to ensure cross-sectoral concerns or solutions are considered.

Main response

Our response is structured in six parts. First, we provide our perspective on the future of mobile connectivity. Secondly, we respond to Ofcom's assessment of mobile markets to date and its identification of good outcomes. Thirdly, using VMO2 as a case study, we set out what continuation of the current regulatory approach will and critically will not support in terms of investment and consumer outcomes. Fourthly, we explore key changes that may occur in the mobile value chain over the next years discussing their potential joint impact on the ability of MNOs to invest. Fifthly, we explain why we disagree with Ofcom's premise that the market will support enough investment and deliver good outcomes *absent a change in regulatory approach*. Finally, we describe the principles that could underpin a pro-investment regulatory approach and discuss future policy actions available to Ofcom when implementing such approach.

The future of mobile connectivity

We start by providing our perspective on what the future of mobile connectivity could be. This includes developments that will occur and other developments that are contingent on regulatory or public policy support.

The mobile ecosystem has historically evolved in a series of "generational" steps, driven by technological innovation at an industry level; so-called 2G, 3G, 4G and now 5G technologies. Connectivity delivered today using 4G is broadly uniform in terms of quality and use cases supported. The user's experience of mobile connectivity depends much more on the generation of radio technology it is delivered over, with 4G offering a step change compared to legacy technologies. The user's experience of connectivity delivered will change as we migrate from 4G to 5G over the next years.

Initial and ongoing deployment of 5G is on a NSA basis. It involves deploying a 5G radio access network (RAN) alongside existing 4G RAN and 4G core. This supports some improvements compared to 4G, most notably by providing an increase in capacity enabling MNOs to accommodate growing traffic whilst preventing degradation of service quality.

MNOs will upgrade to deliver 5G SA over the next few years. It requires MNOs to build a separate 5G core in addition to 5G RAN. Some MNOs have started trialling 5G SA and we anticipate that MNOs will upgrade to 5G SA relatively soon. It will become the primary mode of delivering 5G. Additional use cases that require ultra-low latency, very high speed and capacity must be delivered by 5G SA. Transition to 5G SA will increase the range of use cases, support delivery of higher quality connectivity and enable advanced virtual network functions.

Once 5G SA is in place, the implications of different radio solutions, this time for 5G, becomes relevant again. The performance of the network under certain use cases will depend, amongst others, on which spectrum is deployed and from how many sites. We find it instructive to categorise basic 5G and higher quality 5G.[2] Basic 5G can be delivered using low band spectrum. Strong propagation of this spectrum means that it can be deployed from a more limited number of sites whilst still achieving good coverage. This makes basic 5G a cost-effective way to expand 5G coverage. Higher quality 5G requires delivery using higher band spectrum (with initial deployment of spectrum in the 3.4-3.8 GHz band). This supports greater speed and capacity yet lower propagation means that deployment at a single site delivers connectivity to a much smaller area. Achieving similar coverage as basic 5G thus necessitates deployment from a much greater number of sites. The very high costs of such deployment means that MNOs will initially restrict delivery of higher quality 5G to high-demand (typically urban) areas and other areas where they face capacity constraints. In such circumstances, the substantial and more certain benefits of delivering higher quality 5G can justify its very high costs.

Whereas basic 5G is an upgrade to 4G, in the end only higher quality 5G can support a wider range of use cases and a higher quality of service. We use this categorisation to analyse what mobile markets will deliver under Ofcom's proposed continuation of its current regulatory strategy (basic 5G with limited deployment of higher quality 5G) compared to what is possible when a pro-investment regulatory approach supports considerably wider deployment of higher quality 5G.

Table 1 Basic vs higher quality 5G

	Mode of delivery	User experience	Use cases supported
Basic 5G	Low-band spectrum deployed from limited number of sites	[✂]	Existing or new use cases that can be supported by 4G
Higher quality 5G	Mid-band spectrum deployed from greater number of sites + densification and deployment of mmWave spectrum once available	[✂]; enhanced network reliability; simultaneous use by a greater number of devices	Use cases that require very low latency, higher speed and better quality than basic 5G or 4G support

Source: Based on internal VMO2 ten-year perspective.

[2] Higher quality 5G can also be defined as full capability 5G reflecting the much wider range of use cases it supports compared to basic 5G.

Prospects of 5G uses

There are three main capabilities that enable 5G to support a wider range of use cases.

1. *Enhanced Mobile Broadband* (eMBB) supports bandwidth-driven use cases that require high data rates for a better user experience. For consumers this enables seamless connectivity and wider range of connected applications.
2. *Massive Machine Type Communication* (mMTC) connects many low-power internet of things (IoT) devices to the cellular network, up to 1 million devices per square km, ten times the maximum possible with 4G LTE. This enables hyper-connected living, working and travelling environments that are not constrained by infrastructure limitations.
3. *Ultra-Reliable Low Latency Communications* (URLLC) supports ultra-high network reliability of more than 99.99% and latency of 1 millisecond for data packet transmission making it highly suitable to use in mission-critical use cases (eg, smart grids, water supply).

Connectivity providers can leverage these capabilities to develop use cases for their customers.

5G for consumers

MNOs have not typically charged extra for 5G to consumers and allow their customers to use it where available. This means that consumers can use 5G when a 5G signal is available and their device supports 5G. As Ofcom acknowledges, it is difficult to predict which future use cases may see the widest take-up and will be most valued by consumers. Augmented reality (AR), virtual reality (VR), and gaming are use cases that seem to offer tangible prospects for consumers.

5G for businesses

There is substantial scope for 5G to be used in the private and public sector. In fact, this is where most progress on 5G use cases has been made and where potential will likely be most significant. [3]

- Manufacturing is the sector that currently drives 5G adoption, with private networks (or other deployment) enabling automated robotics, enhanced monitoring and real-time analytics. There is large potential for 5G use cases to enable productivity and quality gains.
- Applications supported by mMTC and URLCC enable transport connectivity solutions that allow organisations to learn about people movement and behaviour and to improve

[3] Additionally, there is significant potential for such use to enable further use and to give rise to multiplier effects (including by expanding employment, environment and growth opportunities as identified by Deloitte's report, *Future of the UK Mobile and Wider Communications Value Chain*, available on https://www2.deloitte.com/content/dam/Deloitte/uk/Documents/financial-advisory/deloitte-uk-future-of-the-uk-mobile-value-chain-feb-2022.pdf.

operational efficiency. Amongst others, this could enable provision of more personalised and relevant passenger experiences.

- AR and VR applications, supported by eMBB, can enhance the learning experience in schools and universities. They can support online, hybrid and immersive learning experience which can significantly improve access to education and training across the country and society.
- Opportunities for remote patient diagnosis, tracking patient health measures and precision medicine supports delivery of improved health and social care.

Ofcom's assessment of mobile markets to date

Importance of mobile services

Ofcom identifies the growing importance of mobile services in the private and work life of people across the UK. Mobile connectivity has become a utility that people rely on and consequently disruptions in or a degradation of quality can have a large detrimental impact. There has been a major shift from voice to data services and demand for and supply of services with higher speeds and lower latency continues to grow. Average data use increased by 369% from 2015 to 2020.[4]

Ofcom acknowledges how important mobile devices and connectivity have become. This was very apparent during the Covid-pandemic when connectivity, including mobile, enabled people to stay connected to friends and family and to work remotely. Mobile devices are often connected to Wi-Fi yet mobile services remain important to people at home (including the 1.5 million households with no other source of internet access), at work, on the go, or as Wi-Fi back-up. Additionally, there is increasing take-up of connected devices that rely on differing types of connectivity (including mobile). Considering the above, it is essential that people and businesses are provided with the high quality and widely available mobile connectivity that they need.

The range of outcomes that mobile markets should perform strongly on

Ofcom believes that mobile markets alone will deliver the *right* outcomes. What is true is that markets will efficiently deliver an outcome. Experience suggests that after meeting some minimum threshold, market forces are unlikely to push outcomes beyond that point. It is important not to conflate the outcome the current market structure will deliver and the outcome that is good for society in general. If regulatory policy can be tuned to allow the market to deliver better outcomes, the greater are the benefits that people and businesses can derive from the mobile connectivity

[4] Ofcom (2022), *Ofcom's future approach to mobile market: A discussion paper*, page 24.

available to them. The objective should thus be for mobile markets to be incentivised to generate better outcomes rather than assume that what the market will deliver is good enough.

Ofcom implicitly adopts the Government's target of 5G available to most of UK population by 2027 as its ambition on future mobile connectivity. The first three outcomes identified by Ofcom – which relate to investment in new technologies, widespread availability, quality of mobile connectivity that meets a variety of needs – justify a higher ambition than this target. Ofcom may regard meeting the target as delivering these outcomes, but it does not constitute strong performance. That will require 5G networks that support delivery of high quality, reliable mobile services across large parts of the UK. In our view, the identified range of outcomes must translate into a higher ambition which then underpins Ofcom's forward-looking mobile strategy.

We have two further observations on the Government's 5G target and Ofcom adopting it as its ambition.

1. This target is not stretching. EE has spoken publicly about its commitment to achieve national 5G coverage by 2027.[5] We expect to meet this target.
2. Government identified a strategic priority for the UK's digital connectivity to be world-class. An ambition that only looks at availability with little regard to quality and use cases supported does not deliver against this priority. Moreover, several countries (South Korea, Norway and the US) lead the UK in building 5G networks that support a wider range of use cases.[6] World-class means staying close to this frontier. Wide deployment of basic 5G will not do so. Also, this ambition does not account for the public benefits of higher quality 5G being made available more widely.

Mobile markets have delivered good outcomes

Competition at network level supported 4G rollout and wholesale competition whilst competition between MNO own brands, MVNOs and resellers ensured that people and businesses benefitted from choice, innovation in services and value-for-money.

MNOs have been central to delivery of good outcomes at both a retail and wholesale level. There has been innovation across the value chain (by MNOs, device manufacturers, service providers), MNOs invested in 4G rollout achieving very wide availability and good quality, and choice and value-

[5] https://newsroom.ee.co.uk/ee-to-offer-5g-solutions-across-the-entire-uk-as-bt-group-unveil-new-mobile-and-convergence-ambitions/.

[6] In the case of Norway, Plum in its international case studies report commissioned by Ofcom found that "*High quality networks in Norway are driven by a combination of market and policy factors but regulatory intervention appears to have the largest influence*."

for-money at retail level is excellent. Ofcom's own evidence points to an industry with an average economic return on capital employed (ROCE) just above its cost of capital, which suggests an effectively competitive market.

The sector's performance on value-for-money is impressive. As identified by Ofcom, average data use increased by 369% over 2015-2020 with average price decreasing with 22% over that same period.[7] The price per unit of traffic thus reduced by five-fold. Moreover, prices of UK mobile services are at the very low end compared to large European countries and the US providing further testimony of the good outcomes that UK mobile markets delivered.[8]

The combination of a marked decrease in ARPU with stalling growth in the number of mobile subscribers has resulted in mobile revenues of MNOs having been broadly flat in real terms between 2010 and 2018 and having declined thereafter. Over the same time, the net debt position of BT Group and Vodafone Group deteriorated materially.[9] The absence of growth opportunities has put pressure on MNO returns, and by extension on their ability to invest in mobile networks.

It must be understood that declining prices reduce the ability of MNOs to invest. At a minimum, such conditions will not support an increase in investment compared to the current level. Also, the trend of declining prices is unlikely to continue. Several of our major costs are subject to inflationary pressures over the next years (including site and energy costs, and spectrum fees). MNOs will have to pass rising costs on to their customers, and when not able to because of the level of competition this will further reduce their returns. Where retail prices increase over next years, this should not be interpreted as meaning that mobile markets no longer deliver good outcomes.

Network competition has historically driven mobile investment needed to support usage growth and improve quality

Ofcom concludes competition between MNOs has been key to delivery of good outcomes. We agree. With price and network quality as key factors, competition incentivises MNOs to differentiate their offering, to retain existing and to win new customers. This encourages MNOs to invest in parameters of network quality that customers care about, including 4G coverage and reliability.

[7] Ofcom (2022), *Ofcom's future approach to mobile market: A discussion paper*, page 24.
[8] Ofcom (2021), *Pricing trends for communications services in the UK*, page 60.
[9] Deloitte (2022), *Future of the UK Mobile and Wider Communications Value Chain*, page 20, available on https://www2.deloitte.com/content/dam/Deloitte/uk/Documents/financial-advisory/deloitte-uk-future-of-the-uk-mobile-value-chain-feb-2022.pdf.

The focus of 4G investment has been on expanding coverage and providing capacity to support growing traffic. 5G brings a greater challenge, with MNOs having to invest in core, backhaul and radio access, and with a range of approaches to their disposal. The market's record on 4G must not be taken as an indication it will deliver on 5G, where requirements on quality and security are much greater.

Finally, we note that the market's appetite to materially increase 4G coverage was exhausted long ago and public intervention proved necessary to support the business case for coverage expansion work – even on a shared basis.

Intense competition between a wide range of providers at retail level

Competition between MNOs' own brands, MVNOs, and independent resellers has given consumers a wide choice of providers and services. The declining prices of mobile services and high consumer satisfaction provide testimony of the good outcomes that mobile markets have delivered. Despite this, Ofcom identifies potential concerns in relation to price dispersion and quality of experience.

- Variation in the pricing of mobile services reflects the nature of competition in retail mobile markets and it is not clear why this would be a concern.
- Ofcom argues that information on network quality at a local level would provide MNOs with stronger incentives to invest in quality. We do not agree. MNOs invested in and delivered on quality of service and more information may not be relevant or helpful to consumers.[10] [11]

Economies of scale

MNOs incur very high fixed costs to build networks and to acquire spectrum. The greater is the number of users on their network, the smaller will be their average unit cost. The combination of high fixed costs and lower variable costs incentivises MNOs to increase the number of users on their network. This makes economies of scale a defining factor of mobile networks.

[10] [✂]

[11] We consider there to be a parallel with ongoing work on the potential implementation of a broadband labelling scheme. It is important that consumers are suitably informed about the services they buy and recognise that more detailed information can be meaningful for some consumers. However, we believe it is vital to avoid consumer confusion by ensuring that information is made available to consumers in a way that is consistent with established norms relating to the promotion of broadband services and that complements existing requirements.

But this is not a simple matter. The economies of scale and the Minimum Viable Scale (MVS), being the minimum scale for MNOs to build and to run their networks efficiently, of individual MNOs will depend on their network choices, subscriber base, strategies and other factors. The scale of MNOs (measured by the number of users on their network) thus does not allow firm conclusions about the economies of scale or MVS for individual MNOs and how this affects competition at the network level.

[✂] A careful assessment is needed to conclude on the impact of scale on competition in UK mobile markets, given the number of variables that need to be controlled for.[12]

The desire for scale will continue to drive the interest of MNOs in network sharing, and of mobile investors in consolidation. It is important to remain open minded as such arrangements or proposals can reflect prospects for efficiencies and cost reductions that MNOs cannot achieve in a different way.

Increased engagement among and higher level of switching of mobile customers

Ofcom identifies the proportion of out-of-contract customers as a relevant measure of engagement noting its decline from 27% in 2019 to 25% in 2020.[13] Such customers are at risk of paying more than they would for a comparable sim-only contract. This risk applies to customers of bundled contracts who pay a single tariff covering device and airtime but not to customers of split contracts (such as O2 Custom Plans) as they pay only for airtime once they paid off their device plan. The CMA investigated overpayment by out-of-contract customers as part of its loyalty penalty investigation but has not recently assessed whether MNO commitments address the overpayment.[14] [15]

Additionally, Ofcom suggests the introduction of end-of-contract-notifications (ECNs) and the new 'text-to-switch' process have had a positive impact on engagement and level of switching. We supported measures to improve transparency and consumer choice but we think Ofcom should exercise caution when drawing such inferences from these limited data. Looking at short-term trends of specific measures does not allow a proper assessment of cause and effect of these relatively new interventions. To properly assess causation (rather than attribute correlation) requires controlling for other factors that may impact on measures. Similarly, it cannot be inferred from

[12] Such assessment could be needed in the context of evaluation of proposed mobile consolidation or potentially other regulatory decisions.
[13] Ofcom (2022), *Ofcom's future approach to mobile market: A discussion paper*, page 25.
[14] CMA (2020), *CMA loyalty penalty update: progress two years on from the CMA's super-complaints investigation*.
[15] Ofcom itself also considered such overpayment, most recently as part of its 2021 fairness commitments monitoring report.

consumers not switching or taking no action when out-of-contract that they act against their interests. If engagement or levels of switching were to decline this must not be interpreted as that regulation has failed to achieve its objective. The standard of analysis required to both prove the "success" or "failure" of an intervention is much higher than observing a few months' figures.

In this context, Ofcom's statement that it does expect to introduce new consumer pricing rules is to be welcomed. It will allow the market to adjust to the new regime which is still being introduced. Only after some further time has elapsed will there be a meaningful evidence base to assess the impact of individual measures or the regime they are part of.

Regulation and public policy helped to deliver good outcomes in the past

Whilst competition has been the key driver of good outcomes, regulation and public policy have played their part by enabling conditions for markets to deliver better outcomes. We regard two interventions as particularly important in this regard: the spectrum auctions which gave MNOs the opportunity to acquire spectrum suitable for deploying 5G, and the Shared Rural Network (SRN) project, through which Government and MNOs funded expanding coverage to partial and total not spots.

The benefits of other interventions are ambiguous, in our view.

- As flagged above, it is too early to assess the impact that regulatory initiatives, such as ECNs and 'text to switch' process, may have had on consumer engagement and level of switching.
- The current Net Neutrality regime restricts the opportunity of broadband providers (fixed and mobile) to better manage their interaction with large OTT providers which drive most traffic on their networks and to monetise the services they could develop and supply to such providers and other network users. Our response to Ofcom's call for evidence explained that Ofcom can achieve similar objectives as the current regime yet in a much more proportionate manner.
- Legislation to strengthen network security will protect people and business from network failures and security breaches (an externality). The investment needed to comply with this legislation will currently come from private investment by MNOs, rather than the public purse (which should be the case given the public benefit). Consequently, if these funding arrangements continue, public policy intervention will lead to prioritisation of security and resilience investments at the expense of investment in 5G rollout, for example.

That is not to say that one is a "better use" of limited private investment capital than the other. Rather, policymakers need to be honest about the absence of a free lunch. The Government's choice

to prioritise security and resilience through enacting legislation will come at the expense of other things, it would be misleading not to recognise that.

There may be ways to mitigate these negative effects; through public funding, spreading investments over a longer timeframe or focussing the impact of legislation on future networks thus allowing for legacy network security issues to be dealt with through accelerated retirement of those networks.

But dark clouds are on the horizon

Markets have delivered good outcomes in mobile so far, yet some underlying foundations are less favourable. There are several reasons to be concerned about MNOs having a continued ability to invest in mobile networks that can deliver the quality and resilient services that users need.

EBITDA margins for UK MNOs have been below those achieved by other European telecommunication operators, including operators that are part of the same telecoms groups as UK MNOs.[16] This suggests that profitability of UK MNOs has been below that of other European mobile (and fixed) operators. This not only makes the UK mobile market less attractive for investment but it also increases the risk that groups will allocate less funding to UK MNOs (compared to their other operations) because of their lower returns over the past years.

The levels of capex relative to revenue for UK MNOs have been in the range of 10-14% over the past years, well below levels observed for Germany, Italy and Spain. This means that investment as a proportion of revenue, likely because of lower profitability, has been low in UK mobile markets compared to those of large European countries. Telecoms stocks are viewed as dividend stocks by investors, like utilities. To generate a predictable dividend, telecoms firms must manage their cashflows. If profits are lower, investments over the long run will be lower to return the same level of cash (profit minus capex), all else equal. This will restrict the ability of such firms to pay the dividends that investors expect. If this trend extends during the 5G investment cycle, this means that investment in 5G will likely be lower in the UK than in these large European countries.

The extent to which participants in the wider mobile value chain have grown over the past decade has varied significantly. A 2021 Kearney report estimated that connectivity providers increased their market size by 3% compared to 119% for the overall value chain, with device manufacturers growing with 80%, infrastructure providers (including towers, cloud and equipment) growing fourfold and

[16] Deloitte (2022), *Future of the UK Mobile and Wider Communications Value Chain*, page 21, available on https://www2.deloitte.com/content/dam/Deloitte/uk/Documents/financial-advisory/deloitte-uk-future-of-the-uk-mobile-value-chain-feb-2022.pdf.

digital service suppliers fivefold.[17] The growth experienced by differing segments reflects the comparative ability of companies in these segments to extract value. This means that connectivity providers are prone to experience a deteriorating position when engaging with players in segments of the value chain that grew at a much faster pace. Further, if this growth leads to superior financial returns in other elements of the value chain, the allocation of sector capital will flow to those firms more readily than it would to connectivity providers.

The initial experience is that 5G rollout is slow compared to that of 4G rollout at the time of its launch. 4G population coverage had reached 72% within two years of its UK launch in 2012. 5G rollout has been slower: more than two years following its launch in 2019, outdoor coverage by at least one MNO has only just surpassed 50% (at high confidence, lower at very high confidence).[18] Analysis by Ookla indicates that UK 5G rollout lags significantly behind that in lead countries such as Norway, South Korea, China and the US.[19] Moreover, this analysis shows that average download speeds in the capitals of these countries are a factor 2-3 greater than those in the UK's capital London. The comparatively slow 5G rollout might reflect the prospects of monetising 5G being more challenging compared to 4G.

What we plan to and will not be able to invest in?

Ofcom concluded, based on its review, that MNOs plan to invest in mobile networks over the next years. This may be true. But perhaps a better question is, would MNOs invest more in 5G networks and services if the UK market generated better economic returns for them?

Ofcom often asserts that competition drives investment.[20] If that is true, then it follows that marginal improvements in returns would flow through into investment – to make a firm more competitive and win market share. To understand what incremental investments would be made today, if returns were higher, it is critical to understand in more detail what MNOs are investing in but also what they will not be able to invest in, and to then have regard to the connectivity and services that are versus are not supported. Naturally we are only able to use our own experience as VMO2 as a case study.

[17] Kearney (2021), *Transforming the telecom value chain – a platform business model*, available on https://www.kearney.com/.
[18] Ofcom (2021), *Connected Nations 2021 report*, page 38. Outdoor 5G coverage by all MNOs is far lower at no greater than 5% (again at high confidence).
[19] Ookla (2021), *State of worldwide 5G*, available on https://www.ookla.com.
[20] Ofcom (2022), *Ofcom's future approach to mobile market: A discussion paper*, page 8, "*We expect competition to continue to drive investment over the next few years*".

We now set out both what VMO2 plans to invest in but also investments that we identified but are unable to fund over the years ahead. This gives insights in what Ofcom's current regulatory approach will and will not support in terms of investment and outcomes.

What we present below draws primarily from our three-year investment plan (3YP) for 2022-2024.[21] In developing this 3YP we identified investment options and decided on the investments that we could include in our plan given the budget constraints we face.[22] The same process required us to deprioritise other investments for which we identified a need but that we are unable to fund from the available capital. It is critical that Ofcom understand the scope of deprioritised investments and how these investments would have benefitted users of our network as well as competition and innovation in mobile markets.

Before proceeding we explain our internal process for deciding on how much we can invest and how this will be funded.

Our internal process

Following regulatory clearance for the VMO2 joint venture, we started to develop our mobile business plan (which covers investment and more) for the years 2022-2024. We refer to this plan as our 3YP. [✂]

To appraise investment, we have regard to a range of financial and non-financial measures and key performance indicators (KPIs). This allows to account for the combination of benefits and costs that investment can deliver. Investment decisions are not based on one individual measure (eg, NPV or IRR) but are mindful of a wide range of measures, considerations and within the context of our longer-term strategy.

How MNOs make investment decisions

Ofcom looks at investment in an overly simplistic manner. It presumes that MNOs decide on individual investments based on their NPV, that MNOs undertake NPV positive investments, and that they can secure external funding if no internal funding is available. This ignores the reality of how MNOs take investment decisions and does not account for the imperfections that MNOs encounter when making investment decisions.

[21] [✂]
[22] [✂]

1. MNOs are not able to determine NPV of most individual investments. They will have an idea on what the investment will bring and how this will improve user experience or what we can deliver to users of our network but this cannot be translated in meaningful revenue or return projections.
2. To the extent MNOs can project future cash flows these will be subject to uncertainty. MNOs will require a risk premium to compensate for uncertainty. This will increase the discount rate that MNOs apply to appraise investments thus reducing the number of investments with a positive business case.
3. Reductions in retained earnings (which will happen to MNOs when they experience significant challenges) reduce the cash that MNOs have available and thus their capability to fund investment internally. In turn, this increases the need for external funding which MNOs will be more cautious to secure because of implications for the company's credit score and perceived financial position. At a minimum, MNOs can be expected to have regard to a range of financial measures and ratios in deciding on investment.
4. UK MNOs may be obliged to stay within the annual budget agreed with their parent group. When faced with a capped budget, they must prioritise investment with the highest expected return or that is deemed most essential for users of their network. The poor financial performance of UK MNOs compared to those of European telcos part of same parent groups may reduce the allocation of investment funding for UK MNOs.[23]
5. The discount rate that companies apply to appraise investments will increase in uncertainty around future cash flows. The change to a new generation of technology for providing connectivity and the significant challenges that MNOs will encounter in the wider mobile value chain means that MNOs face greater uncertainty going forward than they did in preceding years. Hence, it seems plausible that the forward-looking discount rate will be greater than it has been for historical investments.

The above imperfections mean that the investment reality that MNOs face is more complex and challenging than acknowledged by Ofcom. A view that says firms invest in all profitable projects is in practice not borne out in the real world.

[23] Deloitte (2022), *Future of the UK Mobile and Wider Communications Value Chain*, page 21, available on https://www2.deloitte.com/content/dam/Deloitte/uk/Documents/financial-advisory/deloitte-uk-future-of-the-uk-mobile-value-chain-feb-2022.pdf.

Our planned 3YP investment

[✂]

[✂]

[✂]

The investments that we are not able to include in our 3YP

There are also areas where we identified an investment need in developing our 3YP but were unable to allocate funding because of budget constraints. We describe these areas separately for core and radio, explaining the benefits that such investment could have delivered to users of our network.[24]

Some of these projects may be delivered in the future, but they are now pushed out beyond the three-year planning horizon.

Core

1) [✂]
2) [✂]
3) [✂]

Radio

1) [✂]
2) [✂]
    a. [✂]
    b. [✂]
3) [✂]
4) [✂]
5) [✂]
6) [✂]

Key future market developments

Ofcom describe key changes that may occur over the next years in terms of:

1) use of mobile services;
2) provision of mobile networks, and;

[24] [✂]

3) the sale and purchase of mobile services.

It is important to identify such changes and to understand their impact on the role of MNOs in the wider value chain and their ability to invest. Whilst Ofcom identifies relevant changes, it does not assess how these changes, individually or jointly, can be expected to impact on MNOs.

1) Use of mobile services

Ofcom identifies four developments all involving potentially greater use of mobile services.

i. Continued increase in mobile data use driven by growing demand for higher quality mobile services.
ii. Potential for more significant uses in industry and public sector.
iii. Growth in the use of consumer smart technology.
iv. Some increase in deployment of fixed wireless access using mobile services.

We discuss the first development more detail below and refer to our discussion of the second development as part of us setting out our perspective on future mobile connectivity above. In relation to the final two developments, we observe that:

- The combination of the small extent to which consumer smart technology requires mobile services and the limited amount of bandwidth they use means their impact on mobile traffic will likely be small. These same aspects make that potential to monetise the supply of mobile connectivity to wearables or other smart devices is likely limited.
- There may be some fixed wireless access (FWA) deployment over mobile networks to deliver fixed broadband in areas where fixed networks are not available or of poor quality. The combination of the traffic that FWA networks must accommodate for, the requirement of good mobile connectivity, and the wide and increasing availability of fixed networks that provides a higher quality than FWA networks can support will limit potential for FWA deployment. [✂] As fibre is rolled out to more of the UK, it may be that the role of FWA is transitory.

Increase in mobile data driven by growing demand for higher quality mobile services

Use of mobile data will continue to grow exponentially. This increase will initially be driven by people making greater use of existing 'data hungry' applications, such as video streaming and calling. Over time, new use cases will develop and be adopted that can give rise to further increase in mobile data, with use cases such as AR and VR involving very high data consumption.

There are two major aspects to this trend. First, its impact on the growth in traffic that mobile networks need to accommodate for thus requiring investment across the core, backhaul and radio segments of mobile networks. Secondly, the emergence of use cases that require higher quality 5G because of the higher speed and/or lower latency they require. Basic 5G or 4G cannot support such use cases to the same extent, thus limiting their take up.

2) Provision of mobile services

The changes that Ofcom identifies align with our expectations.[25] Importantly, these are changes that will lead to a more fragmented value chain where it concerns the provision of mobile networks.

Further rollout of 5G NSA and deployment of 5G SA

Deployment of 5G started, and will continue, on an NSA basis but will be upgraded to 5G SA over the next years. This SA upgrade requires deployment of a 5G core network and additional investment in mobile backhaul to support faster speed and greater capacity between the RAN and the core network.

Whilst MNOs plan to and will want to switch off 2G and 3G legacy systems, commercial or other requirements can restrict their ability to do so. We believe that accelerating legacy switch off would deliver significant benefits to MNOs and users of their networks as it allows MNOs to focus on building the network that supports and then to deliver mobile connectivity using 4G and 5G[26], while managing potential impact on users of services that rely on legacy technologies.

Separation of infrastructure, infrastructure sharing and emergence of new ownership models

There have been trends towards greater separation of infrastructure assets, evolving network sharing arrangements, and emergence of new ownership models. The commonality of these trends is that MNOs look for ways to improve their capability to fund 5G rollout by reducing costs and better monetising their assets.

We encourage relevant authorities (CMA, Ofcom) to assess transactions involving the sales of network assets or changes to network sharing arrangements in the context of the investment challenge that MNOs face. Given the importance of network sharing as an enabler of both efficient investment and competition, this area requires careful assessment in the event of a merger between MNOs that disrupts the existing arrangements in today's mobile markets.

[25] We set out our views on Ofcom's assessment of use of cloud as part of our discussion on Big Tech below.

[26] Including but not limited by having more spectrum available to deliver 4G and 5G mobile services.

Ofcom recognises the advantages offered by the neutral host model in terms of enabling faster and broader mobile deployment. We agree that this model has the potential to support provision of mobile connectivity in areas where it would otherwise be too costly or complex for multiple networks to be deployed. We contribute to this model by participating in the Joint Operator Technical Specifications (JOTS), which will enable potential hosts to understand what is required to act as a neutral host.[27]

There is a substantial risk that in some circumstances a neutral host can act as a monopoly provider of sites; [✂].[28] If the nature of the location, [✂], a neutral host can leverage its control over the only sites suitable for delivery of mobile services. In such circumstances, such a host might seek to exploit a dominant position in a specific geographic area. This could result in higher prices or other detriment for users of mobile networks. We trust that Ofcom will be alert when it comes to the risks posed by hosts that are monopolists in the supply of certain site locations.

Open RAN offers longer-term prospects for MNOs to diversify equipment vendors

Open RAN supports interoperability between different hardware and software vendors. It offers significant advances beyond the current closed architecture, where MNOs are limited to purchasing hardware and software from the same vendor.

The current market for supply of RAN equipment is characterised by a very limited number of vendors. Nokia and Ericsson are the only, very large vendors. Such a limited number of vendors is not conducive to competition in this market and likely to restrict choice and innovation. Open RAN has the potential to improve this situation by reducing barriers to entry and by enabling MNOs to mix and match equipment from differing vendors.

The challenge is that Open RAN is not mature yet, and much development is needed for it to become an alternative to the existing closed architecture. It will take many years for Open RAN to develop and for a more varied supply of RAN equipment to emerge. Supply of RAN equipment will not be favourable to MNOs in the intermediate period. A lack of choice and competition can be expected to exert upward pressure on prices, to limit choice and potentially to reduce quality and innovation. Therefore, collaboration between Government, Ofcom and MNOs is required to provide conditions for Open RAN to develop as quickly and widely as possible.

[27] VMO2 was the first MNO to support live calls over its network using a new Neutral Host In-Building (NHIB) mobile specification.
[28] [✂]

The programme to remove Huawei from the UK mobile ecosystem presents an opportunity to further the incentives to develop and deploy Open RAN, allowing new market entrants and fostering competition. However, if MNOs are to rely on these new vendors of Open RAN, careful consideration needs to be given to the timetable for HRV removal, such that the developing supply of Open RAN will be robust enough to play a role.

Mixed prospects in relation to private networks

Demand for private networks is forecast to grow substantially over the next ten years, in relation to industrial processes or otherwise. A wide range of players – including MNOs, equipment vendors, managed service providers and hyperscalers – have started to compete for the supply of private networks. These players all have distinct assets, capabilities, or customer contacts they can leverage. Moreover, some companies may have the capabilities to self-deploy.

Whilst competition for the supply of private networks offers choice to those that need a private network, it will limit revenue opportunities available to MNOs. This implies that prospects for MNOs to rely on private networks to improve the business case for 5G rollout (or to use it as an anchor to deliver 5G in a particular area) seem limited – it represents a defensive strategy rather than a growth one. Also, it is important to acknowledge that other players 'cherry picking' higher growth opportunities, whilst not facing the same public policy obligations and expectations as MNOs, can mute the incentives for MNOs to deploy networks that support wide provision of public, higher quality 5G connectivity.[29] [30]

3) The sale and purchase of mobile services

Ofcom identified two major further changes[31] in the sale and purchase of mobile services.

1. Greater role for Big Tech firms such as Apple and Google.
2. Bundling of mobile services with fixed broadband or other services.

[29] See Deloitte (2022), *Future of the UK Mobile and Wider Communications Value Chain*, page 5 for the cherry-picking argument, available on https://www2.deloitte.com/content/dam/Deloitte/uk/Documents/financial-advisory/deloitte-uk-future-of-the-uk-mobile-value-chain-feb-2022.pdf.

[30] For instance, we understand that wholly private networks would not subject to the high-risk vendor legislation that providers of public mobile networks must comply with.

[31] In addition to ongoing trends in relation to differentiation of consumer mobile services predominantly by price and data allowance, the growth of sim-only and the split purchase of devices and airtime.

Greater role for Big Tech

Ofcom recognise the potential for Big Tech players to sell mobile services directly or to act as platform for the sale of mobile services (in particular, through control over the operating systems of devices).

Whilst Big Tech players have not yet played this role in mobile retail markets, Ofcom are correct to identify there are options available to Big Tech to provide mobile services (including facilitated by eSIMs) and that impact on outcomes of mobile markets may not be positive. Increased competition may deliver short term benefits to consumers of mobile services but there are genuine concerns around the potential ability of Big Tech to leverage their strong position in the supply of operating systems and their control over their vertically integrated ecosystems in a way that undermines competition and delivery of good outcomes in mobile markets in the long run.[32]

Bundling of mobile services with fixed or other services

Most customers purchase mobile services on a standalone basis even though Sky, Virgin Media and BT have offered mobile services as part of fixed-mobile bundles for years. This has led to increased take-up of fixed-mobile bundles though its proportion of mobile services purchased remains modest. Following our joint venture, we are in a prime position to offer fixed-mobile bundles to existing customers of Virgin Media and O2, and to new customers. We lost no time: our Volt proposition (which offers higher speeds/more data to bundle customers) was brought to the market within six months of regulatory clearance.

As Ofcom notes, the CMA investigated retail fixed-mobile bundles as part of their assessment of the proposed Virgin Media / O2 joint venture.[33] It concluded that fixed-mobile bundles do not yet constitute a separate retail market and thus should be assessed as part of mobile retail competition. The combination of wholesale competition for mobile and wholesale regulation for fixed means that non-converged operators can offer fixed-mobile bundles in retail markets. Moreover, there is strong competition for the supply of mobile services standalone. Hence, we agree with the CMA not finding any competition concerns in relation to the ability of a Virgin Media / O2 joint venture to use their combined assets to offer fixed-mobile bundles.

As regards to bundling of mobile services with other services (eg, digital services, smart home devices or wearables), this has not happened at scale yet, but may grow over time. It could tap into

[32] For instance, by moving traffic between mobile networks or by influencing consumer selection of mobile provider through their control over mobile operating systems.
[33] See the CMA's final report on the proposed VMO2 joint venture.

consumer preferences and there may be advantages in selling services as part of bundles. There may be some opportunities for MNOs to cross-sell additional products, where these require or benefit from mobile connectivity. At the same time, Big Tech could start selling mobile services as add-ons to digital services or as part of their offering of smart devices. Given the strong position of certain Big Tech in some markets (as provisionally found by the CMA in its mobile ecosystems interim report), Ofcom must remain vigilant when risks to delivery of good outcomes emerge.

What potential changes will mean

Ofcom identifies the key changes discussed above and acknowledges they will have the effect of making the value chain more fragmented. But it does not give further thought to what the joint impact of changes on the role of MNOs and their ability to invest could be. This is a major shortcoming as it means its assessment of what the market will deliver over the next 5-10 years does not account for this joint impact. We anticipate that this joint impact will intensify the economic challenges that MNOs already face. Hence, there is a risk that they will significantly degrade the ability of MNOs to invest over the next years endangering delivery of future mobile connectivity.

Deloitte identified five factors that have the potential to constrain MNOs returns on future network investment.[34]

1. **MNOs' weakening upstream buyer power** will reduce their ability to purchase critical inputs to network deployment at low, competitive prices. This applies to radio access network equipment but also potentially to cloud services and access to sites and tower assets
2. **Intense competition in high growth areas of mobile markets** will mean that MNOs cannot use revenues and returns attained in these areas to monetise their network investment more broadly. By reducing scale available to MNOs and with new players seeking to cherry pick the most profitably supply and customers, these areas will not support MNO investment in their public mobile networks to the extent they could.
3. **Regulation will continue to constrain MNOs' commercial flexibility.** Regulation and the perceived risk of new regulatory initiatives restrict opportunities for monetisation thus reducing higher return prospects.
4. **Limited scale of MNOs constrains their ability to generate value in other parts of the value chain.** Their relative lack of scale restricts the ability of MNOs to compete in high growth

[34] Deloitte (2022), *Future of the UK Mobile and Wider Communications Value Chain*, pages 24-27, available on https://www2.deloitte.com/content/dam/Deloitte/uk/Documents/financial-advisory/deloitte-uk-future-of-the-uk-mobile-value-chain-feb-2022.pdf.

segments of the value chain and in adjacent markets and weakens their position in commercial negotiations with global players in these segments and markets.

5. **Challenges in achieving the network scale to generate the efficiencies needed to support investment**. MNOs require scale for their investment to be economic as it supports greater efficiency, reducing deployment costs and improving returns on investment. Existing merger and broader competition policy risk constraining the ability of MNOs to gain scale through consolidation.

We agree with Deloitte's conclusion that the cumulative effect of these factors (which are driven by the key changes Ofcom identified) is to constrain the ability of MNOs to generate value from their investment. We expect this effect will intensify over the next years putting further pressure on the ability of MNOs to invest at scale.

Will the market continue to deliver good outcomes?

Ofcom concludes continuation of its current approach will suffice as market will support investment

Having taken stock of today's mobile markets and of key potential changes, Ofcom sets out its views on how well the market is likely to deliver good outcomes, potential risks to such delivery and what its future approach to mobile markets should be. Ofcom's premise is that the market will support investment and thus will deliver good outcomes over the next years. This brings Ofcom to propose that apart from monitoring competition and a few clarifications, there is no need to change its current regulatory approach.

We now explain why we strongly disagree with Ofcom's premise and the assessment that underpins it, before commenting on what Ofcom does propose to do.

The market will not support the investment required to achieve the right 5G ambition

Ofcom's 'the market will deliver' premise seems based on mobile markets having delivered good outcomes to date *and* the expectation that they will support the investment needed to meet future connectivity needs going forward. The second part of this premise is flawed. Unless supported by regulation and public policy, the market will not provide the required investment.

Ofcom's expectation is incorrect for the following reasons.

First, Ofcom does not estimate the scale of investment required to provide a good quality mobile connectivity and to meet growing traffic. This level of investment is quantifiable and can be compared to what the market can reasonably support (ie, the current levels). Absent such estimate, Ofcom cannot be confident that the market will deliver enough investment.

Secondly, Ofcom might believe that MNOs were able to jointly invest £2.5 billion per annum over the past years and that similar investment would meet future connectivity needs.[35] Such belief would be flawed.

- Ofcom does not estimate how much investment is needed for the sector to deliver against the Government's current 5G target. This could already exceed the £2.5 billion per annum.
- Ofcom presumes the Government's availability target is the appropriate ambition. Delivering against a higher ambition will require significantly more investment, it is important to therefore consider "what good looks like" for UK plc before choosing the appropriate benchmark.
- In the short term, MNOs must deliver SRN commitments and comply with EECC and high-risk vendors (HRV) requirements. The significant costs associated with this unavoidable spending means that MNOs will have less funding available for 5G deployment and increasing 4G capacity.[36] Unless total investment is increased, there will thus be less funding available for 5G rollout. The rate of 5G deployment will suffer because it will become the opportunity cost of other interventions. If Ofcom believes that overall investment will rise to accommodate this (even though the public policy interventions are demonstrably an externality), it must explain what will trigger such a change.

Finally, if there is a shortfall in future investment (actual versus required) and Ofcom cannot plausibly explain how this gap can be closed, Ofcom should identify what needs to change for 5G to be delivered against a more appropriate ambition. We consider that this requires greater regulatory and public policy support.

Ofcom's expectation rests on three components

The expectation that the market will support enough investment is built on three components.

1. Historical financial performance appears to be supportive of investment.
2. MNOs have some commercial incentives to continue to invest in their networks.
3. Evidence from business plans shows that MNOs will continue to invest.

[35] Ofcom (2022), *Ofcom's future approach to mobile market: A discussion paper*, page 19.
[36] [✂]

Its assessment of these components leads Ofcom to conclude that the market will deliver the required investment. There are flaws in Ofcom's assessment of individual components, exacerbated by a misguided interpretation of what this means for the ability of markets to deliver enough investment.

Historical financial performance appears to be supportive of investment

As part of its review of MNOs' historical financial performance, Ofcom explains why it regards ROCE on an economic basis as its preferred measure of investment return. Then it presents ROCEs for individual MNOs and as sector average over 2017-2020 and explains why it interprets this evidence as that financial performance, at sector level, appears to be supportive of investment.

We are greatly concerned with Ofcom's assessment. Ofcom itself identifies several limitations.

- Investment decisions will be based on expected future returns and not on historical financial performance (and hence looking at historic returns may not be informative for taking a view on what prospects for future investment are).
- Evidence on financial measures other than ROCE indicates that UK MNO margins (% EBITDA, % EBITDA less capex) tend to be lower than those of European and US MNOs.
- ROCEs on economic basis exceed cost of capital across the four years for two MNOs yet for the other two MNOs are below cost of capital for two or more years.
- ROCEs determined on an accounting basis are below cost of capital for more MNOs and years.

Whilst Ofcom identifies these limitations, it fails to draw the right conclusions as it finds that historic financial performance appears supportive of investment. Ofcom should have been more thoughtful in what these limitations mean. In this context, we make the following observations.

- Performance can only be measured for past years whereas companies invest based on what prospects for future returns are. This means that predicting future investment based on historical profitability will not account for changes that make future market conditions less attractive compared to the past. We consider this a substantial risk in mobile markets.
- ROCE is not the only relevant measure of profitability or returns. EBITDA measures are also informative and decision makers at MNOs can be expected to draw from a wide range of financial measures (returns, cash position, debt) when deciding on investment.
- It is not clear that ROCE on an economic basis is the most informative measure of return on capital employed. It would have been more appropriate for Ofcom to consider evidence on differing ROCE measures instead of putting singular weight on this one measure. In doing so,

Ofcom should have reflected on ROCE on accounting basis being the more commonly produced and reported measure within MNOs.

- As noted above, Ofcom's evaluation of ROCE on an economic basis shows that two MNOs had a return above cost of capital for each of the years whilst two other MNOs had returns below cost of capital for two or more years. There are implications for investment if there are persistent "winners" and "losers" amongst MNOs. The shareholders (or potential investors) in those MNOs that persistently lose will tire when they are unable to achieve a reasonable return on their investment.

The commercial incentives and plans of MNOs to invest

We discuss the second and third components of Ofcom's assessment jointly as they are subject to the same limitations. Yes, MNOs have some commercial incentives to invest in 5G rollout as it allows them to reduce some costs and to accommodate for growing traffic more efficiently, and moreover some customers will want 5G. And yes, we (and seemingly other MNOs) plan to invest over the years ahead. The fact that MNOs have some incentives and plans to invest in no way implies the market will provide the investment that is required. It would have been prudent for Ofcom to adopt a more critical approach and to estimate the investment that mobile markets can reasonably support and whether that delivers the future connectivity that UK plc needs.

Ofcom's current approach is to assume that the market will deliver the right level of investment. That is not correct, the market will deliver the level of investment that investors can justify based on projected investment returns. These are not the same things. Whilst investors will invest based on the fundamentals of the UK mobile market, that does not mean that this will deliver the 5G networks that support the UK in becoming a highly competitive, digital economy.

We have two further objections to the weight put by Ofcom on investment plans. [✂] Secondly, plans cannot be taken for granted. The budget constraints that MNOs face mean that they likely must adjust their investment and other spend on an annual basis. It is highly plausible that MNOs will invest less than included in their plans as they must spend more on maintenance or to deal with consequences arising from decisions taken by Government/Ofcom this year, including the timetable for HRV removal.

As part of its 2021 WFTMR, Ofcom took stock of the fibre build plans of fixed infrastructure providers. These plans greatly overstate the build that has occurred and will happen. Applied to this review, the lesson is that the plans of MNOs cannot be presumed to be delivered in full. A critical review is needed as actual investment will likely fall short of planned investment. There is the risk

that MNOs that are consistently unable to make returns above cost of capital will, at some point, no longer be willing to invest as per their plans because they cannot expect to make reasonable returns.[37]

Limited prospects to monetise 5G rollout

Monetisation of 5G rollout must come from consumer or business customers, absent a way to monetise the other side of the market (ie, internet companies).

Speed tiering, with higher prices set for 5G mobile services than for those supplied using 4G or 3G, is a prime prospect for monetising supply of 5G to consumers. Such differentiated offering would allow consumers to self-select, between those willing to pay a premium for 5G and those who are not. Consumers can only be expected to pay a premium if they consider 5G delivers incremental benefits compared to 4G, whether improved experience of existing use cases or supporting new use cases.

[✂] The evidence from our research suggests that prospects to monetise 5G through speed tiering are greatly constrained, for the time being.

For businesses, the greatest potential for 5G use over the next years relates to the use of machine-to-machine applications in the manufacturing, logistics and agriculture sectors. The features that 5G can support – including high reliability, very high speed and bespoke capabilities – allow smarter ways of operating and maintaining assets, reducing costs and enhancing quality.

Ofcom identifies the potential for the public sector to make greater use of mobile services. There are opportunities to significantly improve delivery of public services (city planning, health care or education) by relying on digitisation and mobile connectivity. This can enable cost reductions in the supply of these services but can also improve access to and quality of these services. But there is more. Government and public sector can encourage provision and use of 5G by helping to spread knowledge on what 5G supports and the benefits it can deliver. The wider is the understanding of 5G and the more developed the capability of businesses to adopt use cases, the greater is the potential for MNOs to rely on business demand to monetise investment in higher quality 5G.

Considering the above, we do not currently see the launch of 5G in and of itself providing a material boost to revenues that can justify MNOs to increase investment beyond current levels.

[37] See https://www.bbc.co.uk/news/world-asia-india-59967252 for what happened with Vodafone Idea in India which was unable to invest and had to be bailed out by the Indian government.

Mobile markets will not support enough investment absent a pro-investment regulatory approach

The flaws in the three components that make up Ofcom's assessment undermine its premise that competition will deliver the required investment. We consider there is a great risk that competition will not support enough investment to meet the more appropriate ambition of wide deployment of higher quality and secure 5G networks.

Ofcom commits to monitor how competition evolves, ready to engage where necessary

If Ofcom does not adopt a pro-investment regulatory approach, it is essential that it monitors how competition develops and is ready to address risks that may emerge or exacerbate to the market delivering good outcomes. We expect Ofcom to have a similar commitment when pursuing the pro-investment regulatory approach that we favour.

There are several limitations associated with this *commitment absent a pro-investment regulatory approach*. First, it will not address the investment problem that MNOs face. At best, it may reduce some uncertainty around future investment. Secondly, such commitment will unlikely support timely and effective intervention in case Ofcom identifies risks to delivery of good outcomes.

Ofcom asks for inputs on two potential risks.

1) Market developments reducing the economic prospects of one (or more) MNO becoming a weaker rival.
2) Bottlenecks developing in the value chain that undermine the ability of mobile markets to deliver good outcomes.

We restrict attention here to the first risk as we discuss the second risk (which relates to the increased presence of digital companies in the wider mobile value chain) below.

Ofcom's evaluation of the first risk is sound. Competition at network level rests on the ability of each individual MNO to compete and to invest putting pressure on their rivals. If an MNO were to be weakened in its ability, it could choose or may be forced to compete less vigorously and to invest less in its network. This would weaken competition at the network level.

The question then is whether one or more MNOs in the UK could become a weaker rival over the next years. Whilst we cannot express an informed view on any MNO being disadvantaged by having less economies of scale, it appears that the management of some MNOs or their parent companies

believe this to be the case.[38] Whilst Ofcom might believe that the parent companies of MNOs struggling to achieve an economic ROCE might try again each year to win in the market, they may look for or need an inorganic route out of the situation.

Finally, we observe that a merger between two MNOs struggling to achieve scale must not damage a rival, such that it might become a less effective competitor. In this regard, the impact that any merger might have on network sharing arrangements with other MNOs and potential distortion originating from disproportionately uneven spectrum holdings are primary considerations, in particular where this risks deteriorating consumer outcomes (eg, degradation in user experience or slower 5G rollout).[39]

The impact of regulatory initiatives can be expected to vary across MNOs, being proportionately greater for the MNOs that have a smaller base to recoup compliance costs over. This means that impact of these initiatives will plausibly be greater for marginal operators and thus have a more significant impact on their contribution to competition and the delivery of outcomes.

Ofcom's proposal for its future regulatory approach

Before explaining its views that competition rather than regulation should continue to be the key driver of investment and that it proposes to continue its current regulatory approach, Ofcom summarises views put forward by MNOs. These include the three main reasons why, according to MNOs, the regulatory environment does not support enough investment in UK mobile networks.

1) Regulation reduces their returns by imposing additional costs and restricting their commercial flexibility to generate revenues.
2) Returns from investing in mobile networks are at risk of being regulated away through further future interventions.
3) The prospect of Big Tech undermining future MNO investment through its growing role in value chain.

In the context of these reasons, MNOs argued that the regulatory approach for mobile must support investment – as Ofcom successfully did in promoting fibre rollout – and that higher returns would translate in greater mobile investments.

[38] See https://www.threemediacentre.co.uk/content/three-uk-publishes-full-year-results-for-2021/ for Three's CEO describing the need for a benefits of further consolidation in the UK mobile market, and https://investors.vodafone.com/sites/vodafone-ir/files/result_document/h1-fy22/vodafone-h1-fy22-results-live-qa-16-11-2021.pdf for comments by the Vodafone CEO.

[39] For instance, marked discrepancies in the spectrum holdings of MNOs post-merger may limit the capability of MNOs with less spectrum to compete across the full range of customers and services. This could then inhibit on competition and the network, and by extension retail, level.

Ofcom does not address these reasons directly. Instead, it makes a series of observations to explain why it cannot and does not want to intervene. This includes noting that it does not have similar regulatory levers to encourage investment as in the fixed broadband market, that competition among MNOs has driven investment to date, that MNOs can recoup costs of regulation by adjusting prices of some services, that Ofcom only intervenes where it expects costs to be outweighed by benefits, and that it is cautious about the view that higher returns lead to greater investments.

Whilst these observations are relevant they do not imply that continuation of the current regulatory approach will perform better than a pro-investment regulatory approach in securing good outcomes in mobile markets. These observations could be part of an assessment, but they are clearly not the only relevant considerations, of what the most appropriate regulatory approach is.

Ofcom posits that competition should continue to be the key driver of investment. We agree. Competition has delivered investment and will remain the key driver of investment. But this does not mean that competition can or should not be complemented by a regulatory approach that promotes investment beyond a level that the market will deliver absent such support, if that is a desirable outcome for UK plc. In particular because such an approach can be designed in a way that retains competition as the key driver of *efficient* investment and mitigates potential harm to competition.

Providing clarity is not a substitute to a pro-investment regulatory approach

Ofcom proposes three ways to provide greater clarity over its future regulatory approach.

1) Set out more explicitly how it considers investment when making future policy decisions.
2) Indicate that it does not expect to introduce new consumer pricing rules.
3) Clarify that Ofcom's public position on any future mobile consolidation is "neutral, case-by-case" rather than "there must be four".

Whilst we welcome Ofcom proposals for providing greater clarity, it is no substitute to a regulatory approach that supports investment to a greater extent. It may reduce uncertainty around future regulation yet will not change expected returns on existing or new investments.

Ofcom has historically considered the impact of decisions on investment, so how might the proposed more explicit regard to investment change things? At best, this new commitment encourages Ofcom to be more explicit about the investment impact of its decisions and to weigh this impact against delivery on other objectives. Indicating that it is minded putting greater weight on investment, eg, by having equal regard to competition and investment, would provide a much stronger signal that Ofcom is willing to promote greater investment in mobile networks.

We think this is achievable within the current framework, where Ofcom's primary duty is to act in the interests of citizens and consumers "where appropriate" by promoting competition. If promoting competition in some form would impinge on investment incentives, such that citizens and consumers might be better served by maintaining or increasing these incentives, then in our view the qualification inbuilt in Ofcom's primary duty would be doing its job. The regulatory framework recognises that it might not always be appropriate to rely on competition to deliver the optimal outcome. We suggest Ofcom looks at ways to put that into practice.

Indicating Ofcom does not expect to introduce new consumer pricing rules is positive but comes with caveats.

- Ofcom has been very active on this area and providers are still working on the implementation of the rules and commitments they must deliver against.
- Ofcom reserves the option of intervening when it considers this necessary. In this regard we note that many of the interventions being introduced in the market up to April 2023 derive from the last review of the EU regulatory framework (the "EECC"). The UK will no longer be subject to periodic reviews of that framework driven by legislative priorities in Brussels. In that regard, it will be up to Government (advised by Ofcom) to determine whether and when to further amend the rules (or even retire ineffective ones…). Therefore, given the new reality, Ofcom is working within the legislative framework it has. Any future interventions (absent new legislation) derive from its own decision making. If this signal of regulatory forbearance is to have any value, it might be helpful to spell out further the consumer outcomes that might stimulate further intervention under the current law, so investors can take a more informed view of regulatory risk based on their views of whether such outcomes are likely to occur. Similarly, where interventions have failed to deliver value, they should be retired.

We welcome Ofcom's timely clarification of not having a fixed position on mobile consolidation. There was a sentiment amongst investors that Ofcom would look unfavourably at any proposed merger that would reduce the number of MNOs from four to three. The clarification makes it clear that Ofcom's stance on a proposed merger will not be guided by the number of MNOs. Instead, it will be informed by the circumstances of that merger. This is the correct position for Ofcom to take. It incentivises shareholders to evaluate consolidation options without unduly anticipating that these

have little chance of being cleared. A market without any realistic prospect of exit can drive investors to reduce their investments to the minimum to avoid investing in a stranded asset.[40]

The question of whether higher concentration in mobile markets delivers benefits for consumers or instead results in higher prices is a complex one. GSMA, Ofcom, and others conducted empirical studies to evaluate the relation between consolidation, prices and quality. Whereas GSMA and Compass Lexecon established that consolidation can improve consumer outcomes by increasing network investment and quality, Ofcom found no evidence of a positive link between mobile mergers and quality outcomes. Given these ambiguous findings, a future assessment of a proposed merger should not be unduly led by what these studies did or did not find. Instead, it must *attend to the specificities of the transaction, considering the efficiencies the merger might deliver.*

Our views on three other areas

To conclude this section, we comment on the three areas of the increased presence of digital companies, quality of service and potential wider benefits of higher quality connectivity.

Increased presence of large digital companies

Concerns in relation to use of cloud must be dealt with on a cross-sectorial basis

Use of cloud, part of a move towards digitisation across economy and society, will become an increasingly major part of mobile networks. Benefitting from the economies of scale and scope inherent in a distributed computing infrastructure, hyperscalers account for a very large share of the supply of cloud. With use of cloud growing, the role of hyperscalers will become even more important over time, including in the provision of mobile networks.

Ofcom sets out a balanced assessment of this area which recognises the benefits that use of cloud can deliver yet also identifies potential risks associated with hyperscalers' positions in the supply of cloud services. If the positions of hyperscalers become stronger over time and if the ability of users to switch supplier are restricted, this would weaken competitive constraints. This could increase the input costs of MNOs when paying for the cloud services they require.

For the market for cloud services to work well, suppliers should be subject to competitive constraints and there should be no undue barriers for users that want to switch supplier. Companies across differing sectors (thus extending beyond mobile) will want to take advantage of cloudification by purchasing from the few available suppliers or, in some cases, by self-supply. This means that

[40] As for instance occurred for Vodafone Idea in India.

potential concerns in relation to the supply of cloud services are best dealt on a cross-sectorial basis, ie, going forward by the DMU.[41]

This said, it is possible for competitive conditions in a particular segment to differ from those in a wider market. Hence, we welcome Ofcom having initiated a project to learn about the supply of cloud services in mobile markets.[42] This will put Ofcom in a better position to monitor developments, and where needed, to co-operate with the DMU when it turns its activities towards that market.

Interaction between mobile networks and large OTTs

The great majority of traffic on both mobile and fixed networks originates from consumers using the video streaming and social media services offered by a few very large OTTs – and this traffic continues to increase exponentially. Furthermore, many consumers now regard the internet services provided by these OTTs as indispensable. MNOs are continuously upgrading networks to deal with this, which come at a cost. Also, they innovate in new services, such as network slicing, that must be enabled to ensure investment is efficient.

We appreciate there are several initiatives in play that recognise that a select number of OTTs have gained a scale far greater than that of broadband providers. These include a review of competition or potential regulation in digital markets; Ofcom's work on mobile strategy and Net Neutrality, the CMA's investigation of mobile ecosystems and the DMU's forward-looking remit to impose pro-competition interventions and code of conduct on digital companies found to have strategic market status (SMS). We recommend that these initiatives are progressed in collaboration, mindful of relations between these initiatives and the issues they aim to address. As such, we support the launch of the Digital Regulation Cooperation Forum (which involves the CMA, Ofcom and ICO) to increase coordination and effective implementation.

The very high concentration in mobile operating systems risks detriment to outcomes in mobile and other markets

As part of its December 2021 mobile ecosystems Interim Report, the CMA identifies that Apple and Google have an effective duopoly in the provision of mobile operating systems, with similar shares of supply in the UK.[43] The CMA believes that their control over their vertically integrated ecosystems

[41] The EU's Digital Markets Act offers a helpful parallel. It identifies cloud computing as one of the core platform services of which gatekeepers (ie, providers found to have a particularly strong market position) must comply with a list of obligations and requirements.

[42] As indicated by Ofcom on page 9 of its 2022/23 Ofcom plan of work.

[43] CMA (2021), *Mobile ecosystems: market study interim report*, page 16.

put Apple and Google in a position to influence outcomes across parts of mobile ecosystems.[44] The CMA provisionally finds this to give rise to four competition concerns, of which 'competition in the supply of mobile devices and operating systems' is most relevant to mobile markets.

In assessing this particular concern, the CMA identified the nature of competition, barriers to switching, and barriers to entry and expansion as major factors that weaken competition.

- The nature of competition is characterised by users infrequently switching between operating systems, and limited price competition between iOS and Android devices, with iOS dominating sales of higher-end and Android that of lower-end devices.
- High barriers exist for users to switch between the iOS and Android systems which originate from differences in transfer data, apps, and subscription management across the systems. There is also an asymmetry. Poor compatibility of Apple's first-party apps and services with devices built by other manufacturers (which use Android) means that barriers to switching fall more heavily on iOS users. The CMA is concerned that this mutes competition between Apple and Google's ecosystems with users locked into the system they are accustomed to.
- There are significant barriers to entry and expansion – originating from indirect network effects, licensing payments to Google, and barriers to switching – that protect Apple and Google against alternative operating system providers. These barriers and the closed nature of iOS means that Apple and Google face limited competitive constraints from providers of alternative operating systems for mobile devices.[45]

These factors give rise to the concerns that the CMA identified in relation to competitive conditions in the supply of mobile devices and operating systems and how this could lead to detriment in mobile markets. The mobile-specific nature of these concerns means that Ofcom has a role to play in how these concerns are evaluated and addressed going forward if there are consequential impacts on the functioning of the mobile services market.

However, the CMA's report is currently an "interim" one and as it identifies in its analysis, there may be factors at play that contribute to or explain the observed nature of competition between Apple's and Google's operating systems. For instance, the CMA rightly observes that device purchasing decisions of consumers are likely to be largely based on the upfront cost of the device yet may include mobile tariffs. We agree that the importance of price as a factor in device purchasing

[44] CMA (2021), *Mobile ecosystems: market study interim report,* page 7.
[45] CMA (2021), *Mobile ecosystems: market study interim report,* page 18.

decisions is likely to increase in the price of devices, ie, it will be a proportionately greater factor for higher-end devices. But it is not a problem residing in the functioning of mobile markets *per se*.

The impact of device price on purchasing decisions was a key factor in O2 launching Custom Plans which allows consumers to spread device costs over a longer period (though going forward capped by regulation to 24 months which in our view limits consumer choice). Products such as Custom Plans may mute the impact of a price differential between Apple and Android devices, especially if consumers believe Apple devices might last longer or better hold their value. Also, there is a substantial second-hand device market where devices can be sold or purchased. These factors may limit the extent to which the device market is in practice bifurcated in the way CMA describes.[46] Whether that price differential is caused by the functioning of the mobile operating systems market is what the CMA will want to determine in its market study.

Potential entry into retail mobile

Ofcom hypothesises that if Apple and/or Google were to enter as a MVNO, they could have the ability and incentives to foreclose other mobile providers through their control of eSIMs and how these could be embedded in operating systems. While unclear how this might play out in practice, Ofcom envisages a scenario in which Apple and Google could dictate market outcomes by steering mobile customers and traffic between different networks. This scenario must be prevented as it could undermine competition in mobile markets, potentially giving rise to significant detriment for consumers.

Quality of service

Mobile consumers have access to a variety of information (including coverage and a range of quality metrics) about mobile networks and services, through multiple sources.

- Ofcom's annual report on comparing service levels, provides information about satisfaction with mobile providers services overall, and on complaints about the services supplied by mobile providers. Ofcom publishes this report to help people make informed decisions when selecting their service provider.
- Ofcom also publishes quarterly information on provider-specific complaints. Ofcom considers this information can inform consumers thinking about changing provider or purchasing a new service, and in doing so incentivises providers to improve their performance.

[46] CMA (2021), *Mobile ecosystems: market study interim report,* page 122.

- Independent third-party companies collect data on a variety of metrics through benchmarking or crowd-sourcing which they then publish on websites or in reports. These companies use different methodologies and present their findings in different ways. Some may focus on an individual metric, eg, speed, with others presenting a range of metrics.
- Consumer organisations provide information on quality of experience. They use different methods to collect data (eg, through consumer surveys, crowd-sourced data from a third-party company or using panels of judges) and to then present their findings publicly. They may hand out awards to providers for specific categories of service or quality. Whilst these may be a good indicator, they do not tend to be objective measures of network performance or quality of experience.

The experience of individual consumers depends on a variety of different factors and it is challenging for measures of service quality to be relevant to the experience of individual consumers. For example, differences in speed above a certain threshold, may have no perceptible change to the experience and thus in current circumstances may not be a meaningful metric for many consumers.

We have worked with Ofcom and other MNOs as part of the Ofcom/MNO Mobile Reporting Joint Working Group, including work to improve the accuracy and consistency of coverage information that Ofcom and MNOs publish. Furthermore, this group will explore new approaches to report on the quality of mobile performance which will require examining how real-world data can provide consumers with relevant information about the performance they can expect to receive.

As Ofcom acknowledges, there are difficulties in measuring network quality of experience. These include how to ensure that metrics are relevant, accurate and comparable – something that can be challenging for network level data because of the use of different vendors across MNOs. Furthermore, comparisons that are focussed on a narrow metric of speed, rather than a more comprehensive range of experience metrics (such as coverage, reliability, and customer service) can be misleading as it only provides a partial picture of overall quality of experience.

Initiatives to provide information on network quality to consumers have not always been successful. This has been due to evidence of poor relevance to consumers of the specific measures adopted and to low use of such measures. This led to publication of such measures failing to offer value to consumers as the information it concerned was deemed insufficiently relevant, accurate and comparable.

Ofcom should avoid the introduction of processes which involve significant and ongoing data collection and reporting by MNOs. This would put additional burdens on MNOs whilst not necessarily producing information that is meaningful to consumers. Hence, we recommend that Ofcom demonstrates the suitability and benefit to consumers of providing additional network quality information, including by conducting research that evaluates which information is most valuable to consumers and how best to make such information available to consumers.

Whilst we believe that Ofcom's focus should be directed towards ensuring access to control of inputs (eg, spectrum) and in structural matters, we will continue to work collaboratively with Ofcom as part of the working group to explore potential improvements in the reporting of quality of experience.

Potential wider benefits of delivering higher quality connectivity

Ofcom invites input on the potential wider benefits (ie, positive externalities) that might warrant public intervention to support a quicker and more widespread roll-out of higher quality networks than that what the market is likely to delivery. In assessing such benefits, Ofcom proposes to have regard to three criteria: 1) external nature of benefits, 2) specificity of the benefits to 5G, and 3) scale of benefits. The rationale for intervention would be greater the greater is the scale and external nature of benefits, and the more specific benefits are to 5G.

Whilst evidence is important and should be used in making policy decisions, we consider that this matter goes beyond things that can be objectively measured and accounted for. The extent to which improved mobile connectivity can contribute to important society challenges on areas such as social inclusion, better healthcare and education, and environmental benefits goes beyond an academic exercise of what the scale and nature of such contributions could be.

Moreover, it must be acknowledged that uncertainty on use cases and the benefits that people and businesses can derive from them is very large at these early 5G days. This uncertainty means that it is very challenging to make firm statements on the nature and scale of benefits that could be delivered. This does not mean that there is no potential for such benefits. Such uncertainty is prone to have the effect of reducing benefits that mobile connectivity can deliver. Moreover, the uncertainty will be asymmetric in the sense that the cost of not investing in higher quality mobile connectivity when external benefits prove large will be small compared to the cost of much greater investment on this area when external benefits turn out more limited (at least for initial years).

Another challenge in identifying and estimating benefits is that the costs of investment in higher quality mobile connectivity will be borne well before the much longer period in which the external

benefits will accrue. After all, investment in this connectivity is required before the enhanced connectivity is delivered and it will then take time for people, businesses and public organisations to learn about and develop capabilities to make use of the potential offered by this connectivity. The costs being more immediate and certain vs benefits being longer-term and uncertain is bound to understate the potential wider benefits of higher quality connectivity.

There is a responsibility for Government and Ofcom to reflect on the uncertainty and longer-term nature of benefits being delivered and to decide on potential intervention in such circumstances. Given the large potential for benefits (and the key areas they could be delivered on), we believe there is a great risk for the UK to be too slow in supporting investment that the market will not deliver today. It will be possible to design a public intervention that enables delivery of widest public benefits whilst limiting the financial contribution to be made by the public sector.

The SRN programme has proven that public/private collaboration is feasible and can deliver positive outcomes that the market would not have otherwise been able to deliver. At the same time, this initiative involves funding contribution by MNOs and assigns the responsibility to MNOs to build the required infrastructure to deliver against the agreed coverage levels.

A proposal for a pro-investment regulatory approach

Regulatory levers in mobile may be limited but there are options for Ofcom to design a regulatory approach that supports investment in mobile networks to a greater extent. We believe such approach is justified. To assist Ofcom, we first describe the principles that can guide Ofcom in developing such an approach and then identify what Ofcom can do on differing areas for their approach to be pro-investment.

Principles that can guide Ofcom in developing a pro-investment approach

Ofcom's existing regulatory principles include, amongst others, bias against intervention and maintaining regulatory stability. These are principles that Ofcom have regard to in deciding on their regulatory approach and in taking regulatory decisions. If Ofcom wants to promote mobile investment there are additional principles that can assist them in developing and later implementing its strategy.

Principle 1 – Prioritising investment in mobile networks. Putting greater weight on investment when making future policy decisions must be at the root of a regulatory approach that promotes mobile investment. It is essential that Ofcom can do this as part of the governance framework it

operates under. Ofcom's second principal duty is "*To further the interests of consumers in relevant markets, where appropriate by promoting competition*". In fulfilling this duty, Ofcom must have regard to (amongst others) the desirability of promoting competition, encouraging investment and innovation, and encouraging the availability and use of high-speed data transfer services throughout the UK. Is Ofcom able to put enough weight on encouraging investment?

The framework originates from fixed markets where introducing competition in highly concentrated markets was the primary objective. In those circumstances, there was a lack of competition and thus competition was the desired outcome for Ofcom to pursue. This allowed Ofcom to design a regulatory approach that promotes the building of competing fibre networks. Encouraging investment in such networks, by incumbent and rivals, is the means to get to the desired competitive outcome.

There is no need to promote competition in mobile because of effective competition at the network level. Therefore, in our view the caveat "where appropriate" allows Ofcom to place much more weight on its other objectives, save for ensuring that any intervention does not have a negative impact on competition. If Ofcom agrees, it must consider how it can put greater weight on investment within the current competitive mobile market, and where it disagrees it should advise Government on the limitations it faces because of its operating framework.

Principle 2 – Maintain a level playing field. This must be seen in the context of changes in the mobile value chain that have seen greater involvement of other players alongside MNOs. It is clearly not appropriate if mobile providers are subject to higher requirements and public expectations compared to other players when both supply similar services. The provision of mobile communication services by OTTs and the security requirements that apply to the supply of both private and public networks come to mind.

Principle 3 – An assessment of regulatory impact must be broad. It should account for the *collective* impact of regulatory and public policy interventions on MNOs and their investment in mobile networks. After all, it is this increasing opportunity cost that affects the budget and development resources that MNOs have, as they are required to direct scarce resources towards meeting the range of requirements and public expectations they face.

What Ofcom can do on differing areas to implement a pro-investment regulatory approach

We set out in the table below what Ofcom can do on a wide range of areas to support mobile investment to a greater extent. Whilst Ofcom can decide on few of these areas as part of its strategy, it can identify the options it has and indicate it is prepared to put substantial weight on investment when taking future policy decisions on these areas.

Table 2 Wide range of options for Ofcom to support mobile investment through future policy decisions

Area	What Ofcom can do
Consolidation	Ofcom must be consistent in the clarification it provided. It would be damaging if uncertainty arises among mobile investors in relation to their expectation that Ofcom does not have a fixed position on mobile consolidation.
Network sharing	Ofcom should evaluate whether there is a need to update the guidance used to assess whether proposed network sharing arrangements comply with competition law. Given the continued importance of such arrangements and changes in network provision, it will be ever more important that arrangements that deliver benefits are permitted to the greatest extent possible. [✂]
Neutral host model	Ofcom must monitor the risk of neutral hosts using their control over access to sites in areas where no/few build alternatives are available to exploit their monopoly position.
Public-private collaboration	Ofcom to support joint Government/MNO initiatives to improve aspects of mobile connectivity that would not attract private investment (ie, higher quality 5G outside urban areas or security and resilience)
Legacy switch-off	The Government announced a timeline of switch-off by 2033 but there is strong case for Ofcom, MNOs and Government to pursue accelerated switch-off. Ofcom should support and, where possible, push for decommissioning of 2G and 3G networks. The public sector could set an important example in support of switch-off by migrating to 4G/5G solutions now. As such an important purchaser, it will influence the development of the supply chain.
Open RAN	Given the risk of slow progress on Open RAN, there must be a joint effort by MNOs, Ofcom and Government to accelerate the development and take-up of Open RAN (and wider ecosystem). HRV removal from networks presents an opportunity to diversify the supply chain, but MNOs should not be disadvantaged if they choose to go down this route to comply – otherwise the infrastructure duopoly will be perpetuated.
Barriers to deployment	Ofcom must support Government initiatives that aim to reduce barriers to deployment and advise on how these initiatives can be most effective
Unlocking demand for new use cases	The greater is the demand and capability of businesses and other organisations to take up new use cases, the better will be prospects for MNOs and others to build the networks that support delivery of these use cases. Ofcom can explore how it can support this
Net neutrality	Fewer restrictions could improve opportunities for MNO to manage traffic, and to better monetise their networks by providing value-add services. It is particularly important if new guidance / rules were to provide greater clarity and certainty on monetisation of 5G use cases (eg, network slicing)

Existing regulatory obligations	Ofcom should review whether existing regulatory obligations remain appropriate considering changes in the value chain and obligations that potentially constrain MNOs' commercial flexibility. In doing so Ofcom must seek to ensure a level playing field in the context of OTTs and others entering provision of mobile services, for instance where it concerns requirements on security and resilience
Annual licence fees (ALFs)	MNOs jointly pay over £250 million per annum on ALFs. There is no need for ALFs to be set at such a high level as spectrum trading provides incentives for efficient use and allocation of spectrum. In addition, to the extent that future 'ALF payments' are still made, they might be better diverted into paying for the externalities Government is seeking to address through the Telecommunications Security Act. A contestable fund could instead be used to improve the security and resilience of UK mobile networks.
Spectrum	Our response to Ofcom's mobile spectrum demand consultation sets out what Ofcom and Government should consider when it comes to management of spectrum and the need to release additional spectrum for mobile use.