Strategic Review of Digital Communications

Discussion document

Consultation

Publication date: 16 July 2015

Closing Date for Responses: 8 October 2015

About this document

This document summarises the main elements of the review that Ofcom is conducting into the UK's digital communications markets. This is our first strategic assessment of the telecommunications sector in ten years and only the second since Ofcom was established.

The aim of the review is to make sure digital communications markets continue to work for consumers, citizens and businesses. It considers future policy challenges across fixed, mobile and content sectors, including:

- investment and innovation, delivering widespread availability of services;
- sustainable competition, delivering choice, quality and affordable prices;
- empowered consumers, able to take advantage of competitive markets; and
- targeted regulation where necessary, deregulation elsewhere.

Since announcing the review in March 2015 we have met with a variety of stakeholders including companies we regulate, consumer groups, industry observers, academic experts and public bodies. We also held a stakeholder forum in May and a series of workshops.

This document is consulting stakeholders more formally. We hope to hear from everyone involved in digital communications services, including consumers, businesses, communications providers and public bodies, from across the UK's nations and regions. We are also interested in the views of policy makers and legislators who set the statutory framework that we operate in. Our aim in publishing this document is to ensure that any conclusions we reach are based on an accurate assessment of all available evidence. We are keen to hear from those with alternative views on our analysis, or wish to offer their own.

We have not at this stage made any proposals for changes to our regulatory strategy and approaches. We will consider all consultation responses and evidence within our emerging views document due for publication at the end of the year. Our emerging views document will include any proposals to change our regulatory strategy. Any changes may be implemented through the current legislative framework. Alternatively, it is possible we might recommend legislative change either to the European Framework or domestic legislation.

This consultation will close on 8 October 2015. Please send your responses via our web-form (http://stakeholders.ofcom.org.uk/consultations/dcr-discussion/howtorespond/form) or email them to digital.communications.review@ofcom.org.uk.

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Section 1

Executive Summary

Reviewing a very different landscape from that of 2005

1.1 The telecommunications sector today bears little resemblance to the one Ofcom last reviewed. Our strategic assessment concluded in 2005, at a time when:

- Fixed broadband services were widely available, but only had to deliver a speed of 128kbit/s to qualify as 'broadband'. Today, superfast broadband can deliver speeds of at least 30Mbit/s to 83% of UK premises[1]. Availability is expected to increase to 95% of households and 82% of small and medium businesses by 2017.

- Fixed broadband take-up stood at 31%, compared to 78% now, and nearly one in three connections is now superfast[2].

- Mobile broadband was in its infancy. The new mobile data networks were based on 3G technology. The catalyst for so much innovation, Apple's iPhone, was still two years away. Now, two thirds of UK adults own a smartphone, and over half of UK households have a tablet[3].

- The first tentative TV services over broadband were appearing, but consumer take-up was low. It would take the launch of BBC iPlayer in 2007 and Netflix in 2012 to show the potential of streaming video services, delivered over broadband internet. Now, 48% of data carried over the UK's fixed broadband networks is streaming video[4].

1.2 Although this explosion in new services has been largely driven by the commercial sector, competition policy has also played an important role.

1.3 In fixed telecoms, Ofcom's first strategic review resulted in the creation of Openreach as a functionally separate entity from the rest of BT. Openreach is responsible for operating the 'last mile' of BT's access network on behalf of all communications providers. Competing providers could now access BT's network on equal terms, and this contributed to one of the most competitive broadband markets among major European economies. The average price of a residential fixed broadband package has fallen by 40% in real terms between 2004 and 2014[5], and take-up of superfast

[1] Ofcom analysis of operator data, May 2015. This data has been collected from operators for our forthcoming Infrastructure Report Update, due to be published later this year.
[2] Ofcom / operators
[3] *Ofcom Technology Tracker*, Wave 1, 2015, Table 32/54/66: http://stakeholders.ofcom.org.uk/binaries/research/statistics/2015April/Ofcom_Technology_Tracker_Wave_1_2015_Data_Tables1.pdf
[4] *Infrastructure Report*, November 2014, p.164: http://stakeholders.ofcom.org.uk/binaries/research/infrastructure/2014/infrastructure-14.pdf
[5] Ofcom / operators. Note: Includes VAT. Figures expressed in 2014 prices.

broadband in 2013 was double the average[6] of the other four major European economies[7].

1.4 In mobile, competition has cut the price of a typical bundle of mobile services by two-thirds in real terms, from around £40 in 2003 to £13 in 2012[8]. Access to spectrum has kindled this competition, with the 3G spectrum auction designed to encourage a new network operator into the market, and the 4G auction to maintain four national wholesalers. Lower prices have been accompanied by innovation: for example, Three, as a challenger brand, introduced 'all you can eat' data tariffs and use of Skype voice over IP (VoIP) services, and scrapped roaming charges from a number of countries.

1.5 In TV, paying for services has gained momentum, increasing from 44% of households ten years ago to 59% today[9]. TV is also delivered over broadband, and is increasingly part of retail bundles with broadband and telephony. Connected TV customers are increasing: more than 50% of UK TV homes are estimated to have a connected TV device[10]. Online TV services have also seen significant growth: Netflix now has 4m UK customers and Amazon Prime has 1.2m customers[11].

1.6 In 2010, following a review of pay TV, Ofcom concluded that Sky should be required to offer Sky Sports 1 and 2 to competing retailers. While this decision has been subject to legal appeal, interim arrangements remain in place that maintain the regulation's effects for a number of providers. Consumers are now able to purchase retail bundles that include these channels not only from Sky and Virgin Media, but also from TalkTalk and BT.

New challenges may be emerging

1.7 Serving the interests of consumers and citizens – whether private individuals or businesses - sits at the heart of Ofcom's work. It is our job to make sure that markets work for them by encouraging competition where appropriate.

Changing demands from consumers and businesses

1.8 Although the UK's telecoms users have enjoyed largely positive outcomes in the last decade, some concerns remain. As we all become increasingly dependent on communications, more needs to be done to make sure there is widespread availability of both superfast fixed broadband and better mobile coverage. This is particularly pressing for people in less densely populated areas, for vulnerable consumers, and for small businesses. More generally, there are also continuing concerns about the quality of service delivered by some providers.

1.9 There are also fresh challenges to meet. Although estimates vary, all agree that future demand for data will grow substantially. In fixed telecoms, this is likely to need

[6] *International Communications Market Report*, December 2014, p.25: http://stakeholders.ofcom.org.uk/binaries/research/cmr/cmr14/icmr/ICMR_2014.pdf.
[7] France, Germany, Spain and Italy
[8] *Citizens and communications services*, January 2015, p.33: http://stakeholders.ofcom.org.uk/binaries/research/cross-media/Citizens_Report.pdf
[9] *Ofcom Technology Tracker*, Q1 2005-2015
[10] Research from media consultancy 3 Reasons. Connected TVs refers to TVs connected to the internet, either via a set top box or a smart TV at the end of 2014
[11] *BARB Establishment Survey*, Q1 2015

a new wave of investment in 'ultrafast' broadband services. In mobile, more investment will probably be needed in 4G and, ultimately, a transition to 5G.

The structure of communications markets and services

1.10 How services are delivered to consumers and businesses continues to change. Consumers can buy services and connectivity from vertically integrated providers in "managed" bundles together with their broadband connection, or they can separately purchase services 'over-the-top' ('OTT') via the internet. The relative value attributed by consumers to their broadband connection on the one hand, and the content and services delivered over it on the other, are also subject to continuous change.

1.11 At the same time, there has been a spate of mergers and acquisitions across Europe, and indeed globally, with a stated aim of addressing the increasing convergence of services and the growing importance of scale. These include pure-mobile mergers as well as mergers of fixed and mobile players; some involve domestic-only operators and others international acquisitions.

Four strategic challenges for regulation

1.12 As we define our strategy for the next ten years, good outcomes for consumers and businesses are central to our work. We propose to assess these outcomes under four broad headings:

- **Investment and innovation, delivering widespread availability of services.** Our strategy must provide the right incentives for private sector investment and innovation, so that the full range of services is widely available. We will also focus on what needs to be done to make sure services are available in areas that are not deemed to be commercially viable.

- **Sustainable competition, delivering choice, quality and affordable prices.** In general, we believe that the best mechanism for delivering choice, quality and affordable prices is a healthy competitive market. We will continue to encourage this through regulation that protects both competition and incentives for efficient investment.

- **Empowered consumers and businesses, able to take advantage of competitive markets.** Competition is only effective when consumers are equipped to make an informed decision – and can easily act on that information to make a switch if they want to.

- **Targeted regulation where necessary; deregulation elsewhere.** Regulation works best when it is targeted where it is needed, and removed where it is not.

1.13 These desired outcomes drive our current strategy across digital communications services and we believe they will remain relevant to the future. We explore each in a little more detail below.

Investment and innovation, delivering widespread availability and higher quality

1.14 The key goal of our strategy is to make sure that the UK's citizens and businesses are served by high-quality, widely available telecoms, both fixed and mobile. This

brings substantial benefits both to individual users and to citizens and society more broadly.

1.15 This can be a major challenge in rural areas, which often fare much more poorly than urban areas. In part, this is because the costs of extending infrastructure are higher where there are proportionately fewer people. More remote geographies can be challenging, as can availability for specific use cases, including roads and railways for mobile. But it would be wrong to say problems are unique to rural areas: some urban locations also have issues with availability and service speeds, caused in part by network architectures, deployment costs or demand-side factors such as low incomes.

1.16 We also need to consider that the UK's nations and regions each have a different mix of features that affect network availability across and between them.

1.17 Fixed broadband technology is available almost everywhere, but the speeds that consumers experience vary considerably. The dynamic nature of the evolution of broadband is driven by successive waves of technology investment over time. Today this results in three challenges:

- **Universal broadband**. This is the 'base-level' broadband, which needs to be made available to all households to ensure that they are not excluded from the benefits of living in a digital society. We estimate that a typical household needs a 10Mbit/s speed to benefit from the most popular online services. But today, 8% of UK premises fall below this threshold, with around 2% (c.500k households) unable to receive the most basic 2Mbit/s service[12]. Cost is also an issue: some consumers may not be able to afford broadband at all. The percentages may be small, but the total number of households affected by availability and affordability is still substantial.

- **Superfast broadband**. We currently expect superfast broadband to be available to 95% of UK households, and 82% of small and medium businesses, by 2017. Superfast has been deployed rapidly and its rollout compares well with many other countries. However, availability still needs to be improved, particularly for small and medium businesses.

- **Ultrafast broadband**. In recent months BT has announced that it would deliver ultrafast speeds of up to 500Mbit/s to most of the UK within a decade. Virgin Media has also announced plans to extend its cable network to cover two-thirds of UK premises and its own ultrafast programme. CityFibre has completed the first phase of its trial fibre-to-the-home deployment in York, with TalkTalk announcing prices for this trial. These commercial developments are encouraging.

1.18 Although the UK enjoys widely available mobile services there are significant gaps in coverage, particularly in rural areas. As with broadband, this raises concerns about social inclusion and a growing digital divide. In urban areas, the key challenge will be to meet the rising demand for mobile data. More specifically:

[12] Ofcom analysis of operator data, May 2015. This data has been collected from operators for our forthcoming Infrastructure Report Update, due to be published later this year. Note that these figures are the result of new analysis, undertaken for the first time this year and, therefore, not comparable with previous years' analysis. These figures may be subject to change.

- **Mobile coverage – voice**. Most UK premises are covered by 2G voice networks, with 97% of UK premises having outdoor coverage from all operators. However, this figure is worse for indoor coverage (83%) where consumers make the majority of their calls and for in-car coverage on A and B roads (59%)[13].

- **Mobile coverage – data**. The data coverage provided by 3G networks is lower than 2G voice, with 84% of UK premises having outdoor coverage from all operators in 2014, 71% having indoor coverage, and only 30% of A and B roads having in-car coverage[14]. However, these figures will improve as 4G is deployed. Current figures show that today 4G delivers outdoor coverage from at least one MNO to 90% of premises and from all operators to 42% of premises[15].

- **Capacity growth**. Although forecasts vary, we expect that overall levels of data traffic could grow by a factor of 45 between 2014 and 2030[16]. We expect this to be met partly through the release of more spectrum, including the forthcoming auction of 2.3 and 3.4 GHz spectrum, and clearance of the 700MHz band. Using spectrum more efficiently, and deploying larger numbers of small base stations, will also be important.

- **Mobile quality of experience.** Unlike fixed services, a wider range of factors affect the mobile user-experience. These include network coverage and capacity, mobile users' circumstances (e.g. outdoor pedestrian, in-car, or on-train use for example), the level of demand, the optimisation of the network for certain services, and the capabilities of handsets. As consumers increasingly expect universal availability and always-on capabilities, this poses significant challenges to mobile network investment.

1.19 We need to consider two main issues around network availability in this review. Whilst the private sector takes the lead in investment and innovation in communications services, any regulation applied must protect investment incentives if availability is to be maximised. Secondly, we must consider what more can be done in those geographies where providing a service is not commercially viable. Linked to both these issues is the challenge of whether greater network investment and availability necessarily means that customers will need to pay more.

Competition as a key enabler of investment and innovation

1.20 Our approach to improving availability has relied mainly on private sector investment, driven by competition; we intervene directly only where geography makes commercial investment unviable. This is unlike other utility regulation, where there is typically a greater degree of central planning, and we believe it remains the most effective approach.

1.21 A particular reason for this market-based philosophy is that competition drives innovation. This is not just about new infrastructure, but harnessing technology advances such as processing power that can improve customers' experience of

[13] Ofcom analysis of operator data, June 2014, p75: http://stakeholders.ofcom.org.uk/binaries/research/infrastructure/2014/infrastructure-14.pdf
[14] Ibid. p81
[15] Ofcom analysis of operator data, May 2015. This data has been collected from operators for our forthcoming Infrastructure Report Update, due to be published later this year.
[16] *Consultation on the future use of the 700MHz band*, May 2014, p.3: http://stakeholders.ofcom.org.uk/binaries/consultations/700MHz/summary/main.pdf

digital communications. For example, in the evolution from 2G to 3G to 4G, the mobile operators are now using spectrum more than 10 times more efficiently. Similarly, the amount of bandwidth that can be carried over a fixed copper access network has increased significantly. In 2005, ADSL-based broadband delivered speeds of 8Mbit/s. BT has recently announced its intention to invest in the next generation of copper broadband technology (called G.Fast) which is expected to deliver speeds of 500Mbit/s.

1.22 In addition, the communications sector is different to utilities. The communications sector is characterised by a continual evolution in technologies and service capabilities, matching changing consumer demand and differentiated willingness to pay for different features. The resulting choice and differentiation brings consumer benefits, giving them services or packages of services that most closely meet their needs.

1.23 The recent wave of mobile mergers internationally has prompted some commentators to suggest that investment would increase if levels of competition were lower. We do not believe this is supported by the evidence. Econometric analysis from a range of sources, including some we have commissioned, suggests that there is a complex relationship between competition and investment. In practice, it appears that market structure and competitive intensity combine with many other factors in influencing levels of investment.

1.24 Both access-based and end-to-end competition can stimulate innovation and investment:

- There is evidence that access-based competition, especially that based on access to passive infrastructure, can drive network innovation. For example, local loop unbundling was an important factor in driving early improvements in the exchange-based ADSL broadband technology. Today, some European countries have seen competitive investment in ultrafast broadband supported by passive infrastructure access (e.g. ducts, poles, in-building wiring).

- There is also evidence[17] across a number of countries that end-to-end competition, between the incumbent telecoms operator and cable network operator, has been important in driving superfast broadband. Cable networks are more straightforward to upgrade initially, and typically this then stimulates a competitive response from the incumbent.

- Commentators have noted that Europe has lagged behind the US in 4G mobile services, and have used this to argue that there's a structural problem in European markets. However, the late start was due to a variety of reasons; most notably, the time needed to clear the necessary radio spectrum. End-to-end competition in the UK is driving a rapid deployment of 4G services, with availability now reaching 90% of UK premises.

1.25 We continue to believe that, wherever possible, effective competition helps to encourage efficient investment, led by the private sector. However, where economic

[17] WIK-Consult, *Competition & investment: An analysis of the drivers of superfast broadband*, July 2015, p.18: http://stakeholders.ofcom.org.uk/binaries/consultations/dcr_discussion/annexes/Competition_and_investment_fixed.pdf

bottlenecks deter competition, we must regulate in a way that protects the incentive to make significant, and potentially risky, investments.

Ensuring availability beyond commercial provision

1.26 There are circumstances where the level of availability deemed necessary, either for reasons of economic growth or social inclusion, goes beyond what is likely to be supported by private sector investment. In these circumstances a direct but targeted intervention might be appropriate.

1.27 When considering how best to intervene, we need to work closely with government. Although we have some mechanisms to improve availability (such as coverage obligations in mobile licences), government has other levers including public funding and planning reform. Through a coordinated approach, we can adopt the most effective means of improving availability in each case.

1.28 Some specific examples of current interventions include:

- **Fixed broadband**: the government-funded BDUK scheme will provide a basic 2Mbit/s service to all by 2016, and superfast broadband to 95% of UK households by 2017.
- **Fixed voice**: BT and Kingston Communications are subject to a universal service obligation. This requires them to provide a connection to the network on reasonable request, and at uniform prices, regardless of the location.
- **Mobile broadband**: one of the 4G licences carries an obligation to provide 98% indoor coverage by the end of 2017, with at least 95% in each of the nations. We expect this to drive improved coverage from all the operators.
- **Mobile voice**: an agreement in 2014 between the Government and mobile operators commits each of the operators to provide 90% UK geographic coverage by the end of 2017.

1.29 Although these interventions have delivered substantial improvements in availability, questions remain. In particular, we have suggested previously that the minimum broadband speed should be increased, perhaps from 2Mbit/s to 10Mbit/s and in March 2015 Government announced its intention to raise the Universal Service Obligation (USO) from dial-up speeds to 5Mbit/s. We also need to consider what more can be done to improve mobile coverage. Both issues will be revisited in our next Infrastructure Report, due this autumn, which will contribute to the conclusions of this review.

Sustainable competition, delivering choice, quality and affordable prices

1.30 Although competition policy has contributed to good outcomes for consumers and businesses, we now face a new set of questions:

- In fixed telecommunications, there is an emerging debate whether the current model of access-based competition, based on the functional separation of Openreach, remains appropriate.

- In mobile communications, do the recent and proposed mergers suggest that the current level of end-to-end competition, where players own and operate their own networks, is unsustainable? If so, will we need to rely more on access-based competition?

- Across communications services, regulation that promotes greater competition must be applied in ways that protect incentives for new, significant and potentially risky investment.

- The increasing importance of convergence means communications services should be seen collectively as well as individually. Sometimes they will complement each other, such as in a retail bundle of content and network services, or the vertical integration of these services into a single company. Other services may substitute for each other, such as fixed, mobile and internet-based voice. Either way, we may need a consistent aim or approach to competition policy across the full range of communications services.

- Across all services, concerns are being raised about the quality of experience for consumers and businesses. This includes service quality at the retail level, as well as the quality of service of wholesale products from Openreach.

Promoting competition in fixed telecoms

1.31 The history of fixed telecoms regulation in the UK can be seen as a long-running debate, spanning multiple decades, on how best to address concerns regarding BT's position in the sector.

1.32 After BT was privatised in 1984, retail price control was the main regulatory mechanism to protect consumers from high prices. The duopoly review in 1991 shifted the emphasis towards encouraging end-to-end competition, for example from cable. But when its effectiveness was shown to be limited, the emphasis shifted again, to access-based competition. This culminated in the market-by-market analytic approach set out in the 2003 European Framework.

1.33 In Ofcom's 2005 Telecoms Strategic Review, we noted that the sector had delivered significant benefits for consumers and businesses. Less effective, however, was the large and growing range of interventions designed to secure fair access to BT's network. We therefore proposed a new set of regulatory principles, under which we would:

- Promote competition at the deepest levels of infrastructure where it will be effective and sustainable;

- Focus regulation to deliver equality of access beyond those levels;

- As soon as competitive conditions allow, withdraw from regulation at other levels;

- Promote a favourable climate for efficient and timely investment and stimulate innovation, in particular by ensuring a consistent and transparent regulatory approach;

- Accommodate varying regulatory solutions for different products and, where appropriate, different geographies;

- Create scope for market entry that could, over time, remove economic bottlenecks; and

- In the wider communications value chain, unless there are enduring economic bottlenecks, adopt light-touch economic regulation based on competition law and the promotion of interoperability.

1.34 More specifically, we recognised that BT's market power and vertically integrated structure gave it both the incentive and the ability to discriminate against competitors. We suggested that any solution would require a combination of equivalence at the product level, and behavioural change by BT. BT then offered, and Ofcom accepted, voluntary, but legally-binding, Undertakings. These required the creation of a functionally separate Openreach, committed to selling key products on an equivalent basis to all providers.

1.35 This approach has delivered many benefits to consumers and businesses. However, it does face a number of challenges, for example:

- The current ownership structure of BT means that it still has the incentive to discriminate against competing providers. Although regulation limits its ability to do so, opportunities may remain. For example, BT's downstream business makes use of different wholesale products to its competitors, which raises the possibility of differential quality of service or pricing of products.

- The boundary that separates Openreach and the rest of BT was drawn at a time when broadband was delivered from telephone exchanges, over the existing copper access network. Competition was therefore focused on unbundling individual local loops. However, new broadband networks take fibre closer to the home, changing the topology of the access network, and potentially leading to new models of competition.

- Although Openreach must treat all competing providers equally, the quality of their service has, too often, been equally poor for everyone. This has led Ofcom to impose strict repair and installation performance requirements. While this approach can be effective, it runs against a key goal of the original regulatory settlement: to avoid ever more detailed micro-regulation.

- From a practical perspective, enforcing the current set of voluntary undertakings has not proved straightforward.

1.36 In our last strategic review we also considered the option of structurally separating different parts of BT. We noted that this would be a complex task, and that it would not eliminate the need for regulation. We said that it would represent a significant change to the UK industry's structure, but could perhaps ultimately unlock value and improve customer service, innovation and competition. We noted that we would return to this question if functional separation did not deliver real equality of access.

1.37 We believe that there are broadly four courses of action that we should consider in this review. We welcome your views on each option.

- **Continue with the current approach.** We may conclude that the current strategic regulatory framework remains appropriate, and that any concerns can be fully addressed through the normal cycle of market reviews, or via existing dispute resolution mechanisms.

- **Strengthen the current model of functional separation**. Under this approach we would address any concerns with the current regulatory settlement, either by variations in the existing BT Undertakings, or by new regulatory conditions set within the European Framework. Examples might include revisions to the Openreach boundary; more detailed monitoring and enforcement of cost allocation rules; charge controls that contain stronger incentives to improve quality of service; and more severe penalties for sustained non-compliance.

- **Consider structural separation**. This has the potential to deliver benefits, since it would address BT's underlying incentive to discriminate against competitors, and enable a simplified regulatory framework. It may also increase Openreach's management focus on, and control over, network investment decisions and performance issues. However, to the extent those issues arise from a lack of competition to Openreach, it may not fully address them. It would be an intrusive and complex intervention both for BT and the rest of industry, with substantial implementation challenges. It would also require ongoing regulation to guard against excess returns by the structurally separate upstream 'monopolist'.

- **Substantial deregulation and greater reliance on end-to-end competition**. Access-based competition can be effective in promoting competition downstream of an access bottleneck, but is unlikely to drive improved performance in relation to the access bottleneck itself. Better performance by Openreach may therefore come through us encouraging a greater degree of direct end-to-end competition, by being more selective as to where and how we apply access remedies. However, this can result in increased costs, and therefore higher prices, if networks are duplicated. We have seen a variety of models internationally, delivering a range of different outcomes.

1.38 We are interested to hear views on these and any other options for our overarching fixed telecoms regulatory strategy. Specifically, we want to hear evidence of any poor outcomes for customers resulting from regulation now, and how alternative models might address them.

1.39 In addition, we need to consider the specific products that should be the focus of any continuing access regulation. In recent years we have relied largely on active remedies (such as access to Ethernet services) which require BT to provide fully-functional services to communications providers on a wholesale basis. However this risks limiting the market's ability to provide differentiated services and, in turn, depressing innovation delivered by competition.

1.40 We are interested to hear whether a strategic refocusing on a package of passive remedies - which offers access to elements of network infrastructure such as duct, dark fibre, or wavelengths - might result in more effective and sustainable competition; one that encourages continued innovation as well as competition on quality of service . The acid test of any shift in approach is whether we might then be able to deregulate downstream active remedies.

Sustaining effective competition in mobile

1.41 Competition in mobile has a very different history from fixed. The sector did not start with an incumbent player enjoying national reach. The nature of mobile investment and competition has meant that, generally, we have been able to rely on end-to-end competition to deliver good outcomes for mobile users.

1.42 The history of mobile in the UK has been a long-running case study into how many competitors are needed to make sure that end-to-end competition is effective. In 1985 two operators were awarded the first licences for analogue services. By 1994, sufficient spectrum had been made available to support four operators of 2G digital networks. The 3G auction in 2000 was then used to encourage a fifth operator. Since then, the merger of Orange and T-Mobile to create EE meant a return to four operators. This reduction may continue if Three's proposed acquisition of O2 is approved.

1.43 Along the way we have needed to make interventions to protect mobile consumers from high prices in some specific areas; notably the wholesale rates to terminate calls and international roaming charges.

1.44 Our strategic approach to end-to-end competition in mobile can be summarised as follows:

- We believe UK consumers are likely to get better services at lower prices if there are a reasonable number of effective competitors. In our 4G auction, we defined this as at least four credible national wholesalers of mobile services. We therefore reserved some of the available spectrum for a fourth national wholesaler other than the three largest mobile operators.

- We have welcomed the benefits that come from network-sharing between these national wholesalers; in particular, the potential for cost reductions and improved coverage. We have therefore restricted our response to proposals for network sharing to making sure that rules are in place to protect downstream competition, covering areas such as sharing commercially confidential information. There are currently two of these partnerships, between EE and Three, and between Vodafone and O2.

- We have also welcomed the benefits that Mobile Virtual Network Operators (MVNOs) can bring to consumers. These providers offer retail mobile services without owning all the mobile infrastructure themselves, so provide enhanced retail competition, albeit without the same ability to differentiate services that comes with control of a network. There are currently 21 full MVNOs and numerous light MVNOs[18], some of whom have direct commercial relationships with their host MNOs and some of whom use a Mobile virtual network enabler to gain MNO access. So far, we have not found it necessary to impose access obligations on network operators to achieve this level of retail competition, although we note that individual mobile operators' attitudes to MVNOs have changed over time.

1.45 However, this approach is being challenged by a recent wave of mobile mergers in Europe. Mergers have been cleared in Austria, Germany and Ireland. All have seen the number of operators reduce from four to three and all use MVNO access obligations to compensate for the contraction in end-to-end competition. This contrasts with the US, where the proposed four-to-three merger of Sprint and T-Mobile in 2014 was blocked by the competition authorities.

[18] Full MVNOs are Mobile Virtual Network Operators with own SIM cards and own mobile network codes. Operators that fulfil these two conditions, but are majority owned (more than 50%) by any of the Mobile Network Operators in the same national market are not included.

1.46 These decisions come amid claims that Europe is falling behind other global markets, notably the US, and that consolidation is necessary to promote investment. As we discuss above, we do not see the available evidence supporting these claims.

1.47 The mergers in Austria and Ireland have led to comment about the impact on prices. There is evidence of some significant price increases, at least for certain customer segments. For example, Three Ireland has recently raised prices for its Bill Pay SIM-only customers by 25%. In Austria, RTR's[19] analysis of users' bills shows that prices paid have risen more than 30% between late 2013 and the end of last year, although the recent entry of a new MVNO may bring some downward pressure. We present some analysis of these pricing changes in this document, and would welcome other evidence and assessment.

1.48 It would be inappropriate at this stage to comment on the proposed merger between Three and O2. The detailed proposals have yet to be notified by the parties.

1.49 We start from a pro-competitive position. UK consumers have benefited greatly from end-to-end competition in mobile services. Where it is effective and sustainable, we believe it should be maintained. A model of competition based on regulated access may not deliver the same level of benefits, and we would be cautious about adopting it unless end-to-end competition proves unsustainable.

1.50 However, we acknowledge gauging the sustainability of end-to-end competition is often complex. Where an existing firm is no longer viable and is about to exit the market, it may be clear that competition is no longer sustainable. However, we might go further and take the view that competition is unlikely to be sustainable in circumstances where firms cannot invest enough to maintain current levels of competition in the longer term.

Regulating to protect incentives for efficient investment

1.51 Different models of competition can deliver different outcomes. An important question for this review is: how can regulatory intervention that is designed to deliver competition continue to protect the private sector's incentives for efficient investment? Specifically, where access-based competition remedies are applied, how can they be effective in driving continued investment and innovation, and not remove the incentive for providers to invest in end-to-end competition?

1.52 Linked to this question is the approach we should take when setting prices for access to regulated networks and services. Traditionally, our overarching principle has been to enable the opportunity for investors to recover their efficiently incurred costs. In lower risk, more mature, networks and services, this is relatively straightforward. However, the approach to regulating significant new and potentially risky investments is harder.

1.53 In such circumstances, we have adopted the 'fair bet' principle, trying to ensure investors can benefit from any upside associated with a successful risky venture, alongside the inevitable downside risk of failure. In the specific case of superfast broadband services supplied by BT, this has resulted in an obligation to supply all providers on an equivalent basis, but with a degree of pricing freedom. The approach we have adopted gives BT the freedom to set the price of the wholesale access product, provided it does not 'margin-squeeze' its competitors: i.e. making sure there

[19] Austrian Regulatory Authority for Broadcasting and Telecommunications

is an adequate margin between the wholesale price and the price of its retail superfast broadband services.

1.54 We are interested in how other options for regulation might affect investment incentives and competition. These could include price regulation based on risk-adjusted rates of return; shared investment models where risks and costs are shared among downstream partners; and examples of lighter touch regulation on new investments or nascent markets.

Taking account of convergence

1.55 Ten years ago, most consumers purchased different services from different providers, and these services were provided over different networks. Convergence was widely predicted, but had not yet happened. It is now a reality, and takes several forms.

1.56 One form of convergence is when the same service can be provided by multiple means, and these services can therefore be regarded as substitutes. For example, recent growth in internet-based messaging services such as WhatsApp, alongside a decline in mobile text volumes, suggests that many consumers now see these services as close substitutes.

1.57 This type of convergence is likely to benefit consumers; they have a greater choice of services, with some offering enhanced functionality. This typically increases levels of competition and so reduces any need for regulation. For example, it has been debated for some years whether different forms of voice telephony (fixed, mobile and internet-based) are substitutes. If so, it could pave the way for deregulating telephony services. This is a key issue for this review and we start from the position that there is a case for deregulation.

1.58 A second form of convergence is where different types of network adopt a common architecture. At home, consumers increasingly use wireless devices (smartphones, tablets, laptops) connected to their fixed broadband network. When they are outside the home, the same devices connect to mobile networks which increasingly use fixed fibre backhaul to meet growing capacity demands. If these trends continue, fixed and mobile networks will start to look very similar, both using fibre out to the edge of the network, and wireless to connect to consumer devices. This type of convergence could shift the economic bottleneck away from ‘final-drop’ access and towards ‘backhaul’, and lead to new models of competition between different forms of wireless access.

1.59 A third form of convergence is where different services are sold to consumers as part of the same retail bundle, and these services therefore complement each other. Over the last few years we have seen several waves of increased bundling, starting with voice and broadband services being delivered over the same connection (‘dual-play’); then adding content (‘triple-play’); and with mobile increasingly being added to either (‘quad-play’).

1.60 This type of convergence may deliver lower prices to consumers, if the provider passes on the retailing efficiencies that come with bundling. However, consumers could suffer if bundling results in reduced levels of retail competition. This concern can arise for two reasons: firstly because a lack of competition in any of the individual services can affect the entire bundle, and secondly because retail bundling can make it more complex for consumers to switch provider.

1.61 In particular, including content in retail bundles raises the question of how best to promote competition, not just in communications services, but in the content that forms part of the bundle. At present, triple-play services are a significant focus of retail competition, with take-up running at around 25% of UK homes. There is evidence that, for many consumers, TV content is the most important part of their bundle. So if a retail provider cannot offer attractive content, this is likely to reduce competition across all services in the bundle.

1.62 Access to key content, particularly content that drives the purchase of pay TV, is not a new concern. In particular, Sky's position as a vertically integrated broadcaster and platform operator, with control of a significant amount of key content, has attracted substantial scrutiny over the past 20 years.

1.63 In 2010 we completed our own review of pay TV. We concluded that Sky should be required to offer Sky Sports 1 and 2 to competing retailers; essentially an access-based model of competition for this type of content. While Sky has agreed commercial terms to provide these channels to Virgin Media and TalkTalk, it currently provides Sky Sports 1 and 2 to BT on regulated terms, and we are now in the process of reviewing that regulation.

1.64 In 2010 we also made a reference to the Competition Commission of various markets that exploit the right to show recent movies from the major Hollywood studios. The Competition Commission concluded that, although competition in the pay TV retail market overall was ineffective, competition was not adversely affected by Sky's position in movies. It noted that Ofcom had sought separately to remedy Sky's position regarding sports content. It said that if there were a material change in circumstances, this might warrant renewed scrutiny.

1.65 Convergence brings traditional telecommunications services together with content provision. This raises the question whether our various existing regulatory tools are appropriate to enable us to address any competition concerns across the services which make up the retail bundle. That does not necessarily mean that we need identical regulatory tools for all elements of the bundle, but rather sufficient tools to be able to address any competitive distortions on a consistent basis, in the interests of consumers.

Securing a sufficient quality of service for consumers and businesses

1.66 As digital communications services become indispensable to most citizens, and essential to every business, high quality is both needed and expected. 'Quality' covers a range of factors:

- the technical performance of the service (e.g. broadband speed, mobile call success rates);
- the efficiency with the service is installed (e.g. installation lead-times, whether an engineer turns up at the appointed time);
- the resilience and reliability of the service (e.g. fault rates, fault repair times);
- the range of service qualities available to consumers and businesses, including options for higher qualities of service to meet the needs of specific users (e.g. businesses); and

- the quality of customer service, including the effectiveness with which complaints are handled.

1.67 A specific area of concern to us is the quality of service offered by Openreach to its wholesale customers, for some of the services which we regulate. At the time the Undertakings were agreed, it was believed Openreach had every incentive to invest in its network and provide a good quality of service, given its increased focus on the needs of all of its downstream wholesale customers, including BT Retail. However, there is a growing consensus that this has not been the case.

1.68 Openreach is taking action to improve its quality of service but, given the importance of service quality to consumers and businesses, we have applied a range of minimum standards for its performance on specific wholesale products. Looking forward we want to understand:

- Whether the minimum standards we have imposed are sufficiently challenging and deliver what consumers and businesses require from today's enhanced communications services. How and why might standards need to evolve over time, and how would this work in practice?

- Whether there are alternative approaches to minimum standards, which could reduce the risk of an ever increasing range of more detailed regulation. Alternatives might include consumer information, promoting greater competition on service quality, or approaches that further enhance the incentives and rewards for offering higher quality of service.

1.69 More broadly, we note that quality of service issues are not limited to services which we regulate. For example, we are concerned at an apparent lack of retail competition to deliver business-class broadband to SMEs. And we are aware of a variety of concerns related to the quality of mobile coverage.

1.70 Of course, where there are quality of service concerns in competitive markets, this may simply be because consumers and businesses are not willing to pay for higher quality services.

1.71 However, it may also be that they find it difficult to obtain information on quality of service, in a form which is both understandable and comparable between providers. This may result in providers facing a reduced incentive to compete on quality, manifesting itself as less differentiation on quality as well as a lower likelihood of investment in innovative ways of improving quality.

Empowered consumers, able to take advantage of competitive markets

1.72 Communications services are unlike other utilities; a variety of offerings are aimed at differing needs of consumers and businesses, and to people with a varying willingness to pay. This is potentially good for customers as they can tailor their purchases to their needs. But they are only able to realise the benefits if they have a full knowledge of what's available, and can act on it easily.

1.73 We believe it is essential that consumers have, at the point of sale, accurate and understandable information that enables them to compare. Providers can often win new customers by offering clear, transparent information but sometimes they may have less incentive to do so. For example, some performance aspects are not

immediately obvious at the point of sale, or are technically complex (such as mobile coverage or broadband speeds). This is where we may need to intervene to ensure good information is available.

1.74 Everyone should be able to act on that information and, if they wish, switch provider simply and with no risk of losing service. Our starting point is that, all else being equal, switching processes should be led by the provider who the customer is moving to (the 'gaining provider'), since they have an incentive to make the switching process work well. We have applied this principle in reforming processes for switching voice and broadband services between providers on the Openreach network, and we are currently reviewing the process for switching mobile services.

1.75 Bundling creates a new set of challenges that could affect the consumer experience and dampen competitive pressure. Research found that of the consumers who have switched at least one of their communications services, only 8% switched three services at the same time[20]. We also witnessed some reductions in switching rates for fixed, mobile and pay TV services in 2014. Therefore, as well as reviewing the switching processes for individual services, we are also reviewing the switching processes for triple-play bundles.

1.76 Bundling may also make contract terms harder for consumers to navigate. For example, it can be confusing for a consumer who is thinking about switching, at the point when one of their services is due for renewal, to discover that other services are still in contract for a number of months. Alongside work on switching processes, we may need to consider non-process barriers to engagement and switching such as contractual terms.

1.77 We note that convergence, consolidation and the increasing prevalence of bundles with more features may make choices more complex. In this context, our strategy may need to evolve to give more targeted assistance to consumers and businesses in assessing available choices. For example, this could involve moving beyond current approaches to consumer information, to develop user tools to help with comparisons, and possibly a greater role for intermediaries and other third party information providers.

Targeted regulation where necessary, deregulation elsewhere

1.78 The regulation in place today has been built up over time to guard against a range of risks of poor consumer outcomes, by using competition policy, public policy and consumer protection measures. This may evolve over time, with some risks falling away and therefore making some elements of regulation unnecessary. We are keen to identify where existing regulatory policy may need to evolve, and where there are opportunities to simplify or deregulate.

Ensuring regulation adapts to new technologies

1.79 As the UK adopts next-generation fixed and mobile services, this will result in legacy systems and services being withdrawn. We therefore need to consider what this means for any associated regulation. Specific examples might include:

[20] *Ofcom Switching Tracker*, July-August 2014, Table 255: http://stakeholders.ofcom.org.uk/binaries/research/statistics/Switching_Tracker_2014.pdf

- Switch-off of the traditional Public Switched Telephone Network, and the transition to all voice services delivered over broadband networks. This may raise concerns about the resilience of lifeline services, to which we attach particular importance.

- The transition from traditional interconnection to all-IP interconnection, with implications for the end-to-end delivery of services and existing processes such as number portability.

- Switch-off of the copper access network. This has potential implications for existing investments in local loop unbundling, as well as for various specialised services delivered over copper access networks. Any transition would need to be managed and overseen very carefully to ensure that, for example, fire and security alarm services were not interrupted.

- Switch-off of legacy leased-line services. Preparations are already being made to ensure important services using these services, such as traffic light management systems, are migrated safely to newer technologies.

1.80 Developments like these are often inevitable and, in some cases, desirable, but the transition needs careful management to minimise any associated risks. We are interested in stakeholders' views on where these challenges may arise in the future, the implications for existing policies, and where Ofcom may need to take an active role in managing the process of change.

Opportunities for deregulation

1.81 There is a long-standing debate over whether the need for ex ante, sector-specific regulation will at some point fall away completely. Any competition concerns would then be addressed through ex post competition law, and any consumer concerns through general consumer law. We are open to the possibility of this level of deregulation if it is supported by evidence, but there are a number of reasons why it currently seems unlikely. For example, although the type of enduring economic bottleneck which led to the creation of BT Openreach may shift as technology evolves, an outcome where there are no such bottlenecks seems improbable.

1.82 Nevertheless, the aim to apply proportionate regulation, including looking for opportunities for deregulation wherever possible, is central to Ofcom's regulatory principles. The practical challenge is to identify areas for deregulation that do not create too great a risk of poor consumer outcomes.

1.83 We have identified a number of possible opportunities, including:

- Where end-to-end competition can be protected (in mobile) or promoted (in fixed), this will reduce the need for ongoing regulation to deliver access-based competition.

- Where convergence means that the same service can be delivered via different mechanisms, this will reduce the need for regulation to deliver access-based competition. Indeed, we may be close to the point where voice services via different means are substitutable, allowing voice-specific access regulation to be removed. However, some consumer segments may be slower to take up new services than others, and may need some ongoing protection.

- Where access-based competition can be accurately focused on a specific bottleneck, this can allow deregulation of downstream services. Following the last strategic review, the success of local loop unbundling allowed the deregulation of downstream broadband markets, and the success of wholesale line rental allowed the deregulation of downstream voice markets. If access to dark fibre proves to be an appropriate and effective remedy, deregulation of some downstream leased line markets may follow.

- Where competition is effective in specific geographic markets, this may allow for deregulation. An example is deregulation of leased lines in parts of London.

1.84 Even where large-scale deregulation is not practical, we want to explore the scope for removing individual regulations that are no longer required. For example, some stakeholders have suggested that the General Conditions may offer opportunities for simplification or removal of regulation.

1.85 However, where underlying concerns remain, options for deregulation need to be balanced against the effect on consumers and businesses. For example:

- Removing consumer protections may improve providers' flexibility to innovate in business models, but it risks consumers feeling that they are at the whim of commercial decisions such as mid-contract price rises or penalty payments for early termination.

- Reducing interventions to promote competition could increase some incentives to invest, but could also risk resulting in higher prices for consumers. The revenue generated by these price rises may not be directed into additional investment.

- Business costs could be reduced by removing requirements for specific consumer protections, but this risks creating greater inequality and reduced consumer welfare.

1.86 We welcome stakeholders' views on areas where there might be further scope for either deregulation or simplification.

Section 2

Introduction

This review aims to make sure that the markets continue to work for consumers and businesses

2.1 We announced on 12 March that we are conducting an overarching review of the UK's digital communications markets. This review builds on our first strategic assessment of the telecommunications sector, conducted in 2003-2005. Since that last review concluded, we have seen fundamental changes in what communications services are available, and how they are used.

2.2 The purpose of this strategic review is to ensure that communications providers and services continue to meet the needs of consumers, citizens and businesses in an evolving communications market. This phase of the review is seeking to understand where markets do not work well for consumers. Where evidence of problems is found, we are seeking to identify where and how regulation or public policy may be required to improve outcomes.

We are considering a wide range of issues, complementary to our series of market reviews

2.3 The strategic review offers an opportunity to examine the wider issues of competition, investment, innovation and availability across the broadband, mobile and landline markets, as well as associated digital communications services such as content. The review is complementary to our regular, three-yearly reviews of the individual telecoms markets, and allows us to take a longer term view of the questions raised.

2.4 It identifies areas of strategic challenge, and potentially broader and longer term strategic responses. We have an open mind as to how any such responses might be implemented. The most appropriate powers to use will depend on the nature of the conclusions we reach, and the process may include a need to call for new legislation, either domestically or at EU level. Our work on the strategic review will not be constrained by or alter previous decisions. It aims to review the high level approach we take to future policy decisions where appropriate.

2.5 This document will first set out Ofcom's current strategy and the market context for this review. We will then consider the main policy challenges for the future across fixed, mobile and content sectors, covering issues of:

- Investment and innovation, delivering widespread availability of services;
- Sustainable competition, delivering choice, quality and affordable prices;
- Empowered consumers, able to take advantage of competitive markets; and
- Targeted regulation where necessary, deregulation elsewhere.

Section 3

Ofcom's current strategy

Our duties are set out in the Communications Act 2003

3.1 Serving the interests of consumers and citizens – whether private individuals or businesses – sits at the heart of Ofcom's work. This is reflected in Ofcom's principal duty, as set out in the Communications Act 2003, which is to further:

- the interests of citizens in relation to communications matters; and
- the interests of consumers in relevant markets, where appropriate by promoting competition.

3.2 In addition to this principal duty, our duties include, amongst many others, ensuring that the UK has a wide range of electronic communications services, including high-speed services such as broadband. In particular, Ofcom must have regard to the:

- desirability of encouraging investment and innovation in relevant markets; and
- the desirability of encouraging the availability and use of high speed data transfer services throughout the United Kingdom.

We deliver good consumer outcomes through a combination policy approaches

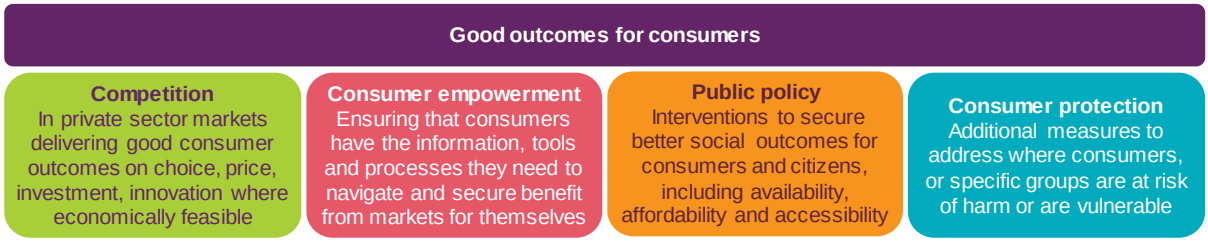
3.3 Our focus is on delivering good outcomes for consumers including businesses, for example, ensuring that consumers have access to a choice of high quality services at affordable prices. We deliver these consumer outcomes through a mixed regulatory approach, relying on a combination of competition policy, including consumer empowerment measures, public policy and consumer protection measures.

3.4 Our duties direct us to promote competition 'where appropriate'. This recognises the fact that well-functioning private sector markets are mostly, though not always, the key mechanism for delivering good consumer outcomes. The market is best placed to understand the wide range of consumer needs and how these can be met through existing and new technologies and business models.

3.5 Effective competition helps to ensure good outcomes for consumers and businesses, promoting genuine choice through a wide range of products and therefore access to new services across consumer segments. It is through competition that companies are incentivised to invest, innovate, compete on prices and deliver higher quality of service. Competition and innovation, led by the private sector, has improved the range and quality of communications services in the UK over the last 10 years.

3.6 Competition has therefore been at the heart of Ofcom's approach to delivering good consumer outcomes. However, we recognise that competition alone cannot deliver the full range of desirable outcomes for consumers, citizens and businesses. This requires competition to be supplemented with targeted interventions through public policy and consumer protection measures.

Figure 1: Ofcom's approach to delivering good consumer outcomes



We have adopted a range of interventions which promote competition

3.7 Competition policy is used to address market failures that prevent the emergence of effective and sustainable competition. Our work has included taking action on both the supply-side, through policies directed at firms, and on the demand-side, through consumer empowerment policies to ensure effective engagement.

3.8 For example, we have addressed the existence of market power on the supply-side through access regulation, supporting multiple retail service providers or setting charge controls for services to limit the risk of excessive pricing. On the demand-side, we have supported market mechanisms through consumer focused switching and information based policies to ensure consumers can take effective advantage of the choice available to them. These issues are explored in more detail in Section 12.

Competition alone will not provide widespread availability, requiring public policy intervention

3.9 A particular issue in communications markets is that competition alone will not provide widespread availability. Differences in customer density and topology mean that provision of network infrastructure is uneconomic in some areas, despite the use of commercial approaches such as geographically averaged prices and demand aggregation. Therefore, there are limits to how far the private sector alone will invest.

3.10 Specifically, in some of the less densely populated regions, which occur throughout the UK, competitive markets alone would not supply new network roll-out, because the cost of deployment exceeds the price consumers would be willing or able to pay. There is therefore a need for wider public policy interventions to deliver widespread availability to consumers, and this need may vary across UK nations and regions (see Section 7).

3.11 Funding for network deployment for the hardest to reach areas and interventions on affordability are key areas of public policy to promote widespread availability. In some cases, a principle of 'universal access' may be adopted in order to ensure access to these communications services. This issue is explored in more detail in Section 7.

Competition will also need to be supplemented by additional measures to protect consumers from harm

3.12 Competition will also need to be supplemented by consumer protection measures. Even where markets are competitive, firms may still engage in harmful behaviour. Protection measures may apply across all consumers, for example those which facilitate better switching processes or ban sharp commercial practices, or may be specific to certain consumer groups, such as ensuring the needs of consumers less able to protect themselves are met. We monitor complaints in order to respond to specific trends and actions in the market that cause consumers harm. Some

consumer protection measures have also had positive spill over effects that promote consumer empowerment. For example, the ban on automatically renewable contracts supports quicker and easier switching. In this review, we will be considering consumer protection measures in the context of consumer empowerment.

A large element of our strategic approach has focused on regulating where there are potential risks to competition

3.13 Given the focus of our duties on promoting competition where appropriate, our strategic approach has focused on regulating those areas where there is a potential risk to competition. In other areas, we have sought to deregulate where possible. For example, we recently proposed deregulation of leased lines in parts of London in our Business Connectivity Market Review consultation[21], and previously implemented geographically targeted deregulation of the wholesale broadband access market and removal of most fixed telecom retail markets regulation.

3.14 Risks to competition arise in particular from the presence of economic bottlenecks. Bottlenecks have traditionally been associated with access to non-replicable assets, and can provide players who control them with significant market power, potentially resulting in market failure. Regulation has therefore focussed on these bottlenecks. Certain physical network infrastructure and some types of premium content have to date been considered as non-replicable. Given scarcity of key bands, spectrum ownership can also give rise to potential competition concerns.

Promoting competitive markets and their associated benefits on the demand- and supply-side

3.15 The existence of these particular bottlenecks has focussed Ofcom's strategy on access to fixed access networks, on maintaining competitive provision in mobile services through spectrum policy and on specific concerns regarding premium content rights.

3.16 We have worked to promote competition in fixed telecoms through regulation of access and pricing in our market reviews. However, as we found in the 2005 strategic review, access alone may not be sufficient to deliver competition and good consumer outcomes. We have therefore complemented access regulation with functional separation as a mechanism to reduce the ability for BT to discriminate between downstream users of the Openreach access network.

3.17 Our specific strategic actions have included:

- technical improvements and price reductions to LLU in order to promote scale competition to BT, with an assumption broadband would form the basis for most future fixed communications services;
- a supportive stance regarding consolidation amongst business providers to support scale competition to BT;
- focus on active remedies for NGA, given limited evidence of interest by the industry in passives to support rollout of superfast broadband;

[21] *Business Connectivity Market Review: Review of competition in the provision of leased lines* consultation, May 2015, p.80-83: http://stakeholders.ofcom.org.uk/consultations/bcmr-2015/

- regulated access to leased lines (increasingly Ethernet services) for business and carrier connectivity; and

- keeping opportunities for contestable investment open through passive infrastructure access and sub-loop unbundling.

3.18 In the mobile market, we have sought to maintain four credible national wholesalers through our approach to spectrum auction design and to facilitate innovation and investment in mobile for example through spectrum liberalisation. We have also undertaken targeted regulation of mobile termination rates to address significant market power in mobile call termination.

3.19 In content, we have imposed a wholesale must offer (WMO) obligation on certain premium sports channels.

3.20 Supply side competition issues are covered in more detail in Section 9.

3.21 On the demand side, past actions have broadly focussed on empowering consumers through access to information and their ability to switch. These issues are covered in more detail in Section 12.

- **Access to information**: we have focussed on providing key information to consumers to allow them to make effective choices.

- **Enabling easy switching**: artificial barriers to switching can affect consumers' engagement with the switching process, and undermine new entrants' ability to win market share. To address this, we have implemented a move to gaining provider-led switching processes on the Openreach and KCom copper networks. The ability to port mobile numbers supports consumer switching. We have also taken action against a wider range of practices that could inhibit switching, including action on automatically renewable contracts and early termination charges.

Supporting investment and widespread availability

3.22 Given that competition alone does not secure universal availability, we have worked to support investment and availability. In fixed telecoms, we have sought to maintain incentives for BT to invest through pricing freedom on the VULA remedy, while also maintaining opportunities for contestable investment through a passive infrastructure access (PIA) product e.g. duct and pole access and proposals for dark fibre in business markets. Promoting availability of mobile services has largely been achieved through coverage obligations in spectrum licences.

3.23 These actions are explained in more detail in Sections 6 and 7.

Enhancing quality of service in the face of limited competition

3.24 Experience since 2005 suggests neither equivalence of inputs (EOI) nor existing commercial agreements provided sufficient incentives for Openreach to improve service quality, we have imposed wholesale quality of service remedies on Openreach. These include minimum standards for the installation and repair of fixed lines and a requirement to publish KPIs.

3.25 Quality of service issues are explored in more detail in Section 13.

Section 4

Market context

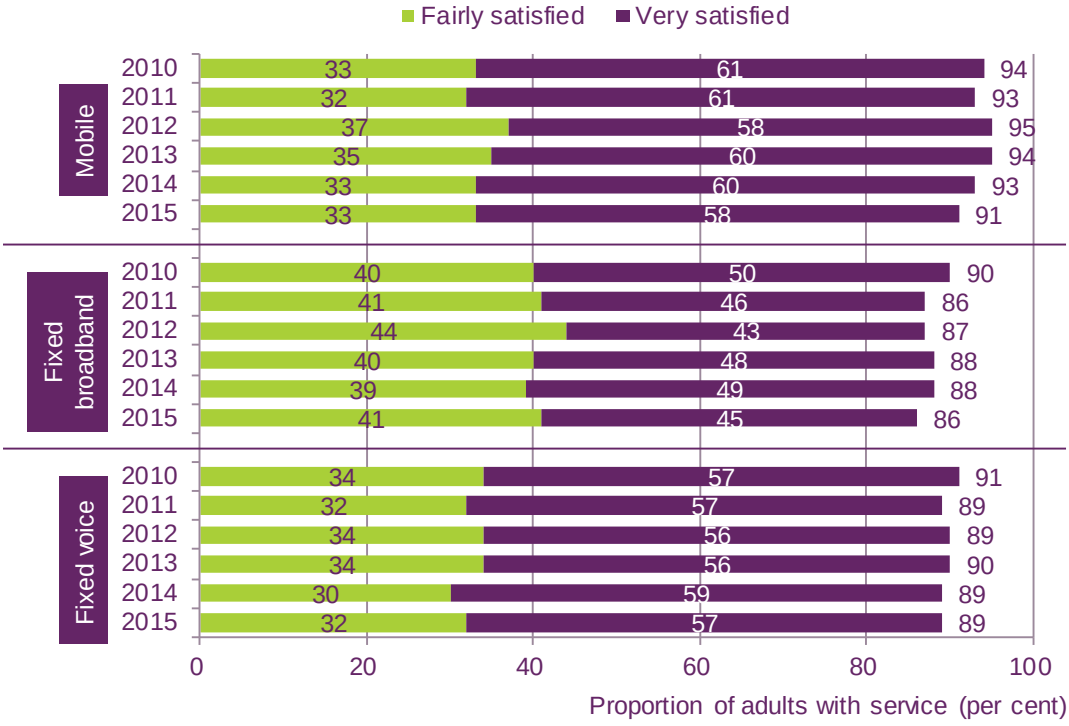
4.1 This is a forward looking review, seeking to understand future challenges to achieving good consumer outcomes, and the available policy responses. However, it is helpful to consider how consumer outcomes have evolved, and where markets or policy may not have delivered good outcomes to date.

4.2 This section sets out, at a high level, the outcomes we have seen in digital communications services in recent years and some potential future trends that we consider will influence the operation of our sectors and associated policy challenges.

The consumer experience of digital communications services

4.3 Overall, consumer and business user satisfaction with communications services is high. Around nine in ten consumers in all are now 'very satisfied' or 'satisfied' with their overall service. Amongst SMEs, 85% felt their business needs were well catered for by the communications market, and only around 5% said they were dissatisfied with their service (landline, internet and mobile)[22].

Figure 2: Overall satisfaction with communications services: 2010 - 2015



Source: Ofcom Technology Tracker. Data from Quarter 1 2010-2013, Wave 1 2014-2015
Base: All adults aged 16+ with each service. Note: includes only those who expressed an opinion; consumers with fixed voice services were specifically asked about their home phone service only; totals may not add up due to rounding.

[22] Jigsaw Research, *SME experience of communications services – a research report*, October 2014, p.18: http://stakeholders.ofcom.org.uk/binaries/research/telecoms-research/sme/sme_research_report.pdf

4.4 Much of this satisfaction is as a result of competitive prices, improving networks and extending availability. However, some overarching concerns remain on how truly widespread digital communications services are, and the quality of experience they offer.

Consumer outcomes over the last decade have been broadly positive

4.5 Ten years ago fixed broadband services were widely available, but a service only had to deliver a speed of 128 Kbit/s to qualify as 'broadband'. Now, superfast broadband (capable of delivering speeds of 30Mbit/s) is available to 83% of UK premises[23]. This increase is primarily due to the Government's BDUK investment programme, building on the commercial rollouts of Openreach's fibre-to-the-cabinet (FTTC) network as well as Virgin Media's DOCSIS 3.0 technology. Superfast availability is expected to reach 95% by 2017.

4.6 Following the 4G auction in 2013 (and EE's launch of 4G services from 2012), end-to-end competition between the UK operators has driven rapid deployment of 4G services. In May 2015 90% of premises had outdoor 4G coverage from at least one operator (while 42% had coverage from all operators)[24].

4.7 Growth in availability and take-up of broadband has driven take-up of connected devices. The increasing availability of superfast broadband has enabled consumers to simultaneously use multiple connected devices. Convergence has also enabled TV services to be delivered over broadband. Connected TV customers are increasing and take-up of OTT services has grown; Netflix is now estimated to have in excess of 4 million UK subscribers and Amazon Prime Instant Video 1.2m[25].

4.8 Over the last decade communications services have increasingly been sold as bundles, offering consumers better value for money and convenience. Furthermore, consumers are now able to purchase retail pay TV bundles not only from Sky and Virgin Media, but also from TalkTalk and BT, including those premium sports channels covered by the wholesale must offer obligation on Sky.

4.9 Furthermore, the average UK household spend on communications services has fallen in real terms and the proportion of total household spend taken up by communications services has also fallen; from 4.0% to 3.5% over the same period[26].

[23] Ofcom analysis of operator data, May 2015. This data has been collected from operators for our forthcoming *Infrastructure Report Update*, due to be published later this year.
[24] Ibid.
[25] *BARB Establishment Survey*, Q1 2015
[26] Ofcom / operators

Figure 3: Consumer outcomes – changes since 2005

	Then	Now
Fixed broadband take-up	31% (Q1 2005)	78% (Q1 2015)
Superfast broadband availability	Launched in 2008[27]	83% (May 2015)
Superfast broadband take-up[28]	Launched in 2008	32% (end 2014)
4G coverage[29]	Launched in 2012	42% (May 2015)
Connected TV take-up[30]	13% (end 2006)	56% (end 2014)
Smartphone take-up	iPhone launched in 2007	66% (Q1 2015)
Tablet take-up	iPad launched in 2010	54% (Q1 2015)
Take-up of bundled services	29% (Q1 2005)	63% (Q1 2015)
Take-up of triple play bundles	5% (Q1 2005)	25% (Q1 2015)
Average household spend on communications services[31]	£94.22 (2005)	£81.30 (2014)

Source: Ofcom Technology Tracker 2005 and 2015, Ofcom / Operators / ONS, Three Reasons. Base for fixed broadband, smartphone, tablet and bundles is adults 16+.

4.10 Availability of superfast broadband in the UK compares well to other European countries. This wide availability is supporting increasing take-up. At the end of 2014, nearly a third of UK fixed broadband connections (32%) had a headline speed of 30Mbit/s or more, a higher proportion than in France (12%), Germany (21%), Italy (4%) and Spain (24%)[32].

4.11 The UK also has some of the lowest mobile prices among the EU5 countries. In 2014, the UK had the second lowest total 'lowest available' and 'weighted average' stand-alone prices for the eight mobile baskets we included in our analysis[33]. In

[27] Virgin Media launched its 50Mbit/s service in 2008: http://about.virginmedia.com/press-release/284/virgin-media-launches-the-uks-fastest-broadband
[28] Superfast broadband take-up refers to take-up of packages with advertised speeds of 30Mbit/s. Around 12% of FTTC connections with a headline speed ≥30Mbit/s do not have an actual speed of 30Mbit/s.
[29] 4G coverage refers to the proportion of outdoor premises with coverage from all operators.
[30] Estimates of proportion of UK TV homes with Connected TVs from Three Reasons. 2006 data refers to VOD homes (i.e. does not include smart TVs).
[31] Spend data includes estimates where Ofcom does not receive data from operators; adjusted to CPI; includes VAT.
[32] European Commission, *Digital Agenda Scorecard*: http://ec.europa.eu/digital-agenda/en/digital-agenda-scoreboard
[33] *International Communications Market Report*, December 2014, p.91-94: http://stakeholders.ofcom.org.uk/binaries/research/cmr/cmr14/icmr/ICMR_2014.pdf. 'Average stand-

addition, overall, the UK had the cheapest 'lowest available' fixed broadband prices in among EU5 countries[34].

Despite good overall outcomes, both consumer needs and the market are changing, giving rise to new concerns

4.12 As communications services become increasingly embedded in consumers' lives, expectations of widespread availability have increased. However, while superfast broadband coverage is increasing and BT is making plans for the next round of investment in ultrafast services, in May 2015 around 8% of premises still could not receive speeds of 10 Mbit/s. Furthermore, around 2% of premises could not receive speeds of 2 Mbit/s, the Government's current universal service commitment (USC) [35]. The percentages may be small, but the total number of households affected (c.500k) is still substantial, and those consumers who are affected risk being excluded from the benefits of living in a digital society.

4.13 In addition, in May 2015 superfast broadband coverage was much lower in rural areas (37%) and not-spots persist in urban areas. The devolved nations are catching up with the rest of the UK in terms of availability, but coverage is still below average in Scotland (73%) and Wales (79%). Our assessment of market outcomes for SMEs has also shown that the market is currently under-delivering superfast broadband connectivity to SMEs (with coverage at 56% in June 2014)[36]. Without targeted action, this under-delivery is set to continue: our analysis of future deployment plans finds that around 18% of SME premises will not have access to superfast broadband by 2017[37].

4.14 Furthermore, while mobile services are widely available, there are significant gaps in 2G and 3G coverage, particularly in rural areas. While 97% of premises have outdoor coverage from all 2G operators, 21% of the UK's geographic area is a partial not-spot for 2G (i.e. there is coverage from at least one, but not all operators). Mobile coverage in the UK also varies significantly at a national level, primarily due to the high proportion of rural areas in the devolved nations. Geographic coverage from all 2G operators is available to less than half of Scotland and Northern Ireland, and 14% of Wales' landmass is without 2G coverage. This raises similar concerns about social inclusion and a growing digital divide.[38]

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alone' pricing was the lowest stand-alone price for each individual service offered by the three largest operators which provide the service in each country, weighted by the market share of the service provider.

[34] *International Communications Market Report*, December 2014, p.95. 'Lowest available' pricing was the lowest price that a consumer could pay for this basket of services. The fixed broadband pricing analysis excludes telephone line rental, even if this is required.

[35] Ofcom analysis of operator data, May 2015. This data has been collected from operators for our forthcoming *Infrastructure Report Update*, due to be published later this year. Note that these figures are the result of new analysis, undertaken for the first time this year and, therefore, not comparable with previous years' analysis. These figures may be subject to change.

[36] *Infrastructure Report 2014*, December 2014, p.3: http://stakeholders.ofcom.org.uk/binaries/research/infrastructure/2014/infrastructure-14.pdf

[37] Ofcom analysis of data provided by BDUK; data excludes Northern Ireland; p.30-31: http://stakeholders.ofcom.org.uk/binaries/research/telecoms-research/sme/bb-for-smes.pdf

[38] Ofcom analysis of operator data, May 2015. This data has been collected from operators for our forthcoming *Infrastructure Report Update*, due to be published later this year. Note: 2G coverage data is based on a coverage threshold of -86dBm.

4.15 There are also continuing concerns about the quality of service delivered by some providers. While overall satisfaction with communications services is high, satisfaction levels with the quality of customer service are lower at between 67% and 80% across the sector[39]. There is also evidence that the actual broadband speeds consumers receive are lower than headline speeds advertised. Using Ofcom data, consumer group Which? found that 74% of UK households with fixed broadband did not receive the 'up to' speeds advertised[40].

4.16 At the wholesale level, the quality of service that Openreach delivers to downstream providers, including BT, has been unsatisfactory. In our 2014 FAMR we found that performance in provisioning and repairs from Openreach declined between 2009 and 2012[41]. Similarly, we reported in the BCMR a decline in average provisioning times for business markets[42].

4.17 Finally, there are also high levels of dissatisfaction among small and medium sized enterprises (SMEs) with some aspects of broadband quality of service, with 42% of SME internet users reporting experiencing issues with internet connectivity. Poor service reliability was the biggest problem, with 29% citing it as an issue[43].

An increasing industry focus on retention may further increase the importance of work to reduce barriers to switching

4.18 To take advantage of competitive markets, consumers need to be equipped to shop around to obtain the best deal. They also need to be able to exercise choice by switching providers easily. However, barriers to switching remain.

4.19 Reasons for considering, but not switching provider vary by market. While in the fixed-line market the main reason given was 'satisfaction with the current provider' (30%) in 2014, 'perceived hassle' was the main reason consumers had not switched broadband provider (28%) and for mobile it was 'terms and conditions' (39%, up by 16 percentage points from 2013)[44].

4.20 The retail bundling of services, and in particular the increased importance of triple play services and emergence of quad play packages, creates a new set of challenges and risks dampening competition. Of consumers who switched at least one of their communications services in a 12 month period, 8% switched three services at the same time[45]. Bundling may make it harder for consumers to choose between increasingly complex offerings and to complete a switch – for example,

[39] Saville Rossiter-Base, *Quality of Customer Service Report*, December 2014, p.6: http://stakeholders.ofcom.org.uk/binaries/research/quality-of-customer-service-annual-reports/Quality_of_Customer_Service_2014_report.pdf
[40] Which?, *Broadband advertising not up to speed,* p.7: http://www.which.co.uk/documents/pdf/broadband-advertising-not-up-to-speed-june-2015-406391.pdf
[41] *Fixed access market reviews*, June 2014: http://stakeholders.ofcom.org.uk/telecoms/ga-scheme/specific-conditions-entitlement/market-power/fixed-access-market-reviews-2014/
[42] *Business Connectivity Market Review* statement, March 2013: http://stakeholders.ofcom.org.uk/consultations/business-connectivity-mr/final-statement/
[43] *Broadband services for SMEs: assessment and action plan*, June 2015, p.3: http://stakeholders.ofcom.org.uk/binaries/research/telecoms-research/sme/bb-for-smes.pdf
[44] *The Consumer Experience of 2014: Research report*, January 2015, p.11: http://stakeholders.ofcom.org.uk/binaries/research/consumer-experience/tce-14/TCE14_research_report.pdf
[45] *Ofcom Switching Tracker,* July-August 2014*,* Table 255: http://stakeholders.ofcom.org.uk/binaries/research/statistics/Switching_Tracker_2014.pdf

where there are different switching processes for the services in a bundle, and/or when contracts for services in a bundle have different end dates.

4.21 It remains important that we make further progress, as appropriate, to ensure the effectiveness of switching procedures for consumers. In June we introduced gaining provider-led switching (GPL) for voice and broadband services on the Openreach and KCOM networks. We are now considering switching processes for mobile and triple play services.

Key market outcomes from the supply side

Scale competitors to BT have emerged in the residential broadband market

4.22 Ofcom's Telecoms Strategic Review (TSR) in 2005 created a renewed focus on and increased the use of local loop unbundling (LLU), leading to market entry and the emergence of scale competitors to BT in residential telecoms.

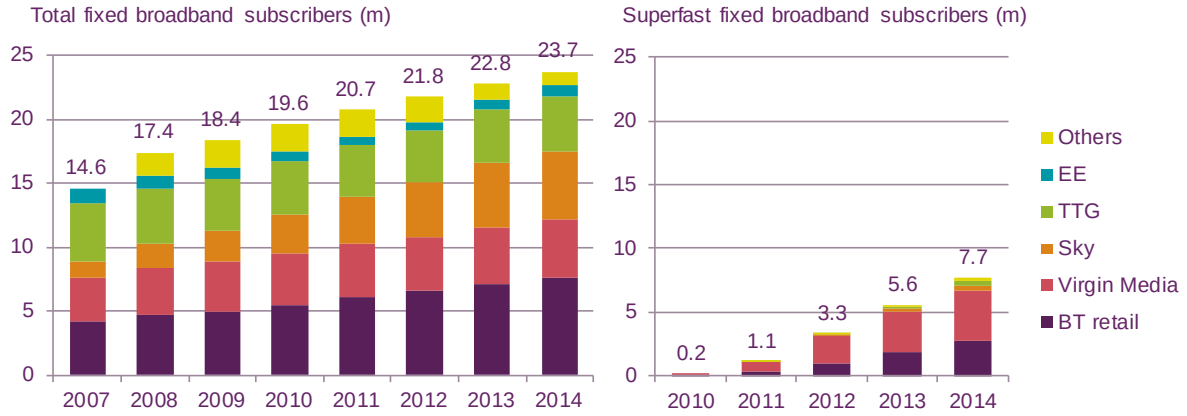
4.23 After initially seeing a significant number of entrants into local loop unbundling, the alternative operators have consolidated down to two main competitors. After entering the market through its acquisition of Easynet in 2005, Sky has grown its share to 23%, by focusing on bundling residential broadband with its core TV proposition. TalkTalk now has 18% of the market, with residential, business and wholesale parts to its broadband business. It has grown its market share by positioning itself as a provider of value for money services.[46]

4.24 Consolidation has also taken place in the cable sector with the merger of NTL and Telewest to form Virgin Media completing in 2006, and its subsequent acquisition by Liberty Global. Virgin now offers a range of fixed, mobile, and pay TV services to residential customers, as well as an increasing focus on business services.

4.25 BT and Virgin are now focussing heavily on upgrading customers to superfast broadband services. As a result, these two firms have a 36% and 49% share of superfast broadband connections respectively. Other providers including Sky and TalkTalk have recently started active marketing of superfast broadband. As a result they only account for 14% of superfast connections today. In Q1 this year, BT accounted for 44% of net superfast broadband additions, followed by Virgin with 24% and TalkTalk and Sky each accounted for just over 13%.[47]

[46] Enders Analysis, Q1 2015. Note: data reflects company reported information where possible however estimates are used where data is incomplete or inconsistent.
[47] Ibid.

Figure 4: Total and superfast fixed broadband subscribers: 2007-2014



Source: Enders Analysis, Q1 2015
Note: data reflects company reported information where possible however estimates are used where data is incomplete or inconsistent.

We have also seen strong end to end competition in the mobile market

4.26 In mobile, access to spectrum has been used as a means of promoting competition. In particular, the auction of 3G spectrum was used to facilitate the entry of a new network operator to the market, and the auction of 4G spectrum was used to maintain four national wholesalers. The resulting competition between mobile network operators has delivered significant benefits to UK consumers, including falling prices. Residential mobile monthly ARPU is currently £16.47, down from £24.51 in 2005[48]. At the same time usage continues to grow: mobile data usage grew from 9m GB in 2011 to 44.3m GB in 2014. The 3G auction in 2000 also enabled market entry by Three. Following entry, it acted as a key market disruptor through its pricing and packaging strategies e.g. all you can eat data and free international roaming, helping further sustain competition.

4.27 Network sharing deals have also taken place in the mobile market, delivering many of the efficiency benefits of consolidation. There are currently two such partnerships, between EE and Three and between O2 and Vodafone. We have welcomed the potential for cost reductions and improved coverage these deals bring. Our response to network sharing proposals has therefore been to ensure only that rules are in place to protect downstream competition, covering such matters as the sharing of commercially confidential information.

4.28 We have also welcomed the benefits that consumers derive from being able to access services from mobile virtual network operators (MVNOs). These companies offer retail mobile services through a range of business models combining wholesale capacity acquired from existing mobile operators with their own assets including for example customer management and core networks. There are 21 full MVNOs[49], and numerous light MVNOs, some of whom have direct commercial relationships with their host MNOs and some of whom use a mobile virtual network enabler (MVNE) to gain MNO access.

[48] Ofcom / Operators
[49] Full MVNOs are Mobile Virtual Network Operators with their own SIM cards and own mobile network code. Operators that fulfil the above two conditions, but are majority owned (more than 50%) by any of the mobile network operators operating in the same national market should not be included.

4.29 At the end of 2014 Virgin Mobile had c.3 million subscribers and TalkTalk had c.400k subscribers. The proportion of voice minutes used by MVNO customers has not changed since 2011, at 16% of total mobile voice minutes. However, the proportion of total mobile data used by MVNOs has fallen to 7% (from 14% in 2011)[50]. This suggests that MVNO networks are more targeted at voice call markets, or that their service propositions lead to a higher proportion of such. This may be influenced by the terms available from mobile operators for MVNOs (e.g. whether 4G services are made available) or availability of high end, data focussed handsets.

4.30 Thus far, we have not found it necessary to impose access obligations on network operators in order to maintain retail competition.

However, we still lack scale competitors to BT in business markets

4.31 In business telecoms, our overall strategy was to support moves towards consolidation in order to help create scale competitors to BT. We have witnessed some consolidation (notably the mergers of Cable and Wireless / Energis in 2006, Cable and Wireless and Thus in 2010, and Vodafone / C&W in 2012) but still lack strong competitors to BT across the full range of business telecoms services.

4.32 In the SME market, BT Business remains the largest provider, with c.49% share of SME fixed-line revenues. No other provider has more than 10% share and there is a long tail of smaller providers and resellers[51].

Figure 5: SME revenue market share 2014 (indicative)

BT Business	Virgin Media	Daisy	TalkTalk	KCOM	Others
49%	9%	7%	6%	5%	24%

Source: Ofcom estimate based on numbers given by different providers

4.33 However, there are signs in the last year or so of renewed competitive focus on the SME market. Virgin Media, TalkTalk and BT have re-launched their SME propositions and new technologies have facilitated entry from alternative network business-focused providers such as Metronet, Optimity and Warwicknet. There are also new opportunities for small local resellers created by increasing demand for bundled connectivity, applications and IT support.

4.34 Although there are positive indications of growing competitive choice, it remains uncertain in the long-term how successful challengers will be in exerting competitive pressure and driving better market outcomes for SMEs.

Financial sustainability

All fixed and mobile network operators are continuing to invest

4.35 All of the major fixed broadband operators and mobile network operators are profiting from operations in digital communications services and are investing capital in these

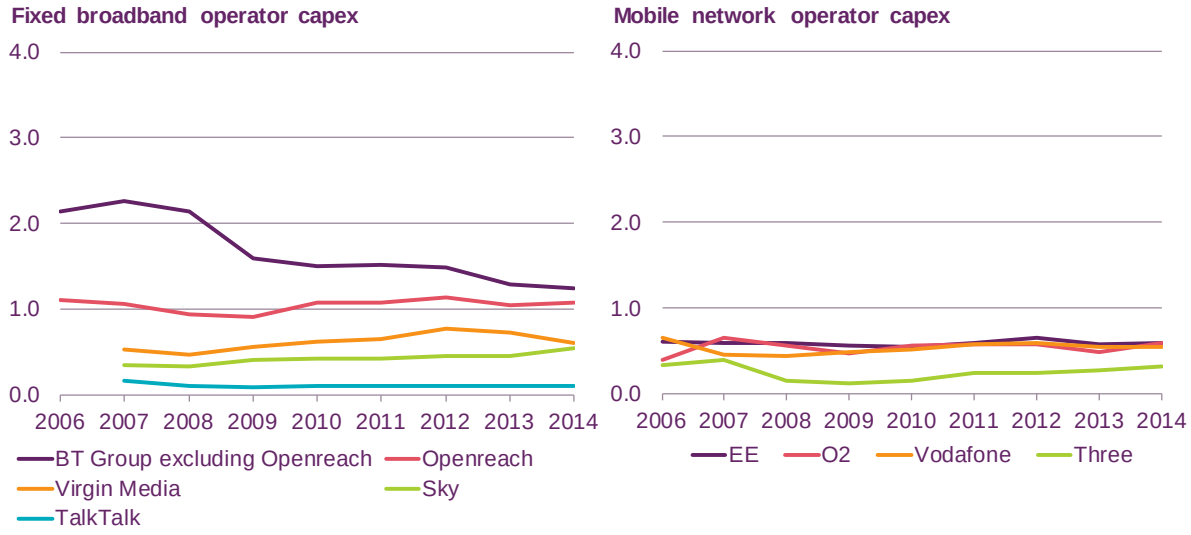
[50] *Infrastructure Report 2014*, December 2014, p.94: http://stakeholders.ofcom.org.uk/binaries/research/infrastructure/2014/infrastructure-14.pdf
[51] *Broadband services for SMEs: assessment and action plan*, June 2015, p.41: http://stakeholders.ofcom.org.uk/binaries/research/telecoms-research/sme/bb-for-smes.pdf

services. The total capital expenditure of the four largest fixed broadband operators (BT, Sky, TalkTalk and Virgin Media) has averaged c£3.7bn per annum in the last three years, while that of the mobile operators averaged c£2.0bn per annum.[52]

4.36 BT Group accounts for the majority of capex on UK fixed lines (see Figure 6), through its Openreach and BT Wholesale divisions.[53] These divisions' combined capex (£1.0bn and £0.2bn respectively in 2014/15) is equivalent to c7% of BT Group revenues in recent years (BT Group's capex is considered in more detail below). Sky and TalkTalk's capex has also totalled 6-7% of revenues in the last three years (£543m and £112m respectively in their most recent full financial years) and Sky's absolute capex has risen slightly since 2007. Virgin Media's capex accounted for 14%-19% of revenues in the last five years. Overall levels of operator capex as a proportion of revenues are in line with those in a range of international markets.[54]

4.37 The mobile operators' absolute total capex is spread more evenly across the four operators. The three largest mobile operators by total revenues (EE, O2 and Vodafone) have each invested on average c£0.5bn p.a. over the last decade. Three's capex has risen since 2009 as it has invested in network coverage and capacity. The mobile sector's total capex was approximately 10-11% of revenues in the last three years. Over the last decade, the UK's capex / revenues ratio was broadly comparable to those in a number of other EU and international mobile markets.[55]

Figure 6: Fixed broadband operator and mobile network operator capital expenditure (nominal terms) (£bn): 2006-2014



[52] From operators' published accounts.
[53] Openreach is the operationally-separate division of BT responsible for maintaining the local access network and providing regulated access products, including Ethernet, to communications providers, including other downstream divisions of BT. BT Wholesale offers connectivity services to business customers and other communications providers such as Ethernet services and connections between voice telephony networks
[54] WIK-Consult, *Competition & investment: An analysis of the drivers of superfast broadband*, July 2015, p.76: http://stakeholders.ofcom.org.uk/binaries/consultations/dcr_discussion/annexes/Competition_and_investment_fixed.pdf
[55] WIK-Consult, *Competition & investment: An analysis of the drivers of investment and consumer welfare in mobile telecommunications*, July 2015, p.41: http://stakeholders.ofcom.org.uk/binaries/consultations/dcr_discussion/annexes/Competition_and_investment_fixed.pdf

Source: Operators. Data refers to operators' financial year reporting periods

4.38 BT Group's total capex has fallen by approximately £1bn p.a. since 2008. However it generated these savings primarily in divisions other than Openreach, its access network division. In real terms,[56] Openreach's capex has remained steady over the last five years, at c£1.1-1.2bn. This investment covered a number of costs, including ducts and fibre in backhaul and access networks, and software. It also included copper access network maintenance and repair, Ethernet product development and BT's rollout of superfast broadband services. Some providers have expressed concerns about the overall level of maintenance capex for Openreach's access network, arguing this has a direct impact on fault rates and quality of service. This issue is considered in more detail in Section 13.

Figure 7: BT Group capital expenditure by division (nominal terms) (£bn): 2006-2014

Source: BT. Data refers to financial years starting in the labelled year

Recently there has been a focus on some operators' returns on capital employed

4.39 While operators are investing, there is some debate as to the future returns available to network businesses in the UK and internationally. In particular, mobile operators[57] have expressed concerns about falling absolute revenues and profits across Europe.

4.40 Some stakeholders, such as Vodafone, have also expressed concerns about the level of Openreach's returns in regulated markets. Its report[58] (by Frontier Economics) states that returns on BT's regulated services have been consistently above the rate required to compensate investors.

[56] Adjusted for RPI

[57] See for example Vodafone, *Vodafone and Europe: Investing for the future*, p. 19: https://www.vodafone.com/content/dam/group/policy/downloads/vodafone_europe_investing_for_future_feb_2015.pdf.

[58] Frontier Economics, *The Profitability of BT's Regulated Services: a report prepared for Vodafone*, November 2013: https://www.frontier-economics.com/documents/2013/11/the-profitability-of-bts-regulated-services-frontier-report.pdf. Also see Frontier Economics, *The relationship between BT profitability and charge controls: a report prepared for Vodafone*, November 2014: http://www.vodafone.com/content/dam/group/policy/downloads/the-relationship-between-BT-profitability-and-charge-controls.pdf.

4.41 Both absolute and comparative returns matter for the regulator:

- we need to take into account the potential impact our regulatory policy and competition decisions may have on investment in the UK and the implications for the availability and quality of digital communications services, alongside our other duties;
- evidence of systemic under or over-recovery of costs in regulated markets may be evidence of more fundamental problems in market structure or regulatory approach. These could inform longer term changes to market structure or regulatory strategy; and
- while, in additional to capex, operators' absolute profits and cash flow in the UK appear positive, international operators may still choose to invest in markets where returns are likely to be greater.

Mobile operators' returns on capital employed

4.42 Some stakeholders have raised concerns that the profitability of the UK mobile sector is low in comparison with that of mobile sectors abroad. For example, it has been noted that operators' EBITDA margins are lower than in some other international markets and that, as a result, multinational operators may be more likely to invest elsewhere. It has also been argued that operators' returns on capital employed (ROCE)[59] have fallen significantly over time and are below the industry's cost of capital. We note some stakeholders' arguments that our approach to regulation may have contributed to such outcomes.

4.43 Research by WIK-Consult suggests that UK mobile operators' EBITDA margins are lower than those in a range of comparator countries[60]. However, independent analysis also suggests that, in general, European operators' ROCE is not below the industry's cost of capital. For example, New Street Research's[61] analysis suggests that, whilst overall EU mobile sector ROCE has halved from c20% in 2010 to c10% in 2015, it still exceeds the industry's cost of capital. Our own analysis (set out below) suggests that the UK mobile sector is earning returns above its cost of capital within the current market structure and regulatory environment. In some cases, mobile operators are earning returns significantly higher than the cost of capital.

4.44 A key consideration in policymaking is the effect of regulation on operators' anticipated returns on efficient investment, and the implications for potential future investment. The most important consideration for companies that are not capital-constrained is whether future investments will make what shareholders would consider to be an adequate return.

4.45 ROCE is a measure of the profitability of historic investments, which can be compared to the cost of capital. With appropriate adjustments to make this measure

[59] Returns on capital employed (ROCE) is a measure of the relative profitability of companies, taking into account the amount of capital they use.
[60] WIK-Consult, *Competition & investment: An analysis of the drivers of investment and consumer welfare in mobile telecommunications*, July 2015, p.43: http://stakeholders.ofcom.org.uk/binaries/consultations/dcr_discussion/annexes/Competition_and_investment_mobile.pdf
[61] New Street Research, *European Telecoms Review*, October 2014. New Street Research's more recent estimates, provided to Ofcom, suggest that EU mobile sector ROCE fell from c21% in 2010 to c11% in 2015.

forward-looking, ROCE is a useful indicator of an operator's incentives to invest if the operator is not capital-constrained.[62]

4.46 With regard to some stakeholders' concerns that mobile operators' ROCE is below their cost of capital, we note that such calculations can be sensitive to the operator's accounting treatment of assets with a current value substantially lower than their historic value (e.g. spectrum licences). They can also be sensitive to the treatment of intangible assets created at the time of a merger (e.g. goodwill) rather than through capital investment in the business. Without appropriate adjustments, these calculations may not reflect true underlying returns on actual investment.

4.47 An example of the adjustments needed to use ROCE as a forward-looking measure of operators' profitability is the treatment of 3G spectrum licences. These were purchased in 2000 for over £4bn in each case. Accounting spectrum costs at too high a level would be likely to distort any forward-looking measure of profitability significantly. Today, the value of the licences on operators' balance sheets is still a significant proportion of their initial cost, although it is widely accepted that their current value is lower than that cost. Investors would expect that the future costs of this spectrum (either to replace the spectrum, or the costs of paying future annual licence fees) would be based upon a current, lower valuation. Adjusting both the asset valuation and depreciation to reflect the current value of spectrum provides a better indication of forward-looking profitability.

4.48 When calculating operators' forward-looking profitability, replacing historic spectrum licence costs with estimates of future costs and excluding the value of certain intangible assets where appropriate, such as goodwill, has a positive effect on the calculation of forward-looking adjusted ROCE.

4.49 By way of example, we undertook analysis of EE's adjusted ROCE based on publicly available information on its recent financial performance. We used EE's results as EE has published a significant level of detail about the valuation of its assets. In doing so we calculated its capital employed on the basis of adjustments to figures in its statutory accounts, as appropriate for calculating forward-looking profitability. For example, our adjustments excluded certain intangible assets (goodwill and customer relationships) that were not likely to have an accounting value corresponding to capital invested in the business.[63] We also adjusted the value of 3G spectrum licence assets to match their estimated current value.[64] On the basis of appropriate

[62] In general it is appropriate to take into account the incentives of unconstrained investors, as a governance structure that constrains capital investment in otherwise profitable investments may not best deliver investor value, or good consumer outcomes.

[63] EE's annual report for the year ended 31 December 2014 includes intangible asset values for goodwill (net book value = £5,692m at 31 December 2013) and for customer relationships (£1,216m at 31 December 2013). Each was calculated at fair value at the time of Orange and T-Mobile's merger. Customer relationships were subsequently amortised, and that amortisation charged to the P&L.

[64] The value we used for EE's 3G 2.1GHz spectrum was £11.07m per MHz, which for EE's 2x20 MHz allocation gives a gross value of £443m. The figure of £11.07m per MHz is used in our model for the mobile call termination market review for the period 2015-18. See *Mobile call termination market review 2015-18* statement, March 2015, Annex 11, p.131: http://stakeholders.ofcom.org.uk/binaries/consultations/mobile-call-termination-14/statement/Annexes_7-13_final.pdf. This total value (£443m) is considerably lower than the c£8bn paid by Orange and T-Mobile for the spectrum and the gross book value in EE's statutory accounts for its 3G spectrum (£3,682m at 31 December 2012).

adjustments, we calculated that EE's adjusted ROCE in the calendar years 2012 and 2013 was c27-28%, significantly above its cost of capital.[65]

4.50 The published results of the other operators do not provide sufficient detail to perform similar adjustments. However we are not aware of any observable factors that would mean that other operators' adjusted ROCE would be so much lower than that of EE that their returns would not also be significantly above their cost of capital. Three's smaller scale could make it more likely to have a lower adjusted ROCE than EE. However, our indicative analysis suggests that, in general, the sector is earning returns above its cost of capital, and in some cases mobile operators are earning returns significantly higher than the cost of capital.

BT's regulated returns

4.51 Some stakeholders have expressed concern about the level of BT's returns in regulated markets. For example, in 2014 Frontier Economics[66] (on behalf of Vodafone) estimated that, in the nine years to March 2014, BT made returns from regulated wholesale markets that were £5.5bn higher than they would have been if they were consistent with Ofcom's various assessments of its cost of capital during the period. Frontier's analysis also indicated that BT had made returns greater than its cost of capital in each of the nine years.

4.52 Frontier's analysis is based on BT's Regulatory Financial Statements ('RFS'). Over the nine years to March 2014, the RFS report aggregate returns of around £17bn. The RFS suggests that this is around £4bn more than our benchmark cost of capital. In calculating its figure of £5.5bn, Frontier has adjusted the reported returns to reflect the Regulatory Asset Value[67] of BT's copper and duct assets (which differs from that reported in the RFS).

4.53 In principle we think this adjustment is reasonable, although we do not agree with Frontier's estimate of the effect. We also believe there are other adjustments that should be taken into account.

4.54 We consider that the reported returns in the RFS should be adjusted:

- for the Regulatory Asset Value of BT's copper and duct assets; and

[65] In the mobile call termination market review for the period 2015-18 we assessed the pre-tax real (i.e. deflated for CPI inflation) weighted average cost of capital (WACC) for an average efficient mobile communications provider to be 7.0%, equivalent to a nominal WACC of 9.1%. See *Mobile call termination market review 2015-18* statement, March 2015, p.150: http://stakeholders.ofcom.org.uk/binaries/consultations/mobile-call-termination-14/statement/MCT_final_statement.pdf

[66] Frontier Economics, *The relationship between BT profitability and charge controls: a report prepared for Vodafone*, November 2014, http://www.vodafone.com/content/dam/group/policy/downloads/the-relationship-between-BT-profitability-and-charge-controls.pdf. Also see Frontier Economics, *The Profitability of BT's Regulated Services: a report prepared for Vodafone*, November 2013, https://www.frontier-economics.com/documents/2013/11/the-profitability-of-bts-regulated-services-frontier-report.pdf.

[67] See *Valuing Copper Access*, statement, August 2005, http://stakeholders.ofcom.org.uk/binaries/consultations/copper/statement/statement.pdf

- to take account of repayments we have required BT to make following various disputes relating to overpayments for partial private circuits and Ethernet services; and

- to exclude the effect of recent changes in the way BT allocates its costs by restating costs as if they were still being allocated on the basis used in 2011/12. This is the basis for the cost calculations used in both the current Fixed Access and Leased Lines charge controls.

4.55 Taking into account these adjustments, we estimate that the gap between BT's returns and the benchmark cost of capital is £4bn.

4.56 However, it is important to note that these estimates start with the RFS. While the RFS provide an important input into our regulatory decisions, they are not always the basis for these decisions. The returns reported in the RFS provide only part of the picture.

4.57 There are several factors that may contribute to any gap between BT's regulated returns and our estimate of its cost of capital. These include:

- incentive effects;

- balancing policy objectives;

- price control design;

- inherent forecasting challenges; and

- changes in the way costs are recorded.

4.58 In terms of approximate magnitude, we consider that around two thirds of the estimated gap of £4bn over the past nine years is accounted for by those factors that represent policy choices made by Ofcom when setting charges, with the remaining third being due to BT's performance against the charge controls put in place.

Incentive effects

4.59 One of the aims of our regulation is to promote efficiency by permitting regulated firms to achieve an upside (i.e. returns above their cost of capital) by reducing their costs. Over time, we expect these efficiency savings to be passed on to customers through price reductions.

4.60 In a similar way, we may also wish to promote investment by allowing regulated firms to make relatively high returns in the case that risky investments turn out to be more successful than expected i.e. when demand turns out to be high. This approach is described as allowing firms a "fair bet".[68] The potential for higher returns balances out the possibility of returns below the cost of capital if demand turns out to be low.

4.61 Our approach does not guarantee that the regulated firm will recover its costs and works on the principle that, at the time of investment, the expected return should be equal to the cost of capital. In setting charge controls we look at expected future

[68] See *Proposals for WBA Charge Control* consultation, annex 8, 2011, p.178, http://stakeholders.ofcom.org.uk/binaries/consultations/823069/summary/condoc.pdf.

returns, but do not claw back past returns above the cost of capital or compensate for past under-recovery of costs.

Balancing different policy objectives

4.62 We have in the past made specific policy choices on regulated pricing that were intended to balance our broad range of duties. For example, pricing decisions have been made on products such as ISDN that take into account the incentives faced by users of these services to migrate to newer, higher quality services such as Ethernet. In setting prices, we recognised the danger of setting artificially low prices based on fully depreciated assets and, therefore, restated asset values to a higher valuation more consistent with the market in a steady state. This had the effect of increasing prices (and reported returns) above the level that would be suggested by simply applying an estimate of BT's cost of capital to the asset values reported in the RFS.

4.63 We have also in some cases decided not to impose price regulation on some regulated products, for example in order to promote investment (such as in local loop unbundling) in light of our judgment of the greater competition and better outcomes for consumers this would bring.

Price control design

4.64 When setting charge controls we often use a glide path approach. Glide paths allow pricing changes to be made gradually, helping ensure a stable and predictable regulatory framework. The use of glide paths is an inherent part of regulation designed to promote dynamic efficiency. They provide greater incentives for efficiency than one-off adjustments aligning prices with costs at the start of the price control period as they allow the firm to retain the benefits of cost reductions made under a previous charge control for longer.

4.65 However, the effect of such glide paths can be that prices are not closely aligned with actual costs at any given point in time. If prices are being reduced into line with lower cost forecasts over time, this can contribute to relatively high returns.

Inherent challenges when regulating on a forward looking basis

4.66 There are inherent challenges in taking decisions on a forward looking basis, particularly where this needs to be based on forecasts and potentially an asymmetry of information between the regulator and the regulated companies. We seek to minimise those risks through consultation and judgments based on the evidence available, but inevitably some forecasts may prove inaccurate.

Changes to the way BT allocates costs

4.67 Regulated returns could be increased by changing the way costs are allocated amongst regulated markets and between different price control decisions. In effect, the same costs could potentially be recovered in more than one market.

4.68 We have in the past taken action in respect of this risk. When BT changed it cost allocation rules in 2012/13, we took steps to ensure such cost redistribution did not happen. In 2014 we introduced new regulatory accounting principles,[69] including a

[69] *Regulatory Financial Reporting: Final Statement*, May 2014, http://stakeholders.ofcom.org.uk/binaries/consultations/bt-transparency/statement/financial-reporting-statement-may14.pdf

change control process that gives Ofcom early sight of any changes in allocations proposed by BT and a power of veto if the changes are not consistent with our principles. We are currently consulting on further proposals regarding the way that BT attributes its costs to services (the Cost Attribution Review[70]).

4.69 The Cost Attribution Review illustrates the possible impact of BT's choice of allocation bases on the reported profitability of its regulated services. In the Cost Attribution Review we identified mathematical or input errors in BT's spreadsheets and supporting calculations and proposed changes to the way that BT allocates some of its costs where we consider that the current methodology is not appropriate.

Conclusions

4.70 The analysis above suggests BT's returns on its regulated markets have consistently been greater than returns consistent with our estimate of its cost of capital. As set out above, this is in part as a result of policy decisions we have taken when deciding whether or how to regulate, and in part due to BT's performance. However, would be concerned if such higher returns might be as a result of gaming by the regulated firm.

4.71 To provide greater clarity on this issue, we have sought to improve stakeholders' understanding of BT's returns. As illustrated by the explanations above, it is not straightforward to determine BT's historical returns from its RFS. We have taken steps to simplify this exercise in future years. For example, from 204/15, BT will be required to prepare its RFS on a basis that reflects the Regulatory Asset Value. BT will also be required to publish additional statements setting out the potential impact of some of our regulatory adjustments (such as the restatement of asset values for pricing purposes) on its reported returns.

4.72 We would welcome stakeholders' comments on our approach to price regulation and the possible sources of higher returns. We are interested in views as to whether concerns on Openreach returns require additional policy action to protect end-users and limit the risk of competitive distortions.

Market trends

4.73 In this section we set out the key trends that we have seen in the communications sector over the past ten years, and the potential trends we may see develop in the near future. Whilst helpful in identifying potential future regulatory challenges, the nature of digital communications services is such that we expect the future will consist of some developments that cannot be forecast.

The consumer experience

4.74 Digital communications services have become increasingly important to consumers and businesses alike. As services and devices have become more sophisticated, so have the needs of residential and business consumers. Some of the key trends include:

- **Increasing demand for residential broadband.** Consumer demand for bandwidth and higher quality connections has increased dramatically over the past ten years. Increased usage and more simultaneous use from multiple

[70] *Review of BT's cost attribution methodologies*, June 2015, http://stakeholders.ofcom.org.uk/consultations/cost-attribution-review/.

connected devices in the home will continue to drive demand over the course of the next decade[71].

- **Greater demand for non-residential connectivity.** Business adoption and use of ICT services, such as cloud-based services, will continue to drive demand for higher bandwidth and more resilient connectivity. Growth of the internet of things (IoT) will further drive demand for reliable networks[72].

- **Increasing demand for mobility.** Both consumers and businesses are demanding greater mobility, both inside the home (81% of adults access the internet via WiFi, with the vast majority doing so at home[73]) and on the move. This has been driven by the growth in powerful mobile devices: smartphone and tablet take-up is 66% and 54% respectively[74].

- **Bundling.** In recent years, consumers have increasingly bought multiple communications services and products under a single contract (63% of customers take some form of bundle, with 25% taking triple-play). Bundles have benefits for consumers: they can offer new functionality drawing on the combination of different elements of the bundle, e.g. TV anywhere, are frequently discounted and may increase convenience by providing a single supplier relationship.

- **Niche groups.** The proliferation of new services has led to an increasingly diverse set of consumer needs and tastes, defined as much by attitudes to communications services as by actual adoption. This was highlighted by recent research from Ofcom on customer segmentation[75]. This includes businesses, particularly SMEs whose communications needs vary enormously depending on factors including business size, type, sector, and location. In addition, there will continue to be a group of consumers that are less engaged with communications services (14% of adults in the UK are non-users of the internet[76]).

[71] Total monthly data traffic per average UK subscriber will increase from c.55GB in 2013 to 360-470GB by 2024 – Analysys Mason, *The evolution of fixed telecommunications networks and services in the UK,* April 2014

[72] There are currently in excess of 40 million devices in the IoT within in the UK. This is predicted to grow to 360 million by 2022. The majority of IoT devices are expected to have low bandwidth requirements. See *Promoting the Investment and Innovation in the Internet of Things* statement, January 2015, p.2:
http://stakeholders.ofcom.org.uk/binaries/consultations/iot/statement/IoTStatement.pdf

[73] Research conducted by Kantar Media in March and April 2014, see *The Communications Market Report 2014*, August 2014, p.317-8:
http://stakeholders.ofcom.org.uk/binaries/research/cmr/cmr14/2014_UK_CMR.pdf

[74] *Ofcom Technology Tracker* Wave 1 2015:
http://stakeholders.ofcom.org.uk/binaries/research/statistics/2015April/Ofcom_Technology_Tracker_Wave_1_2015_Data_Tables1.pdf

[75] *The Consumer Experience of 2013*, January 2014, p.18 onwards:
http://stakeholders.ofcom.org.uk/binaries/research/consumer-experience/tce-13/TCE_Research_final.pdf

[76] *Adults' media and use and attitudes*, May 2015, p. 192:
http://stakeholders.ofcom.org.uk/binaries/research/media-literacy/media-lit-10years/2015_Adults_media_use_and_attitudes_report.pdf

Digital communication provider strategies

4.75 Operator strategies have evolved over the past decade in response to changing technologies and consumer demand. In the face of competition, particularly in residential fixed broadband, traditional communications providers have sought to build scale and scope in order to retain customers. New players have also emerged. As services have increasingly moved online, smaller players are exploiting new models such as over the top delivery.

4.76 The key trends in provider strategies include:

- **Bundling services and products.** As operators have diversified, bundling has allowed them to effectively target and retain different consumer segments. This trend looks set to continue as the industry prepares to make quad-play bundles[77] a core offering. Take-up of quad-play has so far been limited to 2% of households[78], which may be due to the fact that fixed and mobile operators have largely remained distinct in the UK until now. However, adoption of fixed and mobile bundles in some EU countries has been higher where these have been actively marketed to consumers[79]. Quad-play bundles are currently offered by Virgin Media and TalkTalk and EE. BT has launched a SIM-only mobile package and Sky is set to launch an MVNO next year. Vodafone recently launched its fixed mobile service, and has announced its intention to add TV services.

- **Wholesale deals and new network deployment have both led to market entry.** BT remains the only fixed network operator with nationwide coverage, followed by Virgin Media's cable network which currently covers 44% of UK premises[80], with plans to extend this footprint to 59% of premises[81]. To date, a large proportion of alternative fixed broadband services are provided using BT's network[82]. However in recent months a number of smaller providers, such as Gigaclear and CityFibre[83], have begun deploying their own localised fibre-to-the-premises (FTTP) networks. It is still early days to assess these initiatives' long term footprint and commercial model. While there has been stronger end-to-end competition in the mobile market, new entry has increasingly been characterised by MVNOs purchasing wholesale capacity from established MNOs.

- **Consolidation.** Consolidation to build scale has been a key theme, particularly in the residential broadband market. In mobile, there has been some consolidation of operators, and additionally of the underlying networks. In addition, as operators have grown in scale, they have increasingly moved into each other's traditional

[77] Telephony, fixed broadband, TV, mobile phone
[78] *Ofcom Technology Tracker* Wave 1 2015
[79] In October 2014, 6% of French consumers and 8% of Spanish consumers reported to taking quad play bundles. See *International Communications Market Report*, December 2014, p.34: http://stakeholders.ofcom.org.uk/binaries/research/cmr/cmr14/icmr/ICMR_2014.pdf
[80] *Infrastructure Report 2014*, December 2014, p.19: http://stakeholders.ofcom.org.uk/binaries/research/infrastructure/2014/infrastructure-14.pdf
[81] In February, Virgin Media announced plans to invest £3bn to roll out its cable network to a further 4 million premises by 2020. See http://about.virginmedia.com/press-release/9467/virgin-media-and-liberty-global-announce-largest-investment-in-uks-internet-infrastructure-for-more-than-a-decade
[82] Communications providers can purchase wholesale products from Openreach such as local loop unbundling (LLU) and virtual unbundled local access (VULA) in order to provide broadband services that use BT's network.
[83] CityFibre has formed a joint venture with Sky and TalkTalk to trial FTTP in York.

core markets. More recently, we have seen fixed-mobile consolidation proposed in the UK[84], mirroring similar activity in Europe[85].

- **OTT vs vertical integration.** Value is shifting away from connectivity, and toward services themselves. OTT providers are competing with traditional providers for service revenues, whilst also driving data demand. As 'conventional' services are increasingly delivered over-the-top, consumer expectations are likely to remain high, particularly for video. In this environment, ISPs will increasingly look to manage IP networks, with some services 'managed' and others offered on a 'best effort' basis. Improving network qualities and bandwidths will support the delivery of both types of model. This raises strategic questions for network operators who will have to decide whether to focus on the efficient provision of connectivity or compete with OTTs in the provision of services.

- **Cloud computing.** Industry will continue to develop and deploy new approaches to the delivery of content and services. Many of these initiatives revolve around developments in distributed hosting and processing – often referred to as cloud computing or cloud services. This trend is characterised by an increasing amount of storage or processing capacity moving away from the edge of networks towards the core.

Network evolution

4.77 Over the past decade, we have seen network capabilities for both fixed and mobile services evolve considerably. As well as the evolution of new technologies, some technologies may be retired over the coming years, although the roadmap for retiring old technologies is less clear than the path for future innovation. Key trends include:

- **Increasing use of internet (IP) networks.** A key driver of convergence is the increasing use of IP for distributing voice, data and video services. Previously, networks were typically designed to support a particular service. Consumers have embraced services delivered over IP, for example with voice[86] and video. Mass market voice over LTE is expected to begin in the UK over this summer[87].

- **Network capability improvements.** Network operators have announced initiatives to improve the capabilities of their networks in order to meet future demand. In addition to its plans to roll out G.Fast[88], BT is trialling vectoring (noise cancellation technology) in order to increase the *actual* speeds that consumers experience. In cable, the rollout of new cable standard DOCSIS 3.1 in 2016 seems likely[89]. Developments such as node splitting and a greater frequency range dedicated to cable broadband could potentially deliver greater bandwidth in future. In mobile, research is underway on future 5G networks which could be deployed from 2020. There is also great interest being taken in software defined

[84] Earlier this year, BT announced plans to acquire EE whilst Three and O2 have agreed to merge.
[85] E.g. Vodafone's purchase of Ono, and Liberty Global's purchase of Base
[86] 35% of UK adults used VoIP in Q1 2014. See *The Communications Market Report 2014,* August 2014, p.13: http://stakeholders.ofcom.org.uk/binaries/research/cmr/cmr14/2014_UK_CMR.pdf
[87] Vodafone press release, March 2015: http://www.vodafone.co.uk/cs/groups/configfiles/documents/assets/vfcon059242.pdf
[88] In its Q4 2014/2015 results, BT announced plans to roll out G.Fast and deliver speeds of up to 500Mbit/s to most of the UK by 2025.
[89] DOCSIS 3.1 could provide speeds of up to 1Gbit/s

networks[90], which offer greater flexibility to accommodate changes in traffic demand and type.

- **New network architectures are utilising fibre.** Both fixed and mobile networks are using fibre closer to the premises in order to provide higher speeds and capacity. For example, BT is planning to develop a premium fibre broadband service to deliver speeds of up to 1Gbit/s, likely to be an evolution of its existing fibre-on-demand product, which delivers fibre to the premises. In mobile, small cells will be positioned, and therefore use fibre, closer to the premises. As a result, we expect increasing similarity between the fibre network topologies to deliver fixed and mobile. In addition, new network architectures such as cloud radio access network (C-RAN) are taking advantage of fibre to offer increased mobile broadband capacity.

- **Potential for more network sharing.** Mobile network operators are examining improved methods for spectrum and infrastructure sharing in order to offer higher capacity to consumers whilst minimising network build and operation costs.

- **Switch off of the Public Switched Telephony Network (PSTN).** BT has indicated that it is seeking to retire its PSTN. Full retirement of BT's PSTN could be a number of years away given the size of the current network[91] and issues experienced during previous attempts at migration. Full retirement of PSTN combined with continuation of the telephony universal service obligation will require the migration of solus telephony users onto broadband networks. Specific migration plans will also be required for certain services as experienced in BT's 21CN trials (including some potentially life critical such as telecare and alarms). BT has started consulting on a stand-alone GEA broadband product that does not require line rental in preparation for such a future transition.

- **Copper access network switch off.** PSTN switch-off and the move to IP delivered services may allow the closure of some parts of the current copper access network. BT's current FTTC network and plans for G.Fast deployment means some copper must remain, but copper connections between the cabinet and exchange might be considered for closure, with implications for local loop unbundling and exchange based broadband services.

- **Other legacy service closures.** BT has announced that it will withdraw most of its very low bandwidth leased lines[92] in 2020, primarily because the network upon which it provides a large portion of them is ageing and approaching the end of its life.

Our regulatory strategy must take account of these and other trends

4.78 Digital communications services continue to be fast moving, characterised by new products, services and business models, and underpinned by continuing investment by providers. Consumers' expectations and demands from these services continue to grow. In order to remain relevant, and to deliver on our primary duties, our long term regulatory strategy must take account of these trends.

[90] With SDNs, the different elements that make up networks can be simplified in terms of hardware, with the necessary functionality being reconfigured through software.
[91] 5,500 exchanges with c.24 million users
[92] VLB leased lines provide dedicated, symmetric, data connections with either analogue or digital interfaces operating at bandwidths lower than 2Mbit/s.

Section 5

Strategic policy challenges in overview

5.1 The following sections set out a range of policy challenges and considerations for this review. For each, we are seeking views, evidence and analysis from stakeholders to help inform Ofcom's longer term strategic approach to delivering good consumer outcomes in digital communications services.

5.2 The remainder of this report is in nine sections:

- **Section 6 – Widespread availability of services**: what determines the extent of availability of services for consumers from commercial deployment? Does the promotion of effective and sustainable competition, complemented by targeted public sector intervention, remain appropriate to deliver efficient investment and widespread availability of services?

- **Section 7 – Extending availability through targeted public policy**: Where private sector investment will not deliver sufficient widespread availability, what role and options are there for public sector intervention?

- **Section 8 - Convergence and changing market structures**: how are digital communications market structures evolving in fixed, mobile and content, including the continued drive to convergence? What does this mean for regulatory policy, including opportunities for new regulatory approaches, deregulation and new competition challenges from more concentrated market structures?

- **Section 9 – Strategies for sustainable competition**: given the broad market structure trends and the importance of competition for good consumer outcomes, what policy options are there for promoting competition in fixed, mobile and bundled services? What role could or should end to end competition policy play in future for fixed and mobile services? Where end to end competition may not be sustainable, what might be the appropriate strategic balance between passive and active regulated wholesale products? To the extent there are competition issues relating to content within retail bundles, what might be the appropriate regulatory approach to address such issues, and is Ofcom able to address these effectively?

- **Section 10 – Promoting efficient investment through regulation**: where regulation is required to deliver good consumer outcomes, how can it be implemented in ways that protect private sector incentives to invest and innovate?

- **Section 11 – Regulating vertically integrated firms**: given the continued focus on vertical integration by communications providers, what competition challenges does this pose and how might they be remedied through today's Undertakings, enhancements to functional separation or possible structural separation of enduring economic bottlenecks?

- **Section 12 - Empowered consumers**: exercising effective choice is vital if consumers are to take advantage of well-functioning, competitive markets. It can be necessary to intervene on the demand-side when markets do not work as

effectively as they could, for example through information or switching remedies. How may future demand side interventions need to evolve?

- **Section 13 – Delivering quality of service**: through regulation where necessary. Our experience of communications services to date suggests that there may be continuing problems with our sectors meeting consumer expectations on quality of service. This may be a challenge in competitive and less competitive markets. Where appropriate, what more can regulation do to improve quality of service for consumers and businesses, including how Openreach's service quality might be further enhanced?

- **Section 14 – Targeted regulation and opportunities for deregulation**: how can we ensure regulation is targeted and evolves over time in ways that continue to protect consumers but does not place an overly onerous burden on industry? What opportunities are there for deregulation as a result of market developments or changes to Ofcom's strategy?

Section 6

Widespread availability of services

6.1 Consumers are best served by widely available, high quality networks capable of supporting a range of services. A key objective of our strategic framework is therefore to secure the widespread availability of high speed fixed and mobile services.

6.2 Availability alone is not sufficient for good consumer outcomes. It must be complemented by choice, value for money, good quality of service, high take-up and easy to use services. The relationship between availability and quality of service is a particularly complicated one. This is explored in more detail in Section 13.

6.3 This section covers:

- the role of competition and public policy in securing widespread availability; an overview of current UK outcomes; and
- investment outcomes in the UK and its drivers.

6.4 Section 7 considers in more detail public policy interventions to extend availability beyond where the private sector alone will reach.

Widespread availability is best delivered through both competitive private sector investment and targeted public intervention

6.5 Ofcom's overarching approach to improving availability has been to rely mainly on private sector investment, driven by competition. This approach distinguishes communications from other network utilities such as water and energy where regulation plays a greater role in determining the specifics of investment programmes.

6.6 However, this approach will not deliver service availability for all consumers. In particular, poor service availability is a particular concern for consumers and businesses in more rural areas where the economics of commercial network deployment are more challenging. Private sector investment does therefore need to be supported by targeted intervention to extend network availability.

6.7 There are therefore two questions to consider:

- How can we maximise the effectiveness of competition in driving private sector investment?
- What more can be done in those areas where commercial provision is not viable?

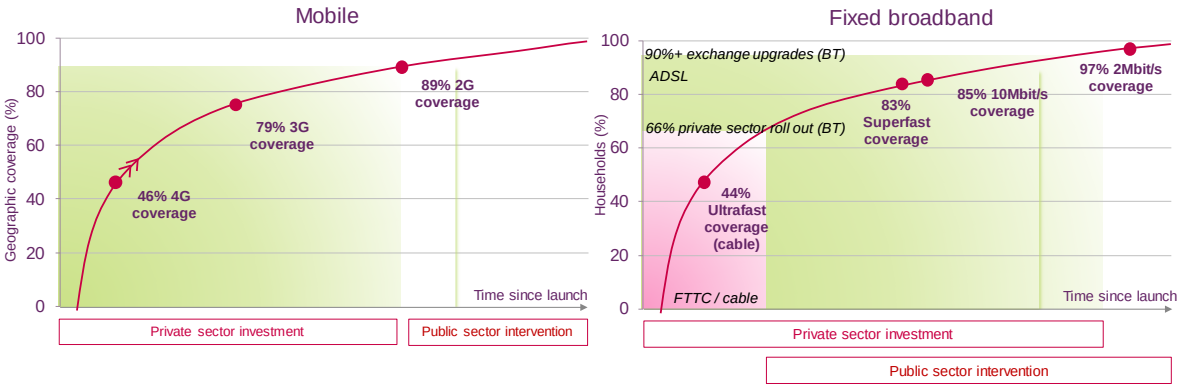
6.8 These questions are made more complex by the fact that the services that we want to make universally available, change over time as successive waves of investment deliver ever-increasing service capabilities. For each wave, how far the private sector reaches will depend on a variety of factors such as the cost of coverage and customer density. Therefore the point at which public sector investment is required will also vary.

6.9 Figure 8 shows a snapshot of where today's main digital communications network technologies stand in terms of availability and how far their deployment is being led by private sector investment or involves public sector intervention. In summary:

- In fixed broadband, the current focus of investment is superfast broadband. Commercial investment in ultrafast is just commencing, and may end up with a similar commercial footprint to superfast broadband. However, commercial investment has probably taken the availability of basic broadband as far as it is likely to go, so any further improvement is likely to depend on some form of intervention

- In mobile, the current focus of commercial investment is 4G, and this is likely to deliver a significant improvement over 3G in terms of the availability of mobile data services. However, it is less likely to improve the availability of mobile voice services, so any further improvement is likely to depend on some form of intervention.

Figure 8: Indicative balance between private and public sector led availability



Source: Ofcom

6.10 Where steps have been taken to promote competition, a further issue is how such interventions can be undertaken in ways that retain private sector incentives for efficient and timely investment and innovation in risky new assets. This is covered in more detail in Section 9.

6.11 This section considers the role commercial private sector investment has to play in widespread availability of services. Public sector intervention to extend availability is covered in the next section.

In general, UK consumers have benefited from continued investment in networks

6.12 Below we set out a high level view of network availability in the UK. More detailed and granular information is available in Ofcom's Infrastructure Reports, the next of which is due to be published later this year[93].

Broadband service definitions

6.13 In assessing availability outcomes and comparisons to other countries, defining what a good outcome looks like is important. Perceptions on what high quality networks

[93] http://stakeholders.ofcom.org.uk/market-data-research/market-data/infrastructure/

should offer vary significantly. This is demonstrated by current debates as to the definition of 'ultrafast' broadband. Some commentators are calling for ultrafast services in excess of 1Gbit/s. Others set more modest targets, with the EU Digital Agenda[94] in 2010 setting aims for availability and take-up of services at 30Mbit/s and 100Mbit/s respectively.

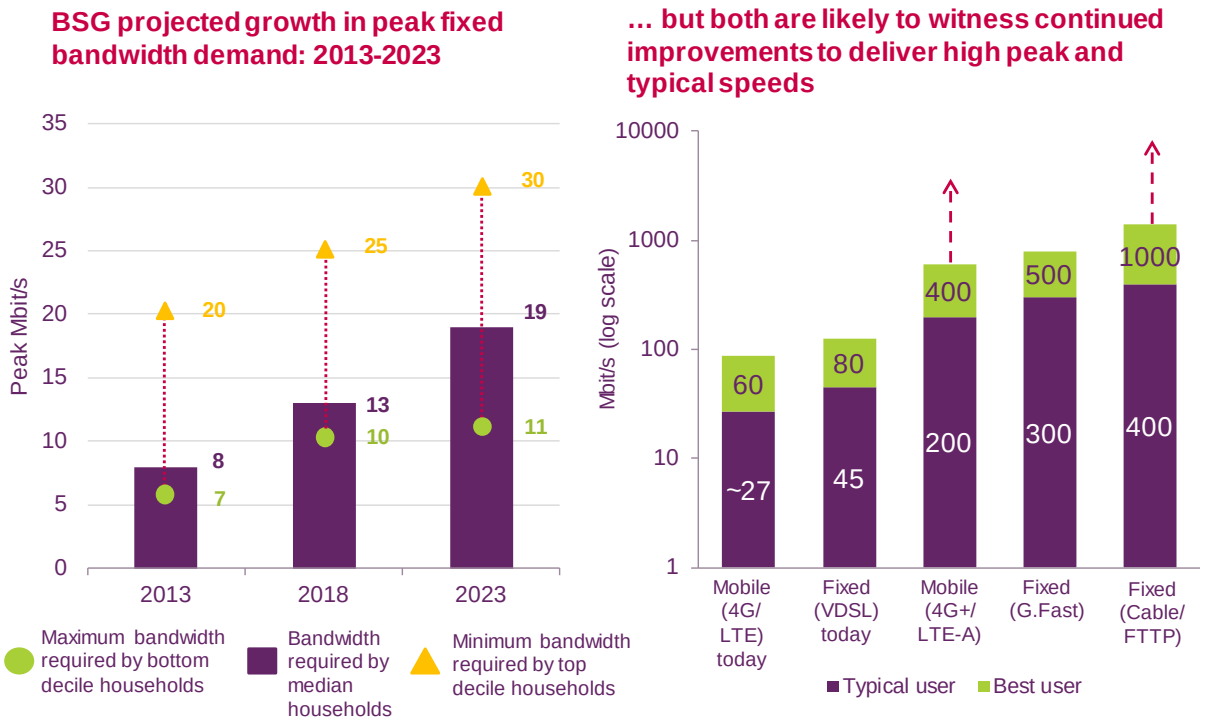
6.14 For the purposes of this document, we are defining 'superfast' as services in excess of 30Mbit/s, and 'ultrafast' in terms of service speeds in excess of 100Mbit/s. This reflects the government's definition in its *Digital Communications Infrastructure Strategy*[95]. We would welcome the views of stakeholders on this definition, however, since there is an alternative view that 'ultrafast' should be defined as an order of magnitude over and above what today's broadband technologies can deliver,[96] or as involving a step change in technology deployed or investment made (although the latter may be a less relevant factor for cable[97]).

6.15 Based on these definitions, superfast and ultrafast services can be delivered by a range of technologies, both fixed and wireless, including mobile. Fixed technologies include fibre to the cabinet and fibre to the premises, as well as cable. Fibre to the cabinet can today deliver peak speeds of up to 80Mbit/s. Fibre to the premises and cable can deliver speeds in excess of 300Mbit/s, and at times above 1Gbit/s. In mobile, the evolution of 4G standards towards LTE-Advanced (LTE-A) will enable headline service speeds up to 400 Mbit/s, and typical speeds of over 200Mbit/s.

6.16 In coming to any view on the definition of broadband services, and setting expectations, it is important to consider what future networks will be used for. While this is an inherently uncertain task, analysts have suggested forecasts of future bandwidth demand, such as in a study for the Broadband Stakeholders Group (BSG) in November 2013[98]. As seen in the Figure 9, the BSG suggested that in 2018 the median household would require a speed of around 13 Mbit/s, increasing to 19 Mbit/s by 2023. However, some users would require significantly higher peak speeds particularly for large file downloads, for example when streaming video content. Different technologies have different capabilities, although as seen in Figure 9, there is usually a disparity between what is available to the typical user and those who receive the best possible service.

[94] https://ec.europa.eu/digital-agenda/en/our-goals/pillar-iv-fast-and-ultra-fast-internet-access
[95] https://www.gov.uk/government/publications/the-digital-communications-infrastructure-strategy/the-digital-communications-infrastructure-strategy
[96] BT's current FTTC technologies can deliver download speeds of 80 Mbit/s
[97] Since DOCSIS 3.1 can be used to upgrade cable networks and offer a significant improvement in performance
[98] Communications Chambers, *Domestic demand for bandwidth: An approach to forecasting requirements for the period 2013-2023*, November 2013, p.52-63: http://www.broadbanduk.org/wp-content/uploads/2013/11/BSG-Domestic-demand-for-bandwidth.pdf

Figure 9: Potential future bandwidth demand and network capabilities



Source: Broadband Stakeholder Group (left) and Ofcom estimates based on current technology standards and likely future developments (right)

The UK has high availability of standard and superfast broadband but limited ultrafast

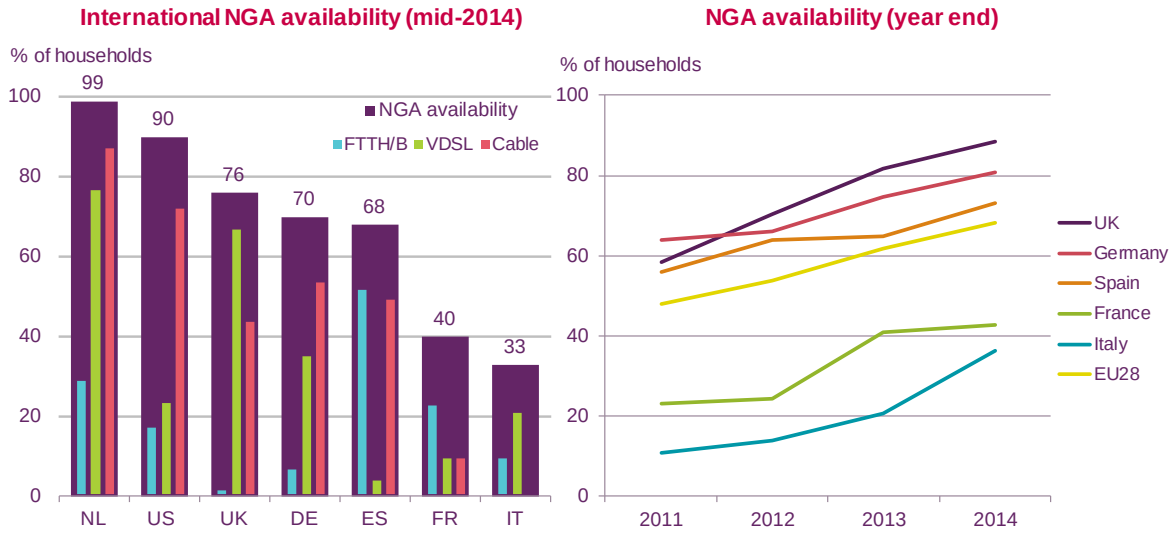
6.17 Investment in superfast broadband by BT and Virgin Media has resulted in good outcomes for the majority of consumers in terms of availability of these services. The UK has the highest level of NGA coverage amongst the EU5; it is also higher than the EU average. As seen in Figure 10, however, NGA availability in some countries such as the US and Netherlands is higher than in the UK. As discussed later, this is often due to a higher level of cable coverage.

6.18 Commercially Virgin Media has invested to offer superfast broadband services to 44% of UK households, and BT's commercial investment in FTTC aimed for around two-thirds of UK households. Availability of FTTC has since increased further as a result of the government's Broadband Delivery UK (BDUK) public investment programme.

6.19 At present, however, the UK has lower availability of ultrafast broadband than many other countries, since it is only widely available from Virgin Media (with speeds of up to 152Mbit/s) over its limited footprint and from a number of smaller providers such as Hyperoptic and Gigaclear. BT has also made some limited deployments of fibre-to-the-premises, including as part of a public intervention in Cornwall. This service offers speeds in excess of 300Mbit/s where available.

6.20 In addition, there remains a significant minority of users who do not have access to superfast broadband services, and are at risk of digital exclusion as a result. This is covered in more detail in the next section.

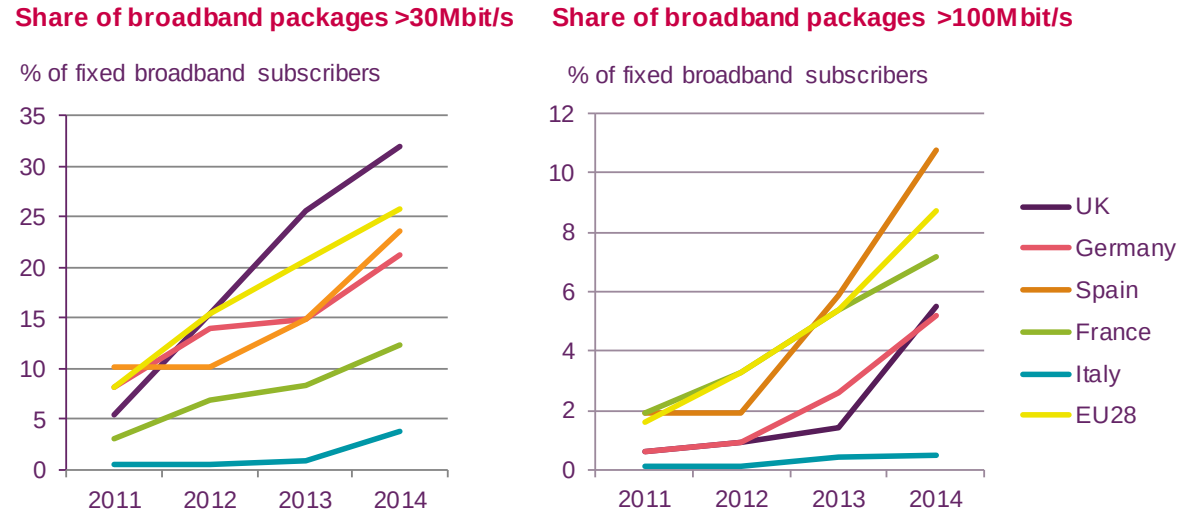
Figure 10: NGA availability in different countries



Source: IDATE (left) and EU Digital Agenda Scorecard (right)

6.21 Take-up of superfast broadband in the UK is also growing rapidly, driven by competition between providers. As seen in Figure 11, the UK has the highest share of broadband above 30Mbit/s compared to the other EU5 countries. However, lower availability of ultrafast broadband means far fewer ultrafast customers in the UK.

Figure 11: Take-up of superfast and ultrafast broadband



Source: EU Digital Agenda Scoreboard

6.22 In some other countries there is higher ultrafast broadband availability as a result of much greater deployment of fibre-to-the-premises (FTTP) than there is in the UK. In recent years, for instance, FTTP coverage in Spain has grown rapidly and has been deployed by a number of operators including Telefonica, Orange, Jazztel and Vodafone. As FTTP has been made available, more consumers have taken up broadband packages with download speeds of over 100Mbit/s, as can be seen in Figure 11 which shows that Spain has twice the proportion of broadband

subscriptions that are above 100Mbit/s as the UK. The UK is also below the EU average on this metric.

6.23 The availability of ultrafast broadband in the UK is beginning to improve, with a number of examples of ultrafast deployments announced in recent months:

- Virgin Media has announced a £3bn network extension programme which will extend its network to an additional 4 million households and businesses, extending reach of its network to nearly 70% of UK premises.
- BT has announced its intention to roll-out G.Fast, a technology which delivers ultrafast broadband speeds over short copper lines. Openreach is currently trialling services, and subject to the results of these pilots it will begin rolling out the technology across the UK in 2016-17 and expects to deliver speeds of up to 500Mbit/s to most of the UK within a decade.
- Sky and TalkTalk have partnered with CityFibre in a FTTP network in York, with the potential to extend the network to other cities. TalkTalk has indicated that it sees roll-out of a UK-wide network to rival BT and Virgin Media as potentially commercially viable.

Investment in mobile networks continues

6.24 Commercial investment in 3G and 4G networks has resulted in relatively high mobile broadband coverage by international standards and good choice of service provider. Mobile data availability in Northern Ireland, Scotland and Wales, is, however, below the UK average and fewer than a third of A and B roads have in-car data coverage

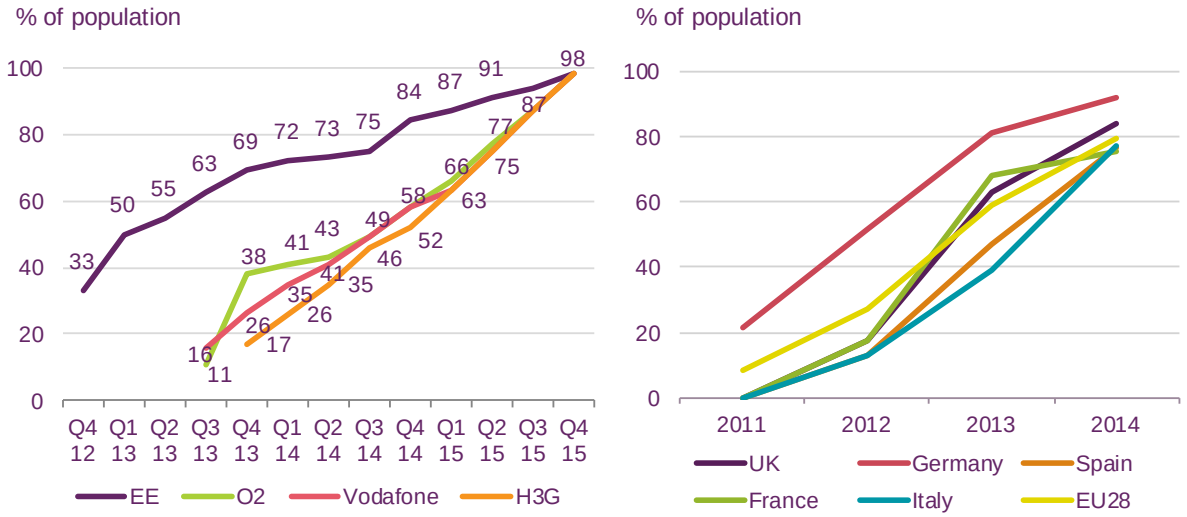
6.25 Although 4G spectrum bands were cleared and released later in the UK than in some other EU countries (due, in large part, to the timing of digital TV switchover), subsequent rollout by UK operators has been comparatively fast, aided by liberalisation of the licensed 1800MHz spectrum. 4G availability is now above the EU average (see Figure 12 below). EE rolled out services earliest, achieving 84% 4G availability by the end of 2014[99], and other operators followed. In May 2015, 42.4% of UK premises had 4G coverage from all four 4G operators[100].

6.26 O2's 4G licence requires it to offer 98% indoor premises coverage by the end of 2017, with reception for 95% of the population in each of England, Wales, Scotland and Northern Ireland. The other operators expect to match this commitment. In aggregate, 4G outdoor coverage is likely to exceed 99% of UK premises.

6.27 In recent years UK mobile operators' capex has typically been approximately 10% of revenues, a level comparable to those of other EU mobile markets[101]. Each mobile operator is likely to make significant further investments in coverage, capability and capacity of their 4G networks.

[99] Enders Analysis, *UK mobile market Q1 2015: A little growth, less convergence, June 2015*, p.15. Note: coverage figures are estimates based on company reports of population coverage and the population of covered cities, and are thus strictly approximate.
[100] Ofcom analysis of operator data, May 2015. This data has been collected from operators for our forthcoming Infrastructure Report Update, due to be published later this year.
[101] WIK-Consult, *Competition & investment*: *An analysis of the drivers of investment and consumer welfare in mobile telecommunications*, July 2015: http://stakeholders.ofcom.org.uk/binaries/consultations/dcr_discussion/annexes/Competition_and_investment_mobile.pdf

Figure 12: UK and European 4G availability



Source: Enders Analysis (left) and EU Digital Agenda Scoreboard (right)

Economic geography is the principal determinant of the availability of digital communications services

6.28 There are a number of different factors affecting whether a particular local market is supplied with a communications service. The extent of local demand largely determines whether the cost of extending a network to an area is commensurate with the return it can generate. Demand is influenced by the size and density of a local population, as well as the willingness and ability to pay within the population. Availability can also be influenced by more technical factors, including past decisions on network build (some dense urban locations have no cabinets, meaning fibre to the cabinet cannot be deployed) or space and planning constraints (for example on new base stations or base station heights).

6.29 We examined the effects of economic geography on network availability across the UK in *The availability of communications services in the UK*[102], and again in *Availability of communications services in UK cities*[103] which considered availability variations between a sample of 12 cities.

6.30 In fixed and mobile communications markets, the majority of UK premises are economic to serve on the basis of private investment. Some areas with a high density of customers will be particularly attractive to serve. Many towns and cities thus have multiple fixed and mobile network providers. Conversely, there are areas where, absent intervention, there is only one provider or no provider at all. These areas are primarily in remote locations or have challenging topographies.

6.31 Fixed networks have been upgraded to superfast broadband by replacing some of the copper along their length with fibre optic cable. The cost of doing so will be higher where the distances involved are longer. This potentially means that remoter and less densely populated locations may be uneconomic to serve.

[102] May 2013: http://stakeholders.ofcom.org.uk/binaries/research/markets-infrastructure/economic-geography.pdf
[103] June 2014: http://stakeholders.ofcom.org.uk/market-data-research/market-data/cities-summary-14

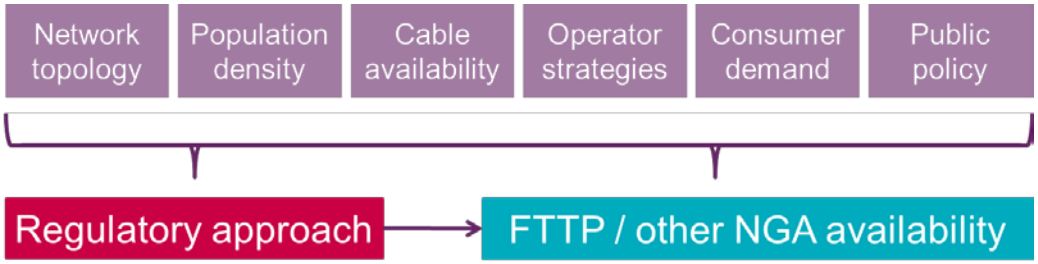
6.32 For mobile networks, the main costs involved are in equipping, powering and maintaining the network of base stations, and in providing backhaul circuits to connect these base stations to the core network. For more remote base stations, the costs of supplying power, maintenance and backhaul are likely to be higher. In addition, these remoter base stations are likely to serve less densely populated areas which potentially increase per-user costs to an uneconomic level.

6.33 The effect of this economic geography is that the availability of communications services is broadly good on a national basis, but rural locations are typically less well served.

There is no one single driving factor for fixed broadband investment decisions

6.34 We commissioned international case studies from WIK-Consult[104] and Analysys Mason[105] (published alongside this discussion document) to examine the different influences on NGA rollout and take-up, and to help us consider why NGA deployment varies between countries. These studies indicate that a combination of different factors explain different levels of investment in superfast broadband, as illustrated below.

Figure 13: Factors affecting regulatory approach and superfast broadband deployment



Source: Ofcom

6.35 The main factors are:

- **Network topology, quality and availability**. The architecture of telecoms networks plays an important role including factors such as the length of local loops, the existence or otherwise of street cabinets, the availability and quality of ducts. BT's focus on fibre-to-the-cabinet in the UK is enabled by relatively short copper loops between telecoms cabinets and consumer premises which mean that superfast broadband speeds can be delivered over short copper lines using the VDSL technology. In contrast, longer local loops in France and Spain largely

[104] WIK-Consult, *Competition & investment: An analysis of the drivers of investment and consumer welfare in mobile telecommunications*, July 2015: http://stakeholders.ofcom.org.uk/binaries/consultations/dcr_discussion/annexes/Competition_and_investment_mobile.pdf and *Competition & investment: An analysis of the drivers of superfast broadband*, July 2015: http://stakeholders.ofcom.org.uk/binaries/consultations/dcr_discussion/annexes/Competition_and_investment_fixed.pdf

[105] Analysys Mason, *International Case Studies*, July 2015: http://stakeholders.ofcom.org.uk/binaries/consultations/dcr_discussion/annexes/International_case_studies.pdf

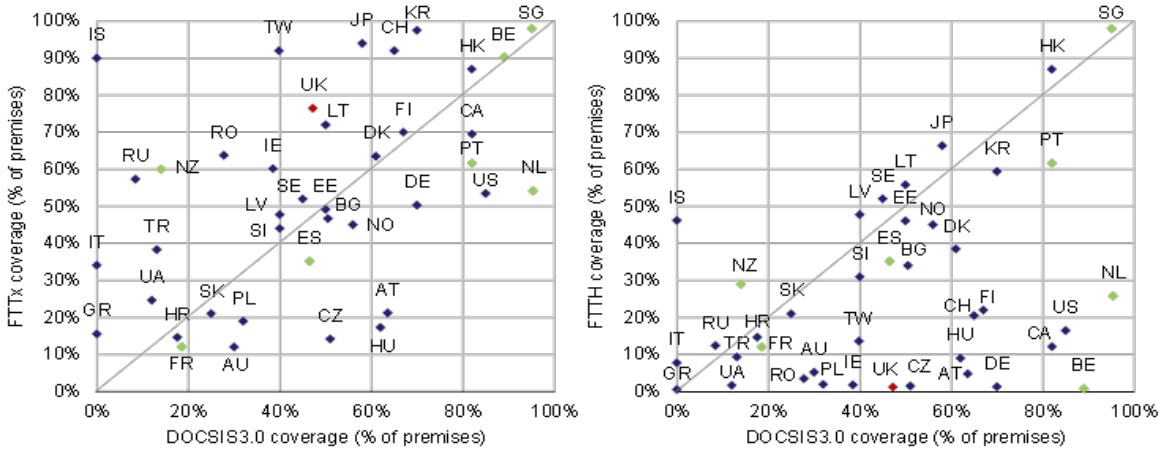
prevent superfast broadband delivered by VDSL; superfast broadband deployment has instead been delivered by fibre-to-the-premises, which is itself facilitated by the presence of accessible ducts or use of sewers. Quality of ducts is cited by Analysys Mason as a significant factor in some countries: for example, "because there are useful ducts in Portugal[106], an FTTH deployment based on these ducts is feasible."

- **Housing density** is also an important factor, not simply in terms of population density and the split between rural and urban dwellers but also in terms of the number of people who live in multiple dwelling units (MDUs). The effect of this can be seen in differences within countries as well as between them. In most countries, densely populated urban areas are better served by broadband infrastructure than less dense areas including rural districts. In countries such as Singapore, Japan or Korea, where most people live in large apartment blocks it is much cheaper to deploy cable or FTTH than where housing is more dispersed.

- **Cable availability**. The degree of end-to-end competition from cable networks appears to play a role in encouraging incumbents to deploy faster broadband. In particular, as cable networks upgraded their networks to DOCSIS 3.0 to begin to offer superfast broadband, incumbents came under more pressure to offer FTTP or FTTC broadband. Near-universal cable availability in the US and Canada has driven investment in fibre networks from incumbent operators.

Analysys Mason note the strong correlation between FTTH coverage and cable coverage with FTTH coverage rarely exceeding cable (see Figure 14). They state that "this suggests that the upper bound on deployment of both may be determined by the economics, and that where it is economic to deploy one, it is potentially equally economic to deploy the other to a similar fraction of the population (all other things being equal)."[107]

Figure 14: FTTx and FTTH availability versus cable availability



[106] Analysys Mason also note Portugal has "30,000km of high quality ducting all the way to the building" p9 *International Case Studies*, July 2015: http://stakeholders.ofcom.org.uk/binaries/consultations/dcr_discussion/annexes/International_case_studies.pdf Analysys Mason have separately credited a "particularly clean and comprehensive duct system". See *Portugal Telecom: investing in fibre infrastructure in the downturn and waiting for the economic tailwinds,* November 2012: http://www.analysysmason.com/About-Us/News/Insight/Portugal-Telecom-fibre-infrastructure-Nov2012

[107] Ibid, p10

Source: Analysys Mason, International Case Studies, June 2015

- **Operator strategies**. The bundling strategies used by different operators appear to be a factor in some countries' deployment of NGA. Where operators bundle superfast broadband with pay TV services, for instance, they are able to attract more revenue which will encourage investment in infrastructure.

- **Consumer demand**. There are varying forecasts for how much bandwidth consumers will want and be willing to pay for over time. It is possible that in some countries there will be more demand for faster speeds than in others. Most notably, if consumers in a particular country have greater propensity to use high-bandwidth applications such as IPTV and gaming then they are more likely to adopt higher speed broadband services.

- **Public policy** has played a greater role in deploying NGA in some countries than in others. Notably, in the UK, the superfast broadband programme led by BDUK is helping to rollout superfast broadband to 95% of UK premises, and the Government is considering ways in which universal availability can be provided (see Section 7).

6.36 Some of these factors can also help explain differences in the choice of and level of investment in superfast broadband technologies between the UK and other countries:

- Network topology, quality and housing density have been important determinants for the type of fibre deployment that has happened in the UK. In France, longer local loops meant that FTTC was a less attractive option for superfast broadband. Analysys Mason[108] cite lower quality and availability of ducts as one factor behind limited non-incumbent FTTH deployment in the UK stating " it appears logical that FTTC would be the primary means of NGA deployment in the UK given the comparatively low density housing and more limited availability of ducts (compared to say Spain and Portugal)."

- Cable has encouraged BT's superfast rollout. As noted earlier, cable provision of superfast broadband has encouraged telecoms incumbents to also offer it. As Virgin Media extends its network further and offers faster speeds, BT is likely to come under greater competitive pressure to offer ultrafast broadband.

- There is a degree of trade-off between overall NGA rollout and ultrafast broadband rollout. While the UK has lower availability and take-up of ultrafast broadband than countries such as Spain, it has higher superfast availability and take-up. This is a result of the fact that the economics of FTTH deployments are such that they are often geographically restricted to dense urban areas. For example in France 71% of FTTH premises passed so far are in high-density areas (which represent only 20% of the country)[109].

[108] Analysys Mason, p12 *International Case Studies*, July 2015: http://stakeholders.ofcom.org.uk/binaries/consultations/dcr_discussion/annexes/International_case_studies.pdf
[109] Ibid, p49

Investment outcomes do not appear to be directly determined by the regulatory model adopted

6.37 In some countries (such as Spain, Portugal and France) regulators have elected to implement passive remedies such as duct access and/or dark fibre remedies and placed less emphasis on active remedies, if at all. In part, this may have been because of country-specific factors that made such remedies more likely to enjoy some success (e.g. greater MDU occupation). But it is also notable that countries such as France and Spain where there has been more emphasis on passive remedies have experienced greater FTTH rollout than the UK (see Figure 15 below).

Figure 15: Comparing relative superfast broadband outcomes by regulatory approach

Regulatory model	Country	NGA coverage	NGA take-up	FTTH deployment	Choice of provider	Prices
No access regulation	Canada	90%	47%	7%	Limited	
	US	90%	61%	19%	Limited	
Deep passive access	France	40%	20%	25%	3-4	
	Spain	68%	32%	58%	3-4	
Access remedy focus	Netherlands	99%	27%	31%	3+	
	Sweden	61%	43%	58%	3+	
Passive & active focus	UK	76%	33%	1%	3+	
	Italy	33%	5%	10%		
	Germany	70%	19%	7%	3+	

Source: IDATE, WIK-Consult, Ofcom. Note: figures are for mid-2014 (except price) and so may differ from figures elsewhere in this document

6.38 An important question for this review (Section 9) is whether regulation should, in future, focus more on encouraging use of passive access remedies. It may be the case that regulation has less impact on superfast broadband outcomes than other factors: if country-specific factors are more important than regulation in deciding eventual superfast broadband outcomes, then a greater focus on passive remedies in the UK may have limited impact. But on the other hand, it may be that a greater focus on passive remedies could encourage the same kind of alternative infrastructure deployment that has happened in other countries. We would hence welcome the views of stakeholders on the potential lessons for the UK from

international case studies (see also the reports from WIK-Consult[110] and Analysys Mason[111] published alongside this Discussion Document).

Investment in mobile networks is also driven by a number of factors

6.39 Investment in mobile networks and coverage depends on a range of factors. Some factors, such as population density, are broadly similar to the factors that affect ultrafast broadband coverage, but there are also factors that are unique to mobile:

- **End-to-end competition** has played an important role in encouraging investment in mobile. 4G coverage provides one example of this: once EE accelerated the rollout of 4G, other mobile network operators were encouraged to follow using the spectrum they bought.

- **Topography**. Mobile coverage relies on wireless signals that can easily be blocked or interfered with by hills or tall buildings. If coverage is to be extended to some areas, additional sites need to be built to provide coverage which can be uneconomic.

- **Customer density** will affect where mobile operators deploy coverage. Areas that have low population density may be uneconomic to serve which helps explain why mobile geographical coverage is substantially lower than mobile premises coverage. Other things being equal, an operator is more likely to add a site where they can address a larger number of customers than where only a smaller number can be addressed. However, while in areas that are more densely populated, fewer mobile sites will be needed to provide coverage, more capacity may be needed.

- **Consumer demand**. More mobile usage has stimulated operators to invest in their networks. Notably, growing take-up of smartphones and mobile data has encouraged investment in 4G coverage and higher capacity.

- **Spectrum usage**. Using lower-frequency spectrum allows wireless signals to travel further than higher-frequency spectrum, making wide area coverage is cheaper and easier to provide. We are planning to release further UHF spectrum at 700Mhz for mobile services.

- **Newer mobile technology**. Mobile operators are increasingly investing in smaller cells to provide mobile coverage. These are not only smaller but also use less power and have shorter range, but they can provide coverage in areas where coverage or capacity was previously problematic.

[110] WIK-Consult, *Competition & investment: An analysis of the drivers of investment and consumer welfare in mobile telecommunications*, July 2015: http://stakeholders.ofcom.org.uk/binaries/consultations/dcr_discussion/annexes/Competition_and_investment_mobile.pdf and *Competition & investment: An analysis of the drivers of superfast broadband*, July 2015: http://stakeholders.ofcom.org.uk/binaries/consultations/dcr_discussion/annexes/Competition_and_investment_fixed.pdf

[111] Analysys Mason, *International Case Studies*, July 2015: http://stakeholders.ofcom.org.uk/binaries/consultations/dcr_discussion/annexes/International_case_studies.pdf

- **Planning considerations** can play an important role in determining mobile coverage, both in rural areas and in urban areas. They can also be a factor in determining coverage along road and rail routes. Examples including rules on tower heights and options and rules on building and sharing physical infrastructure.

- **Public and regulatory policy** has played a role in determining the degree of mobile investment. Ofcom has imposed mobile coverage requirements on operators. As mobile coverage has become more important to consumers', citizens' and businesses' connectivity needs, the Government has undertaken a number of interventions to extend mobile availability (see Section 7).

There is no compelling evidence that competition is harming mobile investment

6.40 Some commentators have suggested that current levels of competition may undermine investment, especially by mobile operators. Such commentators have argued that a reduction in the number of operators as a result of mergers would increase investment. This argument is considered further in Section 9. This builds on the arguments around potentially low mobile returns on capital employed, discussed in Section 4 where we set out our initial view that the mobile sector is earning returns above its cost of capital, and in some cases mobile operators are earning returns significantly higher than the cost of capital.

6.41 The nature of the relationship between competition and investment is complex with conflicting effects at play:

- On the one hand, firms with market power may face less risk that the profits from investment and innovation will be eroded by rivals.

- However, competition increases firms' incentive to invest in new products and services in order to gain a competitive advantage over rivals, and reduce the risk of being left behind as others invest.

- Another argument is that a firm's incentive to invest in new products may be weakened by the cannibalising effect this has on profits from existing services. In this context, competition from a rival that does not face this dilemma may increase the firm's investment incentives in order to maintain its competitive position.

6.42 Our starting point is pro-competition: we believe this is an important contributor to a range of good outcomes for consumers, including investment and innovation. We have not seen clear empirical evidence that a reduction in competition would result in a significant increase in investment, capital expenditure per subscriber or associated consumer outcomes on availability or quality. As discussed in Section 4, with the current level of competition in the UK market, UK MNOs are continuing to invest and appear to be sustainable. UK consumers have benefited greatly from end-to-end competition in mobile services, and we believe that where effective end-to-end competition is sustainable, it should be maintained. We welcome stakeholders' views on this issue.

6.43 However, we acknowledge that even with effective and sustainable competition between four national wholesalers, some aspects of mobile service availability and quality are not meeting users' expectations. This includes specific coverage issues, including rural areas, road and rail, but also issues on coverage quality, capacity and

overall quality of service. These concerns potentially reflect the limits of market provision, even where there is effective competition. These issues are covered in Section 7.

Effective competition remains the most appropriate way to deliver timely and efficient investment to most

6.44 We believe that a market-based approach remains appropriate in the communications sector in which network-based competition is a key driver of investment and innovation that meets customer requirements. For example:

- Competition between Virgin and BT has helped drive NGA investment: Virgin Media has used DOCSIS 3.0 technology to offer faster broadband across its footprint, and in turn BT has been encouraged to rollout and upgrade its superfast network. In both fixed and mobile networks, operators have had to invest in more capacity to meet consumers' needs as data usage has grown exponentially.

- Competition between MNOs has helped drive improvements in mobile network efficiency as a result of the evolution from 2G to 3G to 4G. For instance, in mobile the launch by Three of the UK's first large-scale 3G network encouraged other MNOs to also upgrade their networks. Subsequently, competition between MNOs has helped support a rapid deployment of 4G.

6.45 A key reason for adopting this market-based approach is that competition is a key driver of innovation. And improvements in the performance of communications networks are often due to innovation in the use of existing assets, exploiting advances in electronic processing power, rather than the deployment of new civil infrastructure. For example, the efficiency with which mobile networks use spectrum has increased by more than tenfold as a result of the evolution from 2G to 3G to 4G. Similarly, the amount of bandwidth that can be carried over a fixed copper access network is expected to increase hugely as a result of the evolution from basic to ultrafast broadband.

6.46 In other sectors, such as energy and water, there is greater involvement by the regulator in deciding what investment should be undertaken by regulated companies. But in communications, this has not been necessary because competition, combined with appropriate regulation and technological developments, has helped to drive new investment and innovation. Indeed, in a fast moving, highly technological sector, there is a risk of regulatory failure if policy makers seek to define investment programmes and technology choices.

6.47 Most notably, the copper telephone network has been continually upgraded to be able to offer consumers first dial-up narrowband internet access, and then later standard and superfast broadband – and it will be upgraded again in coming years to be able to offer ultrafast broadband. In mobile, competition between mobile operators has led networks to be upgraded from 2G to 3G to 4G, both fostering consumers' growing use of data services and catering for it.

6.48 There is evidence that both access-based and end-to-end competition can be beneficial for investment:

- There is evidence that access-based competition, based on access to passive infrastructure, can drive network innovation. For example, local loop unbundling was an important factor driving early improvements in the exchange-based

ADSL broadband technology. Today, some European countries have demonstrated competitive investment in superfast broadband supported by passive infrastructure access (e.g. ducts, poles, in-building wiring). Such investment is often limited to denser urban areas, and is dependent on local factors such as the quality of duct as well as the regulatory regime.

- There is evidence[112] across a number of countries that the presence of end-to-end competition between the incumbent telecoms operator and the cable network operator has been an important factor in driving the deployment of superfast broadband. Cable networks are more straightforward to upgrade initially, and this then typically drives a competitive response from the incumbent.

- A variety of commentators have noted that 4G mobile services launched later in Europe than in the US, and have used this to argue that there is a structural problem in European markets. However, the late start was due to a variety of reasons, notably the time taken to clear the necessary radio spectrum. And end-to-end competition between the UK operators is now driving a rapid deployment of 4G services.

6.49 It is less clear, however, that competition based on active remedies offers the same opportunities and potential for significant investment and innovation. These issues are explored in more detail in Section 9.

6.50 We continue to believe that, wherever possible, effective and sustainable competition is a key factor in securing efficient, private sector led investment. However, where competition may not emerge given the presence of enduring economic bottlenecks, we must consider how regulatory policy can be applied in ways that protect the incentive to make new, significant and potentially risky investments. This is considered in more detail in Section 10.

Questions for discussion

Overarching issue	Specific questions
Should competition policy remain at the core of good availability outcomes for most consumers, complemented by targeted intervention as required?	*Q1: Do stakeholders agree that promoting effective and sustainable competition remains an appropriate strategy to deliver efficient investment and widespread availability of services for the majority of consumers, whilst noting the need for complementary public policy action for harder to reach areas across the UK?*
	Q2: Would alternative models deliver better outcomes for consumers in terms of investment, availability and price?

[112] WIK-Consult, *Competition & investment: An analysis of the drivers of superfast broadband*, July 2015, p.18: http://stakeholders.ofcom.org.uk/binaries/consultations/dcr_discussion/annexes/Competition_and_investment_fixed.pdf

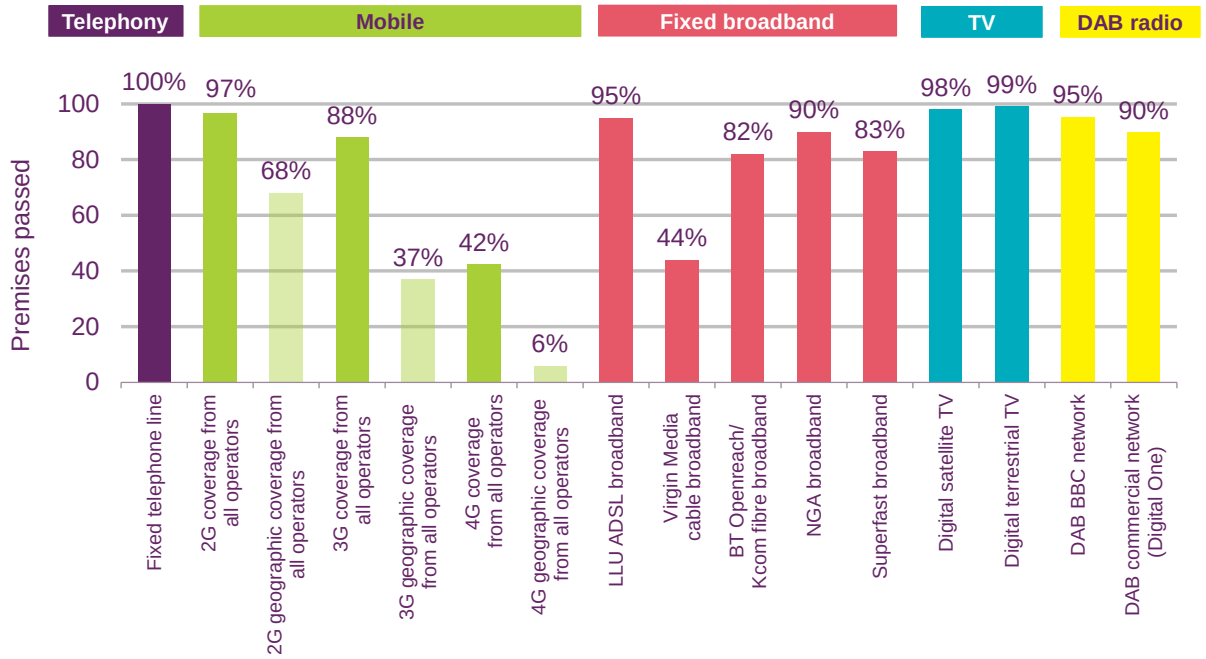
Section 7

Extending availability through targeted public policy

Private sector investment alone cannot deliver good consumer outcomes for all

7.1 While competition can be relied upon to provide incentives to invest, it is unlikely to be sufficient to provide universal availability of all communications services. As seen in the table below, most communications services are available to the vast majority of the UK. But availability does not extend everywhere.

Figure 16: UK coverage of communications services



Source: Ofcom and operators[113]

Some areas are likely to experience repeat market shortfalls in future

7.2 The availability challenge is a recurring one. The rapid technological changes in our sector require new technology to be installed at regular intervals, meaning that with each generation of technology there is a risk that consumers in areas which are

[113] Proportion of premises that have outdoor mobile coverage from all operators, May 2015, and proportion of UK landmass covered, May 2015; Proportion of premises connected to an LLU-enabled BT local exchange area, Dec 2014; Proportion of premises able to receive Virgin Media cable broadband services, Openreach/Kcom fibre broadband services, NGA broadband services, and superfast broadband services in May 2015; Digital Satellite TV relates only to the ability to achieve a necessary line of sight path to the satellite; Estimated proportion of homes that can receive the PSB channels through DTT (3PSB Mux coverage), DTT Frequency Planning Group (Arqiva, BBC, Ofcom); BBC National DAB coverage as of end 2014.

expensive to serve may be left out. There is a risk of a persistent digital divide occurring over multiple technology cycles.

7.3 We can observe this in the market today; some homes will soon be benefitting from BT or KCom's ultrafast broadband deployments, and others can get speeds of 150Mbits/s from Virgin Media. Meanwhile some are not yet reached by superfast broadband services: 8% of premises cannot receive 10Mbit/s broadband, and around 2% of premises cannot get a basic 2Mbits/s connection[114].

Overall, the devolved nations of the UK have worse availability outcomes due to their higher proportion of rural premises

7.4 We discussed the role economic geography has in determining availability outcomes for consumers. In considering service availability, we must take account of variations in economic geography that affect network deployment across the UK and its nations. England, Wales, Northern Ireland and Scotland all demonstrate a different mix of features that affect network availability across and between them as nations.

7.5 The devolved nations have a higher proportion of rural areas, ranging from 89% of landmass in Wales to 97% in Scotland. 93% of Northern Ireland is classified as rural, and it has the highest proportion of its population resident in rural areas (32%)[115].

7.6 England's landmass is classified as 82% rural, with the lowest proportion of the population living in rural areas (13%)[116]. Although these figures are lower than for the devolved nations, we recognise that this still equates to nearly 7 million of the population and there are communities throughout the UK which will face many common challenges whether they are in north Devon, mid Wales, Fermanagh or the Scottish Highlands.

7.7 Population density in rural areas is not the only factor to consider as the way the population is distributed is also significant when assessing a lack of availability, along with the unique geographies and topographies of the nations and regions.

7.8 The image in Figure 17 of the light pollution in the UK shows that the population in each of the nations of the UK is not distributed evenly. Scotland's population is concentrated across the Central Belt (Glasgow and Edinburgh), up the east coast (Dundee and Aberdeen) and then along the Moray Firth (to Inverness). Other centres of population across the rest of Scotland are small and widely spaced.

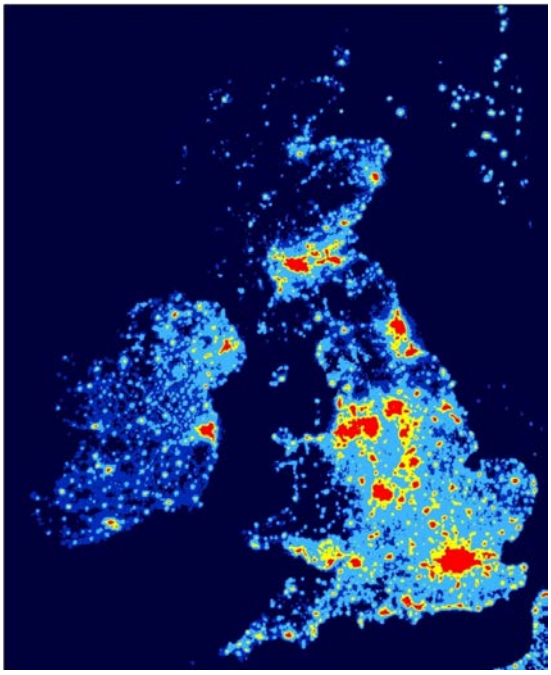
7.9 This contrasts with most of England, where there is a grid effect apparent with large centres of population and gradually diminishing population densities between them. Different regions within England have very different population patterns and levels of rurality, thus leading to different coverage outcomes.

7.10 Northern Ireland's rural population is relatively evenly scattered which makes it difficult for an FTTC network to effectively provide superfast broadband to multiple

[114] Ofcom analysis of operator data, May 2015. This data has been collected from operators for our forthcoming Infrastructure Report Update, due to be published later this year. Note that these figures are the result of new analysis, undertaken for the first time this year and, therefore, not comparable with previous years' analysis. These figures may be subject to change.
[115] *The availability of communications services in the UK*, May 2013, p.10: http://stakeholders.ofcom.org.uk/binaries/research/markets-infrastructure/economic-geography.pdf
[116] Ibid.

premises. Wales has a clear majority of is population clustered in the south, with a widely dispersed rural population particularly in the middle and north of the country.

Figure 17: UK population density, as indicated by light pollution



Source: The availability of communications services in the UK, Ofcom 2013

7.11 Local topography also affects the range and quality of digital communications services, particularly in mobile coverage provided by a base station. In hilly areas wireless signals are impeded, and additional cells are necessary to improve coverage. Mountainous regions throughout the UK present considerable topographical challenges for mobile networks as is reflected in the high numbers of not-spots and partial not-spots in these regions.

Other challenges to availability: City not-spots and SMEs

7.12 Beyond economic geography, other factors can lead to poor coverage outcomes. For example, we see poor coverage of next generation fibre broadband services in some city areas. In most cases, this is due to 'exchange only lines', where there is no street cabinet between the exchange and the customer premises. The lack of a cabinet means these homes are not reached by a network improvement that involves deployment of fibre to the cabinet (FTTC).

7.13 High quality communications services are essential to most SMEs but in our recent SME publication[117], we noted that the coverage of next generation fibre broadband to SMEs was much lower (56%) than that for all premises (75%) as at June 2014. Our analysis of future deployment plans finds that by 2017, when 95% of all UK premises will have superfast broadband, around 18% of SME premises will still not have access to superfast broadband.

[117] *Broadband services for SMEs: assessment and action plan,* June 2015, p.2: http://stakeholders.ofcom.org.uk/binaries/research/telecoms-research/sme/bb-for-smes.pdf

7.14 Low availability for SMEs is in part due to the higher than average costs of deploying superfast broadband to business premises, and because commercial and publicly-funded deployment programmes have principally benefitted residential areas.

7.15 Largely as a result of the low availability of superfast broadband, the average download speed in SME-only postcodes was 13.6Mbit/s in June 2014, compared to 23.4Mbit/s for all UK premises. Average upload speeds (which are typically much more important for business users than for residential users) in SME-only postcodes were 1.7Mbit/s compared to 3.0Mbit/s for all UK premises.

7.16 Many SMEs not only currently lack access to superfast broadband connectivity, but are also unable to access speeds sufficient for basic internet use. We estimate that in June 2014, 56% of premises in SME-only postcodes had broadband connections with a maximum speed of less than10Mbit/s, 24% had maximum speeds of less than 5Mbit/s and 8% had maximum speeds of less than 2Mbit/s. 41% of broadband connections in SME-only postcodes had an average upload speed of less than 1Mbit/s, compared to 26% of all UK broadband connections.

Availability of services for consumers in vulnerable circumstances

7.17 There are groups of consumers who may be under-served by the market due to specific requirements they may have. In particular, consumers in vulnerable circumstances may need extra assistance in accessing communications services. Where the market does not address these use cases, they may require public policy interventions.

7.18 Consumer groups we take account of in our work include:

- Consumers with hearing or speech difficulties, by mandating the provision of relay services;
- Consumers with visual impairments, by mandating the provision of bills in accessible formats and free directory enquiries for people who cannot use the printed directory because of their disability;
- Consumers who depend on the phone because of severe disability or ill-health, by mandating priority fault repair;
- Older consumers who may have health or accessibility reasons for having different needs from communications services;
- Consumers on low incomes in receipt of certain benefits, who can access social tariffs, which reduce the price of line rental and include a small call allowance; and
- Consumers who become vulnerable from life events such as bereavement or illness which can temporarily reduce people's ability to participate in society and/or increase their dependence on certain communications services.

7.19 Without intervention the risk of social exclusion could increase over time as communications services become ever more fundamental to our interactions with central and local government services, and public services such as healthcare.

There are a number of specific policy issues on availability for fixed and mobile services

7.20 Public policy initiatives have been used to extend availability where it is not commercially viable in both fixed and mobile networks.

7.21 Today, fixed broadband technology is almost universally available, but the speeds available to consumers vary considerably. This results in three challenges:

- **Universal broadband**. Those who cannot get superfast or ultrafast broadband currently receive a much poorer level of service than those who can, creating the risk of a growing digital divide. We estimate that a typical household may require a broadband speed of around 10Mbit/s to benefit from the range of services accessed by most. Today, 8% of UK households currently fall below this threshold. We further estimate that 2% of UK households (c.500k) cannot receive a basic 2Mbit/s service[118].

  In addition, a proportion of consumers may risk exclusion if they find the cost of broadband prohibitive. The percentages may be small, but the total number of households affected by issues of availability and affordability is still substantial. Those consumers who are affected risk being excluded from the benefits of living in a digital society. Moreover, affordability issues may unduly affect those who find themselves in vulnerable circumstances.

- **Superfast broadband**. We currently expect superfast broadband to be available to 95% of UK households by 2017, and 82% of small and medium businesses. This has been a rapid deployment, which compares well with many other countries, but availability does still need to be improved, particularly for small businesses.

- **Ultrafast broadband**. There is an emerging debate as to this next phase of broadband evolution and its role in promoting the UK's long-term competitiveness. Over the last few months BT has announced that it would deliver ultrafast speeds of up to 500Mbit/s to most of the UK within a decade, Virgin Media announced plans to extend its cable network to cover two thirds of UK premises, and its own ultrafast programme; and CityFibre has completed the first phase of its trial fibre to the home deployment in York. These commercial developments are encouraging, although questions will rise on how, in due course, coverage can be extended further.

7.22 Mobile services are widely available, but there are significant gaps in coverage, particularly in rural areas. This similarly raises concerns about social inclusion and a growing digital divide. In urban areas the key challenge will be meeting the growing demand for mobile data. More specifically:

- **Mobile coverage – voice**. Most UK premises are covered by 2G voice networks, with 97% of UK premises having outdoor coverage from all operators.

[118] Ofcom analysis of operator data, May 2015. This data has been collected from operators for our forthcoming Infrastructure Report Update, due to be published later this year. Note that these figures are the result of new analysis, undertaken for the first time this year and, therefore, not comparable with previous years' analysis. These figures may be subject to change.

However, this figure is worse for indoor coverage (83%) where consumers make the majority of their calls and for in-car coverage on A and B roads (59%)[119].

- **Mobile coverage – data**. The data coverage provided by 3G networks is lower than current voice coverage, with 84% of UK premises having outdoor coverage from all operators, 71% having indoor coverage, and only 30% of A and B roads having in-car coverage. However, these figures will improve as 4G is deployed. Current figures show that today 4G delivers outdoor coverage from at least one MNO to 90% of premises[120].

- **Capacity growth**. While forecasts of future levels of demand for mobile data vary, we expect that overall levels of traffic could grow by around 45 times between 2014 and 2030[121]. We expect this to be met partially through the release of more spectrum, including the forthcoming auction of 2.3 and 3.4 GHz spectrum, and clearance of the 700MHz band. Improvements in spectral efficiency are also important, as is the deployment of larger numbers of small base stations.

- **Mobile quality of experience.** In contrast to fixed services, consumers' experience of mobile is affected by a wider range of factors, including network coverage and capacity, the level of demand, location, and handsets. As consumer expectations tend towards universal availability and always-on capabilities, this poses significant challenges to mobile network investment.

Public policy interventions are helping the hardest-to-reach areas

Fixed networks

7.23 There are several initiatives already underway to improve availability of fixed networks.

7.24 In 2011 the UK Government announced plans to invest £530m to deliver superfast broadband to rural communities; a further £230m was pledged in 2013 to assist in superfast services being made available to the hardest to reach rural areas. The target is to reach 95% of UK premises by 2017. For the 'final 5%' BDUK has a competitive fund to pilot solutions using different technologies.

7.25 The devolved administrations in Northern Ireland, Scotland and Wales are responsible for national projects that use funding both from BDUK and additional sources. BT has won all the contracts for BDUK programmes following a competitive tender process. The schemes in the devolved nations include:

- The two Digital Scotland Superfast Broadband schemes aim to achieve coverage of 82% to the Highlands and Islands by 2016, and 96% to the rest of Scotland by 2017;

[119] *Infrastructure Report 2014*, December 2014, p.75: http://stakeholders.ofcom.org.uk/binaries/research/infrastructure/2014/infrastructure-14.pdf
[120] Ofcom analysis of operator data, May 2015. This data has been collected from operators for our forthcoming Infrastructure Report Update, due to be published later this year.
[121] *Consultation on the future use of the 700MHz band*, May 2014, p.3: http://stakeholders.ofcom.org.uk/binaries/consultations/700MHz/summary/main.pdf

- The Northern Ireland Next Generation Broadband programme brought superfast broadband coverage to 85% of businesses in 2011. The Broadband Improvement Project should further extend availability to premises in rural areas by December 2015; and

- The Superfast Cymru scheme in Wales, which aims to reach 95% of premises with superfast broadband, is scheduled for completion in 2016.

7.26 There are other smaller initiatives focussed on the remaining gaps in rural areas such as Community Broadband Scotland, a Scottish Government funded programme to support rural communities by establishing community broadband networks. A £20m Rural Community Broadband Fund under Defra is targeted at rural communities in the 10% hardest-to-reach areas of England.

7.27 The UK Government's Super Connected Cities voucher scheme can provide funding of up to £3000 to fund the installation of superfast broadband to businesses. So far 25,000 small businesses have used the scheme and another £40m has been made available for the scheme in 2015/16.

The debate on policy interventions to extend ultrafast broadband is just beginning

7.28 Given the relatively early stage of commercial ultrafast deployments in the UK, some may argue that it is premature to consider public intervention at this stage.

7.29 However, as we set out above, there are clearly areas of the UK that are less likely to benefit from commercial roll-out of ultrafast broadband networks even in the longer term. In this situation, models of 'outside-in' intervention, aimed at deploying high quality networks in the least economically attractive areas early may be appropriate.

7.30 One example of this has been the Superfast Cornwall intervention, where 95% of premises have been reached through the joint public-private funded deployments of superfast broadband; 30% of connections have used FTTP technologies, delivering speeds of around 300Mbs[122].

There are a range of public policy options available to extend network availability

7.31 In some cases, Ofcom has required services to be extended beyond the point that commercial viability alone would do so in order to meet consumer and citizen interests. We have also worked with Government in their implementation of a number of public policy interventions helping to extend mobile and superfast broadband coverage. These are discussed later in this section.

7.32 Where public policy interventions are required to extend availability they can take several forms:

- **Obligations on specific providers**: policy can place obligations on particular communications providers to offer minimum levels of service availability. This can include universal service conditions in spectrum licences. In both cases, the policy would take into account any costs associated with the obligation, for

[122] SERIO, *Superfast Cornwall Final Evaluation Report,* June 2015: http://www.superfastcornwall.org/assets/file/Superfast%20Cornwall%20Evaluation%20-%20Evaluation%20Report%20with%20Executive%20Summary.pdf

example through lower spectrum receipts or industry funds for the delivery of universal services.

- **Direct funding**: Government can decide to directly fund wider deployments of networks, for example through competitive tenders for contracts. This is the approach adopted for BDUK's superfast broadband programme and the mobile infrastructure programme (MIP).

- **Policy actions to reduce network deployment costs**: policy can seek to further extend commercial private sector deployments by reducing barriers and costs to network build. This can include, for example, relaxing planning restrictions relating to issues such as new mobile masts, mobile mast heights, or the use of newer civil works technologies like micro-trenching. It may also include facilitating greater network sharing. The Government's recent consultation on the Electronic Communications Code is one example of such activity.

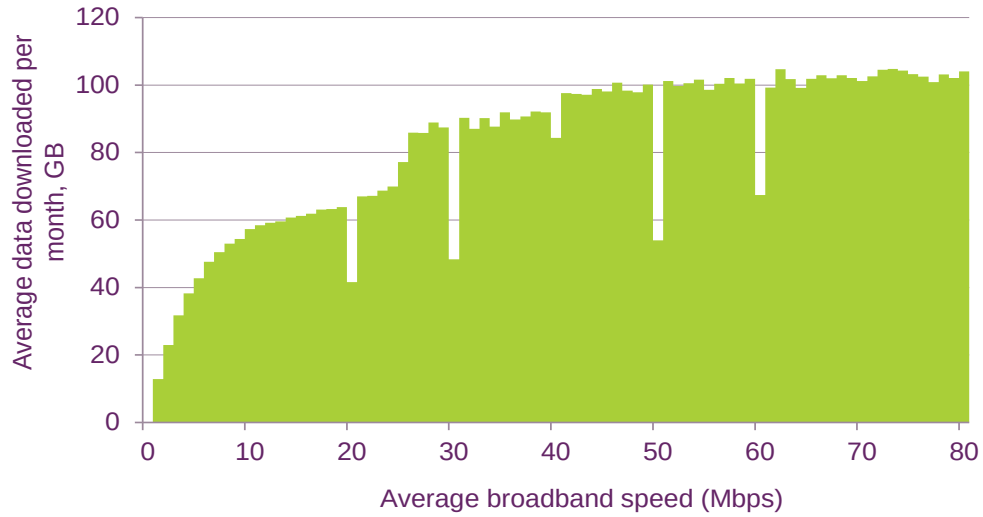
7.33 To date, we have seen a range of specific actions undertaken to extend availability, with options for further action.

The time has come to review public policy around the Universal Service Obligation for broadband

7.34 As we set out in our Infrastructure Report 2014, it may be time to review public policy around universal service. The current universal service commitment, set by the Government in 2009, specified that every household should have broadband access of at least 2Mbit/s. Consumer expectations of broadband continue to rise with the availability and take-up of faster broadband.

7.35 There is evidence that today broadband of at least 10Mbit/s is required to support typical consumers' use. As shown in Figure 18, there is a rapid increase in data use as speeds increase between 0 and 10Mbit/s. This suggests that use may be constrained for broadband below this threshold, because some applications will not work properly, if at all.

Figure 18: Average data downloaded per household per month by broadband speed

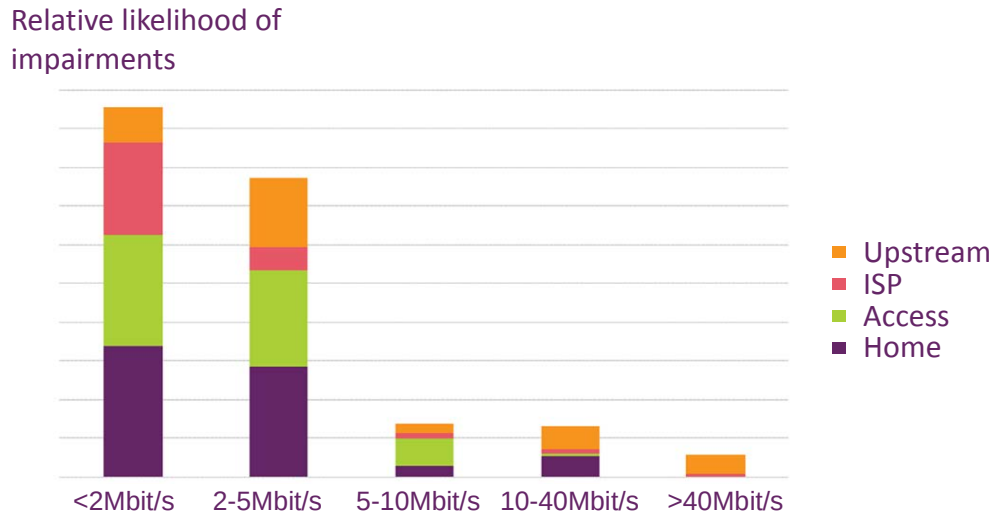


Source: Ofcom Infrastructure Report 2014

7.36 Recent work for Ofcom by Actual Experience also shows that access speed mainly affects the consumer experience when it falls below around 10 Mbit/s. For connections with a download speed greater than this, access speed appears to become less significant than other factors (see Figure 19 below).

7.37 In March 2015, the Government announced its intention to look to raise the Universal Service Obligation (USO) – the legal entitlement to a basic service – from dial up speeds to 5Mbit/s broadband. Ofcom is currently working in collaboration with central government to assist the discussions relating to a universal service obligation in broadband.

Figure 19: The effect of different parts of the broadband connection chain on the consumer experience, at different broadband connection speeds



Source: Actual Experience plc

There have been a number of interventions in mobile to extend availability

7.38 As we have seen, progress is required in mobile voice and data coverage to extend network availability across the UK, particularly in rural areas and the devolved nations. There are four broad categories of coverage issues we are particularly concerned about:

- Geographic coverage on all networks needs to be extended in order to reduce the number of not-spots and partial not-spots. In May 2015 89% of the UK's landmass could receive coverage from any one 2G operator, compared to 79% on 3G, and 46% on 4G[123].
- Indoor coverage to UK premises lags that for outdoors coverage of premises.
- Advances are also required in coverage of road networks, in particular A and B roads.

[123] Ofcom analysis of operator data, May 2015. This data has been collected from operators for our forthcoming Infrastructure Report Update, due to be published later this year.

- Railways are another area where consumers frequently suffer poor mobile coverage. This is primarily linked to large parts of the rail network located in rural areas and due to topographical features such as tunnels and cuttings.

A range of work is underway to address these concerns, but we welcome ideas of what more might be required

7.39 For coverage indoors, we expect 4G coverage will overtake 3G coverage and provide a substantial improvement in availability. We imposed a requirement in the spectrum licence bought by O2 to provide indoor 4G coverage to at least 98% of the population by the end of 2017, with at least 95% in Scotland, Wales and Northern Ireland. The other operators have indicated that they will match this coverage.

7.40 To improve geographic coverage through investment in mobile infrastructure, the UK Government reached a deal in December 2014 with the UK's four MNOs. The agreement is to offer guaranteed voice and text coverage from each of the MNOs across 90% of the UK's landmass by 2017. The pledge will see EE, O2, Three and Vodafone invest £5bn between them to tackle poor signal issues in areas that have coverage from some, but not all MNOs.

7.41 The Mobile Infrastructure Project (MIP) from the Department of Culture, Media & Sports is also spending £150 million to deliver mobile voice services for up to 60,000 unserved premises and on some of the UK's busiest A-roads.

7.42 Attention has also moved to improve coverage on trains. A joint plan between the Department for Transport (DfT) and Network Rail aims to improve coverage to 70% of the travelling public. The DfT has also committed an investment of £53m to improve Wi-Fi access on trains. The Government has recently opened a call for evidence in order to understand the full range of options for both getting coverage to remaining rail 'not-spots' and into train carriages[124].

7.43 Whilst these activities will all contribute to wider availability of mobile services, it is likely more will required given expectations from consumers continue to increase. This may be especially the case for mobile services on the move, with implications for geographic coverage of roads, rail and in geographic locations where there may be very low population density but significant numbers of people travelling through.

7.44 Further potential future action could include additional coverage obligations in our forthcoming spectrum awards, notably the release of 700MHz spectrum given its propagation characteristics. In addition, the Government intends to consult on further action on reforming and relaxing planning rules to help reduce the cost of achieving greater coverage such as by creating greater scope for higher mobile masts.

Questions for discussion

Overarching issue	Specific questions
What more can be done through public policy to deliver truly	*Q3: We are interested in stakeholders' views on the likely future challenges for fixed and mobile service availability. Can a 'good' level of availability for particular services be defined? What options*

[124] Department for Transport, *Improving mobile communications to UK rail passengers,* June 2015: https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/434379/Improving_mobile_communications_to_UK_rail_passengers.pdf

widespread availability?	*are there for policy makers to do more to extend availability to areas that may otherwise not be commercially viable or take longer to cover?*

Section 8

Convergence and changing market structures

Introduction

8.1 The purpose of this section is to consider how convergence and changing market structures could alter the competitive dynamics in communications markets and whether these changes have any implications for how we approach regulation. Our intention is to consider our strategic approach to these issues and we are not seeking to reach conclusions on the competitiveness of particular markets, or to propose specific remedies.

8.2 Specific policy issues, including the balance between end-to-end competition and access regulation, mobile competition and access to content are considered in Section 9. Vertical integration and related discrimination challenges, including models of functional and structural separation, are considered in Section 11.

8.3 The rest of this section is structured as follows:

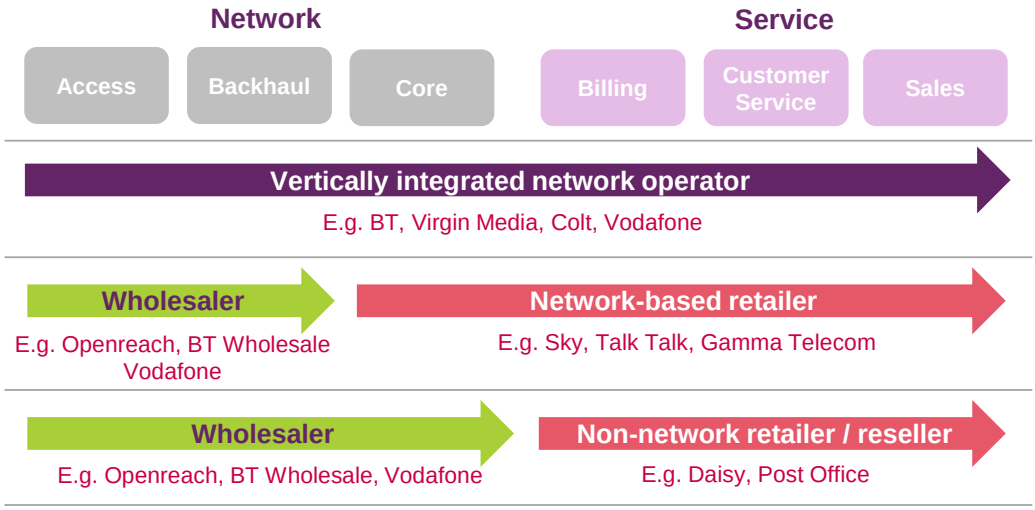
- Overview of current market structures
- Convergence
- Changing market structures

Overview of current market structures

Fixed telecommunications

8.4 The value chain for fixed telecoms is made up of a number of wholesale inputs (such as core networks, backhaul and local access networks) which are packaged together to provide a retail service to customers. The current structure of the market reflects the importance of significant network-related economies of scale and scope, combined with BT's existing ubiquitous network for both residential and business services.

Figure 20: Fixed telecoms value chain



Source: Ofcom

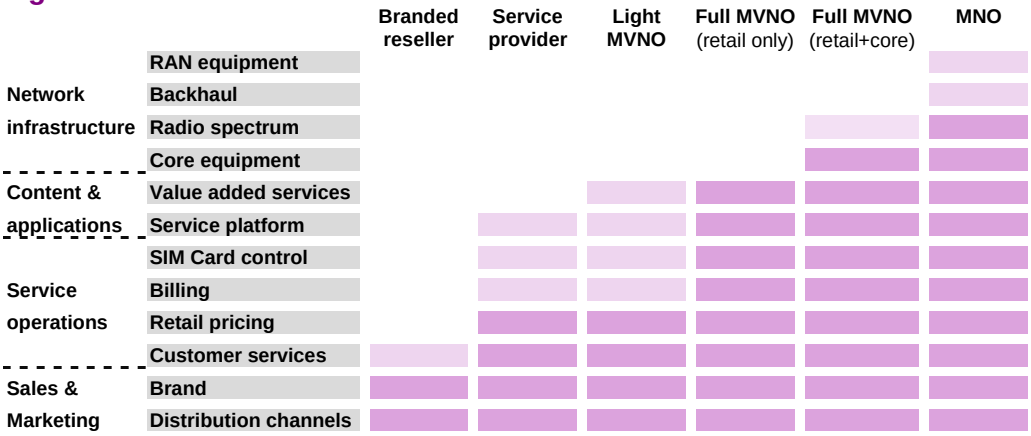
8.5 In the residential market, BT Openreach, Virgin Media and KCOM (in Hull) remain the only operators to own and operate significant fixed access infrastructure. Although there are number of smaller scale, often community based, alternative network operators (see Section 9 for more details). Almost all UK premises are connected to an ADSL-enabled BT exchange and approximately two thirds are connected using VDSL from a BT cabinet, while Virgin Media's cable network covers 44% of UK premises. Other operators, such as Sky and TalkTalk, have established a presence in the market and gained scale by unbundling local exchanges.

8.6 In business markets, providers including Virgin Media, Vodafone and Level 3 own and operate sizeable physical networks in the UK, although the coverage of each of their networks is significantly less extensive than that of BT. The main wholesale providers of leased lines include BT, Virgin, Vodafone, Level 3, Colt, Verizon and Zayo. Many resellers and retailers also use wholesale leased lines to provide services to business customers. As well as being essential components of many business services, leased lines are also used as backhaul for mobile and fixed residential services.

Mobile telecommunications

8.7 The market structure in mobile telecoms is mainly based on competition between vertically integrated operators who own end-to-end infrastructure. There are broadly two types of infrastructure-based operators: mobile network operators (MNOs) who own national radio access networks (RANs) and sub-national network operators (SNNOs) who own a RAN with limited geographic coverage.

Figure 21: Mobile telecoms value chain



Source: Ofcom

8.8 The number of MNOs with competing infrastructure has varied over time. In 1985 two operators were awarded the first licences for analogue services. By 1994, sufficient spectrum had been made available to support four operators of 2G digital networks. The 3G auction in 2000 was then used to encourage a fifth operator. In 2010 the merger of Orange and T-Mobile to create EE meant a return to four operators.

8.9 Access to spectrum has been used as a means of promoting competition between mobile operators. In particular, the auction of 3G spectrum was designed to facilitate the entry of a new network operator to the market, and the auction of 4G spectrum was designed to maintain four national wholesalers.

8.10 Although each MNO currently owns its own core network, in some instances MNOs share elements of their radio access networks. Today there are two national sharing agreements. EE and Three co-own a joint venture company (MBNL) operating a shared 3G (but not 4G) network. Vodafone and O2 also share networks in different geographic locations of the UK through a joint venture company (Cornerstone).

8.11 In addition, there are a large number of MNVOs that provide retail services to customers using commercially negotiated wholesale services provided by MNOs. There is a broad range of MVNO approaches that roughly fall into two categories:

- Light MVNO – MVNO uses own branding but most business systems are provided by the hosting MNO, so a lower level of investment is required.
- Full MVNO – MVNO uses its own branding and, in addition, manages most business systems. Some more advanced MVNOs may own core network and a limited amount of spectrum (or use licence exempt spectrum).

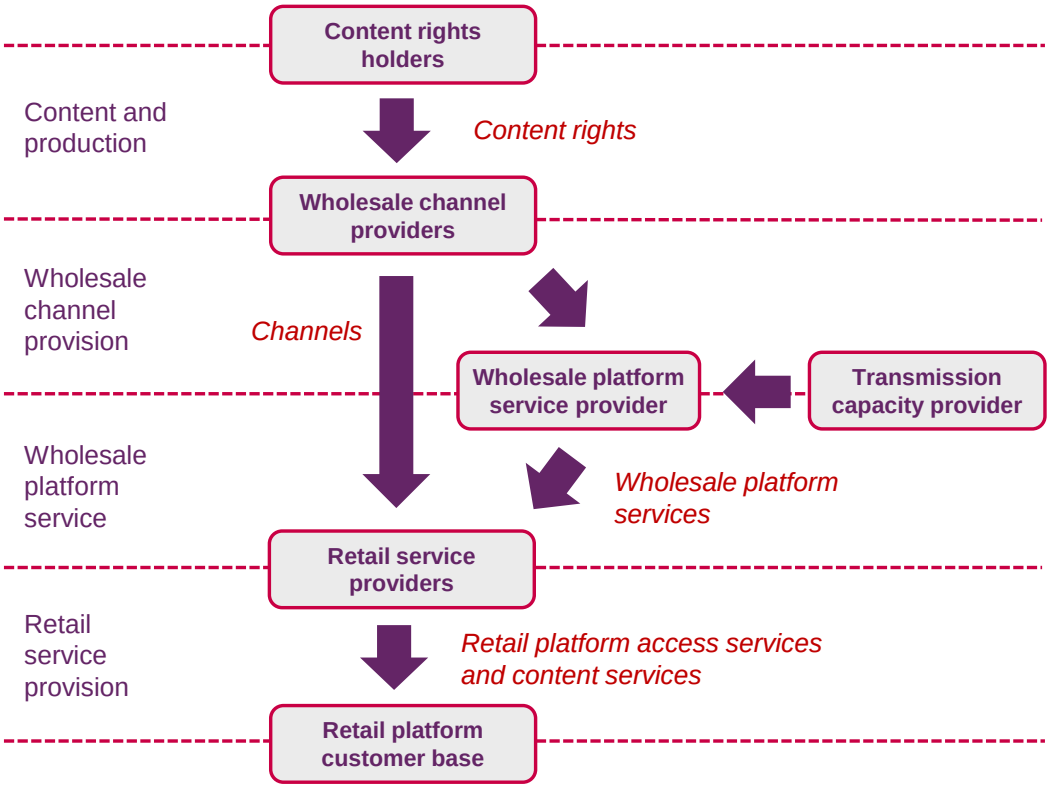
8.12 Initially most MNVOs tended to follow the 'light' model. Some entrants used existing brand recognition to enter the mobile retail market e.g. Tesco and Virgin, while others targeted niche market segments e.g. Lycamobile offers cheap international calls. More recently some fixed telecoms providers have entered or announced that they plan to enter the market by extending their retail offering to include mobile services i.e. offering 'quad' play bundles[125].

[125] TalkTalk launched an MVNO in 2010. In January 2015 Sky announced that it plans to launch an MNVO, see http://news.sky.com/story/1417269/sky-to-enter-mobile-market-in-o2-partnership

Content and pay TV

8.13 A common feature of the pay TV market is that most providers are integrated across multiple elements of the value chain, illustrated in Figure 22. Virgin Media and TalkTalk have platform and retail services, while Sky and BT are fully vertically integrated by also holding content rights and wholesaling channels.

Figure 22: Content and pay TV value chain



Source: Ofcom

8.14 However, the broader market structure for content is changing. New OTT providers have emerged, such as Netflix and Amazon, who sit across the value chain, producing content, aggregating it, and then retailing it directly to consumers. These providers often sell access to a range of content for a monthly subscription fee.

8.15 As the same time, there are also now many different ways for consumers to access content. These include internet-enabled devices, such as smart TVs, or hardware that allows users to stream online content from their devices onto their TV, such as Google's Chromecast and Apple TV.

Key developments and potential implications for competition

8.16 As discussed in Section 4, there is a range of technological and industry developments shaping the communications market. We have identified two key developments that we believe could have a potentially significant impact on market structures.

- Different forms of convergence, including convergence of communications services, networks and retail propositions.

- Increasing mobile market consolidation and new fixed network deployment in some geographic areas which both have the potential to bring about concentrated markets but where no single firm is dominant.

8.17 The following sections consider the nature of these developments and their likely impact on market structures, including any implications for our approach to regulation

Convergence

8.18 Convergence is a broad term used to describe developments that can take several forms, each with different implications for the development of competition in communication markets. Three specific types of convergence relevant to the discussion of market structures are listed below:

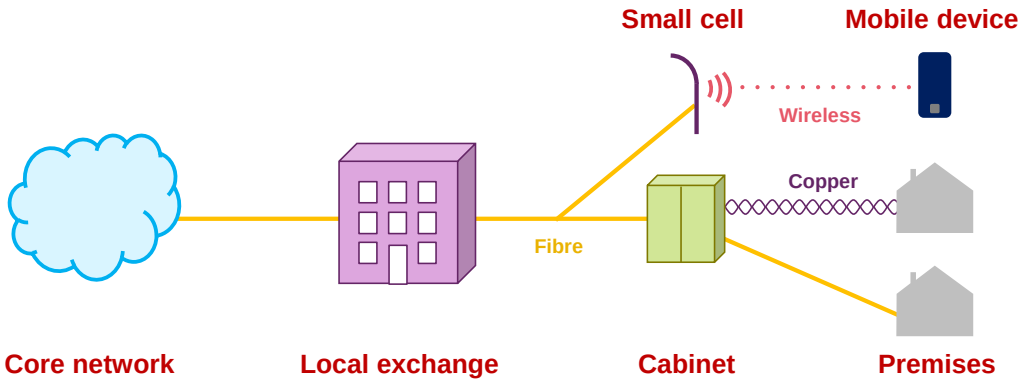
- **Network convergence**: where networks that used to be distinct are increasingly adopting common characteristics and may start to share parts of the network infrastructure.
- **Service convergence**: where services that may have been considered separate in the past are increasingly seen as interchangeable.
- **Retail convergence**: where different services are sold to consumers as part of the same retail bundle, and therefore complement each other.

Network convergence

8.19 Fixed and mobile networks have been historically operated using relatively separate infrastructure. However we are seeing changes in the structure of both networks which means that they are increasingly adopting common characteristics and even have the potential to use shared assets.

8.20 Whereas mobile networks previously self-supplied wireless backhaul for a significant proportion of their overall backhaul needs, they are increasingly using fixed fibre leased lines to meet growing capacity demands. The structure of mobile networks is also changing, in particular the use of more small cells closer to the consumer that require access to fibre deeper in the network (see Figure 23 below).

Figure 23: Convergence of fixed and mobile networks



Source: Ofcom

8.21 Fixed networks are also increasingly connected to wireless devices, for example through consumers installing wireless routers in their premises.

8.22 In addition, as the currently separate core networks used by fixed and mobile services move towards IP technology, there is scope to combine large parts of these networks. This could lead to operators using a combined IP core network with separate servers for mobile and fixed services.

8.23 However, network convergence is likely to have its limits. These could include:

- Geography: The deployment of small cells (and requirement for fibre backhaul) is being driven by the demand for mobile data from multiple users in dense urban areas. Therefore convergence could be limited geographically, with increasing use of fixed assets being confined to urban areas.

- Cost: The costs associated with the elements of the network most likely to be converged (e.g. backhaul) make up a small proportion of the overall cost of operating mobile networks. It appears likely that the majority of costs, approximately two-thirds, remain associated with the radio access network although this may change over time.[126]

Implications

8.24 If these trends continue, fixed networks, in particular backhaul, are likely to play a more important role than previously in the delivery of mobile services to consumers. Therefore developments in fixed regulation, including the scope of sustainable end-to-end competition and our approach to access regulation, could become increasingly important for ensuring effective competition in mobile. Our strategic approach to fixed regulation is discussed in more detail in Section 9.

8.25 Looking further ahead, fixed and mobile networks might start to look very similar, both using fibre out to the edge of the network, and wireless to connect to consumer devices. In the event that this happens, one potential implication could be that the economic bottleneck may shift from the access to the backhaul segment of the network as the final drop may be deliverable by either fixed or wireless technologies. This could lead to new models of competition between different forms of wireless access.

Service convergence

8.26 Service convergence occurs where services that may have been considered separate in the past are increasingly seen as interchangeable. Whether or not services are in fact interchangeable will depend on a number of factors, including characteristics, price and the way in which consumers use a service.

8.27 We distinguish between services, for example voice, and access. By voice services we mean the services consumers purchase allowing them to call other consumers. In the case of fixed networks, access involves a copper or fibre line from the exchange to a consumer's premises. For mobile networks, access involves wireless transmission between a radio mast and consumer mobile device. In order to use services consumers need some form of access.

8.28 For voice services, a perennial question is the extent to which different forms of voice telephony, such as mobile and internet-based services, are substitutes for traditional

[126] Estimate based on 2015 mobile call termination cost model, see http://stakeholders.ofcom.org.uk/consultations/mobile-call-termination-14/

voice services delivered over fixed networks. Fixed voice call volumes have declined in recent years as consumers make more use of mobile services and we consider that the trend towards substitution will continue. Total outgoing fixed voice call volumes fell from 141 billion minutes in 2008 to 92 billion minutes in 2013[127]. This trend, combined with competition from internet based services, may mean that there will be increasing levels of substitution between different types of voice service in the future.

8.29 While historically we have not considered fixed and mobile as sufficiently close substitutes for access to voice services due to the different characteristics of these services. We are currently reviewing this position in our review of the fixed voice origination and termination markets.

8.30 In relation to data, convergence may be more relevant for some services than others. For example, OTT messaging (such as WhatsApp) may be a substitute for SMS in some circumstances. However, for services where bandwidth is more important (such as OTT TV services) mobile data may not be a good substitute for superfast broadband. Depending on future consumer requirements for broadband speed and data capacity, the ability for mobile to be a substitute or a complement may vary for different uses, groups of users or types of use. The implications of the increasing availability and use of OTT are discussed further in Section 14.

Implications

8.31 Overall this type of convergence is likely to be beneficial for consumers, presenting a greater choice of services. The emergence of alternative services can also increase levels of competition and has the potential to reduce the need for regulation.

8.32 Given the use of mobile and internet-based voice services, these services may be becoming substitutes for traditional fixed voice. We will be considering the case for potential deregulation in this area as part of our fixed call origination and termination market review. We assess the broader scope for deregulation in Section 14. Regarding the potential substitutability between fixed and mobile data services, this may vary for different uses, groups of users or types of use, but appears to remain less likely for some services, such as OTT TV services, than for others such as OTT messaging services. The implications of the increasing availability and use of OTT are discussed further in Section 14.

8.33 In the event that mobile remains a complement for fixed access it is likely that BT's fixed access network will continue to be an economic bottleneck and require some form of access regulation, the form of which is discussed further in Section 9.

Retail convergence

8.34 Increasingly, different communications services previously sold separately to consumers are being sold together as part of a retail bundle. In Q1 2015, 63% of households claimed to have bought at least two of their communications services together in a bundle[128]. As operators have diversified, bundling has allowed them to effectively target and retain different consumer segments.

[127] *Communications Market Report*, August 2014, p.326: http://stakeholders.ofcom.org.uk/binaries/research/cmr/cmr14/2014_UK_CMR.pdf

[128] See Figure 3 in Section 4.

8.35 This trend has shifted the overall focus of retail competition towards bundled services, starting with voice and broadband services ('dual-play'), but increasingly including content ('triple-play') and mobile ('quad-play'). Within the bundle, consumer research indicates that for some consumers content is viewed as an important driver of consumer purchasing decisions[129]. This is increasing pressure on operators to provide attractive content to compete effectively for triple and quad-play customers.

Implications

8.36 Retail convergence can deliver benefits for consumers, for example where the retailing efficiencies associated with bundling can allow operators to deliver lower prices. However, it also has the potential to be less beneficial for consumers, if it results in reduced levels of retail competition. This is because insufficient wholesale competition in any of the core elements of the bundle may place suppliers at a disadvantage, leading to reduced competition across all services.

8.37 The implication of this is that supply-side inputs (both telecoms and content) need to be effectively replicable in order to ensure competition is effective in retail markets. This raises the question of how best to promote competition not just in fixed and mobile communications services, but also in content. Our strategic approach to ensuring effective competition in fixed, mobile and content services is discussed in Section 9.

8.38 We also recognise that retail bundling could have demand-side implications. These include increasing complexity for consumers when assessing the options available to them and potentially making the process of switching provider more difficult. The effects of product bundling on consumers' ability to assess the choices and make informed decisions is considered further in Section 12.

Changing market structures

8.39 This subsection considers two different market developments, mobile consolidation and new fixed network deployment, that may have similar implications for market structures.

Mobile consolidation

8.40 We have seen different forms of consolidation within the UK fixed and mobile markets at various points over the last ten years. More recently, there has been a fresh wave of mergers and acquisitions among European fixed and mobile operators, driven by the increasing convergence of services and continuing importance of scale.

8.41 We have seen two broad types of consolidation, some which have occurred within national markets and others across different international markets.

- **Fixed and mobile consolidation**: Examples include Vodafone's purchase of cable operator Ono in Spain, and Liberty Global's acquisition of Base, the Belgian mobile operator.

[129] *Ofcom Pay TV Omnibus Study 2013*, Table 23: http://stakeholders.ofcom.org.uk/binaries/research/tv-research/tv-data/pay-tv-research/Pay-TV-omnibus-2013-data-tables.pdf

- **Horizontal mobile consolidation**: Examples include Three's purchase of O2 Ireland and O2's acquisition of E-Plus in Germany, both of which have reduced the number of mobile wholesale network operators in these markets from four to three.

8.42 In the UK, the shift towards bundled competition at the retail level has led to communications providers moving aggressively into each other's core markets. Such examples include BT's acquisition of content rights, Vodafone's entry into fixed broadband and Sky's announced plans to launch an MNVO.

8.43 It is in this context that two major mergers have recently been announced.

- Three/O2: Three proposes to acquire O2, which if approved would combine the second and fourth largest MNOs by retail market share (28% and 13% respectively)[130]. The detailed proposals have yet to be notified by the parties.

- BT/EE: BT proposes to acquire EE, which if approved would combine the largest fixed network operator with the largest MNO by retail market share (31%)[131]. The merger is being considered by the CMA (Competition and Markets Authority).

8.44 If approved by the relevant regulatory authorities, each merger may result in significant changes to existing market structures. The BT/EE merger would establish a converged operator with significant fixed and mobile network infrastructure. The Three/O2 merger would lead to a more concentrated mobile market, with a shift from four to three competing national wholesalers. In addition, given Three's strategy after entering the mobile market, it may also lead to the loss of a company that historically has been disruptive. Our broader approach to ensuring effective competition in mobile markets is discussed in more detail in Section 9.

New fixed network deployment

8.45 Another relevant development is further infrastructure deployment by new and existing fixed network operators. Increased network investment by Virgin Media and other fixed operators may lead to the emergence of stronger infrastructure competition in certain parts of the country. The prospect for further competition based on new network deployments is considered in more detail in Section 9.

8.46 This would be a positive development and potentially lead to BT competing with one or more significant vertically integrated rivals in downstream markets in these areas. Therefore new fixed network deployment could also lead to a market structure with a small number of significant network operators, at least in some areas of the country. In these areas less concentrated markets may emerge, where neither BT nor any other operator has sufficient market power to be individually dominant.

Implications for market structures

8.47 Mobile consolidation could lead to a more concentrated market structure with fewer mobile network operators. Currently no operator holds a position of single firm dominance and this may continue in the future.

[130] Enders Analysis, Q1 2015. Data reflects company reported information where possible however estimates are used where data is incomplete or inconsistent.
[131] Ibid.

8.48 To the extent that new fixed network build leads to an increase in competing infrastructures, this would lead to a less concentrated market structure in certain geographic areas, and it may be that no supplier holds a position of single firm dominance.

8.49 Although concentrated so-called 'oligopoly' markets can result in effective competition and good outcomes for consumers, there is also the potential for competition concerns to arise, even in the absence of single firm dominance.

8.50 Competition may not be effective if firms successfully coordinate their conduct, for example through either explicit or tacit collusion. Alternatively, competition may be weak if several firms have a material degree of unilateral market power due to weak competitive constraints in the market, and there are significant barriers to entry.[132] More generally, there may be features of the market, including the ability of consumers to participate effectively (see Section 12), that may undermine effective competition, even in the absence of market power.

8.51 There may be a case for intervention to secure effective competition in such circumstances provided that an effective and proportionate remedy can be found.

Addressing competition concerns in concentrated markets with no single firm dominance

8.52 There are a number of ways in which we may currently address competition concerns that arise, including:

- our powers to enforce the prohibitions of anti-competitive agreements and the abuse of dominance under the Competition Act 1998;
- our ability to make market investigation references to the CMA under the Enterprise Act 2002;
- the imposition of ex ante regulatory obligations under the European Framework where we do not consider that competition law remedies are sufficient to address the problem.

8.53 Much of our competition related regulatory intervention under the European Framework is based on a finding of single firm dominance (SMP) and the imposition of remedies to address the competition problems that may arise from this. Both competition law and the European Framework also recognise that there may be situations of joint dominance held by two or more suppliers if certain conditions are met, typically including a finding of tacit collusion.[133]

8.54 However, we are not aware of any findings of joint dominance where competition problems have emerged as a result of unilateral market power held by a number of firms that are not tacitly colluding.

[132] The term unilateral market power in this context refers to the fact that firms are able to exercise market power by acting independently in a market rather than through coordinated conduct as is the case with tacit collusion.

[133] For example, the Airtours case equated joint dominance with a situation of tacit collusion and set out a number of criteria which must be met to establish tacit collusion (or the risk thereof): http://ec.europa.eu/dgs/legal_service/arrets/03t212_en.pdf

8.55 BEREC is currently considering the potential for competition concerns to arise in concentrated markets as a result of either tacit collusion or unilateral market power, and has recently published a draft report.[134] This report recognises that although national regulators have significant experience in the regulation of markets characterised by individual SMP, there are only a few clear precedents that deal with concentrated markets in which no firm has individual SMP in an ex ante context.

8.56 The report goes on to consider whether there is a need explicitly to extend the regulatory framework to address competition concerns arising in concentrated markets which are not already covered under the existing concept of joint dominance (for example because of a lack of tacit collusion).

8.57 We are interested in stakeholders' views as to whether the current regulatory and competition frameworks are capable of effectively addressing any competition concerns which may arise in concentrated markets in which no single firm is dominant, including whether there is a case for any new regulatory competition tools to be made available for application in such circumstances.

Questions for discussion

Overarching issue	Specific questions
Does convergence and consolidation in our sectors suggest new approaches or tools are required to deliver effective competition?	*Q4: Do different types of convergence and their effect on overall market structures suggest the need for changes in overarching regulatory strategy or specific policies? Are there new competition or wider policy challenges that will emerge as a result? What evidence is available today on such challenges?*
	Q5: Do you think that current regulatory and competition tools are suitable to address competition concerns in concentrated markets with no single firm dominance? If not, what changes do you think should be considered in this regard and why?

[134] BEREC report on oligopoly analysis and regulation (2015): http://berec.europa.eu/eng/document_register/subject_matter/berec/reports/5042-draft-berec-report-on-oligopoly-analysis-and-regulation BERCE refer to a market where competition problems arise due to unilateral market power as a 'tight oligopoly'.

Section 9

Strategies for sustainable competition

9.1 This section considers Ofcom's approach to ensuring sustainable competition and efficient incentives to invest in communications services, and how this might need to change in the future. This is important as competitive markets and continued efficient investment, are key to securing good outcomes for consumers.

9.2 This section raises four strategic issues for regulation:

- End-to-end competition in fixed? In future, are there fresh opportunities for full end-to-end competition in fixed networks? Should Ofcom do more to promote this form of competition? For example, by taking a more proactive approach to deregulation?
- Passive or active access focus? Where full end-to-end competition is not sustainable, is there a case for placing an even greater focus on passive access remedies (such as duct or dark fibre) in the longer term to promote infrastructure competition from third parties?
- End-to-end competition in mobile? What is the role and importance of sustainable full end-to-end competition in mobile networks in light of industry trends towards consolidation?
- Content: Given the increased focus on retail bundling including essential content services what are the implications for today's regulatory frameworks and approaches?

9.3 In the sub-sections below we first consider the various models of competition and our approach to assessing their costs and benefits. Then we set out key considerations in defining a strategic approach for the various key components of digital communications services: fixed telecoms, mobile telecoms and content.

Ofcom's strategy and different models of competition

9.4 Various types of competition are possible between communications providers in digital services, ranging from end-to-end competition, access based competition and resale competition. We have seen all three types of competition employed.

9.5 **Full end-to-end competition**: companies can build (or buy) and operate their own end-to-end network. This can take two forms:

- Vertically integrated providers (e.g. BT, Virgin, EE, Vodafone, O2 and Three) that compete using end-to-end networks across all stages of the value chain.
- Alternatively, providers may use some combination of their own infrastructure and another providers' infrastructure purchased on a commercial basis, for example mobile virtual network operators who combine their own core network and radio mobile operators' radio access network.

9.6 **Access based competition**: Where we find significant market power we can require the dominant firm to provide access through the use of regulated remedies. This can support two models of competition:

- *Infrastructure competition based on passive access* – in this case, competitors rely on the access to physical network infrastructure, with no active electronic equipment. Providers need to invest in some network elements which results in some degree of infrastructure competition: the extent of this varies with the remedy. In some cases, for example duct access, this can result in infrastructure competition over all elements but the civil infrastructure.

- *Competition based on active wholesale products* – active remedies combine active electronic equipment and physical infrastructure which is wholesaled to third parties.

9.7 **Resale competition:** Finally, providers can compete as service providers: offering marketing, billing, pricing and some service design, but using another operator to provide the underlying network infrastructure.

Figure 24: Different types of competition

Full end-to-end competition	Providers deploy own network across the whole value chain or use a combination of own network and third party wholesale services from other CPs on a commercial basis.
Infrastructure competition using passive inputs	CP deploys own network sharing some passive infrastructure. For example, in fixed telecoms a CP using local loop unbundling (LLU) installs its own equipment in the local exchange and LLU enables a CP to take control of Openreach's physical telephone lines so that can provide fixed voice and broadband services direct to customers. In mobile telecoms an example would be mobile mast sharing, whereby a CP is allowed to install equipment on another CP's mast.
Competition using active inputs	CP purchases wholesale inputs from a CP with an access network in order to provide services to its subscribers. In fixed telecoms examples include virtual unbundled local access (VULA) and leased lines.
Competition as a reseller	CP does not deploy own network but purchases an end-to-end wholesale product from another CP which it resells to consumers with its own marketing, billing etc. The Post Office provides telephony services using this model in fixed and mobile telecoms.

9.8 In the mobile sector there is end-to-end competition between four vertically integrated MNOs. We have not imposed access obligations on mobile network operators, and the MNOs supply wholesale access to MVNOs on a commercial basis. In contrast we have found enduring economic bottlenecks in fixed telecoms and have imposed a variety of active and passive remedies that provide competitors with regulated access to bottleneck parts of BT's network.

9.9 A key decision for Ofcom is the balance between end-to-end competition and competition based on regulated access to bottlenecks. This may vary geographically. For example, end-to-end competition may be viable for some services/in some parts of the country but not others. This is the case for some leased line services, where in

the 2013 BCMR we found effective end-to-end competition in parts of London but not in the rest of the UK.[135]

Assessment framework

9.10 In order to consider the strategic choices available for competition policy, it is important to understand the factors we consider in reaching decisions. This 'assessment framework' is set out here.

9.11 Our broad policy goals are achieving efficient investment and effective competition. We also want to enable innovation which can lead to lower costs and prices (e.g. through technical advances) and greater consumer choice (e.g. through product differentiation).

9.12 In economic terms, we commonly assess the costs and benefits of different competitive models across three types of efficiency (the first two types of efficiency are often grouped together as 'static efficiency'):

- Productive efficiency – ensuring there is no inefficiency or waste in production. Goods are produced as cheaply as possible, with production costs minimised;
- Allocative efficiency – ensuring the right combinations of goods and services are produced given consumers' tastes and preferences. Prices are aligned to marginal or incremental costs; and
- Dynamic efficiency – improvements over time resulting from investment and innovation. For example, the development of new goods and services, or technological advances that reduce production costs for current and future goods and services.[136]

Static Efficiency

9.13 Competition tends to put downward pressure on the retail price that providers charge consumers. Competition results in prices that are more closely aligned to costs (allocative efficiency), and there are strong incentives to reduce costs to achieve a competitive advantage relative to rivals (productive efficiency). End-to-end competition exposes the whole value chain to competition: this may sharpen incentives to improve static efficiency versus situations where some or all of the value chain is monopolised.

9.14 However, telecoms networks (and in some cases content provision – given the need to purchase rights) can be characterised by high fixed and sunk costs (i.e. costs that do not vary with output levels). This means that average costs are lower when output is higher - a feature commonly referred to as economies of scale. In these circumstances, increasing competition will not necessarily lead to overall efficiency

[135] *Business Connectivity Market Review* statement, March 2013: http://stakeholders.ofcom.org.uk/consultations/business-connectivity-mr/final-statement/

[136] Dynamic efficiency can be related back to productive and allocative efficiency, e.g. investment in a process innovation that reduces costs enhances productive efficiency and investment in an innovative new service valued by consumer enhances allocative efficiency. But it is often helpful to identify it as a third type of efficiency, emphasising the incentives to invest and innovate and the development of competition, even if there is potential for overlap with the other two types of efficiency.

gains if it results in duplicated fixed costs being spread across lower volumes per provider and hence higher average costs.

9.15 This loss in productive efficiency may be sufficient to offset the other efficiency gains from competition, depending on the significance of the lost economies of scale compared with the benefits of competition.

9.16 This trade-off means it is unclear which model of competition will deliver best in terms of static efficiency. On the one hand, full end-to-end competition exposes the whole value chain to competitive forces with strong incentives for firms to become efficient and reduce costs. On the other hand, duplication of assets tends to put upward pressure on average costs, which access based models of competition avoid to varying degrees.

Dynamic efficiency

9.17 In competitive markets firms have an incentive to improve their competitive position relative to rivals, for example by developing new products and services or cost-reducing efficiencies. This creates a spur to dynamic efficiency.

9.18 Different competitive models may result in more or less innovation. Broadly speaking, the greater a providers' ability to generate added value, either through product differentiation or increasing cost efficiency, the greater the scope and incentives for investment and innovation. Control over a greater part of the value chain tends to increase this ability.

9.19 Competition based on passive remedies (where the access seeker controls the active electronic elements) generally provides greater scope for product differentiation and innovation compared to competition based on active remedies. Furthermore, the dynamic efficiency benefits from competition based on passive remedies may be similar to those realised from full end-to-end competition. This is because there may be small additional dynamic efficiency benefits associated with some passive elements such as civil infrastructure (e.g. ducts and poles).

9.20 Active remedies can also provide scope for product differentiation depending on the circumstances. For example, we considered that VULA could allow significant product differentiation and innovation, potentially similar to the opportunities available using physical access products. This is because VULA allows the communication providers control over backhaul and core networks' dimensioning and operation.[137] This can improve the ability to offer new and innovative services e.g. new video services.

9.21 There is a risk that wholesale regulation may undermine dynamic efficiency incentives for the access provider. For example, cost-based access regulation which does not suitably reward network upgrade investment will reduce the incentive for investment. More generally, a requirement to provide access on a non-discriminatory basis may limit the ability of the access provider to fully capture the value of its network investment. These issues are returned to in Section 10.

9.22 Finally, a more subtle possibility is that non-discriminatory access regulation combined with equivalence of inputs may reduce downstream providers' incentives to seek upstream network upgrades by the access provider. This is because any

[137] For example, the CP can decide the amount of capacity to make available to its customers.

benefits from network improvements must be made available on an equivalent basis to all. As a result, none may enjoy a competitive advantage in the downstream market.

Other factors

9.23 In addition to economic efficiency, a number of other factors may be relevant when considering the appropriate model of competition. For example:

- *Degree of wholesale market disruption* – moving between different models of competition is likely to cause market disruption for wholesale providers. For example, it could result in stranded assets where providers have made investments based on a model of competition that is no longer supported.

- *Degree of disruption for consumers* - moving between different models could have distributional effects on different consumers. Changes might result in price rebalancing and changes in the way common costs are recovered across different customer groups. This could create winners and losers among different customers depending on services typically purchased.

- *Risk of regulatory failure* – facilitating some types of competition may inherently involve a greater degree of risk that the desired outcome is not achieved. There may also be a risk that regulation gives rise to unintended consequences.

9.24 In deciding which types of competition regulation should facilitate, the trade-off between static and dynamic efficiency is a key consideration. Assessing this trade-off is not straightforward. It involves a degree of judgement, based on the evidence about the likely future benefits from dynamic efficiency, which may be substantial given the importance of innovation but hard to quantify. In principle, we generally favour incentivising providers to invest in their own network where this is efficient i.e. where the benefits of potential competition and innovation exceed the costs from duplicated assets.

Overview of possible strategic approaches in fixed access

9.25 We face two key questions in defining a longer term strategy to promote competition in fixed access services:

- Should we focus more on promoting sustainable full end-to-end competition, given its effect on incentives for dynamic efficiency, investment and quality of service?

- Where this may not be possible or desirable, should access based regulation focus on passive remedies to deliver greater infrastructure competition, active remedies or a mix of the two?

Today's situation

9.26 We have found that there are enduring economic bottlenecks in fixed telecoms i.e. parts of the network where effective and sustainable competition is unlikely in the short to medium term. In light of this, we have imposed a variety of active and passive remedies that allow competitors regulated wholesale access to bottleneck parts of BT's network. We have decided which access remedies to impose by weighing up the costs and benefits on a case by case basis.

9.27 Sub-national full end-to-end competition combined with successful access regulation has facilitated competition at the retail level. This allowed us to largely deregulate fixed telecom retail markets nationally.[138] We have also been able to implement some targeted wholesale deregulation on a geographic basis (e.g. wholesale broadband access and some leased lines).

9.28 We have followed a 'lighter touch' approach to regulation of new products in order to provide incentives for efficient investment. Essentially this involves encouraging market led investment by providing a degree of pricing flexibility. In the specific case of the superfast broadband services supplied by BT, this has resulted in an obligation to supply all providers on an equivalent basis, but with a degree of pricing freedom on superfast broadband active products.

Should we focus more on promoting full end-to-end competition in fixed?

9.29 A key issue for our strategy is whether the economic bottlenecks we have previously identified are likely to remain in future. The market has moved on since 2005, with a range of recent announcements suggesting the potential scope for more end-to-end competition. In addition, we have seen the emergence of some additional end-to-end competition in other countries, at times supported by regulatory interventions. There are possible developments that could suggest the potential for fuller end-to-end competition.

Internationally, some countries have focussed on an end-to-end strategy in fixed

9.30 Some countries have sought to promote end-to-end competition by encouraging providers to build their own infrastructure. The key example is the approach to broadband networks adopted in the US and Canada. These countries have adopted an approach of 'regulatory forbearance' whereby there are no regulated access products, and competition between telecoms companies and cable companies[139].

9.31 Whilst we may not advocate full US-style deregulation and reliance on two vertically integrated providers, it may be appropriate to be more selective about where and how we apply access-based competition as seen in some other EU countries in order to promote infrastructure based competition using passive access.

There may be more potential now than in 2005 for fixed network deployment in parts of the UK to support end-to-end competition

9.32 There have been some developments since 2005 that have encouraged fixed infrastructure investment:

- *Changes in demand*: demand for bandwidth has increased for both residential and business users. Initially there was a growth in the uptake of standard

[138] Only traditional interface leased line services with a bandwidth of less than 2 Mbit/s remain regulated. We have proposed to remove regulation from this legacy product in the 2015 BCMR consultation: http://stakeholders.ofcom.org.uk/consultations/bcmr-2015/

[139] WIK-Consult, *Competition & investment: An analysis of the drivers of superfast broadband*, July 2015, p.33-36: http://stakeholders.ofcom.org.uk/binaries/consultations/dcr_discussion/annexes/Competition_and_investment_fixed.pdf

broadband and more recently the increase in the demand for higher bandwidth services has led to a relatively rapid uptake of superfast broadband.[140]

- *Reduction in cost*: There have been general improvements in network build, for example, the introduction of micro trenching which has reduced somewhat the cost of deploying fixed access infrastructure. [141] In addition, the move to internet protocol networks has allowed greater economies of scope for some network equipment.

9.33 These developments have helped increase the amount of, and interest in, fixed infrastructure investment beyond that anticipated in 2005.

9.34 BT has been making network investments to provide faster broadband services primarily using FTTC. It embarked on an upgrade of its network in 2010 and in Q1 2014 reached its roll-out target of two-thirds of UK homes and businesses (a total of 19 million premises).[142]

9.35 BT's initial rollouts were commercially funded but, in addition to this, public funding was made available via the Broadband UK (BDUK) scheme. BT won each of the BDUK scheme contracts and is currently focused on completing Phase 2 of the BDUK deployment. This will take coverage of its superfast broadband deployment to 95% of premises.

9.36 In addition, we have seen a number of recent network investments and planned investments by providers other than BT. These are summarised in Figure 25.

Figure 25: Summary of network deployment by alternative providers

Virgin Media	Virgin Media's cable network currently covers approximately 44% of UK premises and is capable of speeds over 100Mbit/s. It has recently announced plans to extend its footprint to a further 4 million premises, bringing total coverage to approximately 17 million. Network expansion will be prioritised according to demand from households and companies, with a focus on areas closest to Virgin Media's existing network.[143]
CityFibre	CityFibre is deploying FTTP networks in 'second tier' cities[144] such as Bournemouth, primarily focused on providing business services. In York, CityFibre has partnered with Sky and TalkTalk to rollout FTTP to residential premises.[145] It has recently completed an initial trial phase and the next phase of deployment has been approved. Sky and TalkTalk plan to launch services

[140] Superfast broadband connections have increased from 0.1 million in 2011 to 6.1 million in Q1 2014 with the premium for superfast broadband over standard broadband being between £5 and £10 per month. See *Communications Market Report 2014*, August 2014, p.310: http://stakeholders.ofcom.org.uk/binaries/research/cmr/cmr14/2014_UK_CMR.pdf

[141] Micro-trenching/slot-trenching dig very narrow trenches into which thin plastic ducting is placed. Fibre can then be blown along the duct. This reduces the costs of digging and repairing the carriageway.

[142] *Communications Market Report 2014*, p.308.

[143] Virgin Media press release, February 2015: http://about.virginmedia.com/press-release/9467/virgin-media-and-liberty-global-announce-largest-investment-in-uks-internet-infrastructure-for-more-than-a-decade

[144] It states it has presence in over 50 towns and cities, see http://www.cityfibre.com/network

[145] CityFibre press release, March 2015: http://www.cityfibre.com/news/2015/3/26/cityfibre-announces-completion-of-first-phase-fttp-roll-out-in-york-with-joint-venture-partners-sky-and-talktalk

	later in 2015.
Gigaclear	Gigaclear builds point to point FTTP networks for customers in rural communities. Gigaclear uses a range of approaches to reduce costs, including micro-trenching and a self-install option to save on costs associated with engineer callout. Gigaclear has recently obtained an extra £30m funding. [146]
B4RN	B4RN also focuses on providing networks to customers in rural communities. However, B4RN seeks more active involvement from the local community, offering the opportunity to invest in the company or to sponsor part of the deployment.
Hyperoptic	Hyperoptic focuses on serving Multi-Dwelling Units (MDUs) in a number of cities across the UK. It works with a range of developers and property owners, including targeting new build housing developments.
KCOM	In the Hull Area, KCOM operates the copper access network that covers 0.7% of UK premises and is currently building a FTTP network. It intends to cover around 100,000 premises by 2017.[147]

9.37 It is unlikely that such developments will give rise to an alternative operator with truly national geographic coverage. However, BT may face increasing competition, or the prospect of competition, from a number of alternative networks with sub-national coverage.

The prospects for end-to-end competition to develop further

9.38 The desire for higher value services, such as ultra-fast broadband and high bandwidth data services, may mean that providers may be able to earn higher revenues by deploying new infrastructure (i.e. FTTP). This could potentially make infrastructure build economic where it was not previously.[148] Some providers may be able to focus on particular market segments that are not currently well served, for example, residential or business users placing a greater value on higher quality access networks. However, particularly in relation to ultrafast broadband, it is currently unclear how much customers will be willing to pay for these services, meaning that such investment would be inherently risky.

9.39 On the supply side the cost of building physical infrastructure may continue to fall.[149] In addition, regulatory interventions could reduce costs and increase civil work co-ordination. For example, passive remedies can reduce network cost deployment. The EU Civil Infrastructure Directive will introduce a requirement for all utility networks to meet reasonable requests for infrastructure access for the deployment of high speed electronic communications networks. The Directive is expected to come into effect in the UK in summer 2016.

[146] Gigaclear press release, May 2015: http://www.gigaclear.com/prudential-and-woodford-investment/
[147] KCOM press release, March 2015: http://www.kcomplc.com/media-centre/news-2015/kcom-group-plc-kcoml-pre-close-statement/
[148] This will ultimately depend on the additional costs of deploying FTTP compared to the additional revenues that can be earned.
[149] For example, using techniques to deploy or make more efficient use of duct such as mole ploughing and slot cutting. See *Review of Civils Technology and Adoption*, Analysys Mason, August 2012, p.8-9: http://stakeholders.ofcom.org.uk/binaries/telecoms/policy/Analysys_Mason.pdf

9.40 One other possibility is that the entry of mobile operators into fixed services, and the rollout of denser mobile networks, might bring mobile operators more into competition with fixed access providers. Given the trend in mobile network architecture for a greater number of small cells (see Section 8) it is possible that mobile operators may choose to build fibre out to backhaul traffic from these cells rather than buy backhaul products from fixed operators. If this happens, it may then become cost effective for them to use that fibre network to offer services to specific customer groups as part of a fixed-mobile proposition.

Sub-national alternative networks could reinforce geographic differences across the UK

9.41 Given the trends outlined above, some areas could have three significant rival infrastructures competing for residential customers (e.g. BT, Virgin Media and CityFibre). If this results in competitive conditions that are appreciably different over a significant part of the country, it might suggest sub-national geographic markets are appropriate. We already consider geographic market definition as part of our market review process. We have defined sub-national geographic markets in respect of wholesale broadband access and some leased lines. In both cases this has led to deregulation in particular geographic areas.

9.42 Whilst positive for those consumers with access to more competition, differing competitive conditions could result in a greater variation in prices across the UK, and alter the economics of network deployment in areas of lower customer density. This could have implications for consumers, citizens and businesses that live in more rural areas.

9.43 As part of our future market reviews we will continue to consider whether sub-national geographic markets are appropriate for particular services. In order to define sub-national geographic markets we would potentially need to undertake a granular assessment of competitive conditions. Such an approach may increase the regulatory burden (requiring more resource from us and detailed information from CPs). In our experience defining sub-national markets increases the complexity of the market review assessment and the regulatory model. We would need to trade off the proportionality of such an exercise against the anticipated benefits (e.g. potential for deregulation).

In light of these trends, should promoting end-to-end competition play a greater role in our strategy?

9.44 We could consider adopting a strategic approach to promote end-to-end competition, for example by:

- Removing access regulation (either immediately or through a managed transition). Providers would have no alternative but to build their own network and/or negotiate commercially for network access if they want to compete in the market;

- Allowing an increase in the price of regulated access products to make building own network relatively more attractive, whilst noting the potential shorter term effect on consumer prices or downstream competitiveness; or

- Considering, together with the Government, actions aimed at reducing the cost of infrastructure investment, such as changes to planning regulations.

9.45 Sustainable and effective end-to-end competition can be expected to deliver consumer benefits in the form of greater choice and potentially stronger price competition. However, promoting end-to-end competition could be a relatively risky strategy and could harm consumers and competition if effective end-to-end competition does not materialise or is not sustainable. It is also possible that there would be fewer providers competing in the retail market unless commercial wholesale access agreements emerge, which could reduce choice for consumers. In addition, end-to-end competition would result in the duplication of fixed costs as discussed at 9.14.

9.46 We are interested in stakeholders' views on the prospects for greater end-to-end competition in future, the implications this might have for consumers, and whether this could form the basis for an alternative regulatory model at least in some geographic areas. This would be an important change of strategy with implications for regulation elsewhere in the value chain where end-to-end competition was either feasible or could emerge.

Q6: What do you think is the scope for sustainable end-to-end competition in the provision of fixed communications services? Do you think that the potential for competition to vary by geography will change? What might this imply in terms of available regulatory approaches to deliver effective and sustainable competition in future?

Should access based regulation focus on passive remedies, active remedies or a mix of the two?

9.47 Where full, effective end-to-end competition is not sustainable, or in the period until it emerges, it may be necessary to address market power through access based regulation.

9.48 Strategically, there are two key related questions:

- Which model of access based competition is most likely to deliver good consumer outcomes in the round – passive or active remedies? And;
- Is it appropriate or desirable to have remedies at multiple points in the value chain (i.e. passive and active remedies concurrently) or not?

9.49 In the 2005 TSR, we placed significant emphasis on LLU, a type of passive remedy. Given investments in superfast broadband, and following consultation with stakeholders, we have tended to place greater reliance on active remedies over the last few years. These require Openreach to provide fully functional services to communications providers on a wholesale basis. Whilst statically more efficient, this risks limiting the ability of providers to offer differentiated services and hence the level of innovation possible.

9.50 We are interested in views as to whether a strategic refocussing on a package of passive remedies - which offers access to elements of network infrastructure (e.g. access to duct, dark fibre, or wavelengths) - might result in more effective sustainable competition that encourages innovation and competition on the quality of service offered.

9.51 Given that we have a number of active remedies in place, if we were to refocus more on passive remedies there is an important question as to whether downstream active remedies should be removed and if so how such a transition is implemented.

9.52 Below we provide some example of how passive and active remedies have been used to date and then discuss the high level pros and cons of different approaches.

Use of passive and active remedies to date

9.53 LLU is the pre-eminent passive access remedy in UK fixed telecoms today. By the end of 2014, 95% of UK premises were connected to an unbundled exchange and 29% of UK fixed lines were provided using LLU[150], primarily by Sky and TalkTalk. It was implemented in combination with active remedies (wholesale broadband access) which has been progressively removed on a geographic basis as the take up of LLU has resulted in wholesale broadband access in some areas being effectively competitive.

9.54 The question of the balance between passive and active remedies was a key element of Ofcom's 2009 next generation access strategy statement and the subsequent 2010 fixed access market review. We asked stakeholders how far an active product (VULA) could deliver efficient and effective competition. At that time, given the economics of superfast network deployment and uncertainty on demand, we considered that the most effective way to promote competition in superfast broadband was through active remedies i.e. VULA.

9.55 At the same time we made available two passive infrastructure remedies: passive infrastructure access (PIA) covering ducts and poles primarily for residential services; and sub-loop unbundling. However, the take up of both products has been very limited to date.

9.56 In the case of business markets to date we have relied on active remedies (such as access to Ethernet services). However, recently we have explored the case for passive remedies in business markets and proposed the introduction of a dark fibre passive remedy in the current BCMR (other than in the Central London Area). [151]

Focus on passive remedies

9.57 In some other countries, regulatory intervention has focused on upstream passive access (such as ducts, in-building wiring and terminating segments) to deliver more infrastructure based competition. This has been combined with little or no mandated downstream active access to superfast broadband networks.

- In France the regulatory approach to superfast broadband is focused on duct access and symmetric access to the fibre 'terminating segment' (the portion of wiring from the customer site to the first distribution point).

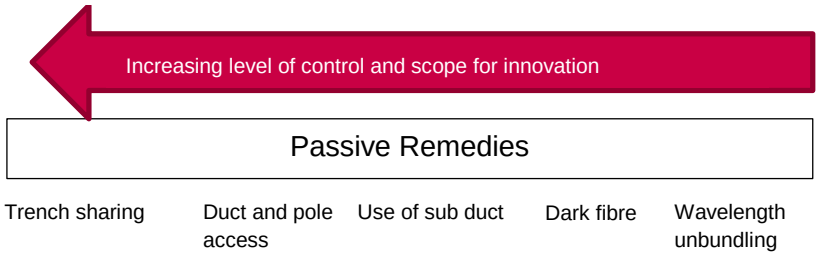
[150] Ofcom / BT
[151] *Business Connectivity Market Review* consultation, May 2015: http://stakeholders.ofcom.org.uk/consultations/bcmr-2015/

- In Spain passive access regulation has been focused on fostering competing FTTH networks through duct access remedies applied to Telefonica, and sharing of in-building wiring based on symmetric regulation.[152]

- Portugal has applied wholesale access obligations on ducts to enable third-party operators to roll out FTTH networks. In addition there are symmetric access obligations to vertical building infrastructure which applies to the first operators to roll out to the building.

9.58 There are a variety of possible passive remedies offering different control to the access seeker, as is illustrated in the diagram below.

Figure 26: Extent of network control for different passive remedies



Source: Ofcom

Pros and cons

9.59 The high level advantage of passive remedies is that they facilitate competition and innovation over more of the value chain compared to active remedies. Passive remedies encourage investment in own infrastructure to varying degrees. For example, a provider using a duct access remedy will be laying its own fibre. In the case of trench sharing a provider would additionally be laying its own ducts. In some cases, for example duct access, this can result in infrastructure competition over all elements but the civil infrastructure. These remedies may allow most of the innovation benefits associated with end-to-end competition with a lower cost of duplication. Passive remedies have promoted network investment in some European countries such as France, Spain and Portugal as explained above.

9.60 The high level disadvantages are it may lead to greater duplication of assets than active remedies and disincentivise investment in end-to-end networks. However, it is not always the case that passive remedies lead to greater duplication of assets compared to active remedies. For example, when assessing the case for introducing a dark fibre passive remedy in the current BCMR consultation our analysis found that use of passive remedies could use less equipment in aggregate compared to active remedies.[153] It may be possible to reduce the degree of duplication of assets through use of co-investment models in which two or more providers share infrastructure. Finally, it is possible that it may be uneconomic to use passive remedies given the greater level of investment required compared to active remedies, and in such circumstances solely relying on passive remedies might lead to a worse outcome for consumers.

[152] Where all CPs are required to provide network access
[153] *Business Connectivity Market Review* consultation, May 2015, p.492-499: http://stakeholders.ofcom.org.uk/binaries/consultations/bcmr-2015/annexes/BCMR_Annexes_Non_Confidential.pdf

Pursuing a revised strategy focussed on passives in the longer term

9.61 As noted above, in 2010 we put in place PIA, with a specific focus on enabling competitors to BT to deploy superfast broadband in areas where BT had not.[154] More recently in the context of the current BCMR we have investigated the case for introducing passive remedies in the current market review period and proposed a dark fibre remedy (other than in the Central London Area).

9.62 We are interested to hear from stakeholders on whether we should build on this work and develop a strategy for promoting competition over the longer term that increasingly relies on passive remedies.

9.63 There are a number of potential elements of such an approach. These might be considered and implemented through future market reviews or other processes.

- Improve the product design and processes to make using passive remedies easier/lower cost to use. For example, in Portugal a duct paths and location database is available;
- Increase the portfolio of passive remedies. This could involve making new products available. We could also consider adaptations to passive infrastructure access. Alternatively we could make existing passive remedies available over a wider range of services;
- Change the relative pricing of passive remedies to make them more attractive; [155] and/or
- Undertake a managed removal of active remedies with the aim of incentivising providers to transition to a model based on passive remedies.

Focus on active remedies

9.64 It is possible to make various active remedies available, ranging from those that allow some service differentiation (e.g. VULA) to those that are closer to resale products (e.g. IPstream).

Pros and Cons

9.65 The high level advantages of active remedies are that they may reduce the cost of network duplication relative to passive access or end-to-end competition, and can be used as a way for smaller players to enter a market and compete effectively with scale providers who can otherwise aggregate traffic across a wider range of customers and services.

9.66 The high level disadvantages are the limited scope for those purchasing access to innovate and that less of the value chain is exposed to competition, reducing the incentive on the access provider to innovate and reduce cost.

[154] We also considered that the existing passive remedy sub loop unbundling could be used to deploy superfast broadband.
[155] In making any pricing changes we would need to be mindful of providing BT with the ability to recover efficiently incurred costs.

9.67 It may be possible to design access regulation with wholesale charge controls that provide incentives for cost minimisation (i.e. because if the access provider outperforms the control it gets to keep the benefits of cost reductions, with the efficiency improvements taken into account in the next control). However, in this case there is a reliance on regulation rather than competition to drive efficiency.

Remedies at multiple points in the value chain: a mixed approach of passive and active remedies

9.68 To date we have adopted a mixed approach to access regulation (i.e. using both active and passive remedies). For example, following the 2005 TSR, we promoted the use of LLU (a passive remedy). We also continued the availability of an active product (wholesale broadband access) which was progressively deregulated.

9.69 A mixed approach gives providers the flexibility to build business models using a variety of wholesale remedies and allows for different levels of investment. For this reason it may result in a larger number of providers competing in the market and enable providers to target particular customer needs or niches.

9.70 The potential disadvantages of this approach is it may not actively encourage investment in alternative networks since third party providers may choose to rely more on the (potentially lower risk) active products. We observe that where passive remedies have been successful, the regulator has usually made them a primary focus of regulation. There is also a risk that intervention at multiple levels in the value chain creates a risk of inconsistency (e.g. in pricing of different access products) or increases the complexity of regulation.

9.71 In principle, this potential disadvantage could be mitigated by setting access prices that provide 'build/buy' signals consistent with efficient investment i.e. investment is incentivised when the benefits (in terms of potential for competition and innovation) exceed the costs (due to duplication of assets which increases total industry costs). In practice, however, this is challenging due to the need to take account of differences in local conditions.

9.72 We can also provide investment incentives for regulated firms by adopting an approach that allows the access provider to earn a fair return on investment (including compensation for risk). Our regulatory approach in relation to NGA (requiring wholesale access, but allowing BT pricing flexibility) has led to a situation where BT took a commercial decision to roll out a superfast network to two thirds of UK premises.

Summary

9.73 Figure 27 below compares the three access remedy approaches above, summarising at a high level the main points under our assessment framework headings.

Figure 27: Comparison of access remedy approaches

Criteria	Focus on passive remedies	Mixed approach – active and passive remedies	Focus on active remedies
Promotes static efficiency	Exposes more of the value chain to competition compared to other access remedy approaches	Exposes more of value chain to competition compared to focus on active remedies alone	Exposes less of value chain to competition compared to other access remedy

	May result in duplication of assets (active elements only)	May result in duplication active network elements where passive remedies are used	approaches Less risk of duplication of assets compared to other access remedy approaches
Promotes dynamic efficiency	Allows more significant scope for innovation/differentiation compared to other access remedy approaches Encourages investment in active network elements Possibly lower incentives to invest in own end-to-end networks (including civils)	Providers have flexibility to build business model using a wider range of remedies compared to other access remedy approaches. Potential for a larger number of providers in the market Availability of passive remedies provides scope for product innovation and network investment. Does not actively encourage investment in alternative networks since third party providers may choose to rely more on the (potentially lower risk) active products	Lower scope for innovation and investment compared to other access remedy approaches. All access seekers have similar underlying economics and a common wholesale product
Market/consumer user disruption	Possible disruption for CPs that currently use active access products. May create a risk of stranded assets and lead to exit of some CPs May result in rebalancing of the charges that consumers pay creating winners and losers	Minimum disruption as maintains status quo	Possible disruption for CPs that currently use passive access products. May create a risk of stranded assets and lead to exit of some CPs
Risk of regulatory failure	Could result in poor outcomes for consumers if passive access is not sustainable model of competition	Risk that intervention at multiple levels in the value chain results in arbitrage opportunities due to inconsistent pricing Remedies at multiple levels in value chain increases complexity of regulation	Setting low prices could deter investment in network elements where this would have been efficient

9.74 We have a numbers of objectives to consider when we regulate, based on our duties to further the interests of consumers and business - these include effective competition, innovation, efficient investment and widespread availability. Different

approaches to access regulation will meet these objectives to different degrees and there are certain trade-offs.

9.75 Our approach in the past has been to consider the appropriate remedies on a case by case basis for each market review i.e. we weigh up the costs and benefits of each model of competition for each market review taking into account the circumstances and market context. However we would be interested to hear from stakeholders as to whether we should consider adopting a strategic focus on passive remedies with an objective of reducing the points in the value chain where regulation is imposed.

Q7: Do you think that some form of access regulation is likely to continue to be needed in the future? If so, do you think we should continue to assess the appropriate form on a case by case basis or is it possible to set out a clear strategic preference for a particular approach (for example, a focus on passive remedies)?

Overview of possible strategic approaches in mobile telecoms

9.76 To date, our approach to competition in mobile is that UK consumers are likely to benefit from better services at lower prices if there are at least four credible national wholesalers of mobile services. In our 4G auction we therefore reserved some of the available spectrum for a fourth national wholesaler other than the three largest mobile operators.

9.77 Competition between mobile network operators has delivered significant benefits to consumers. These have included:

- The price of a typical bundle of mobile services has fallen by two-thirds, from around £40 in 2003 to £13 in 2012.[156] Three, as a challenger operator, has introduced a number of innovations to the market, such as unlimited data tariffs, the ability to use internet-based voice services such as Skype, and the scrapping of international roaming fees in a number of countries.

- Investment has continued in new services for consumers, with competitive responses to both EE's early 4G network deployment and O2's 98% indoor coverage commitment.

9.78 In addition, competition in wholesale networks has supported additional services for consumers based on mobile virtual network operators (MVNOs) – see Section 8. This is based on commercially negotiated access agreements rather than regulated access.

9.79 Effective end-to-end competition relies on vigorous competition between a number of credible national wholesalers. To date, our policy has been to use access to spectrum to facilitate this. However, wholesalers do not need exactly the same spectrum holdings to be credible competitors. Indeed, we see benefits to having some asymmetry of spectrum holdings (which can facilitate different business models) as long as downstream competition is maintained.

9.80 We can also see benefits in network sharing between the national wholesalers where this has the potential to deliver cost reductions and improved coverage. In addition to

[156] *Citizens and communications services*, January 2015, p.33: http://stakeholders.ofcom.org.uk/binaries/research/cross-media/Citizens_Report.pdf

the economic benefits (e.g. cost savings) there are potential environmental benefits because network sharing means fewer masts. Our response to network sharing proposals has been to consider the economic benefits alongside the impact of the arrangements on incentives to invest and on competition. There are currently two such partnerships, between EE and Three, and between Vodafone and O2.

Diminution of end-to-end competition could harm the UK's positive outcomes

9.81 There has recently been consolidation in several European mobile telecoms markets, with mergers in Austria (2012), Germany (2014) and Ireland (2014) reducing the number of national mobile network operators from four to three. This contrasts with the position in the US, where the proposed four to three merger of Sprint and T-Mobile in 2014 was blocked by the competition authorities. A proposed merger in the UK between Three and O2 is expected to be notified to the European Commission.

9.82 There are a number of different potential commercial arguments made for the focus on mobile mergers, including:

- Scale benefits (mainly in terms of capacity available to support consumers)
- Efficiencies and synergies (via cost savings)
- New revenue opportunities (including fixed mobile convergence)
- Lower competitive tension, leading to what many analysts have referred to as the opportunity for "market repair" in terms of prices.

9.83 Decisions on the recent EU mergers have been against the backdrop of a policy debate in which it has been claimed that Europe is falling behind other global markets, notably the US.

9.84 It would be inappropriate at this stage to comment on the details of the four to three merger proposed for the UK, between Three and O2. The detailed proposals have yet to be notified by the parties. In the event of major consolidation in the mobile sector we would need to assess the appropriate approach given the effectiveness of any remedies imposed and any potential reduction in competition.

9.85 However, the implications of a general trend towards consolidation and concentration are important for our wider strategy in respect of mobile services.

What is the relationship between competition and investment?

9.86 Some commentators have argued that consolidation is required as "excessive" competition in the mobile sector can damage incentives to invest because firms are unable to generate sufficient economic returns. For example, HSBC suggest that a four-to-three mobile merger will increase concentration and profit margins, and this will boost investment by MNOs to the long-run benefit of consumers.[157]

9.87 Because a multitude of different factors drive investment, it is difficult to find convincing econometric evidence which identifies a simple, causal link between competition and investment. In order to assess whether there is any empirical

[157] HSBC Global Research, Supersonic, April 2015

evidence for this view we commissioned WIK[158] to undertake a quantitative empirical study examining the relationships between competition, investment and consumer outcomes (published alongside this Discussion Document).

9.88 This WIK study finds that there is no general relationship between competition and investment that can be expected to hold across all markets. The WIK findings are supported by a similar econometric study undertaken by Frontier Economics which found no empirical link between the level of market concentration and investment in various international mobile markets.[159]

9.89 We believe that market structure and competitive intensity combine with many factors in influencing levels of investment. We have not to date seen any compelling evidence that competition and investment are in tension in the UK, but are interested in alternative views and evidence on this point.

End-to-end competition in mobile remains an important contributor to a range of good outcomes for consumers

9.90 We start from a cautious and pro-competitive position. UK consumers have benefited greatly from end-to-end competition in mobile services, and we believe that where effective end-to-end competition is sustainable, it should be maintained. A model of competition based on regulated access may not be able to deliver the same level of benefits. We would be cautious of adopting such an approach, other than in circumstances where end-to-end competition is not sustainable.

9.91 We acknowledge that determining the degree of end-to-end competition which is sustainable is often not straightforward. Where an existing firm is no longer commercially viable and is about to exit the market, it may be clear that competition is no longer sustainable. However, we might go further and take the view that competition is unlikely to be sustainable in circumstances where firms are unable to make the necessary levels of investment to maintain current levels of competition in the longer term.

Q8: Do you agree that full end-to-end infrastructure competition in mobile, where viable, is the best means to secure good consumer outcomes? Would alternatives to our current strategy improve consumer outcomes, and if so, how?

Are there wider competition issues for mobile?

9.92 Beyond issues of consolidation, a number of other potential mobile competition issues could emerge in future, including, for example:

- Whether access to sites becomes an increasing competitive concern?
- Whether all players can access sufficient spectrum to maintain effective end-to-end competition?

[158] WIK-Consult, *Competition & investment: An analysis of the drivers of investment and consumer welfare in mobile telecommunications*, July 2015: http://stakeholders.ofcom.org.uk/binaries/consultations/dcr_discussion/annexes/Competition_and_investment_mobile.pdf

[159] Frontier Economics, *Assessing the case for in-country mobile consolidation*, February 2015: http://www.gsma.com/publicpolicy/wp-content/uploads/2015/02/Assessing-the-case-for-in-country-mobile-consolidation-report.pdf

- Whether incentives remain for effective wholesale markets (MVNO access) as well as vertically integrated ones in the face of maturing markets and continued consolidation?

- Does the potential for widespread small cell deployment change the dynamics of end-to-end competition?

- Whether the static efficiencies of further site sharing in the most remote areas may outweigh the benefits of continued network based competition in these areas?

- How regulators should consider other options for further and future network sharing, including options such as spectrum pooling?

Q9: In future, might new mobile competition issues arise that could affect consumer outcomes? If so, what are these concerns, and what might give rise to them?

Overview of possible concerns from bundling content and telecoms services

Introduction

9.93 In Section 8 we noted that one important market development was the increasing prevalence of retail convergence in which consumers purchase their telecoms services together with pay TV services, such as linear TV channels and on-demand services. Any strategic approach to sustainable competition in digital communications needs also to consider whether the potential for competition problems in content provision may also affect competition in the provision of telecoms services.

9.94 As set out in our Terms of Reference, our focus for this review is predominantly on connectivity, both fixed and mobile. Our intention is not to undertake a full review of competition in content markets as part of this review. Rather, we need to consider whether communications providers are likely to be able to offer sufficient compelling content alongside their telecoms offers in order to compete effectively for bundled customers. This is particularly important for customers who have a preference for purchasing content packages together with telecoms services, whether triple-play or quad-play packages.

9.95 The traditional pay TV business model has typically involved offering large bundles of content. These are now increasingly bundled together with telecoms services. Both Sky and BT are vertically-integrated providers, active both in the broadcasting of channels as well as the retailing of pay TV services. Virgin Media and TalkTalk acquire wholesale content services in order to retail these to their customers. New pay TV services, such as Netflix and Amazon Prime Instant Video, have emerged using OTT delivery.

9.96 While different business models are likely to evolve, presenting increasing choice, at least for some consumers, retail bundling is likely to remain an important part of the landscape. Triple-play bundles combining TV content and fixed telecoms services have grown in popularity over the last ten years with approximately 25% of households now choosing to purchase such bundles. Quad-play bundles, adding mobile telecoms services, have proved increasingly popular in other countries, particularly France and Spain. These bundles can deliver benefits to consumers

through efficiencies that may result in lower prices, and retail and packaging innovation.

9.97 There are a number of different types of potential concern that could arise in relation to competition and content services, including supply and demand side.

9.98 In terms of supply-side issues, access to key content and access to platforms are well established issues. Access to key content, particularly content that drives the purchase of pay TV, is a critical input for a traditional pay TV provider to be an effective competitor. Access to TV platforms, where a platform provider is in a position to act as a gateway to its subscribers, may also be a necessary input for a content provider to build a sustainable business. For example, Sky's position as a vertically integrated broadcaster and platform operator, with control of a significant amount of key content, has attracted substantial scrutiny over the past 20 years.

9.99 In this part of Section 9 first we explain our approach to potential supply-side competition issues in relation to content, second we provide a high level overview of considerations in gaining access to different content genres, third we briefly consider issues around gaining access to platforms, and finally we briefly comment on potential implications.

9.100 On the demand-side, barriers to switching for consumers looking to switch pay TV provider may present competition, and consumer concerns. This may be particularly true when bundled with other communications services. These concerns are discussed in more detail in Section 12.

Access to different content genres

9.101 Generally the commercial model for rights owners and content producers is to make pay TV content available on an exclusive basis (sometimes for a limited period of time) to wholesale channel providers in order to maximise returns. For example, a drama series might be made available exclusively on Sky 1. However, those channels are typically made available on platforms non-exclusively, so for example the Sky 1 channel is available on a number of platforms. These arrangements allow wholesale channel providers to differentiate their services from others in the marketplace.

9.102 A wholesale channel provider using exclusive content to differentiate itself from its competitors is less likely to raise competition concerns if other providers can easily find alternative content which consumers are happy to watch instead because they regard it as a good substitute.

9.103 In general, content providers should have incentives to invest in content and have the opportunity to earn a fair return for their content investment and innovation.

9.104 Concerns may arise in relation to types of content for which it is difficult to find substitutes and the absence of which results in a material competitive disadvantage because it is capable of influencing the choice of pay TV provider for a significant number of subscribers. While it may not be necessary to have identical content, if consumers do not regard any other content as a good alternative, the content concerned may effectively be unreplicable. We refer to this as "key content".

9.105 While competition concerns may arise if key content is limited in its distribution, or offered on terms which prevent rivals from competing effectively, the starting point is

to identify what might constitute key content. We set out below a high level consideration of different content genres.

Premium sports

9.106 In our Pay TV Investigation in 2010, we found that premium sports content was key content for pay TV services and we concluded that Sky should be required to offer Sky Sports 1 and 2 to competing retailers by imposing a wholesale must-offer (WMO) remedy. This is essentially an access-based model of competition for this type of content. While this decision has been subject to ongoing appeals before the Competition Appeal Tribunal and Court of Appeal, interim arrangements remain in place that maintain the regulation's effects for a number of providers.

9.107 Sky currently supplies these channels to Virgin Media and TalkTalk on commercial terms, but it currently provides Sky Sports 1 and 2 to BT's YouView platform on regulated terms. There have been other notable market developments since 2010, including the launch of BT Sport which includes the broadcast of live Premier League matches.

9.108 We are currently reviewing the WMO remedy to decide whether regulation is still appropriate in light of market developments since 2010, or whether it should be modified or removed. In our December 2014 consultation we set out the view that the availability of certain types of sports content in a retail pay TV service continues to be an important driver of consumers' choice of pay TV retailer, with live coverage of Premier League matches standing out as the most important sporting competition for a large number of consumers. We therefore considered that certain premium sports remained 'key content'.

Premium movies

9.109 In 2010 we were also concerned that Sky held all the premium first pay TV window rights for the six major Hollywood studios, not only for linear movies channels but also for subscription video on-demand (SVOD). Our concern focussed on SVOD rights, and we made a market reference under the Enterprise Act to the Competition Commission (CC). In 2012 the CC decided that while pay TV retail competition was ineffective, it was not necessary to impose remedies in relation to movies, in light of the growth of OTT services from LoveFilm (now Amazon) and launch of Netflix. It also concluded that the length of time viewers have to wait after a film is shown at the cinema before they can watch it on TV (which it termed "recency") was less important than we had found in 2010.[160]

9.110 Since 2012 the provision of movie content via OTT players such as Netflix and Amazon, as well as Sky's Now TV, has grown significantly,[161] though a large proportion of those subscribing to OTT services from Netflix and Amazon also take pay TV services from Sky, Virgin Media, TalkTalk or BT.[162] In addition Sky now wholesales its Sky Movies linear channels to other pay TV providers including Virgin

[160] CMA, Final report on 'Movies on pay TV market investigation', CMA, paragraph 6.7: https://assets.digital.cabinet-office.gov.uk/media/5519492940f0b614040001ca/main_report.pdf

[161] http://www.thetimes.co.uk/tto/news/medianews/article4471006.ece

[162] For example our November 2013 pay TV survey indicated that of those respondents that had paid to use LOVEFiLM (now Amazon Prime Instant Video) or Netflix, in the previous 6 months, 69% and 77% were also subscribers to pay TV services from Sky, Virgin Media, TalkTalk TV or BT TV. See http://stakeholders.ofcom.org.uk/binaries/research/tv-research/tv-data/pay-tv-research/Pay-TV-omnibus-2013-data-tables.pdf, question B1A

Media, TalkTalk and BT. Also the growth of the OTT players is causing the windowing structure to evolve. In some cases a second pay TV window with exclusive rights has been established. This creates movie content that is a closer substitute to Sky's first run content than existed previously. Overall, while Sky continues to retain a strong position in terms of first pay TV window rights from the major Hollywood studios, enabling it to offer recent movies, there appears to be greater choice available to consumers interested in premium movies than five years ago.

High quality drama / box sets

9.111 A further development in recent years has been the growth in popularity of high quality drama content, or box sets, such as *Game of Thrones* or *House of Cards*. This type of content typically requires significant investment, has high production values, well-known actors (who may have previously only appeared in Hollywood movies), and is designed for global audiences. High quality drama may provide an alternative to premium movies, at least for some consumers. Its high cost and high profile in marketing of pay TV services may also raise questions about whether it might have a role to play as key content.

9.112 Content producers such as HBO (producers of *Game of Thrones*) have a reputation for delivering popular high quality drama series. Sky has extended its output deal for exclusive first-run HBO content in the UK until 2020, which Sky broadcasts on its Sky Atlantic channel.[163] Sky Atlantic is only available on Sky's satellite platform and through Sky's Now TV OTT service.

9.113 However, OTT providers, such as Netflix and Amazon, have also entered into exclusive deals with US studios and are increasingly commissioning high quality content directly, rather than acquiring it from more established providers. Netflix commissioning *House of Cards* is one example. BT has also recently indicated its interest in this type of content, entering into a multi-year exclusive arrangement to distribute the AMC Networks channel in the UK, including the exclusive UK premiere of *Fear the Walking Dead*.

9.114 This is a relatively new and dynamic area, which may be of growing importance to consumers.

Content aggregation

9.115 In addition to offering key content, providers are likely to require a sufficiently broad portfolio of content to sustain subscriber interest, for which they will need to aggregate a broad range of content. This may require aggregation across a number of different content genres, including so-called basic pay TV content.

9.116 It is possible that an incumbent content provider could act in a way to create barriers to a rival's ability to aggregate sufficient content in order to compete effectively. For example, BT argues that it faces barriers in compiling sufficient sports rights in addition to Premier League and Champion League matches to create a channel that is capable of attracting subscribers and competing with Sky.[164]

[163] Sky press release: http://www.sky.com/tv/channel/skyatlantic/article/hbo
[164] *BT's response to Ofcom's review of the pay TV wholesale must-offer obligation*, February 2015: http://stakeholders.ofcom.org.uk/binaries/consultations/wholesale-must-offer/responses/BT.PDF

9.117 In contrast, we note there are often a large number of different sources of content, in particular for what is termed “basic content”. Further, the wide availability of UK originated content made available by public service broadcasters, both linear channels and catch-up VOD, means that a pay TV provider can make use of this content as part of the overall portfolio of content that it offers. There is therefore a question whether the barriers to content aggregation are sufficiently strong to mean that rival providers are not able to compete with others’ content offerings in terms of breath of choice for their viewers.

Access to platforms

9.118 Retailers of pay TV services need to be able to gain access not only to content, but also to the viewers who are willing to pay to watch that content. This issue requires gaining access to platforms and devices.

9.119 In principle, platforms may have the ability to act as a ‘gatekeeper’ setting the terms on which broadcasters and content providers can access viewers. Platform access concerns have previously arisen in the case of linear channel providers looking to secure access to Sky’s satellite platform: the Technical Platform Services regime[165] enables channel broadcasters to provide their services direct to subscribers if they are unable to or do not want to become part of Sky’s retail package. In the context of a shift from linear channels towards VOD services, we are currently considering the question of access to VOD services on TV platforms.[166]

9.120 Over recent years, as a result of technological developments and convergence, there are now a greater number of platforms and devices than ever before to access content services. This ability for content providers to access homes in multiple ways is therefore likely to be pro-competitive. However, we are mindful that it may also raise the potential for new online platform gatekeepers to emerge in the future.

9.121 Investment in content typically involves large fixed costs and so access to platforms and viewers is important in order to recover those content costs across a large customer base. In our Pay TV Investigation in 2010, we observed that the incumbent (Sky) had an unmatched record in successfully bidding for key rights, as a result of its established large base of subscribers willing to pay for premium sports, which translated into an advantage in bidding for rights over new entrant rivals (sometimes referred to as the 'virtuous circle').

9.122 BT's entry into wholesale channel provision with the launch of BT Sport has relied on upselling to a related subscriber base (broadband subscribers) over which some of the costs of sports rights investment can be recovered. Similar entry strategies might be possible using other related subscriber bases, for example mobile subscribers; we observe that it is reported that Vodafone is planning to launch its pay TV offering before the end of this calendar year.[167] However, there is greater uncertainty and hence risk associated with the willingness to pay for premium sports amongst broadband or mobile subscribers, in contrast to a pay TV subscriber base which has an established and predictable willingness to pay.

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[165] The regime provides regulated access to electronic programming guide (EPG) services and conditional access (CA) services.

[166] *Access to on-demand services on TV platforms: Terms of Reference*, March 2015: http://stakeholders.ofcom.org.uk/binaries/consultations/sky-access-control/statement/Terms_of_Reference.pdf

[167] http://www.theguardian.com/business/2015/may/19/vodafone-launch-home-broadband-pay-tv-service

Implications

9.123 Convergence, and in particular retail bundling, brings traditional telecoms services together with content provision. Any potential competition problems in content provision could have implications for the wider bundle including the provision of telecoms services.

9.124 To some degree, the telecoms and content elements of the retail bundle are subject to different regulatory frameworks, with the EU Framework for telecoms principally dealing with transmission services and distribution, rather than content provision. This distinction has caused some to question whether there should be greater alignment of the regulatory frameworks to ensure consistency.

9.125 It is important to start by understanding the likely nature of any potential competition problems in relation to content that could create concerns in relation to telecoms services. There are differences between content and telecoms services: for example, the characteristics of any enduring economic bottlenecks in content are likely to differ from those in telecoms which typically focus on control of infrastructure which is uneconomic to replicate. In content, the concepts of replicability and enduring economic bottlenecks are also relevant. As noted above, in deciding whether particular content constitutes key content the question is whether such content can be replicated. This does not require identical content to be available but content that sufficient consumers regard as a good alternative. There is a further dimension to replicability in the case of content because even where key content rights do exist they are in principle contestable, generally on a regular basis. However, the control of an established retail subscriber base may deliver bidding advantages which means they may not be replicable in practice.

9.126 In identifying enduring economic bottlenecks in the provision of content, relevant questions include:

- Are there types of key content which are effectively unreplicable?
- Is market power likely to persist despite the contestability of content rights?
- Is vertical integration likely to raise concerns, such as discriminatory behaviour?
- Do competition problems arise that affect the ability of any retail providers to compete effectively for bundled consumers?

9.127 Having established a clearer understanding of the potential competition problems that might arise, we can consider whether our various existing regulatory tools are appropriate to enable us to address any competition concerns across the services which make up the retail bundle. That does not necessarily mean that we need identical regulatory tools for all elements of the bundle, but rather sufficient tools to be able to address any competitive distortions on a consistent basis, in the interests of consumers.

Q10: Does the bundling of a range of digital communications services, including some which may demonstrate enduring competition problems individually, present new competition challenges? If so, how might these issues be resolved through regulation, and does Ofcom have the necessary tools available?

Questions for discussion

Overarching issue	Specific questions
What model of competition should future regulatory strategy focus on: full end to end networks; passive access to support end to end networks; or active wholesale remedies to deliver downstream competition?	*Q6: What do you think is the scope for sustainable end-to-end competition in the provision of fixed communications services? Do you think that the potential for competition to vary by geography will change? What might this imply in terms of available regulatory approaches to deliver effective and sustainable competition in future?*
	Q7: Do you think that some form of access regulation is likely to continue to be needed in the future? If so, do you think we should continue to assess the appropriate form on a case by case basis or is it possible to set out a clear strategic preference for a particular approach (for example, a focus on passive remedies)?
	Q8: Do you agree that full end to end infrastructure competition in mobile, where viable, is the best means to secure good consumer outcomes? Would alternatives to our current strategy improve end user outcomes, and if so, how?
Are there new or unresolved competition issues in digital communications services?	*Q9: In future, might new mobile competition issues arise that could affect consumer outcomes? If so, what are these concerns, and what might give rise to them?*
	Q10: Does the bundling of a range of digital communications services, including some which may demonstrate enduring competition problems individually, present new competition challenges? If so, how might these issues be resolved through regulation, and does Ofcom have the necessary tools available?

Section 10

Promoting efficient investment through regulation

10.1 As discussed in Section 9, where there are enduring economic bottlenecks regulators need to be aware of the potential effects on efficient investment by either regulated parties or alternative operators by promoting competition in ways that focus too much on short-term market outcomes. Regulation needs to ensure consumers and the wider economy benefit from waves of private sector investment in successive generations of technology that is as widely available as possible.

10.2 In Section 9 we discuss how this involves deciding when it might be appropriate impose regulation rather than rely on ex post competition law as well as how much of the supply chain should be exposed to competition.

10.3 This section discusses how regulated access can be applied in ways that retains incentives for efficient investment alongside effective competition. It covers:

- at a high level, the pricing approaches available for regulating access to more or less risky investments in enduring economic bottlenecks and the key trade-offs they entail;
- our current approach to superfast broadband charging, characterised by overall pricing flexibility alongside regulation to address the risk of a price squeeze; and
- potential future challenges as providers continue to meet rising demand through widespread commercial investment in ultrafast technologies.

High level approaches to regulating for efficient investment

10.4 Regulation in investment intensive industries such as telecommunications requires regulators need to be mindful of the impact their approach to access pricing can have on incentives to invest, both of the regulated firm and potential alternative operators.

10.5 In taking a decision on whether to invest or not, investors take account of a number of factors including likely demand for the product or service and the likely cost of deploying and operating it. Because these factors involve judgements about essentially unknown future developments, investment decisions involve a degree of risk. Investors require a return commensurate with the risk they take: as they are exposed to a net loss should the investment turn out to be unsuccessful they require the opportunity for reward in the event of success.

10.6 Where the assets being invested in are also an economic bottleneck, the situation is complicated. On the one hand the regulator, in order to incentivise investment - and mimicking competitive markets - may want to ensure that investors are not only exposed to the downside risk of investment, but equally enjoy some of the upside (the ‘fair bet’ principle). On the other hand, they need to ensure that consumers are not unduly harmed either by excessive pricing by an unregulated dominant firm, or because of a loss of competition at the retail level if a dominant firm upstream can distort downstream competition.

10.7 We set out a number of general pricing principles in 2008 when considering available regulatory approaches to investment and competition in superfast broadband services[168]. These principles were:

- pricing and rates of return should reflect the level of risk faced when investments are made;
- pricing approaches should take into account the level of demand uncertainty;
- flexibility in pricing is desirable, allowing experimentation, increased investment and greater take-up;
- pricing approaches need to reflect the underlying characteristics of products;
- regulation should consider the impact on investment incentives from the relative prices of different products;
- the costs of new investments should be recovered from the services that they support; and
- investment risk might be addressable by more than just pricing approaches, including approaches to risk sharing and shared investment.

10.8 The approach taken to access pricing will affect the incentives to invest, the success of competition, and consumer demand for retail services. There are a number of high level options for regulated pricing as illustrated in Figure 28 below.

Figure 28: Pricing options to promote investment and secure competition

No regulation of new services or technologies	Seeks to retain investment incentives and not skew potential returns from risky investment. It might be most appropriate where indirect price constraints existed on new services, limiting the ability to price excessively. Ex post competition law would also provide protections. However, poorer consumer outcomes could result if indirect constraints are insufficient. This approach may also enable upstream monopolists to distort downstream competition, for example by withholding supply to competitors as it builds market share in the new service.
Access regulation, an obligation to supply including rules to prevent undue discrimination	This would secure supply for downstream competitors, but leave the network investor with freedom on the price level and structure. Alternatives interpretations to 'undue' discrimination may allow alternative pricing structures for risk sharing such as: volume discounts or upfront fixed access fees with low variable costs. This approach would not address other competition risks such as the possibility that the firm might "price squeeze': where a vertically integrated provider might use pricing freedoms on wholesale and retail pricing to set "too high" access charge, or by a "too low" retail price, or

[168] *Delivering super-fast broadband in the UK*, September 2008, p.48-49: http://stakeholders.ofcom.org.uk/binaries/consultations/nga_future_broadband/summary/main.pdf

	both. It would also not provide protection for consumers from high prices.
Access regulation, obligation to supply, no undue discrimination rules and prices set on a retail minus basis.	The regulated firm would need to set wholesale access prices at a level that ensures a retail margin sufficient to cover competitors' retail costs. It would limit the firm's ability to distort competition, for example by setting a high wholesale price that favours its own downstream division. For a network investor, it may leave the option of higher upstream wholesale prices compared to more cost orientated charge controls in order to encourage network investment.
Access regulation, obligation to supply, no undue discrimination rules and prices set on a cost-orientated basis	This could take different forms according to cost standard - typically the degree to which different types of costs are allowed -; cost base; glide paths – for example the time allowed for charges to converge on the long term target; and finally their duration. It may also entail an allowance for risk to reflect the possibility of project failure.

10.9 In practice, these options present a continuum of possible outcomes. For example, the higher the risk premium applied to a cost based charge control, the closer the outcome might be to pricing flexibility.

10.10 The most appropriate pricing approach in any given case will depend on a range of factors, including how far there are competitive constraints on the new service. While these constraints may not eliminate market power, they can, depending on the case, mitigate its effects. Examples may include:

- constraints from similar legacy products;
- the potential for market entry - including that facilitated by access to passive network elements
- the riskiness of underlying investments, and the need to allow investors a 'fair bet'; and
- the commercial incentives an investing provider has following a large sunk cost investment to rapidly generate incremental revenue from new adopters.

10.11 In terms of the types of economic efficiency described in Section 5, less tight regulation of prices could promote dynamic efficiency by enhancing the prospects for new entry and growth in end-to-end competition where sustainable. However, it would involve a trade-off with allocative efficiency since it would permit higher prices in the shorter-term.

10.12 Whatever approach is adopted, its success or failure depends significantly on the trust investors place in the regulator. Investors value predictable and stable policy interventions: significant and poorly signalled changes of policy can damage investor confidence, and may increase the risk associated with new investments.

Q11: What might be the most appropriate regulatory approaches to the pricing of wholesale access to new and risky investments in enduring bottlenecks in future?

Our current approach to superfast pricing

10.13 Our standard approach as an economic regulator is to reflect the risk and uncertainty of investment by allowing investors a "fair bet"[169]. This approach does not guarantee cost recovery is based on the principle that, at the time of investment, the expected return (i.e. the balance of potential upside and downside returns) should be equal to the cost of capital. A key point under this approach is that the firm would be allowed the opportunity to enjoy returns higher than the cost of capital in the circumstances when demand turns out to be high, while being equally exposed to losses when the opposite turns out to be the case. The firm's ability to generate an upside thus balances out the possibility of returns below the cost of capital if demand turns out to be low.

10.14 For standard broadband networks (providing telephony and standard broadband), we set price controls that allow the recovery of the cost of access equipment plus a rate of return that is based on BT's cost of capital. This approach is suitable where there may be low demand risk, relatively low new investment required and substantial sunk costs that have already generated a return on the initial investment.

10.15 We did not consider this approach suitable to incentivise investment in new network technologies. Superfast broadband investment involved a higher level of risk than investment in current generation networks, both because the demand for superfast broadband services was subject to significant uncertainty at the time investment commenced, and due to the nature of the investment (high cost assets that have to be acquired as part of the investment but will be sunk once the investment is made).

10.16 Therefore, in the case of BT's superfast broadband investment we:

- allowed BT pricing flexibility in wholesale services, so that it is able to experiment with different approaches to serving demand
- recognised that potential harm to consumers is limited given the presence of competitive constraints from cable and current generation copper broadband; and
- complemented this by introducing passive remedies (including duct and pole access and sub-loop unbundling) to allow contestable investment by alternative operators where it might be sustainable.

10.17 This regulatory choice reflected the risk of regulatory failure in establishing a cost-based price control for a new service where demand is uncertain. In such circumstances, forecasting costs and revenues is likely to be very difficult, and there is a risk of stifling investment if prices are set too low.

10.18 We have adapted our approach to the regulation of superfast broadband as markets matured, while retaining BT's broad pricing flexibility. Specifically, we initially required BT to maintain fair and reasonable VULA terms, conditions and charges[170], setting out what we were likely to consider initially when reviewing that differential including the cost standard. The 2014 FAMR Statement set out Ofcom's view that BT should retain broad flexibility over the level of VULA prices during this market review

[169] *Proposals for WBA Charge Control: Consultation*, January 2011, Annex 8, p.181-182: http://stakeholders.ofcom.org.uk/consultations/wba-charge-control/,
[170] *Review of the Wholesale Local Access Market* statement, October 2010, p. 144: http://stakeholders.ofcom.org.uk/binaries/consultations/wla/statement/WLA_statement.pdf

period[171]. The VULA margin statement preserved that pricing flexibility, while seeking to protect and promote competition at the retail level by clearly setting out the minimum VULA margin BT must maintain[172]. We did this considering the 2014-2017 market review period likely to be an important period in the transition from standard to superfast broadband, and against the backdrop of a heightened opportunity for retailers (including BT) to compete to attract new subscribers. We noted that this competition could be dampened were BT to set the VULA price in a way that allowed it to distort competition.

10.19 In the 2014 FAMR we anticipated that we would revisit the issue of the level and nature of the charge control in future. Relevant factors in determining the our approach to, and the level of, any charge control may include

- the extent to which superfast broadband has matured in terms of demand, technology and/or costs certainty
- the presence of a constraint from copper (or other services),
- the risk of regulatory failure; and
- the returns that BT has made.[173]

10.20 The question on the evolution of pricing freedom for superfast broadband is an issue of strategic significance. It can affect both investment and competition today and in the longer term from BT and other communications providers.

Effect of regulation on alternative providers' incentives to invest in infrastructure

10.21 As discussed in Section 9 above the choice of access remedies, and the associated pricing, may affect all market participants not only by incentivising entry at retail level, but also affecting upstream competitive dynamics. For example as discussed in the Section 9, cable networks are being expanded in the UK for both residential and business services and we have seen some targeted market entry by new fixed providers in specific geographic areas by firms such as CityFibre or Gigaclear.

10.22 Access regulation, and associated charge control approaches, can affect third party investment in a number of ways:

- For full end-to-end competition, access remedies and charge controls can affect the incentives for own build networks, potentially increasing or decreasing the incentive and opportunity to invest in different circumstances.

[171] This was on the basis of competitive constraints (such as the pricing of standard broadband services and Virgin's superfast broadband services) on the level of superfast broadband prices and the risk of Ofcom determining inappropriate price levels that would harm incentives for efficient investment.
[172] *Fixed Access Market Reviews: Approach to the VULA Margin* statement, March 2015, p4: http://stakeholders.ofcom.org.uk/binaries/consultations/VULA-margin/statement/VULA_margin_final_statement.pdf
[173] *Fixed access market reviews* statement, June 2014, p.386: http://stakeholders.ofcom.org.uk/binaries/telecoms/ga/fixed-access-market-reviews-2014/statement-june-2014/volume1.pdf,

- For infrastructure based competition utilising passive remedies, the prices charged for passive access relative to other remedies where applied will influence third parties' choice of access remedy.

10.23 In our regulatory decisions we are mindful of the effect our proposed regulatory measures may have on the market as a whole. For example, in our BCMR proposals of May 2015, we proposed that BT should provide dark fibre priced in a manner consistent with its 1Gbit/s wholesale Ethernet services.

10.24 We considered that this would deliver most of the benefits of passive access while addressing a number of risks such as the risk of inefficient entry as well as potentially reduced investment incentives for alternative end-to-end competitors currently in the market such as Virgin Media, and smaller firms such as CityFibre; this proposed approach may also limit appropriately the risk of any distributional impacts between different consumers.

Possible evolutions to our approach to risky investments

10.25 As discussed in Section 8 above, the situation with respect to fixed access network investment has changed materially since our last strategic review in 2005. The regulatory model put in place in 2005 was based around a relatively stable access network infrastructure. In 2009-10, this changed as announcements of superfast broadband investments were being made. Now, we see a prospect of a further round of material access investment in ultrafast technologies such as G.Fast or FTTP.

10.26 The implication is that, rather than being a relatively static and stable network business, fixed access networks may well undergo a number of more major, cyclical upgrade investments as providers respond to growing demand and realise the potential of new technologies.

10.27 In this context, we need to consider what our longer term strategic approach to access pricing should be for superfast broadband recognising its impact on future investment in the next generation of infrastructure. Our approach will need to be mindful of the potential for infrastructure competition to emerge as well as the potential risk involved in new investments. In maintaining incentives for efficient investment we need to continue to promote sustainable competition as the best way of achieving this.

10.28 In relation to superfast broadband, some stakeholders have suggested that our current approach of pricing freedom to superfast broadband based on fibre to the cabinet investments should be adapted as markets mature. They have pointed to the risk that the approach generates asymmetric incentives to migrate customers to superfast between BTs own downstream operations on the one hand and its downstream competitors on the other asserting that this may cause a longer term erosion of retail competition. Others argue that companies often face divergent strategic incentives and that there may be other reasons why for example LLU operators may be slow in migrating customers to superfast broadband. They argue that this could be because they favour the comparatively higher returns from current generation broadband due to their sunk investments.

10.29 More generally, and based on high level principles that apply to all enduring economic bottleneck facilities characterised by high levels of investment, it may be that over time, a move to cost based remedies may be appropriate . Our over-arching approach to considering the appropriate timing of such a change will need to consider that intervening too soon may risk eroding investor confidence and

certainty in the regulatory environment for risky investments. In turn this could undermine the fair bet principle and affect incentives for future investment, including by potential competitors to the SMP provider. At the same time, intervening too late may risk harm to consumers arising from higher prices or lower adoption of superfast broadband, and in addition risk distortions in downstream competition. Achieving the right balance of risk and reward for new investments is a complicated task, affecting longer term outcomes for consumers beyond the period of individual market reviews.

10.30 In relation to new investments not yet commenced, one approach might be to replicate our current approach for new assets and services as they emerge. However, there may be reasons why we should adopt a different approach this time, including:

10.30.1 **Greater or lesser potential for infrastructure competition potentially differentiated by geography.** This could potentially affect need for any regulation at all in some areas, if there were sufficient infrastructure based competition. It could also mean that the effects of regulation on alternative providers' incentives to invest in infrastructure may become a more or less significant consideration for access regulation.

10.30.2 **The degree of demand uncertainty.** Investment may be more or less scalable in future, and face a different risk profile to superfast broadband investments in 2009-10 onwards. For example it may well be that investment in G.Fast or FTTP occurs incrementally in response to unmet demand, either by geography or customer group.

10.30.3 **The scale or likely cost of investment.** - Shared investment models or commercial agreements with service providers could help reduce the risk of investment in ultrafast technologies. Some examples where the costs of investment have been shared include France, Spain and Portugal.[174]

10.31 The regulatory terms for access to new and risky investments and their evolution over the lifetime of these investments are both key strategic issues for this review. Going forwards, it is important that any access regulation remains mindful of its effect on potential future investment and the degree of sustainable investment in alternative infrastructure. This will require striking a balance to ensure consumers remain protected as necessary and, where possible through downstream competition.

10.32 The regulatory terms for access to new and risky investments and their evolution over the lifetime of these investments are both key strategic issues for this review. Going forwards, it is important that any access regulation remains mindful of its effect on potential future investment and the degree of sustainable investment in alternative infrastructure. This will require striking a balance to ensure consumers remain protected as necessary and, where possible through downstream competition.

[174] Analysys Mason, *International Case Studies*, July 2015: http://stakeholders.ofcom.org.uk/binaries/consultations/dcr_discussion/annexes/International_case_studies.pdf

Questions for discussion

Overarching issue	Specific questions
Where regulation is required to promote competition, how can it best secure both efficient investment and effective competition during periods of significant investment in risky new assets?	*Q11: What might be the most appropriate regulatory approaches to the pricing of wholesale access to new and, risky investments in enduring bottlenecks in future?*
	Q12: How might such pricing approaches need to evolve over the longer term? For example, when and how should regulated pricing move from pricing freedom towards more traditional charge controls without undermining incentives for further future investment?

Section 11

Regulating vertically integrated firms

11.1 Vertical integration is a feature of many successful firms and is not a concern absent market power. However, when a vertically integrated firm has significant market power in upstream markets it has, under some circumstances, both an incentive and ability to leverage its market power downstream.

11.2 By regulating upstream prices, a regulator can limit the ability of a vertically integrated firm to charge excessive upstream prices (via price controls) and from raising rivals' costs (via non-discrimination obligations).

11.3 However, the ability and incentive to discriminate remains. While overt price discrimination can be detected and prevented, information asymmetries mean that different forms of non-price discrimination may be more difficult to identify, both by competitors and regulators.

11.4 We attempted to address concerns associated with non-price discrimination through the functional separation of Openreach from the rest of BT, associated with a strict form of non-discrimination obligation, 'Equivalence of Inputs'. Taken together these were intended to give all competing providers equal access to BTs network.

11.5 This approach has led to generally good outcomes, but there have also been some concerns, and in any case the wider communications market has evolved materially since 2005. Our current approach limits the ability to discriminate but does not address the underlying incentive, so risks to competition may remain.

11.6 Therefore we need to consider whether there are changes in competitive conditions, or the wider market context, that might suggest a need to update or evolve the current model of fixed access network functional separation. Our analytical approach to thinking about this challenge is based on the following questions:

- Are there actual or potential sources of discrimination that may undermine effective downstream competition?
- Does the changing market context and wider concerns regarding consumer outcomes, for example in relation to quality of service, mean changes are required to our current approach?
- What may be the most appropriate approach in future: functional separation; enhanced functional separation or structural separation?

11.7 We are not setting out any proposals at this stage, but are seeking views and evidence from stakeholders on these issues to inform our more detailed analysis of the range of potential regulatory models.

Our current approach is based on delivering behavioural change and a level playing field between BT and its competitors

11.8 In 2005 we recognised in our Strategic Review of Telecommunications (TSR) that BT's vertically integrated structure gave it both the incentive and ability to discriminate against competitors[175]. The main manifestation of this concern was that competitors faced inequality of access. BT had historically engaged in forms of non-price discrimination, through delays and inadequacies in wholesale products made available to its competitors[176]. As a result, UK fixed telecoms was underperforming for citizens and consumers. For example, broadband take-up and innovation were limited given the development of the network at that stage.

11.9 We took the view that traditional behavioural remedies had proven ineffective in addressing this concern, despite increasingly detailed regulation to support them. We also believed that, absent major change, this was likely to continue.

11.10 Therefore, we decided to adopt a new approach under which BT would be required to deliver equality of access. In September 2005, we accepted legally binding undertakings from BT under the Enterprise Act 2002 (the Undertakings) in lieu of a market reference to the Competition Commission[177]. The Undertakings focused regulation on those assets within BT's access and backhaul network that represented enduring economic bottlenecks. The main pillars of these undertakings are functional separation and equivalence of inputs (EOI)[178].

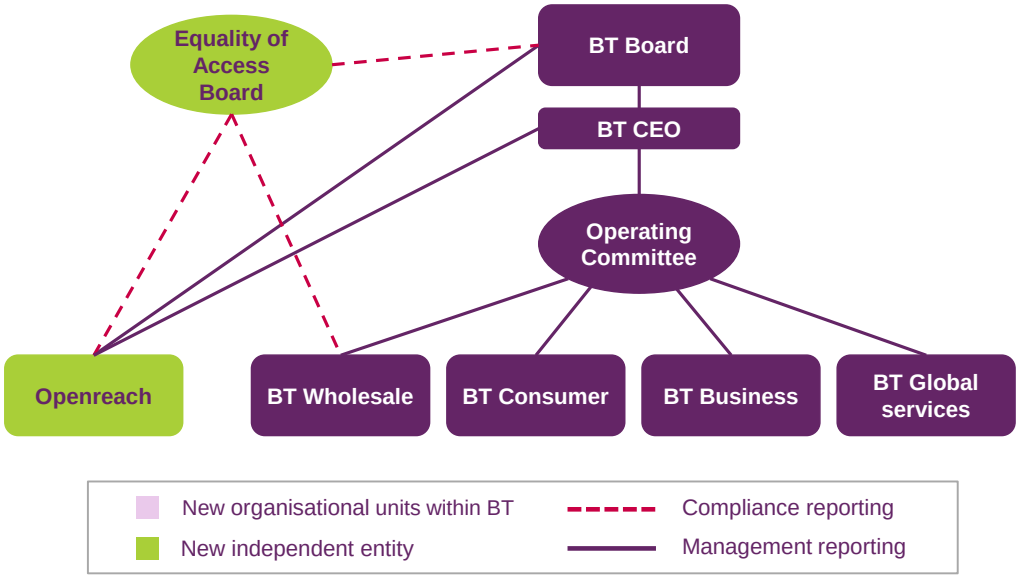
Functional separation

11.11 Functional separation aims to deliver behavioural change by creating an organisation whose culture and incentives are aligned with the interests of all wholesale customers rather than just the vertically integrated company's downstream divisions. This potentially reduces the need for detailed regulation to address discrimination concerns, and means that any regulation which is applied goes with the grain of the organisation, so is more likely to be effective.

11.12 In the case of BT, Openreach was created as a new organisation (with a separate brand) that was intended to be operationally distinct from the rest of BT Group (see Figure 29 below).

[175] *A Notice under Section 155(1) of the Enterprise Act 2002*, 2005, Annex F, paragraphs 23-31: http://stakeholders.ofcom.org.uk/binaries/consultations/telecoms_p2/statement/sec155annexes.pdf.
[176] *Strategic Review of Telecommunications* Phase 2 consultation, p.11, http://stakeholders.ofcom.org.uk/binaries/consultations/telecoms_p2/summary/maincondoc.pdf
[177] On 1 April 2014, the Competition Commission's functions were transferred to the Competition and Markets Authority.
[178] *A Notice under Section 155(1) of the Enterprise Act 2002*, 2005: http://stakeholders.ofcom.org.uk/binaries/consultations/sec155/summary/sec155.pdf

Figure 29: BT organisational structure



Source: Ofcom

11.13 Some other specific elements of the Openreach model are summarised in Figure 30 below.

Figure 30: The core elements of functional separation

Openreach boundary	The current boundary was drawn to most sensibly capture the enduring economic bottlenecks and the technical, commercial and operational inputs that supported them. We focussed on the 'dumb' assets (ducts, poles, basic transmission equipment) contained within BT's access and backhaul network. Key product boundaries were then established for each vertical segment, such as LLU for broadband and Ethernet for business connectivity.
Governance	The Equality of Access Board (EAB) was created to monitor and report on BT's compliance with the Undertakings. The EAB is a committee of the BT Group Board. It is supported by its own secretariat, the Equality of Access Office (EAO), which reports to Ofcom and directly advises the BT Group Board on compliance with the Undertakings.
Employee incentives	All incentive remuneration of Openreach employees depends solely on Openreach objectives and is not linked to BT Group performance. Openreach employees also physically reside in a different location from the rest of BT to prevent the sharing of sensitive information.
Control of expenditure	The Openreach management team has to agree an annual operating plan with the BT Board, but within that operating plan can approve capital expenditure up to £75m. When making such decisions, it is required to take equal account of the requirement of all downstream providers.
Breaches and enforcement	While Ofcom is responsible for enforcing the Undertakings, BT and the EAB are required to identify and report on breaches. The EAB is then required to ensure that BT remedies them. The Undertakings are legally binding commitments, but we need to apply to the High Court to enforce a breach and we cannot impose any financial penalties on BT if a breach has

	occurred.
Separation of business systems and processes	Physical separation of the business process and IT systems used by Openreach and the rest of BT has been put in place both to support EOI and guard against inappropriate information flows. The ultimate intent of the Undertakings is for Openreach's data, applications and hardware to be both logically and physically separated from the rest of BT.
Northern Ireland	Functional separation as currently exists in Great Britain does not apply to Northern Ireland, where Openreach does not have a physical presence. However, all Openreach products and services are available to providers through BT Ireland's Wholesale division, which acts as Openreach's agent in Northern Ireland. To ensure that providers and BT's lines of business are treated equally, the EAO can investigate any concerns in relation to EOI in Northern Ireland.

11.14 Functional separation complements the conditions which apply to all providers of public electronic communications services or networks (such as access to emergency calls and obligations to protect the interest of customers with disabilities) as well as the ex-ante regulation imposed through the European Framework. The latter requires us to undertake reviews every three years of a number of digital communications markets, such as fixed access and business connectivity. We analyse these markets to determine whether they are effectively competitive before deciding on appropriate remedies, known as Significant Market Power (SMP) obligations.

11.15 When applying SMP obligations we have a range of regulatory tools at our disposal. For example, access to network products or infrastructure, price controls and non-discrimination obligations. Once these are in place, we continue to review markets to ensure that SMP regulation remains appropriate and proportionate in the light of changing market conditions.

11.16 Through both the Undertakings and the SMP obligations we have imposed on BT contain measures aimed at preventing discriminatory conduct when supplying services to its downstream competitors. For example, we have imposed certain SMP obligations on BT relating to accounting separation and cost accounting in markets where BT has been found to have SMP. This complements equivalence of inputs, which is discussed in more detail below.

Equivalence of inputs

11.17 Equivalence of inputs (EOI) aims to ensure a level playing field between BT's downstream business units and competitors purchasing access to its network. Openreach is required to supply a range of products and services to downstream rivals and its own downstream divisions on the same terms, at the same prices and using the same processes[179]. This ensures that any deficiencies in those products and services are felt by BT itself, as well as its downstream competitors, so that BT is incentivised to address them.

[179] *Consolidated version of the Undertakings (covering all variations up to and including variation number 24),* June 2014, p.52: http://stakeholders.ofcom.org.uk/binaries/telecoms/policy/bt/Consolidated_Undertakings24.pdf.

11.18 EOI was applied to enduring access bottlenecks, supporting competition including local loop unbundling (LLU), wholesale line rental (WLR) and wholesale Ethernet services. A number of BT's wholesale products remained within the BT Wholesale division, some of which had EOI applied under the Undertakings. For certain legacy products where we expected demand to decline over time, such as partial private circuits and carrier pre-selection, we concluded that the costs of retrofitting EOI were not likely to be justified by the benefits of enhanced competition.

11.19 As part of the Undertakings, BT committed that Openreach would process all requests for new product developments on an EOI basis. BT's Statement of Requirements (SoR) process enables Openreach customers formally to request the introduction of a new product or a change to an existing one[180]. All new product developments for SMP products, including requests by BT's downstream divisions, are determined by Openreach and provided to all CPs on equal terms.

Variations and exemptions

11.20 Since 2005 the Undertakings have had to adapt to technology change and market developments while ensuring the principles of EOI and functional separation continue to be safeguarded. This has meant that the Undertakings have evolved to incorporate some variations and exemptions. For example, as the Undertakings did not allow Openreach to control and operate electronic equipment in BT's access network, we agreed revisions to the Undertakings to allow Openreach to provide the VULA wholesale superfast active product[181].

We need to consider whether this is still the best way to deliver good outcomes for consumers

The current model has led to generally good outcomes, but there are some concerns, and the market has evolved

11.21 As discussed in Section 4, consumer outcomes over the last decade have been broadly positive, although there have also been some concerns. We have seen increased availability and take-up of fixed broadband, with consumers getting more for less as prices have reduced in real terms. Overall consumer and business user satisfaction with communications services is high. These outcomes have been delivered as a result of private sector competition, supported through regulation including, the renewed focus on LLU and equivalence, which has led to market entry and the emergence of scale competitors to BT in residential telecoms.

11.22 However, the current model has been established for ten years: during this time we have seen significant changes in the wider communications sector. Convergence has shifted the focus of retail competition beyond a single product towards a range of bundled products, including content and mobile services. As a result, all major

[180] The SoR process was put in place by Openreach as a consequence of section 5.11 of the Undertakings, but has been developed primarily though our market reviews under the European Regulatory Framework.

[181] Ofcom, *Variation to and Exemption from BT"s Undertakings under the Enterprise Act 2002 related to Fibre-to-the-Premises and Fibre Integrated Reception System*, March 2010, p.1, http://stakeholders.ofcom.org.uk/binaries/telecoms/policy/bt/fttp.pdf. Also see Ofcom, *Variation to BT's Undertakings under the Enterprise Act 2002 related to Fibre-to-the-Cabinet*, June 2009, http://stakeholders.ofcom.org.uk/consultations/fttc/statement/

players are extending their focus and activities into wider digital communications services.

11.23 At the same time, BT has pushed the boundaries of the access network to deploy superfast broadband and is making plans for the next round of investment in ultrafast services. We have also seen increasing demand for fibre-based Ethernet services in business markets. For both residential and business services, many consumers and communications providers remain dependent on the resilience and service levels delivered over BT's infrastructure.

11.24 BT's regulated access and backhaul networks are increasingly being required to do more, with a potentially growing investment and maintenance demand. At the same time, BT Group is responding to the changes brought about by convergence by investing in adjacent markets (such as its proposed entry into mobile) and facing new competitors (such as Vodafone in fixed broadband).

Competition concerns related to vertical integration remain, alongside wider risks for poor outcomes for consumers and businesses

11.25 Broadly, there are two sets of potential concerns that mean it is appropriate to consider alternative models of regulation. Firstly, BT's vertically integrated structure means that it still has the incentive to discriminate against competing downstream providers. Although the current approach limits its ability to act on this incentive, competition concerns related to discrimination may still remain.

11.26 Secondly, there could be a wider set of risks related to the current regulatory model that may lead to poor outcomes for consumers and businesses. For example, although all products are provided on an equivalent basis, the absolute level of quality of service provided on some products has been poor. Some stakeholders have also argued that, given its increased focus on deploying superfast broadband, Openreach faces limited incentives to invest sufficiently in maintaining its existing copper access network.

11.27 Some of these wider concerns can reinforce competition concerns. For example some stakeholders have argued that there is a discriminatory element to poor performance on quality of service, as lower service quality can lead consumers to favour well established brands.

We want to gather views from stakeholders on the advantages and disadvantages of alternative models of regulation

11.28 Given the changing market context and continued risks to competition and consumer outcomes more broadly, we need to consider whether alternative models of regulation could address any specific concerns. There are three broad sets of issues we need to take account of when thinking about whether a change in the model of regulation may be required:

- Competition concerns: Are there actual or potential sources of discrimination that may undermine effective downstream competition?
- Wider concerns: Are there wider concerns beyond competition that could be addressed through a different model of regulation?

- The changing market context: Are there areas where the current model of functional separation needs to be updated to reflect the current market context, such as changes to the underlying network architecture and economics?

11.29 When considering alternative options, we would ask stakeholders to focus on the extent to which the current model of functional separation, an enhanced model of functional separation, structural separation or any other means may most effectively and proportionately address any concerns identified.

Arguments for why change may be required to the current regulatory model

Potential competition concerns arising from discrimination

The potential for continued discrimination

11.30 The Undertakings require Openreach to deliver products to all downstream operators on an equivalent basis. However BT does not always use the same products as its competitors. For example, BT Consumer has largely based its voice and broadband services on WLR and SMPF, while large scale competitors including Sky and TalkTalk tend to use MPF.

11.31 In these instances equivalence is ineffective because BT does not consume the same products as others. Therefore we need to rely on detailed rules to address the potential for discrimination, which are subject to the risk of gaming given information asymmetries between the regulator, the regulated firm and its competitors. This could take a number of forms. For example, BT's rivals may suffer poor performance on the products they take, whereas BT provides better performance on the products that it takes such that BT's downstream division, and its customers, benefit from an improved retail customer experience.

New opportunities for discrimination

11.32 As telecoms services evolve, so new incentives and opportunities for discrimination may emerge. Many downstream providers, including BT, are extending into a wider set of downstream communications services to meet consumers' appetite for bundles. Given the network and service convergence described in Section 8, more of these services may make use of upstream fixed network inputs from Openreach, including access and backhaul. This might mean BT's incentive to discriminate between downstream providers increases.

11.33 For example, as many providers offer fixed / mobile convergent products and services, including BT, its incentives to discriminate between different downstream mobile providers in the provision of fibre mobile backhaul services may increase. This is one of the potential concerns arising from the proposed BT / EE merger[182].

[182] https://www.gov.uk/government/news/btee-merger-fast-tracked-to-phase-2-investigation

Differences in the underlying economics faced by BT Consumer and other downstream competitors

11.34 In addition to discrimination, BT's vertically integrated structure compared to that of its rivals could lead to competitive distortions in downstream markets. This risk could manifest itself in a number of ways.

11.35 While effective charge controls constrain BT's ability to undermine downstream competition, BT can make decisions based on overall BT Group returns rather than individual business units. An example of this is that BT Group could effectively consider payments between its downstream and upstream divisions (such as wholesale product costs) as internal transfers. Downstream competitors on the other hand view such payments as real cash outflows from their business.

11.36 Similar concerns may also arise where there is pricing flexibility for new wholesale products in markets where BT has SMP. In this example, pricing flexibility on the upstream wholesale product may give BT the ability to earn more profit in the uncompetitive regulated business (Openreach) and less profit downstream in the competitive unregulated business (BT Consumer). Therefore BT might have an incentive to rebalance its source of profits towards its upstream business to reduce the degree of competition it faces downstream.

11.37 There is a risk that this difference of perspective results in different commercial strategies, and potential competitive distortions. For example, if superfast broadband customers were to provide lower margins than current generation broadband customers at the retail level, they could still be equally profitable when considering upstream and downstream profits in the round for BT Group. Therefore BT may be neutral between its mix of retail customers. However, BT's competitors may face the dilemma of receiving lower overall returns if they want to change their mix of customers towards superfast broadband in such a case.

Product development

11.38 Some providers have raised concerns about the product development process through the fixed access and business connectivity market reviews. One concern is that Openreach favours requests which align with BT's wider interests and rejects a high proportion of requests from competing providers on the grounds that their request is not commercially attractive to Openreach. A related concern is that providing new developments to all providers simultaneously may have a negative effect on incentives to innovate and seek to differentiate services[183].

11.39 We are currently conducting work in this area, including closely monitoring SoRs as they progress through the process and attending working groups. When this work is completed later this year and we have gathered views from stakeholders as part of this review, we will decide whether further work is required to address the concerns raised. For example, we will consider whether potential measures could be introduced to increase transparency around the approval process.

[183] For more information see Annex 27, Business Connectivity Market Review, May 2015: http://stakeholders.ofcom.org.uk/binaries/consultations/bcmr-2015/annexes/BCMR_Annexes_Non_Confidential.pdf

Openreach boundary and de-regulation

11.40 De-regulation in our market reviews may also raise concerns with how the current model of functional separation deals with instances where Openreach sells both regulated and unregulated products. For example, Openreach is no longer required to provide very high bandwidth products in a specific area in and around London, although it does so commercially (i.e. where EOI does not apply). This means that there is more than one set of acceptable behaviours that its staff can adopt depending on the product being sold. Maintaining a culture focussed on equivalence could be difficult where Openreach both supplies downstream providers and competes with them.

11.41 A related issue is how we should respond to any concerns about BT market power outside of the current Openreach boundary. Although all products supplied by Openreach are made available on an EOI basis under the Undertakings, some BT Wholesale products are also subject to EOI. Over time, BT may have different degrees of market power associated with different products, so any form of separation will need to focus on those products most important to competition.

Cost allocation

11.42 BT is subject to regulatory financial reporting obligations. These provide us with some of the information we need to make regulatory decisions and to monitor BT's compliance with regulatory obligations. The reported costs of regulated services depend to a significant extent on the way BT allocates its costs to those services and markets.

11.43 BT has an incentive to allocate costs to those products which are not competitive, to increase the regulated prices of those products, and reduce its observed cost base in those markets where it faces competition. The simplest way in which BT might act on this incentive is by exploiting the discretion it has in the allocation of common costs by moving costs away from markets that have just been charge-controlled into markets that are about to be controlled.

11.44 We recognise that there may be legitimate reasons for BT to change the way it allocates its costs from time to time. However given information asymmetries, it can be difficult for us to distinguish these legitimate reasons from illegitimate gaming.

Q13: Are there any actual or potential sources of discrimination that may undermine effective competition under the current model of functional separation? What is the evidence for such concerns?

Wider challenges affecting outcomes for consumers and businesses

Quality of service

11.45 Although EOI seeks to ensure an equivalent level of service quality for all providers, we have broader concerns about the absolute level of quality of service provided for some products. We had hoped that equivalence would lead to Openreach delivering equally good service to all downstream providers, since BT would itself suffer if this did not happen. However, too often we observe equally poor service being delivered to all downstream providers, with consequently poor outcomes for all consumers and businesses.

Management focus

11.46 Structural separation might result in a greater management focus on operational performance. The Openreach CEO is currently incentivised to focus on the performance of Openreach, but reports to the BT CEO and the BT Board, who have a wider range of responsibilities. It is possible that a separated Openreach, with a management structure and Board that was only concerned about the performance of Openreach, would have a greater focus on quality of service.

Investment in new technologies and ongoing maintenance

11.47 There is a related question as to how Openreach investment decisions are taken. At present Openreach has the ability to take capital expenditure decisions, but within an operating plan agreed by BT Group, and decisions above this level are made by BT Group. In making such decisions BT Group is likely to consider a variety of factors other than the performance of Openreach.

11.48 As we set out above, BT and other fixed providers have already made investments in new networks, and announced longer term plans for further upgrades. In this context, some stakeholders have raised concerns on the incentives for Openreach to invest sufficiently in both new technologies and in maintaining existing access network connections. The potential risk is that under-investment in increasingly important network assets is affecting consumer outcomes and the UK overall.

11.49 A specific concern that might arise from this is that capital rationing within BT results in underinvestment in certain services, and therefore in poor quality of service. While Openreach's capital budget has been broadly stable in recent years, there have been some specific areas where expenditure controls may have affected service performance, such as the provision of broadband services to new housing developments.

Q14. Are there wider concerns relating to good consumer outcomes that may suggest the need for a new regulatory approach to Openreach?

Is there a case for an evolution of the current model of functional separation?

11.50 It is now ten years since the Undertakings and functional separation were implemented. Given the challenges identified above, we would like to gather views and evidence from stakeholders on potential areas where the current model of functional separation could be enhanced and how this would be achieved in practice.

Openreach boundary

11.51 The current boundary between Openreach and the rest of BT was set at a time when broadband was delivered from telephone exchanges, over the existing copper access network. Competition was therefore focused on unbundling individual local loops. It has already evolved incrementally since 2005, for example to include fibre-based services.

11.52 The boundary may need to change further to adapt to the technological evolution of BT's network. In particular, the deployment of new broadband networks taking fibre closer to the home, changing the topology of the access network and potentially leading to new models of competition. Looking further ahead, the possible switch off

of the PSTN and the move to IP interconnection may also have an impact on the Openreach boundary. For example, the extent to which voice services should remain within Openreach.

11.53 Similarly, changing competitive conditions may require us to consider alternative approaches to the Openreach boundary.

Governance arrangements

11.54 As the EAB is a committee of the BT Group Board chaired by a BT Group non-executive Director, some stakeholders have questioned whether it is sufficiently independent under the current set of arrangements. We would welcome evidence and views from stakeholders on this.

11.55 When thinking about how governance arrangements could be enhanced, other models of functional separation implemented elsewhere may have relevance.

11.55.1 In Singapore, separation of the fibre network has not been associated with any divestment and it is fully owned by the incumbent, SingTel. SingTel's stake is managed at arm's length by a Trust, with a structure designed to ensure a break in the incentive and behaviours of a vertically integrated company without undermining the beneficial ownership of the assets.

11.55.2 The Water Industry Commission for Scotland (WICS) has required separation between Scottish Water as a wholesaler and Business Stream as a retailer. Legal separation was implemented by establishing an arm's length body to take responsibility for Scottish Water's interest in Business Stream. Business Stream and Scottish Water have separate executive and non-executive boards and there are no cross directorships, except for a common chair.

Breaches and enforcement

11.56 Currently the Undertakings are enforced through a detailed set of rules and there could be a concern that this is not an appropriate instrument for ensuring compliance. For example these detailed rules may not allow enough flexibility for us and BT in allowing the obligations to evolve with changing circumstances.

11.57 One possible alternative approach, used in some sectors such as financial services, is to have a mix of principles focussed on the desired outcomes together with detailed rules. However this might require us to expand the interpretative role of the EAB/EAO, where we would need to consider whether it is appropriately constituted to take on such a role.

11.58 To enforce breaches of the Undertakings, we need to apply to the High Court and do not have the powers to impose financial penalties on BT. Given the detailed nature of the Undertakings, the nature of the enforcement process may not provide the same incentives to comply as, say, a power to impose fines for breach of the Undertakings. While we do not have direct evidence in this regard, we may want to consider whether the ability to levy fines would provide a stronger incentive effect on BT's behaviour.

Northern Ireland

11.59 Functional separation does not apply to Northern Ireland. Here BT Ireland's Wholesale division acts as an agent of Openreach[184]. Some providers operating in Northern Ireland have expressed concerns that the absence of Openreach from Northern Ireland could give BT Retail an advantage over other CPs. These concerns have been examined by the EAO and no significant issues have been found to date. However, extending functional separation to Northern Ireland could provide a further safeguard.

Q15. Are there specific areas of the current Undertakings and functional separation that require amending in light of market developments since 2005?

An alternative may be structural separation, a one-off intervention which would significantly alter the market structure

11.60 There is a wide range of options for how to implement different organisational structures. This section focuses on the alternative approaches that could be used under a structural remedy.

11.61 Structural remedies are one-off measures that seek to increase competition by altering the competitive structure of the market. In communications markets, structural separation could be used to prevent a vertically integrated incumbent, with control over an access bottleneck, leveraging its market power into downstream competitive markets.

11.62 This would require BT to split its vertically integrated operations: one would provide non-competitive services, the other potentially competitive services. These should be separate legal entities, with no significant common ownership. In some circumstances 'line-of-business' restrictions can be imposed to prevent the non-competitive firm from re-entering competitive activities.

There are many different ways that firms can be separated

11.63 There is no simple boundary between those parts of BT's network where it has enduring market power and those where competition is possible. Therefore structural separation can take a number of forms depending where the dividing line is drawn between competitive and non-competitive elements.

11.64 The choice of where to separate is important as it can have a significant bearing on the degree of the model of competition and implementation. Different models will expose more or less of the value chain to competition. At one extreme, passive infrastructure assets (such as poles, duct, copper and fibre) could be separated and placed into a separate entity. At the other, the separated entity could include all network activities, and the other entity focussed solely on retail operations. There is a spectrum of options in between, for example the asset split established through the creation of Openreach.

11.65 We have seen different models of structural separation in telecoms. Perhaps the best known is the breakup in 1984 of the US incumbent AT&T to promote competition in

[184] CPs in Northern Ireland can also deal with Openreach directly if they so choose.

long distance and international calls. US policy was revised in 1996, allowing the re-integration of telecoms services, ultimately resulting in the current structure of AT&T and Verizon.

11.66 More recent examples of structural separation are where it has been secured not as a competition remedy, but as a requirement made by Governments for public funding for superfast broadband deployment.

- Singapore: As part of the next generation national broadband network programme, Singapore required the structural separation of the fibre network operator (NetCo) from the active infrastructure level and from retail service providers. NetCo is responsible for the passive infrastructure and must offer wholesale dark fibre services to all active operators, who then market services to households and businesses. The creation of NetCo has however not yet been associated with any divestment.

- Australia: Australia has a model of structural separation based on Telstra and Optus' access networks. The government-owned NBNCo is responsible for rollout of a FTTP network (although this is now based on a mix of technologies). Telstra was forced by legislation to structurally separate. It also de-commissioned its copper and cable networks and leased these assets to NBNCo before migrating its customers to the new NBNCo network.

- New Zealand: New Zealand has moved from a previous intervention to functionally separate parts of Telecom New Zealand to structural separation. Telecom New Zealand structurally separated its existing business into two new and separate, publicly listed businesses, Telecom New Zealand (retail) and Chorus (infrastructure). This allowed Chorus to play an important role in the New Zealand Government's deployment of a FTTP network.

11.67 The Australian case in particular has illustrated the scale of the practical challenge associated with structural separation. While the superfast broadband initiative was announced in 2009, agreement with Telstra and Optus to separate their networks was only reached in 2014. Initial plans for a full FTTP rollout also had to be abandoned in favour of an approach using a mix of technologies including FTTC and wireless solutions.

11.68 On the other hand, Singapore provides some indication of the potential benefits associated with separation. There is now full national availability of fibre broadband services and low barriers to entry and non-discriminatory access to fibre have attracted new service providers into the market.

11.69 Structural separation has also been applied in a number of utilities, notably railways and gas, with differing outcomes. In gas, post-demerger coordination between retail demand and gas supply was efficiently done via contractual means. However in rail, there was a misalignment of incentives between the network and train operating companies which contributed to delays in having new rolling stock available to meet increased demand.

The case for structural separation represents a difficult trade-off between competing arguments

11.70 There are a number of arguments for why structural separation could deliver potential benefits, which are summarised in Figure 31 below.

Figure 31: Potential benefits associated with structural separation

Addressing discriminatory behaviour	As noted above, the rationale for functional separation was BT's ability and incentive to discriminate against its downstream rivals. Stakeholders have raised continuing concerns about the potential for such behaviour to occur. For example, there are circumstances where Openreach makes products available to others on an EOI basis, but BT's downstream business does not use these products. Stakeholders have raised the possibility that there could be differences in the pricing and performance of products consumed by BT and those consumed by its competitors Structural separation would remove the incentive to discriminate by leveraging market power downstream. It could also potentially result in a material degree of regulatory simplification compared to the current set of rules. The separated entity would still have the ability and incentive to strike different deals with different wholesale customers, for example to deliver risk sharing through volume commitments and discounts. While this may not result in competition concerns directly, it may raise barriers to entry for new retail providers.
Concerns regarding cost allocation	BT has an incentive to allocate costs to non-competitive products in order to increase the regulated prices of those products and reduce its observed cost base where it faces competition. Another possible concern might be a cross-subsidy between competitive and non-competitive products. This may allow BT to make commercial decisions in the competitive parts of its business which may distort competition. Introducing structural separation would ensure greater transparency of cost information and cost allocations, as there would be a clear delineation of costs for the set of assets owned by each legally separate entity.
Openreach performance	Openreach does not face the same incentive to deliver quality of service that it would face in a competitive market. We have addressed recent concerns regarding quality of service by imposing a series of specific performance targets on Openreach. Structural separation may not change the incentives of Openreach as a monopoly to deliver higher quality of service. However, it might reduce the risk that capital rationing within BT Group results in less ongoing maintenance investment (and therefore poorer quality of service) and result in a greater management focus wholesale product performance.
Increasing Openreach network investment	Some stakeholders have argued that a structurally separated Openreach would invest more. There are several reasons why this might be the case, such as a singular focus on the underlying network and no concerns about cannibalising downstream revenues by new networks and services.

11.71 Conversely, there are arguments cited by some stakeholders as potential challenges associated with structural separation.

Figure 32: Potential challenges associated with structural separation

Determining the correct boundary	Structural separation would require full divestment and separate commercial ownership of the different assets, meaning that the types of compromises adopted when designing Openreach may not be practical. Getting the boundary right first time would be complex as networks, technologies and competitive conditions continue to evolve. It may also be rather more difficult to change once implemented, than it has been to vary the current model.
Ability to co-ordinate investment	It can be argued that vertical integration allows closer co-ordination of retail demand with upstream network investment. Such co-ordination may not be as straightforward under structural separation. An argument that is often put forward in this area is that by separating the businesses, Openreach may effectively lose an 'anchor tenant' in BT Consumer that is prepared to provide guaranteed demand for new network investments
Requirement for ongoing regulation	While regulation would be simplified by eliminating the incentive to engage in non-price discrimination, there would still be an ongoing need for some regulation where Openreach retained significant market power. In particular it is likely we would have to intervene to set prices for Openreach products, and may also need to continue to intervene to ensure an adequate quality of service.
Implementation costs	Both structural and functional separation carry significant costs, either one off or ongoing. These include the direct costs associated with implementing a new structure, potential disruption to consumers' services during the transition, and the risk that uncertainty impacts on investment levels.

Whatever the benefits, structural separation would need to be justified and proportionate

11.72 As a public body, we have to be able to show that our decisions are objectively justifiable on the facts and proportionate to the aims that we are seeking to achieve. In particular, the proportionality requirement means that options less intrusive than structural separation would need to be shown to be insufficient at remedying the harm identified. This would involve demonstrating that both existing remedies have failed to resolve these concerns in recent years and that the other potential remedies available would be similarly insufficient.

11.73 We are therefore interested in stakeholder's views and evidence on the prospective benefits of structural separation for consumers.

Q16. Could structural separation address any concerns identified more effectively than functional separation? What are the advantages and challenges associated with such an approach?

Summary of alternative options

11.74 There are a variety of possible alternatives we could consider and we want to understand the merits of these compared to other options for securing good outcomes over the long-term. Broadly, these fall into the three categories set out below, although we note there is a spectrum of possible changes contained within these.

- **Continuation of our current approach**. We may conclude that the current strategic framework for regulation remains appropriate, and that any concerns which do arise can be fully addressed through the normal cycle of market reviews, or via existing dispute resolution mechanisms.

- **Strengthening the current model of functional separation**. Under this approach we would address any concerns with the current regulatory settlement either by through variations to the existing BT Undertakings and/or the imposition of new regulatory conditions set within the European SMP Framework, which could include an enhanced model of functional separation itself.

- **Consideration of structural separation**. Structural separation would address the underlying incentive to discriminate against BT's competitors, and could do so in a manner that may allow simplification of the regulatory framework.

11.75 The options listed above are not specific proposals for intervention by Ofcom, but are our initial thoughts on what the broad types of alternatives might be. We welcome views and evidence from stakeholders on benefits of these different options and whether there are any alternatives.

We are interested in views on whether there is scope for de-regulation associated with our current approach

11.76 Section 14 discusses the potential for deregulation of fixed telecoms services in the event that the prospects for end-to-end competition increase over time. A strategic approach based on end-to-end competition would also have a bearing on issues of separation: if there was sufficient end-to-end competition in the market, the need to regulate of BT based on its vertical integration would be substantially diminished.

11.77 Functional separation was implemented to address BT's incentive and ability to discriminate against downstream competitors. If these concerns were to have diminished, there may be arguments that functional separation is simply no longer required. We are interested in stakeholders' to views and evidence on whether the need functional separation has diminished since 2005.

Questions for discussion

Overarching issue	Specific questions
Are there changes in competitive outcomes or the overall market context that might suggest the need to update or evolve the current model of fixed access network functional separation?	*Q13: Are there any actual or potential sources of discrimination that may undermine effective competition under the current model of functional separation? What is the evidence for such concerns?* *Q14. Are there wider concerns relating to good consumer outcomes that may suggest the need for a new regulatory approach to Openreach?* *Q15. Are there specific areas of the current Undertakings and functional separation that require amending in light of market developments since 2005?* *Q16. Could structural separation address any concerns identified more effectively than functional separation? What are the advantages and challenges associated with such an approach?*

Section 12

Empowered consumers

12.1 This section sets out Ofcom's current approach to empowering consumers – which may include residential consumers and businesses as relevant. We begin by setting out our current approach, including how to make sure they have the relevant information as well as the ability to exercise effective choice. We then consider whether this approach might need to be adapted and more should be done for consumers and businesses in light of existing and anticipated market developments. In parallel, Section 14 considers whether any existing interventions for consumers could be removed.

It can be necessary to intervene on the demand-side when markets do not work as effectively as they could

12.2 As we have set out earlier in this document, our starting point is that well-functioning, competitive markets are the best means of delivering good outcomes for all consumers. However, even in competitive markets, there can be factors which prevent consumers getting the best from markets – for example because they find it difficult to compare offerings or face artificial barriers to switching. There are a number of risks on the 'demand side' that could result in ineffective consumer choice, harm to consumers or the exclusion of some groups of consumers.

12.3 To address such risks, we have an approach to consumer policy based on three pillars: empowerment, protection and participation:

Consumer empowerment	Consumer protection	Consumer participation
Delivering benefits of competition to consumers by ensuring that they have the information, tools and processes they need to navigate and secure benefit from markets for themselves.	Protecting consumers from harmful behaviour and unfair practices by CPs (e.g. mis-selling or mid-contract price rises).	Based on public policy objectives, it includes ensuring that no one is excluded from the benefits of the services we regulate. It covers the availability, take up and effective use of services.

12.4 In this section we focus specifically on the consumer empowerment aspect of consumer policy and its role in supporting competition. However, we recognise that there are important linkages between the three elements of our approach: each of them is equally important in enabling us to achieve our objectives.

12.5 Communications services differ from the utility services provided by other network industries such as energy or water in that they comprise a range of different services, offered by different providers, and aimed at different consumers. This range of choice and differentiation brings benefits for consumers. In principle, they can find services or packages of services which most closely meet their needs. However, in practice consumers can only realise these benefits if they are able to exercise effective choice.

12.6 For the benefits of competitive markets to flow through to consumers, consumers themselves need to be engaged. This means that they need to be able to shop

around, have relevant information at their disposal and be able to make the choice that is right for them. Consumer policy is sometimes referred to as the "demand-side" of competition policy because consumers have an important role to play in the operation of effective competition. For example, if consumers find it difficult to switch when they received a poor service, or in the face of high prices, then firms will have less incentive to respond to the needs and preferences of their customers.

12.7 There may be a range of possible problems that prevent consumers from engaging effectively with firms. These demand-side factors do not necessarily relate to the presence of market power and can be a general feature of the market rather than specific to one company. Examples include:

- Limited or incomplete information: a lack of information and transparency for consumers leading to them being unable to make the best choices. For example, if consumers do not have clear and easy to understand information relating to a service's technical aspects such as download speed or traffic management, then firms are less likely to compete on that particular service feature. As a result, consumers may not be able to identify the communication provider that offers the service best suited to them.

- Behavioural factors: systematic patterns of behaviour (or biases) can adversely affect the ability of consumers to make fully-informed choices. This can influence the choice of product attributes on which firms choose to compete, resulting in consumers buying products that may not be best suited for them, over-paying for the service they use, or entering contracts unwittingly. An example is automatically renewable contracts where status quo bias[185] resulted in customer inertia and limited switching. This led to Ofcom ensuring that consumers renew their contracts by 'opting-in' to the new contract term rather than needing to 'opt out' of the renewal occurring automatically.

- Coordination problems: a lack of co-ordination between firms can also negatively impact markets and consumers. Firms may not have the incentive to co-ordinate on the design of processes or systems. For example, we mandated Gaining Provider Led (GPL) switching for services using the Openreach and KCOM networks in 2013[186] to ensure that consumers are able to switch easily.

12.8 The presence of one or more of these factors does not of itself imply a need for regulatory intervention. In deciding whether or not to intervene, and how, we also consider:

- whether the demand-side factor identified is an enduring feature of the market or transitory in nature. In some cases, problems could be short-lived given consumer behaviour adapts or market-based solutions emerge to help consumers tackle these problems;

- the risk of regulatory failure or any unintended consequences from taking action;

- whether the intervention is proportionate in terms of cost and level of intrusiveness to the scale of harm; and,

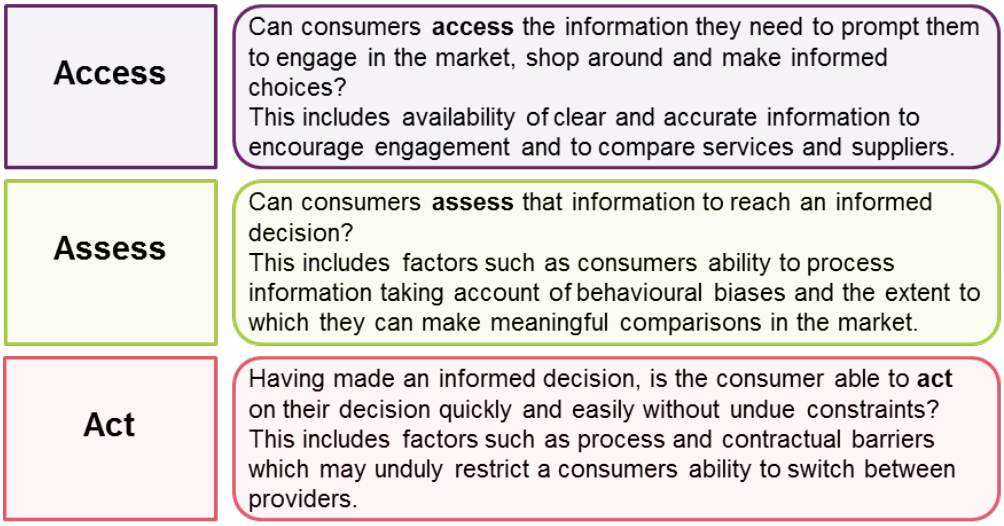
[185] A "status quo" bias refers to a pattern of behaviour in which consumers give disproportionate weight to their existing position and prefer to stick with it even when other, better options are available.
[186] These changes then came into effect in June 2015.

- what forms of intervention could be most effective (e.g. 'nudging' in relation to consumer behaviour).

There are a number of key stages for consumers to make effective choices

12.9 In thinking about how to enable consumers to make effective choices, it is helpful to use the CMA's Access – Assess – Act framework[187]. This framework sets out the key elements that consumers need in order to make informed decisions in the market across the lifecycle of their decision making process.

Figure 33: CMA's Access – Assess – Act framework



Source: CMA

Our work to date has focussed on improving both the information available to consumers (access) and switching processes (act)

12.10 Ofcom's current approach to consumer empowerment has focused on two key issues: access to information and ability to switch.

- We want to make sure consumers have access to relevant information that enables them to make accurate comparisons between services.

- We want to ensure consumers are able to act on this information, switching providers quickly and easily if that is what they decide to do.

'Access' to clear and useful information

12.11 In general we expect communications providers operating in competitive markets will have incentives to provide relevant information to consumers through their usual marketing or advertising. Such information can be used to attract new customers, or to retain existing customers. It may cover product price, quality and specific features. It can also include brand messaging.

[187] Original paper by OFT (predecessor to CMA), *What does Behavioural Economics mean for Competition Policy?*, March 2010, OFT1224

12.12 If consumers struggle to understand this information, then firms may have less incentive to compete on these aspects. In addition, firms may only have the incentive to provide information that actually confers a competitive advantage. For instance, providers may have little incentive to market broadband services using information on the speeds typically achieved when other providers are marketing their services based on the maximum achievable speeds.

12.13 Further problems in leaving the provision of useful and comparable data to the industry relate to consumers' trust in industry provided data, as well as industry's ability to generate comparable data. Whilst a market leader may have an incentive to provide comparative information on its service versus competitors, there is the risk that this is, or is perceived as being, biased. Alternatively industry may not have access to comparable data on competitors' performance (for example, on quality of service or complaints). In either case, a trusted third party may be required to collect and disseminate clear, transparent and comparable data.

12.14 In general, we have witnessed problems with certain types of information being provided to consumers in clear and transparent ways. These have included:

- Quality of service information: in a competitive market, we would anticipate providers compete on the basis of service quality and offer consumers information to support this. However, issues can arise when information about the quality of service relates to an aspect of performance that is not apparent to consumers at the point of sale (e.g. mobile coverage) or can be technically complex and hard to interpret properly (e.g. traffic management or contention ratios etc).

- Complaints data: there may be information that would be relevant to consumers' decision-making but firms would not have any incentive to provide it to consumers.

12.15 As a result, we have pursued three related courses of action.

- Firstly, we have encouraged providers to offer certain product specific information themselves: for example SMS alerts on roaming fees, broadband speeds information at the point of sale;

- Secondly, we have researched and published our own comparative information of providers' performance and quality on a range of more complicated technical areas such as broadband speeds[188] and mobile coverage. In addition we have also published firm specific complaints data and quality of customer service research; and

- Thirdly, we have published a range of consumer guides aimed at better informing consumers directly.

12.16 Some examples of specific Ofcom interventions to improve information for consumers include the publication of:

[188] We are aware that there are also some commercial providers that have started to publish industry-level information e.g. Root Metrics publishes research on mobile coverage. This could represent a useful alternative source of information for consumers and may allow consumers to access more tailored information.

- fixed and mobile broadband speeds by operator;
- a Broadband speeds Code of Practice which requires communications providers who sign up to the Code to provide information to consumers on the speeds they can realistically expect to receive;
- traffic management Key Facts Indicators ("KFIs"): at Ofcom's instigation, ISPs publish a KFI table summarising the traffic management policies that apply to the different packages that they offer;
- provider specific complaints data on the relative volumes of complaints;
- provider-specific mobile coverage maps for voice and data services;
- provider specific information on handset locking / unlocking policies and charges;
- accreditation of price comparison websites to ensure that price calculators are accurate and comprehensive;
- guidance on services that may help reduce nuisance calls and the charges applied by communications providers for those services; and
- 'access' charges for calls to non-geographic numbers by each provider.

12.17 Whilst helpful to consumers directly, the publication of comparative information, including more technically complex data, can help in a number of other ways. Information in the public domain has been picked up by informed third parties (e.g. comparison websites, trade press) to highlight differences in performance. It has been reflected by the mainstream media, drawing attention to the differences between providers and providing consumer advice to their readers. It also helps inform policy makers on the state of consumer outcomes. Taken together with direct consumer action, all of these effects can help incentivise improved performance by industry.

Reducing barriers to switching allowing consumers to 'act'

12.18 Switching is important both to the operation of competition and to the consumer experience of participating in the market. If it is difficult or time consuming to switch then competition can be adversely affected and consumers may have a poor experience of exercising choice. This could put them off switching again in future.

12.19 Our interest in switching is not to encourage switching for its own sake but to make sure that switching processes do not act as artificial barriers for consumers who have shopped around and wish to change provider. In communications services, experience has shown that switching processes left to industry have in some cases led to poor consumer experiences. For instance, communications providers did not have incentives to move away from the losing provider led MAC process for broadband switching despite the poor outcomes it resulted in for consumers. As a result the effectiveness of supply side competition could also be undermined.

12.20 We have stated our high level principle that, all else being equal, Gaining Provider Led ("GPL") processes will deliver the best outcome for consumers. This is because the gaining provider has an incentive to make the switching process smooth and easy.

12.21 We have undertaken a number of specific actions to help improve consumers' experience of switching, including action to improve the process, reducing the financial costs, reducing inconvenience and minimising complexity. These have included:

- requiring providers to reduce the time taken to port numbers between mobile networks;
- introducing GPL-switching process for fixed voice and broadband on the Openreach and KCOM networks;
- mandating processes to minimise the risk of loss of broadband service when switching dual play bundles;
- mandating process changes to reduce the risk of the wrong line being switched in error;
- banning of contractual lock-ins (e.g. Automatically Renewable Contracts);
- fairer early termination charges; and,
- enabling the ability of consumers to exit/switch without penalty where prices increase mid-contract

We have already identified additional areas of focus in the near term

12.22 Through our ongoing consumer policy work programme, we have already identified or proposed a number of actions to make sure adequate information is available to consumers and that they can switch easily if they want to. These include:

- a forthcoming consultation on improving switching processes for mobile services;
- considering options to extend our work on the switching of bundles to include the switching of triple play bundles;
- providing further information on provider-specific mobile coverage;
- considering how best to provide information to SMEs on upload and download broadband speeds (and a commitment that providers allow the SME to exit the contract without penalty if speeds fall below a certain minimum);
- assessing the cancellation policies and the practices providers employ and whether this harms consumers' ability to switch; and
- researching whether requiring consumers to be notified or "prompted" at the end of their minimum contract period would improve consumer engagement.

In future, consumers may face a number of increasing challenges in exercising effective choice

12.23 As we set out in Section 4, there are a number of emerging trends which may affect consumers' ability to assess the choices available to them and act on them. These trends will bring benefits to consumers but can also increase the challenges they face in making effective choices. Examples include:

- Greater differentiation, bundling of services and more complex pricing strategies are making it harder to compare and engage with services from the same provider and across multiple providers given:

- an increasingly large range of products and services;

- the need to make trade-offs between the various product attributes of all the services that make up a bundle; and,

- difficulties in making like-for-like comparisons across bundles and over time.

- The potential for some markets to become more concentrated (have fewer providers e.g. mobile) means that ensuring that there are no artificial barriers to switching is also likely to become more important.

12.24 Consumers' expectations about the level of service that they receive are also increasing over time. Since Ofcom was first established, access to a reliable internet connection and mobile phone have become essential to the way consumers work and live their lives and the functioning of the economy in general.

Greater product, pricing and bundle complexity may reduce consumers' ability to assess the choices and make informed decisions

12.25 Given that consumers already face a number of challenges in making informed decisions, there is a risk that the impact of increasing complexity combined with the effect of behavioural biases (e.g. status quo bias, using "rules of thumb", limited attention span etc.) could make these challenges more significant over time.

12.26 Increasing complexity may reduce consumers' ability to achieve the best deals in the market because they may struggle effectively to assess the information available to them. There is a risk that consumers simply feel overwhelmed by the issues and information they need to take into account when assessing their choices and opt not to shop around but to stick with the packages or services that they are getting from their current provider. Alternatively, they may decide that the gains from switching are not sufficient to justify both the increasing time and effort required to reach a decision. As a result, consumers may not bother to engage with the choices available to them or not make good choices for their own particular circumstances.

12.27 A reduction in the level of engagement by consumers may well in turn reduce the competitive discipline that consumers exert on providers of communications services and reduce the extent of competition.

12.28 As consumers are faced with more and more complex bundles, their ability to take all the different aspects of the bundle into account in their decision-making and to make an informed assessment will be compromised. For example, in choosing a bundle of telecoms services, some consumers may focus more on "headline" features such as speed or the number of inclusive minutes depending on what is most important to them. What those consumers may overlook is other aspects of the bundle which could nevertheless have a significant impact on the overall cost of the service[189]: for

[189] This is perhaps analogous to issues experienced in "aftermarkets". That is, the situation where (for example) having bought a particular make of printer because of its low price, a consumer can then be tied into using that company's expensive printer cartridges. In the case of choosing a communications provider, consumers may not necessarily take into account all the different cost aspects of the bundle

example overseas calls from a fixed line or the cost of roaming while abroad for mobile services. In such situations, the provision of more and more information may not in fact help the consumer because consideration of these other aspects is not necessarily prominent at the time of making their decision. In such situations, there may be a case to consider different forms of intervention on the demand-side (see also below).

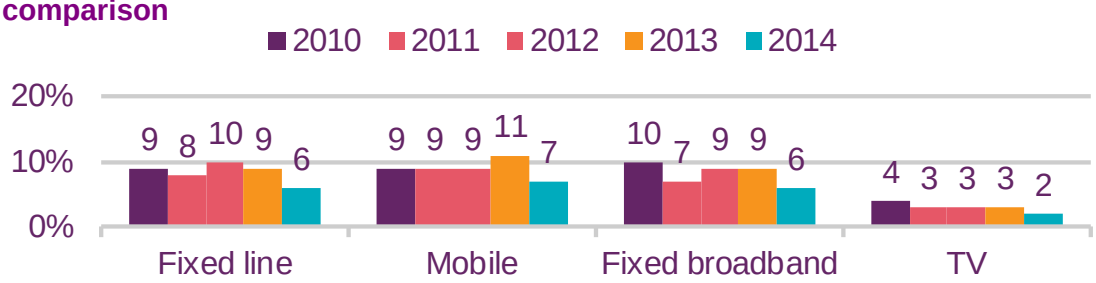
12.29 The issue of complexity is likely to raise issues not just for residential consumers but also for SMEs and even potentially larger firms. For instance, recent research by Ofcom in relation to SMEs has indicated that some SMEs can struggle to navigate the options that are available to them. This results from a combination of the fact that the technical choices available to SMEs tend to be quite complicated and SMEs often lack the internal expertise to be able to make informed purchase decisions or to understand what is involved in moving between providers.

Increased complexity in service offerings may unduly discourage switching

12.30 Market developments can make it more complicated for consumers to switch between providers. Such developments may include the drive towards offering bundled services as the default, a greater focus on customer retention activity, and more complex contracts.

12.31 We note that the level of switching in a number of communications markets declined between 2013 and 2014. For landline and fixed broadband products, switching rates have each dropped 3 percentage points to 6% and in mobile, the switching rate has fallen by 4 percentage points to 7%. The total level of switching of the main pay TV remains low at 2% but this is statistically unchanged from the previous year (3%).

Figure 34: Switching in communications markets in the past 12 months, year-on-year comparison



Source: Ofcom, The Consumer Experience of 2014: Research report, p.163

12.32 This compares to gas and electricity markets where switching rates have been broadly stable at 12% for the last 3 years. In the case of car insurance, 33% of consumers had switched provider in the last 12months[190]. We will continue to monitor the level of engagement and switching in our sectors in order to understand consumer outcomes.

12.33 Although we should be cautious about reading too much into a 12-month comparison, any trend reduction in switching rates could be exacerbated in future. For example, bundling means that consumers may need to need to navigate different

(or some aspects of the contract may not be fully specified) and the consumer then finds themselves tied in to that provider for the duration of their contract for all related communications services.

[190] *The Consumer Experience of 2014: Research report*, January 2015, p.175: http://stakeholders.ofcom.org.uk/binaries/research/consumer-experience/tce-14/TCE14_research_report.pdf

switching processes (and possibly different contracts) when switching different elements of a bundle. Today, of consumers who have switched at least one of their communications services, only 8% of those switched three services at the same time.

12.34 Increasing service maturity and consolidation may lead to a greater focus from providers on customer retention strategies from their now larger customer bases. Reducing customer churn, and focussing on retaining existing customers, can help providers reduce their costs. However, a focus on customer retention strategies by providers can also mean that consumers find it more difficult to switch.

Should we do more to empower consumers to make effective choices?

12.35 In light of these challenges, we think it is appropriate to ask whether Ofcom should do more to empower consumers to make effective choices[191]. For example:

- Is there more or different information we should gather on the experience of consumers and citizens?
- Are there additional or different types of interventions that could help further empower consumers in making choices in the market?

Measuring consumer outcomes in more detail

12.36 We already measure outcomes on consumer experience to inform our work. For instance, we use complaints data to help identify emerging issues and trends, and to measure the effectiveness of interventions.

12.37 However we could extend our approach and assess additional metrics, which might help refine our policy focus or identify emerging issues earlier. There is a range of additional information we could collect. We could regularly monitor certain metrics against pre-defined thresholds, for example switching and engagement levels or consumer awareness of other providers. Another option would be to gather more information related to the use of consumer insights, such as user generated reviews of customer experience or usage data.

12.38 In addition to extending the range of information we collect, we could be more pro-active in monitoring those metrics as a whole. Rather than focus on one specific metric, we could assess the wider message coming from a range of different metrics and evaluate whether there were anomalies that warrant further investigation. Voice only customers are one potential example. Survey responses show these consumers are satisfied with their service, but are not aware of key product attributes, such as price or the availability of alternative products. At the same time, separate information on pricing indicates that voice only customers have experienced real-terms price increases over the last few years. Taken together, these indicators suggest that this group of consumers may not be effectively engaged in the market.

[191] We note that in the provisional findings on its Energy Market Investigation, the CMA has identified weak consumer engagement as an issue in the domestic retail markets for electricity and gas in Great Britain. See *Energy Market Investigation: Summary of Provisional Findings*, July 2015, p.26-30: https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/442500/EMI_PFs_Summary.pdf.

Identifying potential future interventions

12.39 In light of increasing complexity and its implications for consumer assessment of choices and switching, we welcome stakeholders' views on whether we should seek further ways to help consumers make effective choices. We provide some explains of what these actions could be below. They are not intended as specific proposals but rather initial ideas to prompt stakeholders' responses and generate ideas for alternatives.

12.40 In particular, we would be interested in stakeholders' views as to the scope for Ofcom to make greater use of "nudges" in this area. "Nudges" are specific demand-side remedies which are designed to steer consumers in a certain direction in terms of their decision-making but (crucially) do not force an individual to make a specific decision.

Improving consumers' ability to 'Access' relevant information and 'Act' on their decisions

12.41 We have identified above a number of areas in which we are already planning to do further work and analysis in respect of 'access' and 'act' elements of consumer empowerment. In addition, we are interested in understanding whether there is more that could be done to reduce barriers to switching. This could be through actions on switching processes, contractual barriers or more effective prompts for consumers to re-engage with their choice of communications provider.

12.42 Potential issues that Ofcom could consider include:

- aligning the contract end-dates for services within a bundle to make sure that multiple services can be switched more easily;
- moving to harmonised switching processes over time, regardless of the network over which a service (or bundle of services) is delivered.
- assessing the consumer benefits and costs of minimum contract periods where they are applied to contract renewals or upgrades where there are limited up-front costs to the communications provider;
- assessing the ability to port personal data and other content or services when switching service provider;
- fixed number portability in the case of SMEs; and,
- investigating incidents in which CPs appear to be adopting more aggressive retention techniques which make it difficult for consumers to cancel their existing subscriptions.

Helping consumers 'Assess' the choices available to make informed decisions

12.43 As services and tariffs become increasingly complex, consumers are more likely to find it challenging to take into account all the relevant information when considering their choices in the market. As a result of this, the impact of behavioural biases on choice could become more pronounced in the future. To address these developments, we might to consider interventions focussed on enabling consumers to more easily assess the choices available in the market and make informed decisions. We set out some options for potential interventions below.

Enhanced price comparison websites / intermediaries for residential users

12.44 Commercial intermediaries such as price comparison websites (including brands such as uSwitch and GoCompare as well as comparison services accredited by Ofcom[192]) provide information to consumers on communications services. At present around 8-15% of consumers say they make use of such services when looking for information about options to switch[193]. By comparison, in the energy sector 40% of consumers use such services[194]. There is clearly scope to build on this. We have set out some potential areas for consideration in the table below and we would welcome views from stakeholders on these and any alternative options.

Figure 35: Options for improving price comparisons services in communications

Access to data	We could do more to help intermediaries access a wider range of data. For example, today comparison services are not able to provide specific broadband speed estimates for an individual. We could also consider the format in which information is provided. For example, in the energy sector data on consumption has been made available to consumers in a machine-readable format to help price comparison sites develop tailored recommendations.
Consumer prompts	In other markets, such as energy, comparison services are able to engage more directly with consumers and there could be scope to use similar approaches in communications. Examples include prompting customers at the end of their contract and managing the switching process on their behalf.
Collective switch initiatives	"Collective switch" initiatives are led by trusted third party intermediaries (such as Which?) who aggregate demand across consumers to negotiate with energy suppliers on their behalf. We want to understand whether this approach could also play a role in communications sector and whether there are any barriers that might prevent the emergence of such initiatives.
New forms of intermediary	'Next Generation Intermediaries' are new types of intermediaries that take on responsibility for engaging in the market on behalf of consumers. These intermediaries find the best deals for consumers based on their individual needs and switch them directly to those deals.
Promoting trust	For comparison services to be effective, it is important consumers have confidence in the integrity of their recommendations. We currently have a price accreditation scheme in place, which we could look to expand. Another option would be to ensure transparency in the operation of these services is and how they are rewarded by communications providers that they recommended.

[192] For details on the Ofcom accreditation scheme see http://consumers.ofcom.org.uk/tv-radio/price-comparison/

[193] *The Consumer Experience of 2014: Research report*, January 2015, p.190: http://stakeholders.ofcom.org.uk/binaries/research/consumer-experience/tce-14/TCE14_research_report.pdf

[194] CMA Working Paper, *Energy market investigation: Price comparison websites,* February 2015, p.12: https://assets.digital.cabinet-office.gov.uk/media/54ef378a40f0b61427000005/Price_comparison_websites.pdf

Comparison services for small and medium sized businesses (SMEs)

12.45 A number of SMEs have expressed the concern that they struggle to identify and navigate the range of options that are available. Although there are some comparison services which offer services to SMEs, they tend to be limited in terms of number of providers that they cover and not widely used. The majority of SMEs buy communications services from providers on the phone or during a visit by a sales person or an engineer, rather than online.

12.46 Our recent work on SMEs found little appetite among price comparison websites to develop further the existing price comparison services for business customers. Providers of comparison services have told us that price comparison for business communications services can be complex given the diverse nature of SMEs' demand and the large number of smaller providers present in the market.

12.47 We would welcome comments from stakeholders as to whether greater use of third party intermediaries would be helpful to SMEs. If this is the case, and more services are sold online over time, we may have a role to play in removing any barriers to the development of such services.

User-generated recommendations

12.48 Increasingly, apps that measure usage[195] can help consumers track their own individual consumption patterns and compare their usage with other end-users. Recommendations on social media can also play a part in identifying alternative providers and in particular in terms of providing feedback on specific aspects of product and services to other consumers. We would be interested in understanding if there are any barriers to their continued operation, and whether more could be done to support the accurate and effective provision of information via this route.

Devising a set of common comparators across services

12.49 One way of addressing the increasing complexity facing consumers would be to simplify or standardise the information available. This could help consumers to make comparisons between different sets of services and make a more informed assessment of the choices available to them.

12.50 One approach might be to devise some form of common comparison of features, or a 'reference product'. Another option would be to require communications providers to provide information in a standard format to facilitate like-for-like comparisons between different sets of services. For instance, some bundles can be difficult to compare due to discounts offered for an initial period. In this example we could require CPs to set out how much the consumer would actually end up spending in total on the core elements of the bundles over the time they were in contract[196].

[195] For instance, free apps such as "Onavo Count" and "My Data Manager" help consumers keep track of data usage on smartphones and avoid exceeding their monthly data limits.

[196] There could be an analogy here with the development of the Annual Percentage Rate of charge ("APR") that financial services are required to display to make comparisons about the cost of different options easier.

Mandating simpler and more comparable retail propositions

12.51 Consumers could be put off from shopping around because of the range of products and tariffs available to them. If this is the case, reducing the range of choices available to consumers or constraining them to use only certain tariff structures (e.g. per second charging) could help them to assess different options. However, this would also reduce the scope for providers to differentiate themselves from their competitors and also reduces the incentive to innovate[197]. It would also reduce consumers' choice to find a product that best meets their needs.

12.52 In assessing such an option, we would need to consider how important differentiation is in the operation of competition and delivering good consumer outcomes in terms of new products and services. For instance, consumers can significantly from product differentiation where it results the availability of products more closely tailored to their specific preferences. This would need to be balanced against a consideration of whether increasing product differentiation meant that fewer consumers were able to navigate the market and find the right deal.

Independent Advisory Body – a one stop shop for advice

12.53 We note that the Government has recently set up the Money Advice Service to provide free and impartial advice across a range of financial products. The service is a statutory body responsible for improving people's understanding and knowledge of financial matters and their ability to manage their own financial affairs. In this capacity it works with, supports and provides expertise to other organisations in the financial services industry, across government and elsewhere. We are interested in views on whether a similar service, focused on consumer advice, might be useful for the communications sector, either for the needs of residential consumers, SMEs or both.

Questions for discussion

Overarching issue	Specific questions
Should Ofcom do more to further support empowerment at each stage of the consumer's decision-making process?	*Q17: What do stakeholders think are the greatest risks to continuing effective consumer engagement and empowerment?*
	Q18: What indicators should Ofcom monitor in order to get an early warning of demand-side issues?
	Q19: What options might be considered to address concerns about consumer empowerment at each stage of the decision-making process (access, assess, act)? What more might be required in terms of information provision, switching and measures to help consumers assess the information available to them? What role may Ofcom have to play compared to other stakeholders (including industry)?

[197] We note that in its Energy Market Investigation, the CMA has provisionally found that the "simpler choices" component of Ofgem's Retail Market Review rules is a feature of the retail supply of gas and electricity markets which gives rise to an adverse effect on competition.

Section 13

Delivering quality of service

13.1 This section focuses on the quality of service and quality of experience that consumers and businesses receive when using digital communications services. As in the previous section consumers may include residential consumers and businesses as relevant.

13.2 Overall, consumers have received good value for money over the past ten years with strong competition on price in many retail services, particularly in the residential market.

13.3 However, too often, consumers have had to endure poor quality of service in our sectors. Some consumers have suffered unacceptable delays to installation or fault repair, or frequent incidents of dropped mobile calls. This is against the backdrop of an economy where the quality of communications services is becoming ever more critical as consumers increasingly depend on them in all aspects of their lives.

13.4 This section considers:

- What does 'quality' really mean for consumers;
- What quality of service problems can be observed in our sectors;
- What might be causing these problems, in both competitive and less competitive markets; and
- What options are there to foster improved quality of service?

What does 'quality' mean for consumers?

Overall, network performance and reliability has grown in importance for consumers and businesses

13.5 At the start of our last review in 2003, there were 3.2 million residential and SME broadband lines. By 2013 the figure was seven times higher (22.3m)[198]. Today, 94% of businesses would struggle to function without internet connectivity. For residential consumers, the figure is nearly two thirds (64%)[199].

13.6 The range of services using internet connectivity has also expanded. Today these include e-government, e-health, online shopping, and video entertainment services.

13.7 Connectivity has become critical to the day to day lives of consumers and businesses in 2015. Our overall dependence on networks has increased substantially in the last

[198] *The Communications Market Report 2008*, p234: http://stakeholders.ofcom.org.uk/binaries/research/cmr/CMRMain_4.pdf and *The Communications Market Report 2014*, p.322: http://stakeholders.ofcom.org.uk/binaries/research/cmr/cmr14/2014_UK_CMR.pdf

[199] BDRC International, *Fixed Line Installation and Fault Repair Summary Report*, April 2013, p.20-21: http://stakeholders.ofcom.org.uk/binaries/research/telecoms-research/telecoms-market-data/fault-repair-research.pdf

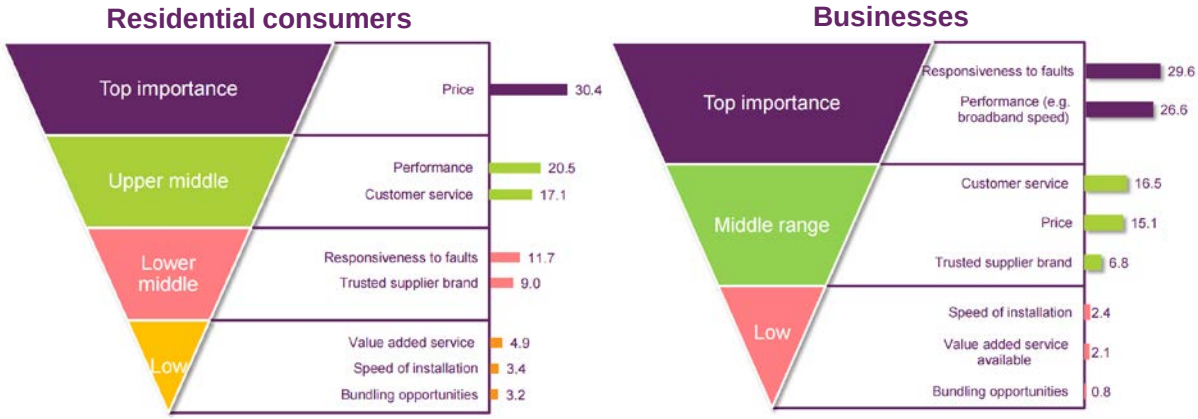
ten years and is likely to continue to rise. Increased dependence on the services which use internet connectivity means that consumer expectations of fixed and mobile networks have increased, while at the same time the negative impact for a consumer when something goes wrong has also increased.

Residential consumers and businesses prioritise different service attributes when making a purchasing decision, but both rank quality elements highly

13.8 Residential consumers and businesses rank different aspects of quality differently. For residential consumers 'price' (rather than quality) is still the most important factor in selecting a provider. 'Performance' of the service and 'customer service' both rank highly too. 'Responsiveness to faults' was ranked at a lower level for residential consumers than businesses[200].

13.9 Reliability, resilience, and fault resolution are paramount for most businesses today. They rely on broadband to communicate with suppliers and customers or to sell products online. 'Responsiveness to faults' and 'performance' were ranked the most critical factors for businesses when determining choice of communications provider. An Analysys Mason report for Ofcom found that the need for resilient connectivity is as important to some SMEs as the availability of adequate bandwidth[201].

Figure 35: Ranked attributes in choosing a communications provider, derived from a MaxDiff analysis



Source: BDRC International[202]

[200] BDRC International, *Fixed Line Installation and Fault Repair Summary Report*, April 2013, p.30-31: http://stakeholders.ofcom.org.uk/binaries/research/telecoms-research/telecoms-market-data/fault-repair-research.pdf

[201] Analysys Mason, *Understanding the demand for communications services for SMEs*, April 2015, p.4: http://stakeholders.ofcom.org.uk/binaries/research/telecoms-research/sme/Annex_3_Analysys_Mason_Ofcom_SME_study.pdf

[202] *Fixed Line Installation and Fault Repair Summary Report*, April 2013, p.30-31: http://stakeholders.ofcom.org.uk/binaries/research/telecoms-research/telecoms-market-data/fault-repair-research.pdf

Both the underlying networks and the customer service offered by service providers are pivotal to consumers' quality of experience

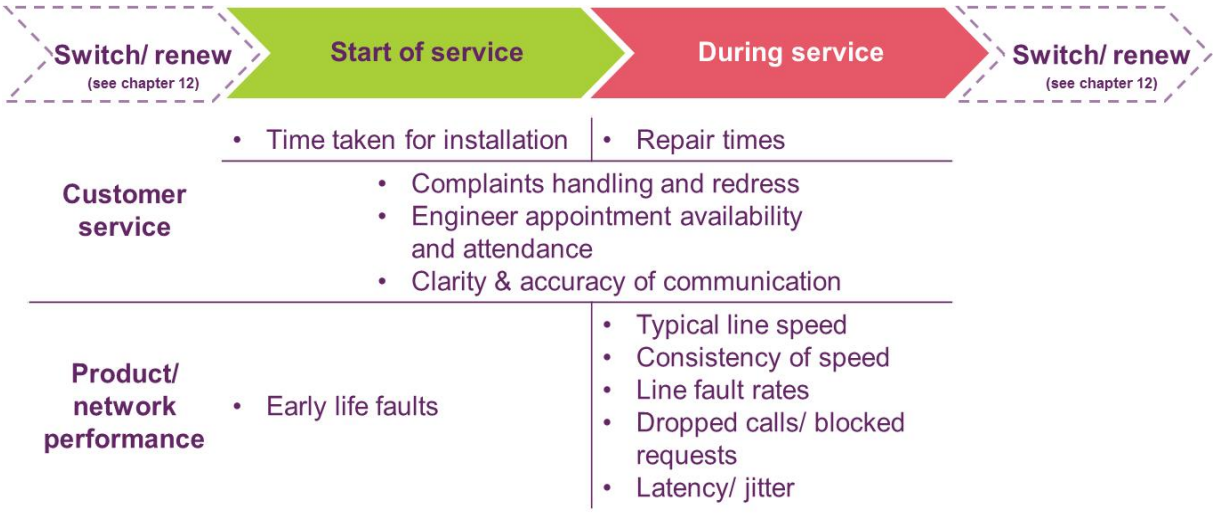
13.10 'Quality of service' can refer to a range of different features affecting the consumer's overall experience of communications services. There are two broad categories of service:

a) the performance of the network or product itself; and

b) the associated customer service given by the provider to its wholesale or retail customers.

13.11 Below we set out common customer service and network performance issues that may arise at the start of and throughout the service contract. The experience of switching at the beginning and end of a contract is considered in Section 12.

Figure 36: Features which contribute to consumer quality of experience



Source: Ofcom / UKRN[203]

Evidence suggests there are persisting quality of service issues

13.12 We know from our research that general consumer satisfaction with communications networks is high. 86% of broadband customers, and 91% of mobile customers, were 'satisfied' or 'very satisfied' with their service in 2015[204].

13.13 However, through consumer research, complaints to Ofcom and letters from consumers, we have seen many examples of poor customer service. We have heard from consumers how they are affected, with experiences ranging from frustrations through to significant financial losses in the case of some business services. Examples include:

[203] This diagram draws on the framework used in the recent UKRN report *Regulating for Quality*, February 2015: http://www.ukrn.org.uk/wp-content/uploads/2015/02/Regulating-for-quality1.pdf

[204] *Ofcom Technology Tracker*, Wave 1 2015, Tables 83 & 51: http://stakeholders.ofcom.org.uk/binaries/research/statistics/2015April/Ofcom_Technology_Tracker_Wave_1_2015_Data_Tables1.pdf

- **Inconsistent speeds -** Some broadband connections are high quality during the day, but unable to support video streaming in the evenings. Meanwhile for a business using a residential connection, they may experience a drop in service quality during the afternoon when children in the neighbourhood return from school.

- **Missed or postponed appointments -** Some appointments are missed or postponed without sufficient notice, which can cause consumers to take leave from work unnecessarily. For businesses, they can end up with weeks of cumulative delays to have a business line installed where the appointment is repeatedly put back.

- **Dropped mobile calls or web page loading -** Around a fifth of consumers say they experience being connected to a call which is unexpectedly terminated on a weekly basis[205]; this is termed a 'dropped call' and is more commonly an issue in rural areas. Consumers using mobile broadband can also experience failures to load web pages.

13.14 The experience of communications services by SMEs has been particularly problematic. Our research has found that 42% of SME internet users had experienced issues with their internet connectivity in the preceding 12 months. Poor service reliability was the biggest problem, with 29% citing it as an issue, followed by slow download (16%) and upload (13%) speeds[206].

Today's issues and responses to date

13.15 Below in figure 37 we set out a range of quality concerns where we have either already decided that regulatory intervention was required or proposed to intervene.

Figure 37: Quality of service issues at the retail and wholesale level

QoS issue	Evidence base	Regulatory approach to date
Retail level		
Customer service	Customer service satisfaction is between 67% and 80% across the sector. The levels of satisfaction have risen since monitoring began in 2009.[207]	Annual research at a provider level conducted to quantify satisfaction with customer service, including in relation to complaints. This informs consumers and gives reputational incentives for CPs. Informal engagement with the largest CPs with the aim of securing overall industry improvements in customer services.
Complaints handling	Complaints handling is an important part of customer service at the retail level. Stakeholders including the Consumer Panel and Citizens Advice	Publish Ofcom complaints data at a provider level. General Condition 14 requires all providers to have an approved complaints handling

[205] *Consumer experiences of mobile phone calls*, August 2014, p.7: http://stakeholders.ofcom.org.uk/binaries/research/telecoms-research/consumer-experiences-mobile-phone-calls/report.pdf
[206] *Broadband services for SMEs: assessment and action plan*, June 2015, p.10: http://stakeholders.ofcom.org.uk/binaries/research/telecoms-research/sme/bb-for-smes.pdf
[207] Saville Rossiter-Base, *Quality of customer service report*, 2014, p.5: http://stakeholders.ofcom.org.uk/binaries/research/quality-of-customer-service-annual-reports/Quality_of_Customer_Service_2014_report.pdf

	have raised concerns about this with us, particularly regarding complaints where there has been a loss or reduction in network service. Dissatisfaction in relation to complaints is more than three times higher than for other service aspects: landline (20% vs. 6%), broadband (21% vs. 6%), and mobile (17% vs. 5%)[208].	code of practice and dispute resolution scheme, though consumer awareness of these measures remains low. Targeted monitoring and enforcement programmes regarding GC14 compliance, applying fines where breaches are found. Informal engagement with the largest CPs about the assistance and redress provided to consumers to identify where potential improvements can be made (such as changes to practices and/or contract terms, or information about consumers' rights).
Clarity of information during complaints	Over a quarter of the complaints Ofcom receive about provider complaints handling are specifically regarding lack of or incorrect information[209].	General Condition 14 monitoring programme and Ofcom's informal engagement programme on customer service addresses the clarity of information provided by CPs.
Broadband speeds lower than advertised	Analysis from Which? shows that 26% of consumers' average broadband speeds were at least 99% of the advertised speed (and just 8% of non-cable customers[210]).	Biannual publication on fixed broadband speeds to ensure that consumers can access accurate comparative information. Updated voluntary code of practice for broadband speeds published June 2015[211].
Mobile dropped calls	Call completion success rates (CCSRs) for all networks are between 97.9% and 99%, though this is lower in rural areas and inside buildings. However our research shows a fifth of UK consumers experience blocked or dropped calls at least once per week[212].	We publish research into the consumer experience of mobile calls and broadband speeds. We continue to work with MNOs and third parties to help improve the information available to consumers. We also work with government and industry to support initiatives to improve QoE.
Wholesale level		
Openreach provisioning and repairs	As the largest wholesale provider of telecommunications services in the UK, Openreach's service performance underpins to a significant extent the level of service received by consumers	We imposed a number of new regulatory obligations on Openreach in the last FAMR. We are consulting on minimum standards in the BCMR. These include new minimum quality standards covering provision and repair,

[208] Ibid.
[209] Ofcom Consumer Contact Team data, 2015
[210] Which?, B*roadband advertising not up to speed,* p.7: http://www.which.co.uk/documents/pdf/broadband-advertising-not-up-to-speed-june-2015-406391.pdf
[211] *2015 Voluntary Code of Practice: Broadband Speeds*, June 2015: http://stakeholders.ofcom.org.uk/binaries/telecoms/cop/Broadband_Speeds_Code_June_2015.pdf
[212] *Consumer experience of mobile phone calls,* August 2014, p.7: http://stakeholders.ofcom.org.uk/binaries/research/telecoms-research/consumer-experiences-mobile-phone-calls/report.pdf

	and businesses throughout the UK. In the FAMR we found that Openreach provisioning and repairs performance declined between 2009 and 2012[213]. In the BCMR, we recently observed Openreach repeatedly changing delivery dates agreed with business customers, as well as a decline in average provisioning performance[214].	with financial penalties possible for non-compliance of up to 10% of turnover. The OTA2 facilitates negotiations on quality standards between Openreach and its customers. Ofcom has a backstop role should certain types of negotiations fail.

Our interventions to date in wholesale markets

13.16 In the wholesale copper-based market we intervened on two specific areas where we found Openreach quality of service to have deteriorated. Both provisioning and repair times had declined between 2009 and 2012. For example, repairs of consumer broadband lines (MPF and SMPF products) had declined from an average of 90% within the service level agreement to 78%[215]. This was compounded by a further marked decline in spring 2012, linked to adverse weather conditions.

13.17 To address the marked deterioration in the installation of new lines and repair times we introduced minimum standards which increase over each of the three years of the charge control. Following these interventions, Openreach's performance has improved in some areas. We welcome the greater focus the management team at Openreach has placed on improving quality in recent years.

13.18 In the leased line market, date certainty and provisioning times for new Ethernet lines have gradually declined since 2011. We provisionally identified two contributing factors to the deterioration in service quality: under-resourcing and the failure of a systems development programme. We have also proposed a set of minimum standards in our recent Business Connectivity Market Review consultation.

13.19 However there are concerns over whether efforts to meet the minimum standards we introduced go far enough to meet the demands of consumers and businesses today. Essentially, our current and proposed remedies aim to return provisioning and repair times to the levels before the recent decline (2009 levels) when complaints were relatively low.

13.20 As part of this review we would welcome views on whether a different level should be aspired to, and what action would be required in addition (or instead) of the current approach.

Strategic approaches to promoting quality of service

13.21 Previous interventions on quality fall into four broad approaches:

[213] *Fixed Access Market Review* statement, June 2014. Annex 30: http://stakeholders.ofcom.org.uk/binaries/telecoms/ga/fixed-access-market-reviews-2014/statement-june-2014/annexes.pdf
[214] *Business Connectivity Market Review* consultation, May 2015, p.244: http://stakeholders.ofcom.org.uk/binaries/consultations/bcmr-2015/summary/BCMR_Sections.pdf
[215] *Fixed Access Market Review* consultation, July 2013, Figure A9.10: http://stakeholders.ofcom.org.uk/binaries/consultations/fixed-access-market-reviews/annexes/FAMR_Consultation_annexes.pdf

i) Facilitating industry discussions on how best to improve quality of service for consumers. This is also exemplified by the role of the Office of the Telecoms Adjudicator in reaching agreement between industry and Openreach;

ii) Publishing information to inform consumers or trigger action by CPs through reputational incentives;

iii) Imposing minimum standards and monitoring performance against KPIs; and,

iv) Taking enforcement action where there are grounds to suspect non-compliance with minimum standards or other regulatory rules, such as the general conditions.

13.22 Whilst there are a range of existing responses to quality of service issues, to date we have not taken a holistic or strategic approach to securing good quality outcomes for consumers in the round. One question for this review is whether alternative, more strategic approaches might help deliver better consumer outcomes.

13.23 We would like to hear stakeholders' thoughts about whether a change is needed in our overall strategic approach to service quality given the increasing importance of service quality to consumers and in the presence of persisting issues. We set out some potential options for this below.

There may be a number of underlying causes for poorer quality of service

13.24 The examples above from the last few years illustrate that quality of service can fail to meet today's consumer expectations. There are a range of factors that may result in markets not delivering good quality outcomes, even where customers would be willing to contribute to the cost of providing it.

13.25 Quality of service issues experienced by consumers are not constrained to economic markets where there are competition problems. Concerns can arise in respect of both competitive and less competitive markets, and across different digital communications services.

13.26 Below we set out potential underlying causes for the quality issues identified above, in order to inform considerations of whether (and if so what) regulatory action is required.

Information failures may mean markets focus on price to the detriment of quality even in relatively competitive conditions

13.27 In well-functioning competitive markets we would generally expect the market to deliver a level of quality that meets consumer demands. However the markets for digital communications services have focussed predominantly on providing more headline bandwidth for the same or lower price. Beyond the headline speeds, competition has not focussed on quality elements.

13.28 This could in part be the result of the right kind of information not being available to consumers, in part due to inefficient industry processes, and in part due to some groups of consumers being underserved by markets, such as SMEs. In particular consumers are often not provided with good information on the quality of service they can expect from a particular provider.

13.29 This means they cannot factor it into their purchasing decision, reducing incentives for providers to compete on quality. A lack of competition on quality can have two different consequences, both of which are likely to be a concern:

- It can reduce the incentive for providers to differentiate their services, by providing a range of products with different price / quality trade-offs; and
- It can reduce the incentive on providers to innovate in ways which deliver improved quality for the same price.

13.30 Since 2005, we have witnessed a number of areas where the industry cannot or will not provide clear and transparent information on quality of service without third party co-ordination or direct policy action. Examples have included:

- In mobile, information on network performance, including dropped calls, mobile speeds and frequency of network outages.
- In fixed, transparent and comparable information on broadband speeds across the day, fault rates, traffic management policies or other quality measures beyond speed (such as latency or jitter) for users who value these specific characteristics.
- Consumer information on the forms of redress that are available when something goes wrong, such as compensation.

13.31 Collecting and publishing pertinent information can be a challenge. For example, some degree of coordination is required between providers (or by a third party) in order to agree comparable measures for network performance.

13.32 This highlights the challenge of ensuring consumers have sufficient information to make an informed choice based on network reliability. However it also illustrates the potential for coordination failures. Because no player in the market knows the outcome of the information comparison, it may be considered in the interests of all network operators not to collect data in a comparable format.

Willingness to pay and the cost of 'quality'

13.33 Sometimes there may be a difference between expectations and willingness to pay for quality improvements. For example, most consumers (73% - 76%) express the view that it is reasonable for an appointment for broadband installation to take place in 5 working days or less (less than half of BT's target provisioning time where an engineer is required). But only 13% of consumers claim they would be very likely to be willing to pay for a faster installation of this kind.[216]

13.34 Ofcom research suggests that a low willingness to pay is a more important feature of residential services than businesses services. Research for our last FAMR found that 29% of businesses would be 'very likely' to consider paying for a repair appointment sooner than originally offered. 11% would be 'very likely' to consider paying for an

[216] *Fixed Access Market Review* consultation, July 2013, Annex 9

installation within 5 days[217]. Sometimes, these options are not offered to businesses or the actual cost of buying these services results in lower take-up.

13.35 The relationship between cost and quality is complicated. The 'costs' faced by communications providers (CPs) resulting from increasing quality may be related to network investments, operating costs or training of customer relations staff. Yet often improvements to quality also avoid costs, such as repairs or reputational costs. Small process improvements may not be very costly, but could potentially lead to material improvements in quality.

13.36 There are a number of instances where quality of service is not meeting expectations. However, it is often difficult to identify whether this is the result of low willingness to pay for improved quality or due to one of the market failures identified above. The example below from our recent report on SMEs illustrates this challenge.

There may be a willingness to pay for quality in the SME market which is not met by the range of products available

13.37 Many SMEs are more willing to pay for higher quality services than residential consumers. However in many cases they are consuming services provided over the same network as residential consumers, rather than a dedicated business line.

13.38 In our recent SME document[218] we noted that there is also a lack of availability of alternative service levels for SMEs on traditional broadband networks (rather than in leased line services). There are examples where Openreach offers enhanced service levels at the wholesale level, but this is not being made available by retail providers.

13.39 In particular, Openreach's highest broadband service care level (SCL4, 6-hour fix) is not offered to consumers by BT Business or many other retail providers. We note that this is an example where improved quality requires industry coordination. Where a wholesale service is offered by Openreach, CPs must be able to match the new care level within their own systems and resourcing for it to be offered to consumers.

13.40 We welcome views from stakeholders whether quality outcomes effectively meet willingness to pay today in the round, or whether there are groups who would be willing to pay for improved connectivity services that are not being given the option.

Quality of service incentives can be weaker where there is limited competition between providers, such as in wholesale fixed line markets

13.41 In wholesale markets, wholesale customers are more likely than retail consumers to be highly engaged and informed. However, where there is a lack of competition they may still receive a poor quality of service due to the lack of credible alternative suppliers. This affects consumers and businesses, who bear the brunt of underlying network delays, faults or poor wholesale customer service.

13.42 As discussed in Section 11, the current Undertakings may have resulted in Openreach delivering the same quality of service to all downstream providers, but

[217] BDRC Continental, *Quality of service, Ethernet Leased Lines*, April 2014, p.13: http://stakeholders.ofcom.org.uk/binaries/consultations/bcmr-2015/annexes/QoS_report_27th_April.pdf

[218] *Broadband services for SMEs: assessment and action plan*, June 2015, p4: http://stakeholders.ofcom.org.uk/binaries/research/telecoms-research/sme/bb-for-smes.pdf

that this quality of service has been equivalently low. Downstream providers, including BT Consumer, have raised concerns about certain aspects of service quality provided by Openreach.

Stakeholders have suggested that weak incentives on Openreach to provide high quality services have led to other poor quality outcomes

13.43 In addition to the weaknesses identified in the areas above, a range of further issues have been raised with us. For example, some stakeholders have claimed that the incentives which led to poor quality outcomes in provisions and repairs also manifest themselves in reduced investment in maintaining the network.

13.44 Stakeholders have raised broader issues around the poor standard of customer service, with missed or rescheduled appointments causing material frustration and financial costs to consumers.

13.45 Specifically, the use of the deemed consent regime (whereby Openreach agrees a revised appointment date after the original agreed date) has been highlighted as a practice which some stakeholders claim is exploited to repeatedly extend delivery times and miss deadlines. This type of repeated failure to supply customers on previously agreed dates is unacceptable.

13.46 In addition, data published by Openreach also shows that while typical experiences may be improving, there are some consumers in the 'long tail' who will experience very long delays. Often these are the experiences which we receive complaints about. Therefore there may be a case for incentivising Openreach to deliver material improvements in this area to avoid such extremes.

What should the future regulatory strategy be to ensuring that the industry delivers on quality of service?

13.47 In the light of the quality outcomes described in this section, some stakeholders have suggested that we should take a more proactive approach to encouraging incentives in the market to deliver an improved customer experience across the board, to realise the positive externalities of improved quality and access to services by the widest possible range of consumers.

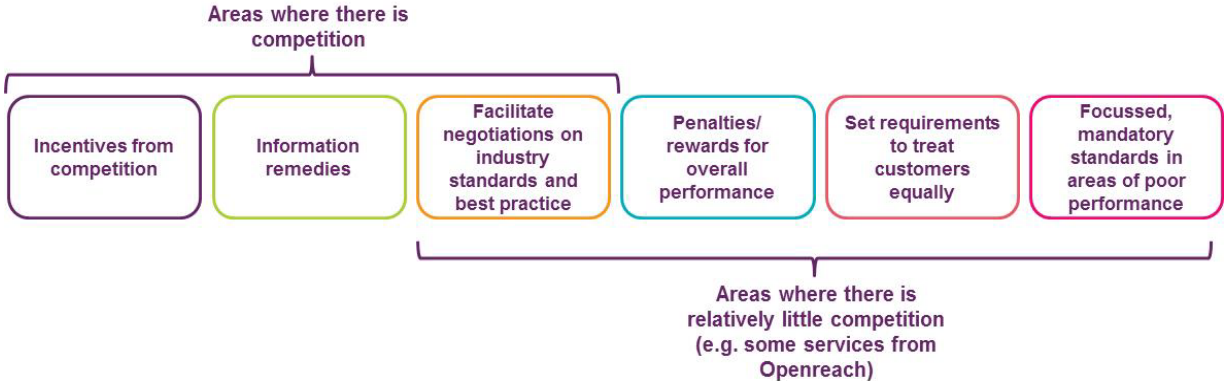
13.48 It has been suggested to us that to do so creates a virtuous cycle, where more reliable networks lead to further service innovations. An example might be some critical e-health applications, which could only be viable over highly resilient networks.

13.49 The deployment of more modern network technologies will contribute to improved performance of fixed and mobile broadband over the coming years. However, these new networks may not guarantee an increase in quality of service for consumers.

13.50 Where the market alone does not deliver sufficient quality of service, questions arise as to how policy may be able to facilitate better quality of service for consumers. At a high level there are a range of approaches which could be taken to ensure the sector delivers improved quality of service over time. We have set these out in the diagram below, though we also welcome any alternative solutions not included.

Potential policy options for increased quality of service

Figure 38: Illustrative range of regulatory approaches to improving quality of service



Relying on incentives from competition

13.51 In practice, there may be cases where regulation cannot effectively deliver better quality of service. In such circumstances, an increased focus on competition may be the most appropriate approach.

13.52 This is particularly the case where there is end-to-end competition between networks. If this type of competition were to increase, then we may be able to rely on it to a greater extent to secure good quality outcomes.

13.53 However, we know that end-to-end competition does not always secure good quality outcomes in all aspects. The mobile sector has had end-to-end competition over the past decade, but we have still observed a range of problems such as dropped mobile calls or slow mobile internet speeds.

Publishing information for consumers and to incentivise the industry to improve

13.54 We gather and publish a range of information to help markets work for consumers. In some cases, information we publish directly informs consumers in the decisions they make between communications providers. In other cases, we report on providers across the industry to incentivise the worst performers to improve.

13.55 We are committed to publishing clear and useful information wherever it will help to improve quality outcomes in our sectors. For example, we will be publishing interactive coverage maps this year so that consumers can see what level of coverage they can expect from different mobile service providers.

Facilitate negotiations in industry to promote best practice

13.56 In many cases, providers have sufficient incentives to address quality problems where they arise. However, there may be coordination failures which lead to weak processes between providers that affect the quality of service consumers receive.

13.57 As an example of action which addresses this type of failure, we have strengthened the role of the Office of the Telecoms Adjudicator (OTA2) in facilitating negotiations with a back stop process. The OTA2 can now report negotiation failures to Ofcom for us to consider whether we should involve ourselves further.

13.58 Negotiations can also be beneficial between retail providers, to share best practice. This can sometimes lead to agreed voluntary codes of practice.

Penalties and rewards for overall performance

13.59 In the sections above we have discussed the minimum standards we have introduced in the FAMR, and are consulting on in the BCMR. These take an approach of targeting specific areas of poor performance, and aim to incentivise Openreach to prevent the level of service falling below a set level. Penalties apply if this is not adhered to. However they do not aim to set targets above this base line.

13.60 For the water industry, OFWAT has introduced the Service Incentive Mechanism. This measures water companies in different regions against a set of standardised qualitative and quantitative measures of consumer satisfaction and quality of service. Rewards and penalties are then factored into the setting of the charge controls as a percentage of turnover according to quality of service performance. While the structure of the water sector is quite different, we welcome views on whether such an approach may be worthwhile here.

Set requirements to treat customers equally

13.61 Openreach is required to provide an equivalent quality of service to both the downstream retail arms of BT, and other retail providers. We discuss the principle of equivalence in Section 11 above, noting that it has had limited success in securing a higher quality of service.

Focussed mandatory standards in areas of poor performance

13.62 These are discussed at 13.16 above.

In principle, more interventionist and directive policies may be unattractive

13.63 Across these options, regulatory measures exhibit different levels of complexity. Some aim to address underlying incentives – such as penalties and rewards for overall performance - others may require more detailed rules to be applied.

13.64 While sometimes necessary and proportionate, more detailed rules can pose challenges. They may exhibit greater complexity and hence may be less effective, and in some cases more prone to regulatory error as well as resulting in higher compliance costs. The risk is greater if interventions are required across many facets of quality, rather than a few specific areas.

13.65 Some countries have highly prescriptive regimes for service quality for example, specifying the service level agreements between providers. For example:

13.65.1 In Belgium, the regulator defines QoS requirements for some operators, such as timescales for installations and repairs, with associated penalties[219].

[219] Analysys Mason, *International Case Studies*, July 2015, p.38: http://stakeholders.ofcom.org.uk/binaries/consultations/dcr_discussion/annexes/International_case_studies.pdf

13.65.2 In New Zealand, detailed QoS obligations are included within the commercial agreements with the operators rolling out the FTTH network. Again, the obligations include timescales for installation, fault repair, disconnection and connecting new retail service providers[220].

13.66 This type of approach can target interventions at particular aspects of service which are not of sufficiently high quality. However, it carries with it the risk of micro-regulation, and regulatory failure if an inefficient level of service is specified. The challenge is establishing what the appropriate balance is between these options, across the value chain.

Questions for discussion

Overarching issue	Specific questions
What more should Ofcom do to support better quality of service for consumers, in either competitive or less competitive markets?	*Q20: Are there examples in competitive or uncompetitive sections of the market where providers are not currently delivering adequate quality of services to consumers? What might be causing such outcomes?*
	Q21: What further options, if any, should Ofcom consider to secure better quality of service in the digital communications sectors?

[220] Ibid.

Section 14

Targeted regulation and opportunities for deregulation

14.1 Existing regulation has built up over time to guard against a range of risks for poor consumer outcomes, including competition concerns, public policy and consumer protection. Once regulation is in place, it is often easier to add to it than remove it. However, circumstances change over time: some risks may fall away, reducing the need for certain elements of existing regulation. This review is an opportunity to challenge the need for existing regulation.

14.2 Deregulation might be beneficial for at least two reasons: in addition to reducing the burden on industry, experience suggests that regulation is more likely to be effective if it is targeted on what matters most.

14.3 However, where underlying consumer concerns remain, options for deregulation need to be balanced against the effects on consumers and businesses. For example:

- Removing consumer protections may improve business' flexibility and innovation in business models, but risks consumers feeling at the whim of commercial decisions such as mid-contract price rises or penalty payments related to early termination.
- Reducing interventions to promote competition could increase some incentives to invest, but could also risk resulting in higher prices for consumers that are not directed into additional investment.
- Business costs could be reduced by removing requirements for specific consumer protections, but this risks creating greater inequality and reduced consumer welfare.

14.4 We are keen to identify where existing regulatory policy may need to evolve, and where there are opportunities for simplification or deregulation.

Seeking opportunities for deregulation whilst still ensuring good consumer outcomes

14.5 We are always keen to seek the least intrusive regulatory mechanisms to achieve good outcomes for consumers. Where we do make ex ante interventions, we aim to do so only where it is necessary, and keep regulation under review to ensure that it remains appropriate.

14.6 We do not envisage a complete withdrawal of ex ante regulation because although economic bottlenecks may shift over time, they are unlikely to disappear completely. Rather we are pursuing a targeted ex ante framework.

14.7 In this context we are interested in the extent to which there may be scope to de-regulate in some areas or to better target regulation in others.

14.8 We have identified the following broad areas where we would like to receive inputs to help inform our approach to targeted regulation, and to deregulating where possible.

In each, our priority continues to be reducing the burden on industry whilst ensuring that consumers benefit from effective competition, receive the wider benefits of digital communications and are protected against harm from sharp business practices:

- **A narrower focus for ex ante regulation** – are there opportunities to rely less on ex ante regulation to delivering good consumer outcomes, for example where end-to-end competition is a viable prospect (see Section 9).

- **Network evolution** - where networks evolve, firms are likely to want to migrate customers to new networks and services, retiring legacy networks and services. Does this provide scope for deregulation or changes in regulatory approach? Any such transitions will require careful handling so that consumers who continue to rely on these services are protected.

- **The rise of over the top ('OTT') services** - the increasing use of OTT services may require a fresh look at the potential for levelling down existing regulation at the service layer, or extending existing regulations to deliver good consumer outcomes to OTT providers where proportionate, ensuring consumers continue to benefit from an equivalent level of protection.

- **Other areas for potential deregulation** - we welcome stakeholder views as to where we may be able to deregulate and on how best to mitigate any negative impact such proposals may have on consumers and citizens.

14.9 The following sections take each of the above areas in turn.

Opportunities to narrow the focus of ex ante regulation

14.10 Our powers to impose ex ante obligations under both the EU Framework and domestic broadcasting competition law already require us to consider the extent to which ex post competition law (for example the prohibitions in the Competition Act 1998 and the EU Treaty) or horizontal consumer protection legislation may be sufficient to address particular problems identified. We must do so before we can decide to impose ex ante obligations[221].

14.11 A determination whether competition law may be sufficient is a matter of judgment based on a number of considerations and may, for example, involve a trade-off between risk of harm to consumers on the one hand, and cost of regulatory error as well as regulatory burden, on the other.

14.12 Under the EU Framework, we primarily aim to promote competition in markets which, by virtue of their structure and/or history are not effectively competitive. As discussed in Section 3, we typically do so by imposing access-based regulation to address persistent economic bottlenecks controlled by firms with significant market power.

[221] When identifying markets other than those in the Commission's Recommendation on relevant markets (see http://ec.europa.eu/information_society/newsroom/cf/dae/document.cfm?action=display&doc_id=7045), we assess whether the following three criteria are cumulatively met for each market: i) the presence of high and non-transitory barriers to entry; ii) a market structure which does not tend towards effective competition within the relevant time horizon; and iii) the insufficiency of competition law alone to adequately address the market failure(s) concerned. Failure to meet any of the three criteria would indicate that the market should not be identified as susceptible to ex ante regulation.

14.13 As these markets develop, potentially leading to increased competition in some areas, and ongoing consolidation in others as set out in Section 4, we may see increasingly concentrated markets in which no single firm is dominant as well as increasing prospects for new entry in some circumstances. This may over time lead to a reduction in access-based competition regulation.

14.14 There are a number of potential drivers for deregulation in respect of competition, including:

- Where end-to-end competition can be maintained or promoted (in fixed), this will reduce the need for ongoing regulation to deliver access-based competition.

- Where convergence results in the ability to deliver the same service via different mechanisms, this should also reduce the need for ongoing regulation to deliver access-based competition. We may be close to the point where voice services delivered via different means are substitutable, allowing a removal of voice specific access regulation. We need to be aware though that some consumer segments might be slower to take up new forms of voice service than others, and may need some ongoing protection.

- Where access-based competition can be accurately focussed on a specific bottleneck, this can allow deregulation of downstream services. Following the last strategic review, the success of local loop unbundling allowed the deregulation of downstream broadband markets, and the success of wholesale line rental allowed the deregulation of downstream voice markets. If we were to decide to require dark fibre and this proved to be an appropriate and effective remedy, then the 'acid test' for success would be the removal of active remedies in downstream leased line markets.

- Where specific geographic markets can be identified, where competition is effective, this may allow for deregulation. An example might be deregulation of leased lines in parts of London.

Q22: Might there be future opportunities to narrow the focus of ex ante economic regulation whilst still protecting consumers against poorer outcomes?

Network evolution and the availability of 'legacy' services

14.15 Communications markets are continually and rapidly evolving with new services and devices entering the market. This requires corresponding investments in networks and systems to support them, in turn leading to the development of more new services in a virtuous circle of innovation and investment.

14.16 One of the consequences of this cycle is potential migration of customers away from, and eventual retirement of, legacy networks and services. This may be due to the costs associated with supporting multiple networks or IT systems or their declining use. Such evolutions may provide scope for deregulation, or alternative approaches to delivering consumer outcomes in the new world.

14.17 However, transition to new networks and services require careful handling so that consumers who continue to rely on older networks and services are not harmed.

14.18 In some cases discontinuing a service may have few ramifications if the number of users is low, suitable alternative services are readily available and the transition is

carefully managed. However, in other cases it may be problematic. Issues can include:

- **The risk that consumers may be forced to buy a service they do not need or want at a higher price -** If old technology options are retired it could leave consumers with a lack of choice if they didn't need or want to buy the new, higher specification service (such as superfast speeds);

- **The potential for consumer protection to decrease** – for example ensuring the continued availability of essential services, such as emergency calls to all consumers as and when required;

- **The potential effects on future investment** – the potential for stranded assets (for example LLU assets of alternative operators to BT) could disincentivise current generation of operators from investing in the future.

In the longer term, a number of service and network retirements may be possible

14.19 While the ultimate retirement of legacy services is undisputed, the timescales over which this will happen may be. However we know that the increase in bandwidth, together with a move from multiple bespoke networks to fewer (or single) multi-function IP networks is already changing how networks are designed and how they interconnect with each other. These changes could have implications in a number of areas, including:

- the retirement of low bandwidth TDM-interface services[222];

- the potential for retirement of some elements of the copper access networks, with implications for local loop unbundling;

- the move to all IP networks; and

- Public Switched Telephony Network ('PSTN') switch-off and the move to broadband based voice for all consumers.

14.20 We welcome stakeholders' views on the potential for future network and service retirements, and the appropriate regulatory approach to any of these elements. However, we discuss the last of these in greater detail below.

Public Switched Telephony Network ('PSTN') switch-off

14.21 BT has recently indicated that full migration of customers off its existing PSTN networks and onto a new platform could take many years, but is a realistic prospect within the next decade. It is already developing a broadband-only product (Single-

[222] For further discussion of this topic, see *Business Connectivity Market Review: Very low bandwidth leased lines,* May 2015: http://stakeholders.ofcom.org.uk/binaries/consultations/very-low-bandwidth/summary/VLB_TI_retail_market.pdf

Order Generic Ethernet Access (SOGEA)) for which the retail CP would not be expected to provide a voice service and trials are expected to begin in 2016[223].

14.22 Similarly other CPs both in the UK and elsewhere are looking to migrate voices services onto new platforms although the timescales are uncertain, depending as they do on the extent and scale of the existing network.

14.23 The retirement of the legacy PSTN could provide the opportunity to deregulate elements of voice services. However, there could be important resulting implications that require careful consideration. We do not expect to require BT to maintain the PSTN indefinitely. Our focus is on ensuring that the migration from PSTN services is implemented in a way that minimises both the impact on competition and the disruption for consumers. For example, a key area of potential concern is battery backup, discussed in more detail below.

14.24 PSTN switch-off raises a number of challenges; we consider that there are four main issues that need to be considered:

i) **New networks may not offer services available today.** Customers using PSTN services that will no longer be available will need to be provided with sufficient notice as well as opportunities to migrate to viable alternative services.

ii) Next generation voice networks may not be as resilient as the PSTN. Legacy PSTN networks offer very high levels of resilience to consumers, particularly in the event of a power failure to the home. This has been particularly important given the historic role of the PSTN providing access to emergency services. Where this level of network-based resilience is not available, we have previously provided guidance[224] that battery backup sufficient to support operation for one hour should be deployed to allow emergency calls in the event of a power failure. Going forward, we are open to alternative approaches, but our guiding principle remains that reliable access to the emergency services is of fundamental importance, and that the deployment of new voice networks should not make citizens less safe.

iii) **Price increases for customers who do not voluntarily migrate away from PSTN services.** It is likely there will continue to be a substantial number of voice only customers for a number of years. The costs of maintaining the legacy PSTN platform and the overall reduction of customers that use it (as increasing numbers of consumers taking service bundles voluntarily move to mobile-only or VoIP services over broadband), could lead to price increases for those either unwilling or unable to migrate. We would be concerned by substantial price increases for basic services; we look to providers to develop suitable replacement products which do not disadvantage consumers.

iv) New wholesale products will be required. Following PSTN switch off, we will need to reassess the suitability of the wholesale products on offer to promote competition. For example, it may no longer be appropriate for communications providers to take both SMPF and WLR products. New wholesale products suited

[223] BT, *BT Wholesale ISP Forum*, February 2015, p.25-26: https://www.btwholesale.com/assets/documents/Previous_Events/ISP_Forum/ISP_Forum_3_February_2015_Slides.pdf

[224] *Guidelines on the use of battery back-up to protect lifeline services delivered using fibre optic technology*, December 2011: http://stakeholders.ofcom.org.uk/binaries/consultations/superfast-broadband/statement/Battery_Backup_Statement.pdf

to the network type chosen to replace PSTN will need to be introduced alongside an appropriate migration path.

14.25 We have focused here on PSTN switch off, which may allow closure of elements of the copper access network. Given BT's current FTTC network and plans for G.Fast deployment, some copper must remain. If BT's strategy were to change, we would need to consider the implications for competition and for consumers.

Q23: Where might future network evolutions, including network retirement, offer opportunities for deregulation whilst still supporting good consumer outcomes?

OTT communications services

14.26 Take-up of fixed and mobile broadband has grown rapidly, helping to support to the growth of a range of over-the-top (OTT) services, including communications services. Examples include messaging services, voice services (VoIP), and TV content services. For the purposes of this document, we will use the term 'OTT' to refer to unmanaged[225] digital communications services provided over an internet connection.

14.27 The continued growth of OTT may impact regulation in the following three areas:

i) economic regulation of traditional services affected by substitution of OTT;

ii) net neutrality and the treatment of OTT traffic; and

iii) the consistent application of consumer protection rules to more traditional and OTT services.

The growth of OTT services may change requirements for economic regulation

14.28 Taking a forward view, OTT communications services may reduce the need to impose competition regulations on retail communications services. Where OTT services represent a close substitute for traditional services they could weaken the need for wholesale regulation.

14.29 A particular example might be voice services, where OTT based communications services can substitute more traditional services for broadband enabled customers. This might reduce the need for some more traditional service based regulation, such as fixed and mobile call termination and fixed call origination regulation.

14.30 To date, although take-up of OTT voice services has grown rapidly from a small base, VoIP and video-calling services are not yet a sufficiently strong substitute for traditional domestic voice services to constrain the pricing of traditional fixed or mobile calls. This is reflected in our fixed narrowband services[226] and mobile call termination[227] (MCT) market reviews.

[225] I.e. calls are routed in the same way as other internet traffic

[226] *Review of the fixed narrowband services markets* statement, September 2013, p.65-69: http://stakeholders.ofcom.org.uk/binaries/consultations/nmr-2013/statement/Final_Statement.pdf. In the narrowband market review, drawing on December 2012 consumer research conducted by Jigsaw, we noted that consumers used VoIP much less frequently than landline (e.g. only 14% of those with VoIP used it to make calls every day/most days vs 47% for landline); and consumers were only more likely to use VoIP than landline to make international calls. In addition, we highlighted the limited

14.31 However we recognise that this is likely to change and we think there is a potential case for deregulation in future. The extent and speed of substitution will depend on the relative pricing of traditional and OTT voice services and the ability of OTT voice services to deliver the essential characteristics of traditional services. A number of barriers to significantly greater substitution of traditional voice services exist today, for example:

- **OTT voice and messaging services currently do not often offer full interoperability between services.** OTT services require users to have access to the same service (e.g. both parties have to have the app installed). Interoperability of different OTT services is not as important an issue as interoperability of networks has been in the past, since users can install multiple apps on their smartphones. It does however increase complexity. As smartphone take-up increases and apps and devices become more sophisticated, this is likely to diminish as a barrier to OTT take-up and usage.

- **Some OTT voice services have not offered consistent quality of service in the past.** Given OTT services are largely unmanaged, service quality is likely to be more variable depending on factors such as network congestion and cell handover when users are on the move. This is likely to be an issue for mobile than fixed, and even this will improve over time with 4G rollout.

- **The majority of fixed providers do not offer broadband services without voice services.** Given that the majority of consumers purchase network access and calls as part of a bundle, there is limited price incentive for consumers to make the majority of calls using an OTT voice or messaging service. In future, we may consider the introduction of new 'naked broadband' wholesale products in order to create the conditions for further OTT service innovation. This may then enable us to deregulate downstream voice services.

14.32 In addition to growing OTT voice substitution, we expect growing substitution of fixed voice calls with calls made from mobiles due to increasing consumer demand for mobility (including nomadic wireless). This may also enable deregulation of voice services in future.

availability and cost saving associated with broadband only services vs packages that bundle access and calls.

[227] *Mobile Call Termination Market Review 2015-18* statement, March 2015, p.32-6: http://stakeholders.ofcom.org.uk/binaries/consultations/mobile-call-termination-14/statement/MCT_final_statement.pdf. The consumer research conducted by Kantar Media for the MCT market review, found that a minority of consumers had used OTT voice or video (33%) and for those that did, usage was low (OTT use only made up c.5% of UK mobile calls. In addition, despite that fact that OTT services are often free, only 50% of users used OTT for reasons of cost. However, this was much higher for those who used OTT to make international calls (71% vs 47%) given that these are often out-of-bundle. We did note a number of practical disadvantages to the use of OTT that may reduce over time, e.g. lower sound quality and the inconvenience of the need for both callers to have the same OTT services. We also referenced a number of other reports from the European Commission, OECD, and industry commentators that did not yet consider OTT to be a substitute for mobile.

New bottlenecks may emerge as a result of the growth of OTT services

14.33 Competition issues may arise when services benefit from network effects[228]. This can create high barriers to entry and incentivise service providers to restrict access between two "sides" in a market.

14.34 It is possible that competition concerns stemming from network effects could emerge in relation to OTT communications services. For example, operators of online platforms can vertically integrate with popular OTT services, meaning that consumption of that service is contingent on using the platform which owns it.

14.35 Even where there is no ownership, app store operators can act as a gateway, restricting access between consumers and app developers. This may be reinforced by difficulties with respect to switching between platforms, e.g. where app purchases are not transferable or interoperable, or data cannot be ported.

14.36 On the other hand, we observe strong substitutes in OTT services and online platforms with potential for new entry in the longer term. In addition, innovative services can help users adapt or evade gateway control (such as apps which help users port their data between platforms).

14.37 These issues are not considered in this review. The European Commission is currently considering these issues as part of its ongoing antitrust cases and separate in-depth investigations.

In the UK, a balanced approach to net neutrality has secured good results for consumers to date

14.38 In general, OTT services and network provision complement each other. As data connections improve, new services become available, driving consumer take-up. This drives more demand for data in turn.

14.39 However, there may be occasions when there is tension between vertically integrated providers on the one hand and OTT providers on the other. In some jurisdictions this has led to legislation limiting the way in which network operators may sell their services to consumers and how they manage traffic delivered over their networks.

14.40 In the UK, effective competition in fixed and mobile services incentivises network providers not to block or throttle access to OTT services. There are some examples in recent history of internet service providers providing access to a restricted set of services within a 'walled garden'. However, business models of this kind have not proven to be sustainable in the face of competition from more open forms of internet access. For example, in the past we have had concerns about MNOs blocking access to VoIP services: this no longer happens in the UK.

14.41 The policy framework in the UK for net neutrality has three main elements:

i) We have set out the high level principles which we would want to apply, in order that we continue to benefit both from innovation in 'over the top' services, and

[228] I.e. when the value of a service depends on the number of other users of the service. It could also depend on the number of users on one "side" of the relevant market that can be "contacted" or sold to by the other side of the market.

from investment and innovation in the underlying network. It does so by seeking to allow managed services whilst protecting open internet access.

ii) There has been industry agreement, facilitated by the Broadband Stakeholder Group, to two industry codes of practice consistent with our principles. One of these ensures that information is available on the use of traffic management; the other limits the use of blocking. These codes have been effective in addressing the concerns of both sides of this policy debate, with a greater degree of flexibility than would be likely if formal regulation was required.[229]

iii) We have used our annual infrastructure report to monitor developments in the market, both against the principles which we established, and the codes of practice agreed by industry.

14.42 This policy framework is likely to be superseded by European legislation that is in the process of being finalised, and which should come into force in April 2016[230]. Our focus in the recent policy debate at European level has been on trying to ensure that any new legislation is outcome-based, rather than specifying in detail how networks should be managed.

Consumer reliance on OTT services may, in future, require a review of consumer protection regulation

14.43 Traditional communications providers are subject to regulation designed to empower consumers to participate effectively in the market and protect them from harm. Examples include protection measures to promote public safety and safety of life, fair and reasonable contract terms, and protection of vulnerable consumers.

14.44 Today, consumers that substitute traditional digital communications services with OTT alternatives will lose some of this protection. This may potentially lead to consumer harm, particularly if consumers are not aware of the level of protection offered by the services they use.

14.45 As these services evolve and take-up and usage increases, we will need to consider the extent to which consumer protection regulation should apply to OTT providers, and/or whether there is a case for deregulation to ensure greater consistency with the treatment of OTT providers.

14.46 In order to make such an assessment, it is important to assess whether the original rationales for intervention remain true, and whether the obligations are proportionate to the costs entailed. We would need to consider both direct costs and indirect costs, such as loss of innovation.

14.47 In addition, the extent to which OTT services replicate the essential characteristics of traditional services and the impact of this on consumer expectations may be a relevant consideration. For example, consumers may expect the same level of protection from OTT communications services as they receive for traditional telecommunications services. This becomes more significant where devices

[229] *Open internet code of practice: Voluntary code of practice supporting access to legal services and safeguarding against negative discrimination on the open internet,* July 2012: http://www.broadbanduk.org/wp-content/uploads/2012/08/bsg-open-internet-code-of-practice-25-jul-2012.pdf

[230] European Commission Press Release, *Roaming charges and open Internet: questions and answers*, June 2015: http://europa.eu/rapid/press-release_MEMO-15-5275_en.htm

seamlessly select alternative services, potentially switching between traditional and OTT communications services, without the consumer being aware which is being chosen at any one time.

14.48 We seek to regulate in a manner that is technology neutral, as far as is practicable. We would consider this objective when assessing whether consumer protection and empowerment regulation should apply to providers, while recognising where technology-specific differences may apply. For example, there may be limitations to the obligations that OTT providers could meet given that they do not have control over the underlying network over which their services are delivered.

Q24: What are the potential competition and consumer protection implications of the rise of OTT services? Might the adoption of such services enable future deregulation without raising the risk of consumer harm?

Other areas where there may be potential to deregulate

14.49 Stakeholders have previously suggested that there are other areas where they consider that regulation could be removed, reduced or better targeted. For example some have argued that Ofcom should undertake a broad review of the General Conditions (GCs) in order to address potential inconsistencies between them and remove unnecessary requirements.

14.50 In general, we consider the development of the GCs over time has created a proportionate framework for sector specific consumer protection alongside general consumer law. Since the GCs' inception we have reviewed and revised specific conditions, simplifying requirements where appropriate.

14.51 For example, in July 2014 we introduced a new Metering and Billing Direction which ensures that communications providers' billing systems meet certain standards for accuracy. The Direction removed some target-based rules contained in the previous Direction and introduced a consistent approach across different markets. In 2009 we also removed a Direction (issued under GC21) that required fixed broadband operators to collect and publish customer service information (the Topcomm Direction), after it was found that the scheme was not meeting its original objectives.

14.52 Some stakeholders have suggested that, in particular, Ofcom should replace General Condition 14 obligations, which relate to codes of practice and dispute resolution, with less prescriptive requirements. These obligations are in place in the light of specific concerns where consumers were formerly not being provided with relevant information. However some stakeholders consider that these rules could be simplified further or clarified.

14.53 We are interested in views on whether there is scope to simplify, remove or better target specific GCs in a manner which continues to provide appropriate protection for consumers and businesses.

Q25: Are there any areas where you think that regulation could be better targeted or removed in future? What would be the benefit of deregulation as well as the main risks to consumers and how these could be mitigated? Please provide evidence to support your proposals.

Questions for discussion

Overarching issue	Specific questions
Are there opportunities for deregulation or simplification that will bring broader benefits whilst avoiding new risks to consumer harm?	*Q22: Might there be future opportunities to narrow the focus of ex ante economic regulation whilst still protecting consumers against poorer outcomes?*
	Q23: Where might future network evolutions, including network retirement, offer opportunities for deregulation whilst still supporting good consumer outcomes?
	Q24: What are the potential competition and consumer protection implications of the rise of OTT services? Might the adoption of such services enable future deregulation without raising the risk of consumer harm?
	Q25: Are there any areas where you think that regulation could be better targeted or removed in future? What would be the benefit of deregulation as well as the main risks to consumers and how these could be mitigated? Please provide evidence to support your proposals.

Annex 1

Questions for discussion

Overarching issue	Specific questions
Should competition policy remain at the core of good availability outcomes for most consumers, complemented by targeted intervention as required?	*Q1: Do stakeholders agree that promoting effective and sustainable competition remains an appropriate strategy to deliver efficient investment and widespread availability of services for the majority of consumers, whilst noting the need for complementary public policy action for harder to reach areas across the UK?*
	Q2: Would alternative models deliver better outcomes for consumers in terms of investment, availability and price?
What more can be done through public policy to deliver truly widespread availability?	*Q3: We are interested in stakeholders' views on the likely future challenges for fixed and mobile service availability. Can a 'good' level of availability for particular services be defined? What options are there for policy makers to do more to extend availability to areas that may otherwise not be commercially viable or take longer to cover?*
Does convergence and consolidation in our sectors suggest new approaches or tools are required to deliver effective competition?	*Q4: Do different types of convergence and their effect on overall market structures suggest the need for changes in overarching regulatory strategy or specific policies? Are there new competition or wider policy challenges that will emerge as a result? What evidence is available today on such challenges?*
	Q5: Do you think that current regulatory and competition tools are suitable to address competition concerns in concentrated markets with no single firm dominance? If not, what changes do you think should be considered in this regard and why?
What model of competition should future regulatory strategy focus on: full end to end networks; passive access to support end to end networks; or active wholesale remedies to deliver downstream competition?	*Q6: What do you think is the scope for sustainable end-to-end competition in the provision of fixed communications services? Do you think that the potential for competition to vary by geography will change? What might this imply in terms of available regulatory approaches to deliver effective and sustainable competition in future?*
	Q7: Do you think that some form of access regulation is likely to continue to be needed in the future? If so, do you think we should continue to assess the appropriate form on a case by case basis or is it possible to set out a clear strategic preference for a particular approach (for example, a focus on passive remedies)?
	Q8: Do you agree that full end-to-end infrastructure competition in mobile, where viable, is the best means to secure good consumer outcomes? Would alternatives to our current strategy improve these outcomes, and if so, how?

Are there new or unresolved competition issues in digital communications services?	*Q9: In future, might new mobile competition issues arise that could affect consumer outcomes? If so, what are these concerns, and what might give rise to them?*
	Q10: Does the bundling of a range of digital communications services, including some which may demonstrate enduring competition problems individually, present new competition challenges? If so, how might these issues be resolved through regulation, and does Ofcom have the necessary tools available?
Where regulation is required to promote competition, how can it best secure both efficient investment and effective competition during periods of significant investment in risky new assets?	*Q11: What might be the most appropriate regulatory approaches to the pricing of wholesale access to new and, risky investments in enduring bottlenecks in future?*
	Q12: How might such pricing approaches need to evolve over the longer term? For example, when and how should regulated pricing move from pricing freedom towards more traditional charge controls without undermining incentives for further future investment?
Are there changes in competitive outcomes or the overall market context that might suggest the need to update or evolve the current model of fixed access network functional separation?	*Q13: Are there any actual or potential sources of discrimination that may undermine effective competition under the current model of functional separation? What is the evidence for such concerns?*
	Q14: Are there wider concerns relating to good consumer outcomes that may suggest the need for a new regulatory approach to Openreach?
	Q15: Are there specific areas of the current Undertakings and functional separation that require amending in light of market developments since 2005?
	Q16: Could structural separation address any concerns identified more effectively than functional separation? What are the advantages and challenges associated with such an approach?
Should Ofcom do more to further support empowerment at each stage of the consumer's decision-making process?	*Q17: What do stakeholders think are the greatest risks to continuing effective consumer engagement and empowerment?*
	Q18: What indicators should Ofcom monitor in order to get an early warning of demand-side issues?
	Q19: What options might be considered to address concerns about consumer empowerment at each stage of the decision-making process (access, assess, act)? What more might be required in terms of information provision, switching and measures to help consumers assess the information available to them? What role may Ofcom have to play compared to other stakeholders (including industry)?
What more should Ofcom do to support better quality of service for	*Q20: Are there examples in competitive or uncompetitive sections of the market where providers are not currently delivering adequate quality of services to consumers? What might be causing such outcomes?*

consumers, in either competitive or less competitive markets?	*Q21: What further options, if any, should Ofcom consider to secure better quality of service in the digital communications sectors?*
Are there opportunities for deregulation or simplification that will bring broader benefits whilst avoiding new risks to consumer harm?	*Q22: Might there be future opportunities to narrow the focus of ex ante economic regulation whilst still protecting consumers against poorer outcomes?* *Q23: Where might future network evolutions, including network retirement, offer opportunities for deregulation whilst still supporting good consumer outcomes?* *Q24: What are the potential competition and consumer protection implications of the rise of OTT services? Might the adoption of such services enable future deregulation without raising the risk of consumer harm?* *Q25: Are there any areas where you think that regulation could be better targeted or removed in future? What would be the benefit of deregulation as well as the main risks to consumers and how these could be mitigated? Please provide evidence to support your proposals.*

Annex 2

Responding to this document

How to respond

A2.1 Ofcom invites written views and comments on the issues raised in this document, to be made by 5pm on 8 October 2015.

A2.2 Ofcom strongly prefers to receive responses using the online web form at http://stakeholders.ofcom.org.uk/consultations/dcr-discussion/howtorespond/form, as this helps us to process the responses quickly and efficiently. We would also be grateful if you could assist us by completing a response cover sheet (see Annex 4), to indicate whether or not there are confidentiality issues. This response coversheet is incorporated into the online web form questionnaire.

A2.3 For larger consultation responses - particularly those with supporting charts, tables or other data - please email digital.communications.review@ofcom.org.uk attaching your response in Microsoft Word format, together with a consultation response coversheet.

A2.4 We also accept joint responses to represent groups of stakeholders.

A2.5 Responses may alternatively be posted or faxed to the address below, marked with the title of the consultation.

Tanja Salem
Floor 3, Strategy
Ofcom
Riverside House
2A Southwark Bridge Road
London SE1 9HA

Fax: 020 7981 3333

A2.6 Note that we do not need a hard copy in addition to an electronic version. Ofcom will acknowledge receipt of responses if they are submitted using the online web form but not otherwise.

A2.7 If you wish to submit a consultation response in a format other than a written submission (such as an audio or video format), do feel free to get in touch.

A2.8 It would be helpful if your response could include direct answers to the questions asked in this document, which are listed together at Annex 1. However it is not necessary to answer all of the questions.

A2.9 It would also help if you can explain why you hold your views and how Ofcom's proposals would impact on you.

Further information

A2.10 If you want to discuss the issues and questions raised in this consultation, or need advice on the appropriate form of response, please contact Tanja Salem on 020 7981 3000.

Confidentiality

A2.11 We believe it is important for everyone interested in an issue to see the views expressed by consultation respondents. We will therefore usually publish all responses on our website, www.ofcom.org.uk, ideally on receipt. If you think your response should be kept confidential, can you please specify what part or whether all of your response should be kept confidential, and specify why. Please also place such parts in a separate annex.

A2.12 If someone asks us to keep part or all of a response confidential, we will treat this request seriously and will try to respect this. But sometimes we will need to publish all responses, including those that are marked as confidential, in order to meet legal obligations.

A2.13 Please also note that copyright and all other intellectual property in responses will be assumed to be licensed to Ofcom to use. Ofcom's approach on intellectual property rights is explained further on its website at http://www.ofcom.org.uk/terms-of-use/

Next steps

A2.14 Following the end of the consultation period, Ofcom intends to publish emerging views at the end of 2015.

A2.15 Please note that you can register to receive free mail Updates alerting you to the publications of relevant Ofcom documents. For more details please see: http://www.ofcom.org.uk/email-updates/

Ofcom's consultation processes

A2.16 Ofcom seeks to ensure that responding to a consultation is easy as possible. For more information please see our consultation principles in Annex 2.

A2.17 If you have any comments or suggestions on how Ofcom conducts its consultations, please call our consultation helpdesk on 020 7981 3003 or e-mail us at consult@ofcom.org.uk . We would particularly welcome thoughts on how Ofcom could more effectively seek the views of those groups or individuals, such as small businesses or particular types of residential consumers, who are less likely to give their opinions through a formal consultation.

A2.18 If you would like to discuss these issues or Ofcom's consultation processes more generally you can alternatively contact Graham Howell, Secretary to the Corporation, who is Ofcom's consultation champion:

Graham Howell
Ofcom
Riverside House
2a Southwark Bridge Road
London SE1 9HA

Email Graham.Howell@ofcom.org.uk

Annex 3

Ofcom's consultation principles

A3.1 Ofcom has published the following seven principles that it will follow for each public written consultation:

Before the consultation

A3.2 Where possible, we will hold informal talks with people and organisations before announcing a big consultation to find out whether we are thinking in the right direction. If we do not have enough time to do this, we will hold an open meeting to explain our proposals shortly after announcing the consultation.

During the consultation

A3.3 We will be clear about who we are consulting, why, on what questions and for how long.

A3.4 We will make the consultation document as short and simple as possible with a summary of no more than two pages. We will try to make it as easy as possible to give us a written response. If the consultation is complicated, we may provide a shortened Plain English Guide for smaller organisations or individuals who would otherwise not be able to spare the time to share their views.

A3.5 We will consult for up to 10 weeks depending on the potential impact of our proposals.

A3.6 A person within Ofcom will be in charge of making sure we follow our own guidelines and reach out to the largest number of people and organisations interested in the outcome of our decisions. Ofcom's 'Consultation Champion' will also be the main person to contact with views on the way we run our consultations.

A3.7 If we are not able to follow one of these principles, we will explain why.

After the consultation

A3.8 We think it is important for everyone interested in an issue to see the views of others during a consultation. We would usually publish all the responses we have received on our website. In our statement, we will give reasons for our decisions and will give an account of how the views of those concerned helped shape those decisions.

Annex 4

Consultation response cover sheet

A4.1 In the interests of transparency and good regulatory practice, we will publish all consultation responses in full on our website, www.ofcom.org.uk.

A4.2 We have produced a coversheet for responses (see below) and would be very grateful if you could send one with your response (this is incorporated into the online web form if you respond in this way). This will speed up our processing of responses, and help to maintain confidentiality where appropriate.

A4.3 The quality of consultation can be enhanced by publishing responses before the consultation period closes. In particular, this can help those individuals and organisations with limited resources or familiarity with the issues to respond in a more informed way. Therefore Ofcom would encourage respondents to complete their coversheet in a way that allows Ofcom to publish their responses upon receipt, rather than waiting until the consultation period has ended.

A4.4 We strongly prefer to receive responses via the online web form which incorporates the coversheet. If you are responding via email, post or fax you can download an electronic copy of this coversheet in Word or RTF format from the 'Consultations' section of our website at http://stakeholders.ofcom.org.uk/consultations/consultation-response-coversheet

A4.5 Please put any parts of your response you consider should be kept confidential in a separate annex to your response and include your reasons why this part of your response should not be published. This can include information such as your personal background and experience. If you want your name, address, other contact details, or job title to remain confidential, please provide them in your cover sheet only, so that we don't have to edit your response.

Cover sheet for response to an Ofcom consultation

BASIC DETAILS

Consultation title:

To (Ofcom contact):

Name of respondent:

Representing (self or organisation/s):

Address (if not received by email):

CONFIDENTIALITY

Please tick below what part of your response you consider is confidential, giving your reasons why

Nothing ☐

Whole response ☐

Part of the response ☐

Name/contact details/job title ☐

Organisation ☐

If there is no separate annex, which parts?

If you want part of your response, your name or your organisation not to be published, can Ofcom still publish a reference to the contents of your response (including, for any confidential parts, a general summary that does not disclose the specific information or enable you to be identified)?

DECLARATION

I confirm that the correspondence supplied with this cover sheet is a formal consultation response that Ofcom can publish. However, in supplying this response, I understand that Ofcom may need to publish all responses, including those which are marked as confidential, in order to meet legal obligations. If I have sent my response by email, Ofcom can disregard any standard e-mail text about not disclosing email contents and attachments.

Ofcom seeks to publish responses on receipt. If your response is non-confidential (in whole or in part), and you would prefer us to publish your response only once the consultation has ended, please tick here. ☐

Name

Signed (if hard copy)

Annex 5

Glossary

2G Second generation of mobile telephony systems. Uses digital transmission to support voice, low-speed data communications, and short messaging services.

3G Third generation of mobile systems. Provides high-speed data transmission and supports multi-media applications such as video, audio and internet access, alongside conventional voice services.

4G Fourth generation of mobile systems. It is designed to provide faster data download and upload speeds on mobile networks.

Access network An electronic communications network which connects consumers to a service provider; running from the consumer's premises to a local access node (a point of aggregation in the access network) and supporting the provision of access-based services. It is sometimes referred to as the 'local loop' or the 'last mile'.

ADSL Asymmetric Digital Subscriber Line. A digital technology that allows the use of a standard telephone line to provide high-speed data communications.

Anchor pricing An approach that bases charge control modelling on the cost of existing technology rather than that of any new technology that might be adopted during the control period.

Backhaul The part of the communications network which connects the local exchange to the ISP's core network, or the mobile cell to the core network.

BARB Broadcasters' Audience Research Bureau

Base station The active equipment installed at a mobile transmitter site. The equipment installed determines the types of access technology that are used at that site.

BCMR Business Connectivity Market Reviews.

BDUK Broadband Delivery UK

BEREC Body of European Regulators for Electronic Communications

Bit-rates The speed at which digital information is carried within a specified communications channel.

Broadband A data service or connection generally defined as being 'always on' and providing a bandwidth greater than narrowband connections.

Communications Provider (CP) A company that provides an electronic communications network or provides an electronic communications service.

Core network The central part of any network aggregating traffic from multiple backhaul and access networks.

Cost orientation The principle that the price charged for the provision of a service should reflect the underlying costs incurred in providing that service.

Data packet In networking, the smallest unit of information transmitted as a discrete entity from one node on the network to another.

DCMS Department for Culture, Media & Sport

DOCSIS Data Over Cable Service Interface Specification. It is a standard for the high speed transmission of data over cable networks.

DSL Digital Subscriber Line. A family of technologies generally referred to as DSL, or xDSL, capable of transforming ordinary phone lines (also known as 'twisted copper pairs') into high-speed digital lines, capable of supporting advanced services such as fast internet access and video on demand. ADSL and VDSL (very high speed digital subscriber line) are variants.

Ducts Underground pipes which hold copper and fibre lines.

Duct Access A wholesale access service allowing a CP to make use of the underground duct network of another CP.

Equivalence of Input (EOI) A remedy designed to prevent a vertically-integrated company from discriminating between its competitors and its own business in providing upstream inputs. This requires Openreach to provide the same wholesale products to all CPs, including BT's own downstream division, on the same timescales, terms and conditions (including price and service levels) by means of the same systems and processes. Includes the provision to all CPs (including BT) of the same commercial information about such products, services, systems and processes.

Ethernet A packet-based technology originally developed for and still widely used in Local Area Networks.

FAMR Fixed Access Market Reviews.

Femtocell A small base station, typically installed indoors to improve indoor mobile coverage. A residential femtocell uses the consumer's broadband connection to offload the mobile data onto the fixed network.

FTTC Fibre to the Cabinet. Access network consisting of optical fibre extending from the access node to the street cabinet. The street cabinet is usually located only a few hundred metres from the subscribers' premises. The remaining segment of the access network from the cabinet to the customer is usually a copper pair (see DSL).

FTTH/FTTP Fibre to the Home / Premises. A form of fibre optic communication delivery in which the optical signal reaches the consumer's home without relying on a copper access line.

Generic Ethernet Access (GEA) BT's wholesale non-physical product providing CPs with access to higher speed broadband products.

G.Fast A broadband transmission standard that further increases the access speeds possible on copper lines.

GSM Global Standard for Mobile telephony. This is used for 2G mobile systems.

Headline connection speed Marketed speed.

IP Internet Protocol. This is the packet data protocol used for routing and carrying data across the internet and similar networks.

IPTV Internet Protocol Television. The term used for television and/or video signals that are delivered to subscribers or viewers using internet protocol (IP), the technology that is also used to access the internet. Typically used in the context of streamed linear and on-demand content, but sometimes for downloaded video clips.

ISP Internet Service Provider. A company that provides access to the internet.

Leased lines A transmission facility which is leased by a consumer from a public carrier, and which is dedicated to that user's traffic.

LLU Local Loop Unbundling. LLU is the process where incumbent operators (in the UK this is BT and KCom) make their local network (the lines that run from the customers' premises to the telephone exchange) available to other communications providers. The process requires the competitor to deploy its own equipment in the incumbent's local exchange and to establish a backhaul connection between this equipment and its core network.

LTE Long Term Evolution. This is a 4G technology which is designed to provide faster upload and download speeds for data on mobile networks.

Mbit/s Megabits per second (1 Megabit = 1 million bits). A measure of bandwidth in a digital system.

Main distribution frame (MDF) An internal wiring frame where copper access network cables are terminated and cross connected to exchange equipment by flexible wire jumpers.

MNO Mobile Network Operator, a provider who owns a cellular mobile network.

Mobile Broadband Various types of wireless, high speed internet access through a mobile telephone or a mobile data dongle.

Metallic path facilities (MPF) The provision of access to the copper wires from the customer premises to a BT MDF that covers the full available frequency range, including both narrowband and broadband channels, allowing a competing provider to provide the customer with both voice and/or data services over such copper wires

MVNO Mobile Virtual Network Operator. An organisation which provides mobile telephony services to its customers, but does not have allocation of spectrum or its own wireless network and instead buys a wholesale service from a mobile network operator.

Narrowband A service or connection providing data speeds up to 128kbit/s, for example via an analogue telephone line.

Next Generation Access (NGA) networks Wired access networks that are capable of delivering broadband access services with enhanced characteristics (such as higher throughput) as compared to those provided over already existing copper networks.

Not-spot An area which is not covered by a telecoms network.

Partial Private Circuit (PPC) A generic term used to describe a category of private circuits that terminate at a point of connection between two operators' networks.

Physical Infrastructure Access (PIA) A regulatory obligation under which BT is required to allow CPs to deploy NGA networks in the physical infrastructure of its access network.

PSTN Public Switched Telephone Network. The network that manages traditional fixed-line telephone systems.

SIM Subscriber Identity Module. A SIM is a small flat electronic chip that identifies a mobile customer and the mobile operator. A mobile phone must have a SIM before it can be used.

Smartphone A mobile phone that offers more advanced computing ability and internet connectivity than a basic 'feature' phone.

SMP Significant Market Power, the test for which is set out in European Directives. It is used by National Regulatory Authorities, such as Ofcom, to identify those CPs which must meet additional obligations under the relevant Directives.

Shared metallic path facility (SMPF) The provision of access to the copper wires from the customer's premises to a BT MDF that allows a competing provider to provide the customer with broadband services, while another provider continues to provide the customer with conventional narrowband communications.

Superfast broadband The next generation of faster broadband services, which delivers headline download speeds greater than 30 Mbit/s.

SLU Sub-Loop Unbundling. This is where the unbundling of the access line takes place at the street-side cabinet (rather than the exchange as for LLU) for a communications provider to gain control of the access line to the customer.

SMEs. Small and medium sized enterprises are businesses with 249 or fewer employees

Unbundled A local exchange that has been subject to local loop unbundling (LLU).

VDSL Very High Speed DSL. A high speed variant of DSL technology, which provides a high headline speed through reducing the length of the access copper line by connecting to fibre at the cabinet.

VOD Video-on-demand. A service or technology that enables TV viewers to watch programmes or films whenever they choose to, not restricted by a linear schedule.

VoIP Voice over Internet Protocol. A technology that allows users to send calls using internet protocol, over either the public internet or private IP networks.

VULA Virtual Unbundled Local Access. An access remedy first imposed by Ofcom in the 2010 WLA that requires BT to provide access to its NGA network in a way that is similar to LLU. It provides a connection from the nearest 'local' aggregation point to the customer premises.

WiFi A short range wireless access technology that allows devices to connect to the internet. These technologies allow an over-the-air connection between a wireless client and a base station or between two wireless clients.

WLR Wholesale Line Rental. This is a regulatory instrument requiring the operator of local access lines to make services available to competing providers at a wholesale price.