The UKB Group's response to Ofcom's Discussion Document on its Strategic Review of Digital Communications

Executive Summary

The UKB Group ("UKB") welcomes Ofcom's decision to undertake a strategic review of the UK's digital communications market. The market has developed and transformed significantly over the last ten years and new competitive fault-lines are emerging. We therefore agree that it is time for a thorough review to be undertaken.

The key characteristic of this sector is BT's continued dominance of the wholesale market, whilst it also maintains a strong presence across multiple retail markets. These factors are creating competitive distortions and having the effect of restricting competition in both fixed and mobile markets.

Ofcom's regulation of Openreach is not achieving acceptable levels of service quality for its customers and, through lack of sufficient incentives, BT is failing to meet the increasingly sophisticated needs of customers, both wholesale and retail. Openreach fails to deliver even basic services in a timely manner. Of the circuits we currently have on order to provide backhaul from our various new campus networks, around 90% have gone beyond the contracted delivery date and at least 25% have been escalated to director level. This is significantly impeding UKB's business progress.

The Undertakings are no longer fit for purpose. We therefore urge Ofcom to refer the market to the Competition and Markets Authority ("CMA") to consider whether structural separation of Openreach would be a more effective solution to enduring competitive problems in the market.

If BT Consumer were separated from Openreach and therefore had the option of purchasing wholesale broadband services from operators such as UKB, this would encourage network deployment on the part of competitors to Openreach as they would be able to invest in the knowledge that BT Consumer would be a potential buyer of their services. It would give more options to consumers in

terms of better connectivity and choice of content and it would encourage Openreach to offer a better service to its wholesale customers.

The regulatory framework needs to evolve away from regulation in "silos" and examining narrow product markets, to regulation of access to the underlying networks which serve multiple retail markets. Data consumption is continuing to grow rapidly and consumer usage habits are changing in ways that are not always predictable. To meet consumer demand for data, multiple layers of fixed and wireless connectivity are needed, dimensioned to provide sufficient capacity at the point of use.

Infrastructure competition is the best way to encourage innovation and investment, but access-based regulation will continue to be needed alongside infrastructure competition for the foreseeable future. Access-based regulation encourages, rather than discourages, infrastructure competition; access to fixed networks is crucial to competition in mobile networks.

Passive remedies should exist alongside active remedies until real (rather than potential) competition develops and active remedies can be withdrawn.

Areas where firmer access-based regulation is or may in future be required include:

- The backhaul market
- The Wi-Fi market
- BT's EMP Platform
- Bundled services

The mobile market would benefit from an evolution of wholesale access models. The competitive benefits of Mobile Virtual Network Operators ("MVNOs") are limited and the market now needs more efficient and flexible models that encourage more effective competition. We believe that Multi-Operator Core Networks ("MOCNs") are key to the success of competition in mobile networks and efficient use of spectrum. MOCNs, which enable two operators to share frequency and share a radio network, whilst each operating their own core network, are the next logical development in the wholesale market, and their success has been demonstrated overseas.

Introduction

UK Broadband Limited (owned by PCCW, a Hong Kong listed company) and UKB Networks Limited (owned by HKT, also listed in Hong Kong) (together "the UKB Group" or "UKB") work together in the UK to provide fixed and wireless data networks and services.

PCCW owns 63% of HKT and investment in the UKB Group to date from both PCCW and HKT exceeds [✂].

PCCW and HKT have together agreed that all future investment in telecoms in the UK will be channelled through HKT and therefore through UKB Networks. UKB Networks is thus effectively the operating company of the UKB Group through spectrum sharing, co-licensing and other inter-company arrangements.

HKT has a market capitalisation of approximately US $9Bn and has extensive fibre and wireless network experience. HKT is Hong Kong's premier telecommunications network and service provider, being the market leader in fixed line voice, broadband and mobile in a highly competitive market. HKT also owns and operates a substantial international voice and data network and services business with a turnover in excess of $1Bn that is often second only to Google in the amount of the world's internet traffic being carried across its network.

[✂]

HKT is a market leader partly through its record of constant technical innovation. Most recent innovations include the pioneering of Multi Operator Core Networks ("MOCN"), eLTE (the next generation LTE designed for mission and business critical usage) and Smart Living and Smart City technologies. [✂]

HKT wishes to leverage its extensive experience of building, designing, and operating complex fixed and wireless communication networks in order to expand and grow its interests in the UK market, [✂].

UKB is headquartered in London, with offices in Wokingham, Stafford and Wrexham and today employs more than 250 people in the UK.

UKBN holds a significant portfolio of UK national radio spectrum suitable for 4G mobile services, superfast fixed wireless solutions and high speed microwave links. Fixed wireless access is now recognised by both the UK Government and the European Commission as capable of providing superfast broadband services.

We are building high capacity, high Quality of Service fibre, wireless and mobile data networks. Examples of these data networks include:

- Urban broadband networks, such as:
    - the Relish fixed wireless network in London, which is achieving [✂]% of the addressable (i.e. churning) market share; and
    - fibre solutions to multi-tenanted buildings, such as the Barbican and Housing Association properties;

- Rural fibre and wireless networks such as the BDUK-sponsored procurement delivering superfast broadband to 20,000 premises in the Swindon local authority area;

- Fibre networks for military and university campuses and keyworker accommodation (through its wholly owned subsidiary, Keycom);

- Fibre and wireless networks for Enterprise campuses such as sea ports and airports;

- Planned "smart city" deployments utilising both fibre and "smart" eLTE wireless capacity layers such as at Meridian Water (North London) and White City (West London).

HKT, through UKB, aims to build a network alternative to BT, utilising both wireless and fibre technologies. This will benefit users and at the same time spur Openreach (or its successor) to compete.

Our expertise across fibre and wireless technology enables us to adopt a multi-technology approach to all new network deployments, including those in rural areas. By the end of 2015 our networks will cover more than 500,000 homes and approximately 150,000 businesses.

In our response, we have answered Ofcom's questions in groups, not necessarily in the same order as they appear in the document.

Changing Market Structures

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?

Ofcom rightly asserts that, ten years ago, convergence was predicted and perhaps nascent, but hadn't yet developed. Now, however, it is a reality and is driving structural changes in the market. Today the focus is on data and the

need to ensure that networks are capable of dealing with ever-increasing demands for data capacity.

There is convergence in the markets for services:

- Fixed broadband is converging with wireless broadband
- Business broadband overlaps with residential broadband
- Mobile voice is increasingly a substitute for fixed voice
- Broadband and data are a substitute for fixed and mobile voice, through OTT applications such as Skype, FaceTime and the substitution of OTT messaging for voice calls (as well as SMS texts and emails)[1]. With the introduction of VoLTE, mobile voice becomes more mobile data.
- Broadband converges with content provision, with content sometimes being the driver for purchasing the broadband.

Mobile Networks are evolving to meet demand for data

In addition to convergence at the service layer, there is also convergence in the network layer. Just as the retail broadband market grew out of the voice telephony market (and was provided over copper wires), so the wireless data market has grown out of the mobile voice market and has, thus far, primarily been provided over networks designed to carry voice calls[2].

Fixed broadband networks have had to be upgraded to allow for improved broadband service provision – initially via fibre extensions to street cabinets and, ultimately, via fibre or high speed fixed wireless to the premise. Through these technical upgrades we, effectively, now have fixed broadband data networks that also accommodate voice calls. Equally, mobile voice networks need to be upgraded and rebuilt to provide the amount of data capacity which is being demanded by customers. In future the UK requires high capacity wireless broadband data networks that also accommodate voice.

The huge growth in demand for and usage of data has contributed to the fact that all networks have become essentially fibre networks in the core, with a wide variety access technologies at the edge, such as:

- fixed cable (eg fibre optic, copper, CAT5/ CAT6, coaxial)
- cellular wireless (2G/ 3G/ 4G)

[1] Research by OnePoll commissioned by UKB in October 2014 found that more than 50% of UK consumers rarely make calls on their landline and only keep the landline for internet access.

[2] Legacy mobile networks were typically provided with FDD technology and "paired" spectrum which was designed for two-way voice calls. New wireless networks are more likely to be built with TDD technology which allows for dynamic allocation of upstream and downstream traffic ratios.

- Wi-Fi

Increasingly the lines will blur for the consumer between fixed and wireless broadband networks which, for a consumer, also includes Wi-Fi networks. Consumers will expect simply to be connected to good quality data capacity wherever they are - at home, at work, at play and on the move. They will also expect a seamless experience when moving from one network or network type to another.

As in other countries where demand for this seamless connectivity is already being accommodated, demand in the UK will increasingly be for the appearance, experience and convenience of one seamless network, regardless of location. This will, in most cases, be delivered by operators seamlessly moving customers between technologies and networks to provide the "one network" experience. This will be especially important for a good data experience where the customer device will seek out the nearest network with enough capacity to deliver the data session required and automatically connect to this network, be it 4/5G wireless or Wi-Fi.

Any review of the market therefore needs to ensure that incentives are in place that ensure that the new data networks that consumers require are built in a competitive environment and that there is true competition across all of the means by which the consumer will receive a "joined up" service, including wireless broadband, fixed broadband and Wi-Fi. No one company should be able to dominate in any one or a combination of these areas. Ofcom must ensure that true competition in the converged broadband data market of the future is encouraged.

In a data world, the majority of usage is not "mobile"; it is "nomadic". Consumers use the largest amounts of data when they are static, primarily because they need to read or look at a screen – in a coffee shop, waiting for a bus, standing in the street downloading directions, etc. The majority of capacity that will be consumed on "mobile" networks in the future will be more static than "mobile".

It is important therefore always to keep in mind that references to mobile networks actually mean high capacity wireless broadband data networks. 4G and 5G cellular wireless base stations will have to be connected to fibre backhaul to provide the capacity required. The consumer is looking for the "always there ultrafast experience", whichever technology is delivering it.

The nomadic nature of the majority of data capacity use leads to a different approach to building wireless data networks from the approach to building voice networks. Whereas voice needs a thin coverage layer everywhere, data requires different levels of capacity in different usage cases. Cities require much more data capacity than rural areas, railway stations need more capacity than parks

and the centre of the village requires more capacity than the surrounding farmlands. The wireless data networks of the future require a thin coverage layer for voice and data and an additional capacity layer where larger amounts of capacity is required. So techniques such as carrier aggregation will become increasingly strategically important[3].

Data offload

Mobile data users increasingly use Wi-Fi connections at home, in businesses and in public places to offload data.

Caps for consumers on mobile data are a symptom of both cost and capacity constraint. As long as one or both restraints remain, usage caps will be a feature of consumer contracts and data offloading will remain a significant feature of the market.

Mobile data will become increasingly interchangeable with Wi-Fi and fixed line services. Where mobile operators are capacity constrained and Wi-Fi networks are unavailable, they will seek to offload to other mobile operators through wholesale offload arrangements.

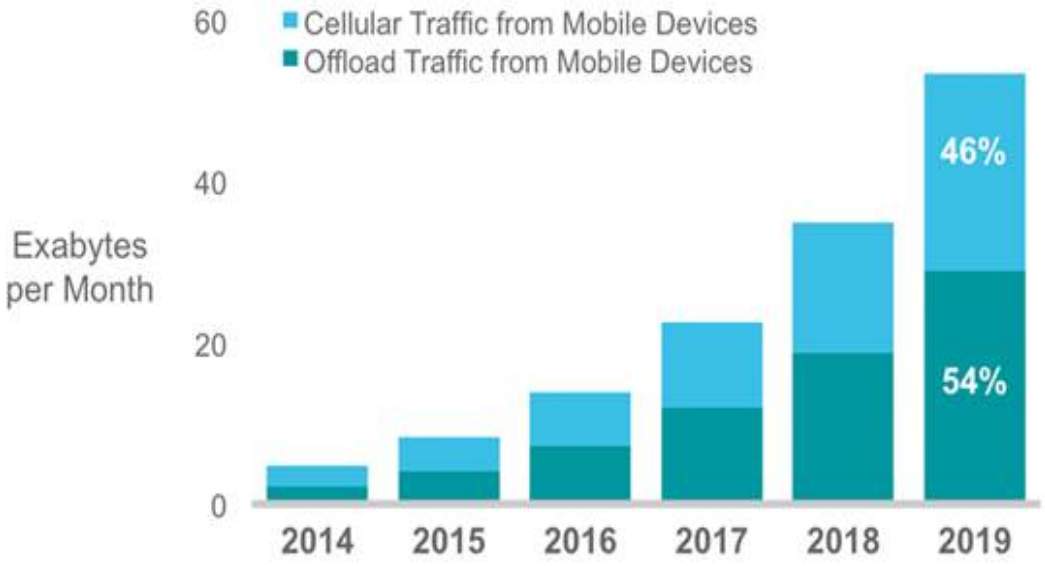
In Hong Kong, HKT makes its Wi-Fi network available to other operators. The HKT Wi-Fi network and HKT cellular network run off separate, but connected, core networks and traffic can be allocated dynamically between them. Additionally HKT operates MOCN arrangements with two other operators which has the effect of ensuring that spectrum is utilised to the full as it allows wholesale "bursting" to occur across the MOCN arrangements – the MOCN equivalent of off-load - and the consumer is allocated the bandwidth they need when they need it. UKB believes that wholesale access to Wi-Fi networks should become a feature of the UK market, as should the introduction of MOCN.

Ofcom has said that it expects overall levels of wireless data traffic could grow by around 45 times between 2014 and 2030[4]. Cisco predicts that by 2019 over 50% of mobile data will be offloaded onto Wi-Fi or fixed networks, as illustrated below.

[3] Carrier aggregation is where multiple spectrum blocks from the same or different frequency bands are aggregated to form a larger block which can provide proportionately more capacity in the network than the individual carriers can when used separately.

[4] Ofcom consultation on the future use of the 700MHz band, May 2014

Projected Growth in Cellular & Offload Traffic from Mobile Devices



Source: Cisco Visual Networking Index: Global Mobile Data Traffic Forecast Update 2014-2019 White Paper

Cisco also predicts that wireless data traffic will increase nearly tenfold between 2014 and 2019 and that wireless data traffic will grow at a compound annual growth rate of 57% from 2014 to 2019, reaching 24.3 Exabytes per month by 2019.

Growth in Wireless Data Traffic

Source: Cisco Visual Networking Index: Global Mobile Data Traffic Forecast Update 2014-2019 White Paper

Our experience from Hong Kong where, for example, our customers watch live streamed television programmes on the train and bus on the way home from work, indicates that this estimate is conservative. HKT's experience is that if you provide the network capacity and capability, the consumer will use it.

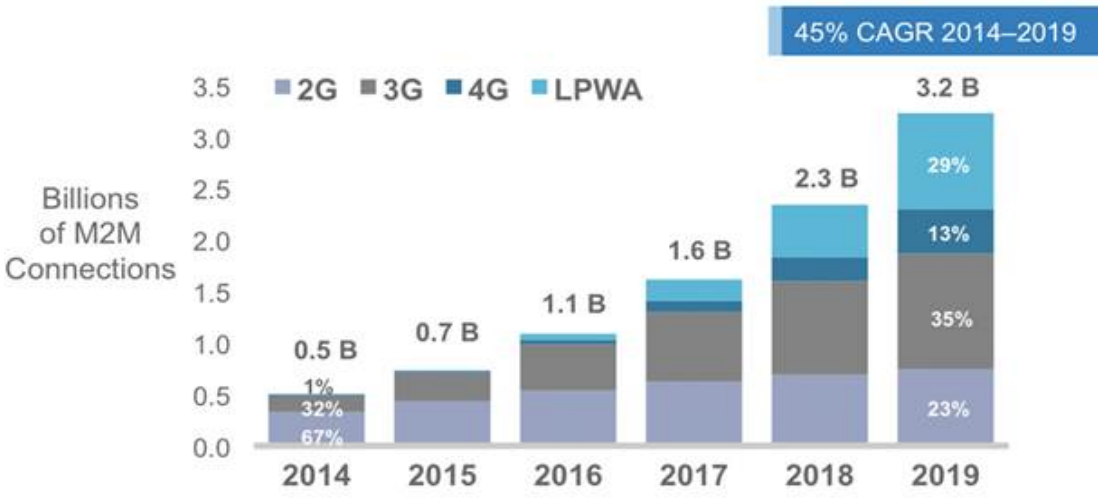
Much of the growth in data usage will come from new applications, particularly in the enterprise space. Usage and innovation are currently capacity-constrained.

The Internet of Things (IOT) and Machine to Machine (M2M) connectivity is increasingly important for businesses and consumers on the move (e.g. wearable devices).

M2M growth has been fast paced and this growth is expected to grow six-fold by 2019.

Competition and growth in IoT, M2M, business wireless broadband and other business-critical applications will be dependent on additional capacity being made available.

Growth in M2M connections



LPWA = Low Power Wide Area

Source: Cisco Visual Networking Index: Global Mobile Data Traffic Forecast Update 2014-2019 White Paper

2. Encouraging investment and innovation through competition

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?
Q6: What do you think is the scope for sustainable end-to-end competition in the provision of fixed communications services?

There is evidence that the market is currently attracting levels of investment not seen since the 1990s. Point Topic said in its recent report:

"*It is arguably boom time for superfast broadband infrastructure and take-up in the UK."*[5]

Ultimately, facilities based competition is the only way to deliver true competition and innovation. The number of new operators (for example UKB, Gigaclear, Hyperoptic, CityFibre) and existing operators (for example Virgin) engaged in network expansion with private sector funding is evidence that investors see an opportunity in the UK for attractive returns.

History has shown that investment and innovation only occur in the presence of true and effective competition. For example, BT only upgraded its network by extending fibre to its street cabinets when faced with losing business to competition from Virgin Media. Virgin Media launched its 50 Mbit/s service in 2008[6]. BT followed with the launch of its "Infinity" up to 40 Mbit/s product in 2010[7]. BT then limited commercial deployment of fibre to the cabinet to areas where it faced competition from Virgin Media. BT required subsidy from the Government in order to do the same in areas where it faced no competition[8].

However, whilst infrastructure competition can bring benefits to consumers, it does not always make commercial sense in as geographically a diverse country as the UK to duplicate infrastructure, so access to the passive elements of BT's network remains crucial.

Competing fixed infrastructure becomes less and less justifiable the closer the network gets to the end user because of the increased likelihood of network being idle[9]. Local loop unbundling enabled consumer ISPs to deliver broadband services over their own infrastructure. The Generic Ethernet Access product through which BT provides wholesale access to its FTTC network does not allow the same degree of product differentiation as LLU did, and so competition in this area is likely to be weakened as customers migrate to superfast broadband.

[5] Point Topic, "Superfast UK: expanding networks and demand", a report from UK Plus, September 2015
[6] http://about.virginmedia.com/press-release/284/virgin-media-launches-the-uks-fastest-broadband
[7] https://www.btplc.com/Sharesandperformance/Annualreportandreview/pdf/2010_review-of-year-lines-of-business.pdf
[8] http://ec.europa.eu/competition/state_aid/cases/243212/243212_1387832_172_1.pdf
[9] The original Virgin Media business case was bolstered by their early offering of TV as a differentiator.

The long term benefits of infrastructure competition mean that Ofcom should do more to encourage facilities-based competition. We believe that an independent Openreach would lead to a more competitive environment in the provision of network infrastructure. We discuss this in more detail in our answer to Q16 below.

"Sustainable" Competition

In UKB's view, the emphasis over the last ten years on whether or not market entry or competition is "sustainable" has not always been helpful. We believe it encourages Ofcom to take a subjective view on what might or might not be sustainable, rather than adopting policies which invite market entry of all kinds.

For example, the view that the consumer broadband market would likely support a small number of large scale ISPs led to a focus by Ofcom on LLU as an effective remedy. Whilst this led to successful retail competition for residential customers over the period, it left the business broadband market largely untouched, with BT continuing to dominate there.

We believe Ofcom should promote competition and market entry above all else, and leave it to the market to decide what is and is not sustainable. Business failures may have a short term detrimental impact on consumers, but the long term benefits of competition and innovation will outweigh these. Ofcom's job is not to pick winners.

"End-to-end" competition

We believe that the use of this term is somewhat outmoded now. It harks back to the birth of the cable networks, the requirement for "end to end connectivity" and a voice-centric world. It implies a nationwide duplication of the incumbent's network.

We would therefore recommend that Ofcom uses the term "infrastructure competition", "network competition" or "facilities-based competition", rather than "end-to-end competition".

The most significant element of the next ten years will be consumption of <u>data</u> and data is not consumed or provided in the same way as voice calls. Data networks are, in effect, provided on a local basis, with backhaul connection to the Internet, rather than to another user. Users are often not reliant on a single network or service provider in any one location. They could have an option, for example, of using either a 4G network or a Wi-Fi network to send or receive data, and they will select which ever offers the best service in a particular location.

What is required now in competition terms is the provision of multiple layers of capacity – fixed and wireless - to meet demand for data from consumers where it is needed.

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?

We think that levels of competition which vary according to geography are increasingly present and inevitable and identification of sub-national markets should become a more prominent feature of Ofcom's regulation.

In the local loop, last/first mile operators such as Virgin, UKB, Gigaclear and Call Flow exist alongside BT's copper network. The backhaul market also enjoys a degree of localised competition from operators such as COLT, CityFibre, Zayo and Virgin. However, there is a long way to go before the presence of alternative operators anywhere near matches the scale and scope of BT's backhaul network or the differing needs of the market.

Ex ante regulation of the backhaul market, with remedies such as dark fibre, will be required for the foreseeable future, but regulation could be withdrawn or could vary on a localised basis if, and only if, a sufficient degree of granularity is applied to geographic market definition. For example, geographically de-averaged cost-plus pricing might be an increasingly appropriate element of the access remedy.

Those deploying rural broadband networks in an attempt to reduce the "digital divide" are, by definition, most likely to need to rely on BT for access to backhaul, so firm regulation here is essential to attract vital competition and technology-neutral end user solutions in these harder to reach locations.

Q7: Do you think that some form of access-based 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)?

As stated above, access-based regulation will continue to be needed for the foreseeable future to address continuing bottlenecks, such as backhaul. To encourage network competition, passive remedies should always be available, but they should be available alongside active remedies unless a fully competitive market for all the downstream active products (not simply based on a theoretical possibility of supply-side substitutability or self-supply) is present.

We made the point in our answer to Question 6 above that permitting new and varied forms of market entry is vital to encouraging innovation. Different operators will require different types of product from the incumbent. They will not necessarily want or need to "climb the ladder of investment" and, even if they do, they will not all do so at the same time or pace.

It is this *variety* of market players which means that the availability of passive products should not preclude the availability of active products. Both can and should exist alongside each other.

For example, the withdrawal of regulated bitstream products in supposedly "competitive" markets (in favour of LLU) foreclosed, to a large extent, the broadband market to SME-focussed ISPs, enabling BT to retain its dominance in the business broadband market. A report by the Federation of Small Businesses in July 2014 described how this affected SMEs:

> *"The type of service offered by providers often does not meet the needs of small businesses. Many ISPs focus primarily on providing paid-for content to consumers, with download speeds dominating the offering. For businesses, however, upload speed is usually of equal if not greater importance. In order to transfer files and deliver goods and services online, a fast upload speed is crucial, as it is for remote working and for online video conferencing. Yet many small firms do not currently enjoy sufficiently fast upload services.*
>
> *The mismatch between the needs of small businesses and the type of service offered points to a problem in a market that is driven by commercial considerations: namely, the current focus of service providers on the domestic market at the expense of the small business market. For an ISP, selling a bundled package (broadband, TV service and a landline) to a household is often more profitable than selling a broadband connection to a small business, unless it is a leased line."*[10]

Equally, there is no reason why dark fibre should not exist alongside active Ethernet products in the so-called "business connectivity market" because they are utilised by different wholesale customers for different purposes. Passive products tend to be used to build networks; active products are more often used to provide retail services. We believe that Ofcom's current proposal in relation to the dark fibre remedy overlooks the former and focusses on the latter, with an over-emphasis on trying to prevent arbitrage. We believe that Ofcom should, instead, focus on encouraging network competition, rather than replication of BT's services.

[10] "The fourth utility: Delivering universal broadband connectivity for small businesses across the UK", Federation of Small Businesses, July 2014

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?

Access-based remedies, far from disincentivising network competition, encourage it. In fact, *not* providing effective access-based remedies has the effect of inhibiting network competition. For example, access to the incumbent's backhaul network enables deployment of last/first mile networks which, were it not for the availability of affordable backhaul, would be economically unviable. Many of the rural broadband projects which we evaluate, such as BDUK procurements, are rendered unviable by the lack of availability of affordable backhaul in the vicinity. [✂]

Strong and effective regulation of access to network bottlenecks will encourage investment on the part of competitors, thus spurring further investment and innovation on the part of the incumbent.

Examples of passive remedies that we consider vital to encouraging the building of alternative local networks are:

- Dark fibre on cost-based terms in areas where there are no alternatives to BT's backhaul network. This will facilitate network deployment in hard to reach rural areas.

- Cost-based access to BT (or BT/EE) towers, poles, rooves and cabinets in areas where there are no alternative network nodes.

- Extension of the PIA product to all ducts where BT faces no network competition.

Crucially, convergence of consumer markets and continuing growth in demand for data means the regulatory framework needs to evolve from "silo regulation" to regulation of access to *underlying network bottlenecks*. Regulation which creates a remedy in the form of a wholesale product which is restricted in its use to one particular retail market (ultimately defined by the incumbent's retail strategy) completely stifles innovation. It also creates a competitive imbalance, since BT itself faces no such restrictions on the use of its network inputs.

PIA is a classic example, where the duct and pole access remedy cannot be used to provide backhaul from radio cell sites, nor can it be used to connect business customer premises. Thus economies of scale and scope which are available to BT are not available to its competitors.

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?

There is no evidence, as some incumbent operators in Europe are suggesting, that continued investment in digital communications networks and services in the UK depends on reduced levels of competition. Network competition has proved effective in mobile networks, but the focus now needs not only to be on *coverage* but also on *capacity*. To meet the capacity demands of consumers, continued investment in wireless networks will remain crucial.

"Four to three" mergers have been cleared by the European Commission in Austria, Germany and Ireland, but blocked in Denmark based on concerns about the potential for consumer harm.

We strongly believe in the importance of competition in mobile networks, as compared with simply competition at the retail/ service level. However, mobile network competition becomes increasingly difficult to justify outside the main conurbations where scale efficiencies are harder to achieve. There are minimal quality or service differentiation factors associated with the Radio Access Network – the innovation tends to be in the Core.

There is, therefore, a place for network sharing arrangements, such as the MBNL & CTIL agreements, and also Multi-Operator Core Networks (as described in more detail below).

In response to a trend in Europe towards consolidation of mobile network operators, EU Competition Commissioner, Margrethe Vestager, has said:

> *"I have not seen compelling evidence that would support the existence of a trade-off between competition and investment."*[11]

She went on to say, in the context of the EU merger approval process:

> *"The "consolidation leads to investment" argument needs to be looked at very carefully. We carefully assess in each case any claims put forward that the merger would lead to increased investment to the benefit of consumers – for example in terms of increased coverage.*
>
> *In practice, we assess whether post-merger investment plans are credible and likely, merger-specific, and with benefits for end-consumers as opposed to shareholders.*

[11] Margrethe Vestager, speech to the 42nd Annual Conference on International Antitrust Law and Policy Fordham University, 2 October 2015

However, only a fraction of the efficiency submissions we have seen in successive cases have met these criteria.

In this context, we should not forget that mobile network operators can share mobile networks and thus benefit from large efficient networks without the need for consolidation."

That said, to some extent consolidation is a normal part of the cycle of investment and competition and is acceptable as long as the conditions to enable and support new market entry are present.

Multi-Operator Core Networks

MOCNs are an extremely efficient way of sharing spectrum and gaining all the benefits of wider frequency bands and carrier aggregation.

An MOCN enables two operators to share frequency (one or more bands) and share a radio network, whilst each operating their own core network and being able to compete fully and effectively. MOCNs thus offer true competition, and enable product and service differentiation, in contrast to MVNOs, which offer mere resale, with no opportunity for service differentiation.

HKT has successfully employed two MOCN spectrum capacity sharing arrangements on a commercial basis in Hong Kong. Such arrangements are efficient, cost effective and enable fast access to spectrum. Consequently, the Hong Kong Communications Authority made the continuation of HKT's MOCN agreement with China Mobile a condition of the acquisition of CSL by HKT.

The technology underlying MOCNs can also facilitate efficient spectrum sharing. For example, dynamic spectrum allocations are the most spectrally efficient version of MOCN, enabling each party to "burst" into the spectrum allocation of the other as needed, if the other party's allocation is not fully utilised. This works well when, for example, the users of one operator tend use the network at different times of day from the users of the other operator. Each operator is thus able to utilise spare capacity when the other operator's network is quiet.

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?

Factors which could adversely affect competition in mobile networks include the following:

- Over-concentration of spectrum in the hands of one or a small number of players;

- Inability of new entrants to access sufficient spectrum capacity in order to compete effectively in terms of both capacity and coverage;

- Inability of mobile network operators to access sufficient (fibre) backhaul capacity to meet the data demands of their customers;

- Insufficient competition to provide an effective constraint on the behaviour of large, vertically integrated network and service providers, leading to oligopolistic behaviour such as tacit price collusion;

- Bundling of products, making switching between service providers difficult for consumers;

- Dominance in adjacent markets such as fixed broadband and Wi-Fi.

These factors highlight the importance of convergence and the need to look at markets holistically, rather than in a narrowly defined way.

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?

Bundling, i.e. selling more than one product as a combined product, often by way of cross-subsidy, is designed to gain competitive advantage, rather than to benefit consumers. Where the sale of one product is tied to the sale of another product in which the seller has significant market power, then that could constitute an abuse of market power.

We would point out that, whereas HKT in Hong Kong offers the full "quad play" of services – voice, broadband, IPTV and mobile – it does *not* bundle these products but, instead, allows customers to choose which combination of services to take.

One example of the ability to leverage strength in an adjacent market is the fact that, if BT were to acquire EE, without legal/regulatory intervention, access to BT's network of 5m Wi-Fi hotspots could be bundled in with its mobile service and available only to BT's mobile customers, and not the customers of other mobile service providers. Given the importance of access to Wi-Fi networks for mobile users (as described in our answer to Q.4 above) there would therefore be a case for requiring BT to offer wholesale access to its Wi-Fi network, to enable other mobile service providers to compete effectively.

BT's Wi-Fi access points could have the capability to be configured as multi-

operator femto-cells, which might be augmented with external antennas to enhance outdoor coverage. This would provide mobile backhaul and customer access over the same infrastructure, offloading significant costs from the MNOs, by avoiding significant duplication of infrastructure in the form of deployment of small cells ("Fibre to the Lamppost" as they call it in Hong Kong). The significant costs for MNOs is in the Radio Access Network and the sites. But why build additional infrastructure when the fixed network infrastructure will do the job?

Bundling of TV Content

We agree that bundling of TV content is an area of concern. There is an intrinsic link between broadband service and key content. For example, some customers do not want to take a broadband service if they cannot get BT Sport with it. BT currently offers wholesale access to BT Sport on very unfavourable terms to alt-net broadband network providers. We therefore think Ofcom should consider imposing a wholesale must-offer remedy in relation to BT Sport, or it will, in effect, be able to tie the provision of BT Sport to its own broadband service, or to broadband services provided over the Openreach network.

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?

UKB's view is that the EU regulatory framework is no longer serving us well. It allows for the regulation of *services* rather than *networks*. This means that the market is often forced to go at the pace of the incumbent, rather than providing market entrants with the raw materials to build a differentiated service.

Equally, the requirement to find Significant Market Power in order to impose regulation may become harder and less appropriate as we move away from a period dominated by former monopolists and towards a more oligopolistic environment.

As stated above, UKB believes that access to passive network elements are an important facilitator of competition in networks – a significant part of the cost of rolling out high speed fixed and wireless networks is in the cost of civil engineering works. Using elements of existing networks can expedite and enable the rollout of new networks.

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?

Whether or not an investment is "risky" can be somewhat subjective. For example, BT was given a degree of pricing flexibility in relation to its VULA product because it claimed that there was significant uncertainty over both the cost and revenues associated with FTTC investment. However, BT limited its commercial FTTC deployment to densely populated areas where Virgin had already demonstrated demand for high speed broadband, which arguably minimised the risk.

In less densely populated areas, BT used government subsidy to cover on average approximately 75% of the cost of network deployment[12]. BT has already had to pay back some of this subsidy as take-up has exceeded its forecast of 20% and has reached 30%[13]. Additional claw-back may be required as take-up levels increase further.

UKB's view, therefore, is that upgrades to the former monopoly's network should always require strong regulatory intervention, as they will always be made with the inherent underlying advantages of legacy write-downs and the economies of scale and scope that go with incumbency.

Delivering widespread availability through public policy

Q3: What are 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?

When considering extension of fixed and wireless networks, there will always be a trade-off between cost and coverage. Economic reality dictates that the business case is harder for less densely populated areas.

Fixed and Mobile Network Coverage

With respect to mobile service coverage, the solution logically lies in network sharing arrangements such as Multi-Operator Core Networks (see answer to Q.8 above) or other network sharing or roaming arrangements. These allow all the benefits of service differentiation, whilst avoiding the need for duplication of passive networks in areas of low demand.

[12] The UK's National Broadband Scheme – an independent ex post evaluation of the UK's broadband state aid measure, Oxera, March 2015

[13] https://www.gov.uk/government/news/additional-129-million-boost-for-nationwide-broadband-rollout

With respect to fixed broadband networks, the situation is more complex. There is no "one-size fits all" technology approach that will deliver 100% connectivity. A variety of technological solutions will be required, which might include copper, fibre, wireless (using licensed and unlicensed spectrum) and satellite connections. A solution will need to be tailored to each individual area and not all consumers should expect to receive the same level of service.

It is worth noting, at this point, that masts and towers used to deliver retail "mobile" service could also be used / shared to provide fixed wireless broadband services to homes and businesses. Network sharing in remote areas should be encouraged wherever possible.

In addition to considering whether public subsidy is appropriate in order to expand broadband coverage, Government and Ofcom should also consider whether differential pricing should be applied to houses in more rural locations. A combination of public subsidy and differential pricing would enable coverage to go further.

UKB's view is that the simplest and most effective approach to applying public subsidy would be to give control to the consumer in the form of a broadband voucher. We think this is particularly suitable for smaller, fragmented rural areas.

We think that BDUK's Connection Voucher Scheme proved to be an effective and efficient way of distributing funds. We believe that a list of registered suppliers for each borough or parish could be provided and residents would be free to approach those providers directly with their voucher. Indeed, the voucher could be pre-approved for certain accredited suppliers, as it is under the existing voucher scheme.

Parish councils could facilitate aggregation of demand where appropriate. However, State Aid rules would prevent the council from selecting a supplier without running a formal procurement.

We note that a voucher scheme has been introduced to provide satellite broadband connections in order to meet the Government's 2 Mbit/s Universal Service Commitment ("USC") by the end of 2015. We see no reason why a similar voucher scheme could not be extended to the remainder of the "final 5%" for a wider range of technological solutions.

We do not believe there is a justification for a subsidised Universal Service Obligation beyond that which is required by the European Universal Service Directive and beyond the minimum coverage provided by the Government's 2 Mbit/s USC.

There is a case for central Government intervention to extend broadband coverage beyond the 95% currently committed. However, a target to provide 30 Mbps for all (in line with EU 2020 targets) would require a high degree of subsidy which we do not think can be justified. Subsidy to deliver 5 or 10 Mbps would require considerably less in the form of subsidy.

UKB's view is that there will always be a small section of the population who live in areas sufficiently remote to remain "off grid" for broadband (as some are for other utilities) as the economics of delivering a service at public cost will be too great. This is especially the case where there is no evidence of demand from residents.

New entrants to the market are beginning to invest in last mile networks in areas neglected by BT. However, they face the threat that, once they have taken the risk to prove demand and provide effective competition, BT will upgrade its subscriber lines in those areas, at potentially lower cost, given its economies of scale and scope. This "Catch 22" situation can inhibit investment.

Robert Madelin, the former Director General of DG Connect, is reported to have said:

"The incumbent is under little pressure to invest, but can destroy the business case of any alternative investor by strategically overbuilding them if they dare enter the market."[14]

We explore this problem further in our answer to Q13 below.

One solution could be a 5-10 year moratorium on BT deployment of network upgrades to deliver higher broadband speeds in areas which it had previously declared uneconomic for NGA infrastructure deployment. This would prevent BT from exploiting the competitive advantage of its network scale.

Reform of the Electronic Communications Code

More could be done to encourage network expansion. Reform of the Electronic Communications Code is urgently required. The current Electronic Communications Code hinders rather than promotes network deployment for the following reasons:

- It is distrusted by landlords and there is therefore a reluctance on the part of landlords and their agents to enter into negotiations with Code Operators.

[14] http://mlexmarketinsight.com/landing-pages/telecom-industry-faces-shakeup-as-eu-tackles-regulatory-catch-22/

- It is ineffective in securing timely access to sites due to the need for lengthy and expensive proceedings through the Courts.

- It does not effectively prevent landlords from charging ransom payments.

Any changes to the relationship between electronic communications network operators and site providers must support the deployment of telecommunications infrastructure whilst enabling landlords to carry out plans to develop and deal with their properties upon provision of reasonable notice to the Code Operator. The Code also needs to provide a clear and certain method of establishing fair market value for occupation of land by Code Operators.

Publication of Network Data

Operators cannot make rational decisions on new investment opportunities without access to accurate data about the presence of existing suppliers in any particular area. Government and local authorities need to continue progress to provide further information about the presence of networks, to encourage network sharing where possible.

Delivering quality of service for consumers and businesses

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?

Openreach Ethernet Provisioning

Our experience is that Openreach routinely fails to deliver circuits on time and their average install time is nearly three times longer than the committed 30 days. This continually leads to UKB incurring delays on our own customer installations, despite building in an allowance for delays.

In a market dominated by service providers who rely on the Openreach network, there is insufficient competitive incentive for improved service performance on the part of Openreach.

BT refusal to supply wholesale products

BT has resisted requests to offer dark fibre as a product over many years. BT has also been slow to offer sufficient features and variants on Ethernet and Wavelength products. For example, on Ethernet BT was slow to respond to

Mobile Network Operator ("MNO") calls for "Synchronous Ethernet" for backhaul for radio networks[15]. Also, BT's Ethernet products are not fit for purpose for connecting smaller housing developments and estates[16], which limits alternative infrastructure development.

In theory an effective SoR process could spur BT to meet demand and invest accordingly. In practice, however, the process is unwieldy and unworkable and notorious in the industry. BT's Undertakings permit Openreach to accept or reject Statements of Requirements on the basis of, among other things:

a) fit with the assets, skills and resources of Openreach;
b) commercial attractiveness to Openreach; and
c) opportunity cost to Openreach.

This gives BT plenty of scope to reject the majority of SoRs submitted to it.

Mobile Data Capacity

In the mobile sector, an example of inadequate quality of service is the constraint (whether by network performance or by contractual data caps) on users' ability to use data-hungry applications on their mobile devices.

This can be caused by lack of spectrum capacity at the cellular level and/or lack of capacity in the backhaul network. This problem should be addressed in the following ways:

- Encouraging competition in wireless data networks;
- Releasing more public sector spectrum;
- Firm regulation to ensure adequate provision of fibre backhaul.

Lack of fast broadband in some areas

There is no provision in the Undertakings that requires BT to upgrade its network to meet customer demand, as would apply by operation of competitive markets (or the operation of an independent wholesale provider). This has meant that BT has lagged behind consumer demand first for ADSL and then for superfast broadband.

BT was widely criticised for being slow to introduce broadband over ADSL in the early 2000s. Widespread consumer discontent resulted in campaigns, petitions

[15] http://stakeholders.ofcom.org.uk/binaries/consultations/business-connectivity-market-review/responses/Combined_response.pdf
[16] See for example the submissions of GTC to Ofcom's BCMR

and community broadband schemes.[17] Also, during the period 1999-2004 BT obstructed efforts to increase competition in the provision of broadband services through local loop unbundling ("LLU"). High prices and unwieldly operational processes made the LLU product unusable in practice[18]. BT maintained that there was insufficient demand for the product from other operators[19]. This led to the appointment of a Telecommunications Adjudicator[20] and later to the creation of Openreach and BT's Undertakings under threat of a referral to the Competition Commission[21].

Some customers are still unable to obtain the quality of broadband service that they would like to buy.

Q21: What further options, if any, should Ofcom consider to secure better quality of service in the digital communications sectors?

In UKB's view, the minimum standards Ofcom has proposed are not sufficiently stringent to ensure improved performance on the part of Openreach. Openreach should face strict penalties for all delivery failures, not just for persistent or repeated breaches. This is especially important for wholesale customers who may have made back to back commitments on several customer orders in respect of one Openreach circuit delivery.

A Review of the Undertakings & 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?

There are countless exemptions to the Undertakings which permit BT to consume different products from those which its competitors are offered, BT's own consumption of its duct and fibre being important examples.

Another example of discrimination is the failure to publish adequate information about the Openreach network. Sky has already highlighted BT's refusal to supply information about its copper network that would enable competitors to provide services using G.Fast technology[22].

We also note that, in breach of State Aid conditions, BT has not yet published location data relating to its subsidised FTTC network from the Government

[17] An example of this was the website http://www.broadband4britain.co.uk/
[18] http://www.theguardian.com/technology/2000/feb/24/columnists.guardiancolumnists
[19] http://www.broadcastnow.co.uk/bonfield-hits-back-at-adsl-critics/1183028.article
[20] http://media.ofcom.org.uk/news/2004/ofcom-sets-out-long-term-approach-to-further-development-of-broadband/
[21] http://media.ofcom.org.uk/news/2005/ofcom-accepts-undertakings-from-board-of-bt-group-plc-on-operational-separation/
[22] Initial submission by Sky to Ofcom's Digital Communications Review, June 2015, paragraph A.17

superfast broadband programme. This hinders other providers from offering retail services in competition to BT in those funded exchange areas.

In its April 2014 report, the Public Accounts Committee said:

> *"There is still not enough consistently good information published by local bodies about planned rural broadband coverage and speed. Despite our recommendation last September, many of the maps currently available do not give sufficiently detailed information about BT's coverage to be of use to other potential suppliers seeking to plug the gaps."*

If Openreach network information is provided privately to individual CPs, rather than published in a central location for all CPs to access, then BT has a chance to gain commercial advantage from knowing CP strategies. If a CP were to ask, for example, for the location of cabinets or poles in a particular location, BT would either be able to gain a competitive advantage from the knowledge gleaned about the competitors rollout plans, or would be able to leak information publically to the disadvantage of its competitor. The presence of Chinese Walls is of little comfort to competitors who don't feel confident of relying on them.

We mentioned in our answer to Q3 above the ability of Openreach to overbuild competing networks. BT will say that it is not a monopoly and offers wholesale access to ISPs. However, overbuilding nevertheless represents anti-competitive behaviour in relation to the alt-net. It also gives BT a head start in marketing terms.

For example, BT has promoted trials of its Fibre to the Remote Node technology in the press[23], where Openreach was mentioned only fleetingly in the context of a job title. These trials have been located in "not-spot" areas – Shoreditch and Leyburn, N.Yorks – where BT had faced competition from alternative network providers[24]. The message is "BT to trial new broadband system in TechCity", not "Openreach to offer new wholesale broadband service in TechCity". So it is hard not to draw the conclusion that BT Consumer is able to exert influence over Openreach in terms of where it builds new network and thus gain competitive advantage over its rivals. For there to be true competition in the market, and for new operators be encouraged to invest in new networks and services, the connection between what Openreach do and what BT Consumer insists is prioritised must be broken.

[23] http://www.theguardian.com/business/2014/jul/30/bt-trial-broadband-system-london-slow-tech-city
[24] https://recombu.com/digital/article/wireless-rural-broadband-hotspots-spring-up-in-leyburn-and-appleton-wiske-north-yorkshire_M11457.html

Q14: Are there wider concerns relating to good consumer outcomes that may suggest the need for a new regulatory approach to Openreach?

We believe that the market has changed significantly since the last Strategic Review (as described above) and BT enjoys enduring dominance in a number of wholesale markets which, combined with its vertical integration and strong presence in all of the key retail markets, gives it the ability to disrupt and distort competition. In fact new positions of dominance have the potential to be created, in the local loop and in mobile and bundled products.

We believe that the grounds for Ofcom to make a referral to the CMA are met: namely that there are "*reasonable grounds for suspecting that any feature, or combination of features, of a market in the United Kingdom for goods and services prevents, restricts or distorts competition in connection with the supply or acquisition of any goods or services in the United Kingdom or a part of the United Kingdom*."

It is time for the CMA to take a fresh look at the market in its entirety.

Q15: Are there specific areas of the current Undertakings and functional separation that require amending in light of market developments since 2005?

We no longer accept the premise of the Undertakings. They were offered by BT "*in lieu*" of a reference under the Enterprise Act and were principally designed to address problems around the LLU process. They were written (obviously) before the creation of Openreach.

UKB's view is that the Undertakings are no longer fit for purpose in addressing the competitive problems in the market.

Pending a reference to the CMA and potential structural separation they need to be thoroughly overhauled, rewritten afresh, and brought up to date. Some or all of the exemptions need to be re-considered and many, such as BT's exemption from offering fibre and ducts on an EOI basis, should be lifted.

Q16: Could structural separation address any concerns identified more effectively than functional separation? What are the advantages and challenges associated with such an approach?

As a customer and competitor of BT, we have no confidence that functional separation is working. Equivalence of inputs has been demonstrated to be ineffective in correcting distortions in competition and, at best, delivers and "equally poor" service to all customers.

A broad non-discrimination EOI requirement fundamentally under BT's control does not address the fact that service quality is poor, timelines are inadequate, costs are high and services are only available when and where BT plc requires.

UKB also provides wholesale broadband services. If BT Consumer were separated from Openreach and therefore had the option of purchasing wholesale broadband services from operators such as ourselves, this would encourage more competition in local access networks. It would encourage network deployment on the part of competitors to Openreach as they would be able to invest in the knowledge that BT Consumer would be a potential buyer of their services. It would give more options to consumers in terms of better connectivity and choice of content and it would encourage Openreach to offer a better service to its wholesale customers.

An important element of such a new competitive landscape would be for Openreach to make its Equivalence Management Platform available to other infrastructure providers so that ISPs could offer services to all consumers, not just those connected to the Openreach network.

In UKB's view, divestiture of Openreach (and potentially some or all of BT Wholesale) is the only acceptable solution to the structural problems in the market.

We understand that structural separation would lead to upheaval in the industry. However this has to be offset against the long term advantages that such structural separation would bring. As we move from a voice world to a data world it becomes more and more important that incentives are in place that encourage multiple solutions and new networks to provide the data networks we need. This cannot occur under the current BT arrangements. The market is already failing in this regard and it will only get worse.

The inconvenience of short term adjustments to separation will be minor in comparison to the long term benefits to be gained. Additionally, the risks to consumers of not addressing the competitive problems are too high if the UK is to meet the data challenge facing it today and, increasingly, in the future. We therefore call on Ofcom to refer the market to the CMA.

Empowering consumers and businesses to benefit from competitive markets

Q18: What indicators should Ofcom monitor in order to get an early warning of demand-side issues?

Ofcom should conduct research to examine usage habits in other countries (such as Hong Kong) where the use of both fixed and mobile data and related services available to businesses and consumers delivered across multiple networks and technologies are already much higher than the UK.

Q19: What options might be considered to address concerns about consumer empowerment at each stage of the decision-making process? 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)?

Ofcom's view is that switching processes should be gaining provider led. We agree.

Ofcom have applied the gaining provider led principle to processes for switching voice and broadband services between service providers using the Openreach network and are currently reviewing the process for switching mobile services. But new Relish customers still have to contact their existing provider to say they are leaving, as Relish is provided over a network that does not belong to BT. This represents a barrier to competition for Relish.

If Openreach made its Equivalence Management Platform available to alt-net providers on a wholesale basis, customers connected to those networks would be able to access all service providers who interface with the EMP. We believe that this should be a regulatory requirement of Openreach.

Network Evolution

Q23: Where might future network evolutions, including network retirement, offer opportunities for deregulation whilst still supporting good consumer outcomes?

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 Ofcom attach particular importance.

We see no benefit in requiring BT to maintain a PSTN network in parallel to an IP voice network. The preference would therefore be to look for battery-backed devices in homes. Customer preferences are evolving so that many are eschewing the landline, including many Relish customers, who purchase a broadband service and a mobile phone service, but not a landline for voice calls.

Mobile networks are developing too, so that voice calls will soon be carried as IP data packets over LTE networks.

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.

New entrants who have invested in IP networks should not be penalised by having to bear the cost of conversation to and from IP. The legacy network operators should bear the cost of upgrading the NNI to meet with new operators as an incentive to upgrade. The technologies and standards for IP interconnect are well established and should be mandated.

Targeted regulation & opportunities for deregulation

Q22: Might there be future opportunities to narrow the focus of ex ante economic regulation whilst still protecting consumers against poorer outcomes?
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

We agree that the market is not yet ready for deregulation and a move entirely to reliance on *ex post* competition law. Due primarily to the move from voice to data, with the additional backhaul capacity needed to drive this change, BT's market strength is actually growing, not receding. This will only get worse if it is not addressed now. There are many enduring bottlenecks, such as backhaul capacity & spectrum capacity.

We agree that convergence in services could remove the need, for example, of voice-specific access regulation.

Effective regulation of dark fibre, along with increased investment from BT's competitors, could remove the need for regulation of downstream business connectivity / leased line services. However, this depends on an effective dark fibre remedy, with cost-based pricing.

We think Ofcom could continue to deregulate on a geographic basis, based on geographic differences in the levels of network competition.

The UKB Group
October, 2015