Robert Kenny

An analysis of the benefits to UK consumers, businesses and citizens from BT's acquisition of EE

A report for BT

COMMUNICATIONS CHAMBERS

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About the author

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Disclaimer
The opinions offered in this report are purely those of the author. They do not necessarily represent the views of BT.

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1. Executive Summary

In February 2015 BT announced that it had agreed terms to bring together the UK's leading fixed and mobile networks through the acquisition of EE, subject to regulatory approvals.

This paper, commissioned by BT, assesses the benefits of the transaction for customers, based on how BT/EE will be placed to address key industry trends. It also reviews the market context for the transaction, within the UK and internationally, considering commercial and regulatory issues.

In summary I conclude that the merger has the potential to generate a wide array of customer benefits driven by enhanced investment, innovation, efficiency and competition for converged services. Notwithstanding the merger, the UK would continue to be a well contested market by comparison to its European peers, with some of the most pro-competitive market interventions globally.

Benefits of BT/EE for customers

There are five key industry trends which the merged company will be well placed to address, to the benefit of customers.

Firstly, customers' **increasing demand for speed and traffic will need to be efficiently met.** Broadband speeds grew 5x between 2008 and 2013, while prices dropped by 12% in real terms.[1] Continuing to deliver such price/performance improvements requires ongoing investment in new technologies and continuing focus on costs. The merger can support this via bundling and general cost synergies.

Currently the UK lags in bundling – in France, for example, adoption is 30%, compared to just 5% in the UK today. The merger can help close this gap, and since bundled offers are cheaper, this will bring savings for customers.

A merged BT/EE[2] will also be able to generate £3bn of overhead and network savings from combining the two businesses, to further support price/performance improvements. This will come in part from delivering a converged, ubiquitous all-IP network.

A merged BT/EE[2] will also be able to generate £3bn of overhead and network savings from combining the two businesses.

UK broadband speeds grew

5x

between 2008 and 2013

[1] Ofcom, Communications Market Report 2014, 7 August 2014
[2] Throughout this document, unless context requires otherwise, BT/EE should be taken to mean EE and the divisions of BT other than Openreach

1. Executive Summary *continued*

Meeting demand growth will also require ongoing investment. BT/EE: will be an integrated entity (rather than a joint venture); will be operating in its home market; will have a willingness to invest against long payback periods; and will have a combined capex budget enabling greater flexibility to invest and innovate across fixed and mobile. These factors will all contribute to supporting future investment requirements.

Secondly, customers also increasingly expect **seamless connectivity** and **widely available and reliable internet** – ubiquitous, high quality and convenient access to voice and data services. With a heterogeneous mix of networks (fixed, wifi, 4G), BT/EE will be well placed to ensure:

- Network resilience, since diverse access networks will be available to consumers
- Where multiple networks are available, the customer's traffic flows on the one best suited to their needs at that time;
- When a customer moves between these networks, hand-off happens in a seamless manner.

It is because of such benefits that (as Ofcom has said), "It is likely that fixed and mobile technologies and networks will converge over time".[3] The combination of BT and EE will ensure that these benefits will be delivered as rapidly as possible to as many customers as possible, not least the existing customers of the two companies. This customer base will represent a powerful incentive for BT/EE to innovate in converged services.

Thirdly, the combination of **pressure on enterprises (and the public sector in particular) to enhance productivity through digitisation** and the rising importance of mobility creates a need for increasingly sophisticated mobile solutions. BT, through its Global Services (GS) division, has managed services skills and enterprise customer knowledge. This, combined with EE's mobile network assets, will enable BT/EE to provide advanced solutions, which to date have not been a prime focus for most MNOs.

Fourthly, for many applications, **delivering the Internet of Things** will require a combination of systems integration, enterprise customer relationships and fixed and mobile connectivity. BT/EE could therefore have an important role to play in the deployment of IoT, thereby enabling substantial productivity benefits in the UK.

A fifth and final challenge facing the industry is **rapid change and rising uncertainty.** This takes many forms, including: steep price declines and growing volumes; technology change; and the rise of 'over the top' players such as Skype and Whatsapp.

Resilience to this change and uncertainty comes in part from adaptability and innovation. BT/EE would have greater innovation capacity than either company on its own. Mergers of businesses with adjacent but complementary knowledge bases (such as BT and EE) are precisely those likely to lead to improved innovation.

[3] Ofcom, Strategic Review of Digital Communications: Terms of Reference, 12 March 2015

Figure 1: Market trends and associated potential benefits of the transaction

Trend	*Challenge/Opportunity*	*Relevance of transaction*
A. Growing demand for data & speed in fixed and mobile	*Significant ongoing capex will be required*	*BT/EE will have greater investment flexibility*
	Customers expect continuing improvements in value for money, requiring substantial efficiencies	*Merger can deliver cost savings to meet this expectation* *Increased fixed/mobile bundles will also reduce costs*
B. Expectation of ubiquitous, seamless and reliable connectivity	*High quality coverage both indoors/outdoors*	*BT/EE can readily offer small cells and good in-building coverage* *Hybrid fixed/wireless solutions may be a cost effective way to 'top-up' broadband speeds for some users*
	Resilient connectivity may be required for some users to provide superior reliability	*Hybrid can also offer diverse customer connectivity solutions, improving resilience*
	Users do not wish to constantly manage wireless connectivity choices	*An integrated fixed/wireless network can deliver seamless connectivity and ensure traffic flows on the optimal network*
	Such connectivity places heavy demand on spectrum, making spectrum efficiency important	*BT's high capillarity fixed assets and EE's mobile capabilities can support small/femto cells and other technologies to support spectrum efficiency*
C. Organisations under pressure to save enhance productivity through digitisation	*Mobile data has been transformative for consumers – organisations have yet to capture similar benefits*	*The combination of EE's mobile network and expertise and BT's systems integration capabilities and customer knowledge can address this*
D. Billions of connected devices	*High wireless coverage and low power requirements will be needed for the Internet of Things*	*BT/EE can readily offer small cells and good in-building coverage, supporting low power connectivity*
E. Rapid change and greater uncertainty	*The telco system will need to be increasingly innovative and flexible*	*Combined skills and financial capacity will enable innovation and flexibility*
		BT/EE represents a 'missing' type of player in the current UK market, and will provide diversity

1. Executive Summary *continued*

BT/EE in a UK market context

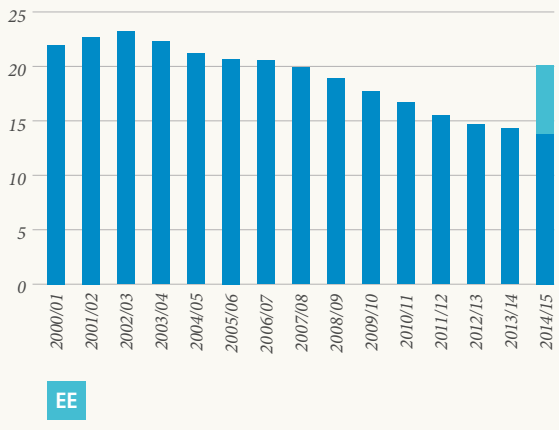
The merged entity has the potential to deliver a wide range of benefits for customers. But the merger would not create a business which was unprecedented in its scale nor one comprehensively advantaged versus its rivals.

In real revenue terms, a combined BT/EE will actually be smaller in the UK than BT alone was in the years prior to 2007/08. Nor is a large integrated fixed/mobile business novel in the UK – BT was precisely this until it demerged its Cellnet business (now O2) in 2001.

Its key rivals will all continue to have their own distinct advantages. Virgin will still have the highest speed broadband network, Sky will still have the pre-eminent pay-TV offer and so on.

While the merged entity will be well placed to offer converged fixed/mobile products, it certainly will not have first mover advantage. Virgin has been offering such bundles to consumers since 2006. Vodafone acquired fixed operator Cable & Wireless Worldwide in 2012 to "capitalise on the growing market for unified communications", with a particular focus on businesses.[5] BT/EE will provide greater choice and competition for customers in both segments, helping the UK 'close the gap' in converged offers relative to its European peers.

Figure 2. BT UK revenue, real terms, (2014/15 £bn)[4]



The international market context

The merger will not put the UK out of line with other countries, where it is common for the largest fixed line operator to also operate a mobile network. Moreover, of the five main EU incumbents, BT/EE would have the lowest shares of mobile and broadband, and one of the lowest shares of telephony and TV. Thus the merger would not jeopardise the UK's status as a highly competitive telecoms market.

The policy context

Moreover, BT will continue to face far greater regulatory constraints than any of these incumbents – indeed, greater than all but a very few carriers globally. Under legally binding undertakings to Ofcom, BT is functionally separated – its Openreach division has been set up to own and operate BT's backhaul and 'last mile' access network at arms-length from the rest of the company, ensuring all retail competitors can access its services on equivalent terms. This substantial pro-competitive intervention will be wholly unaffected by the merger, and there will be no synergies specific to EE and Openreach.

BT/EE will actually be smaller in the UK than BT alone was in the years prior to 2007/08.

Openreach equivalence is just one of many regulatory obligations on BT. Many of these date from a time when the company and the market were growing, but both have now been contracting for a number of years. Thus policy makers need to be particularly careful in balancing consumer protection, promotion of competition and investment incentives. Given the many sector-specific constraints already in place, which limit telcos' room to manoeuvre in responding to a rapidly developing market, particular caution should be used before applying further constraints by blocking mergers or requiring onerous remedies.

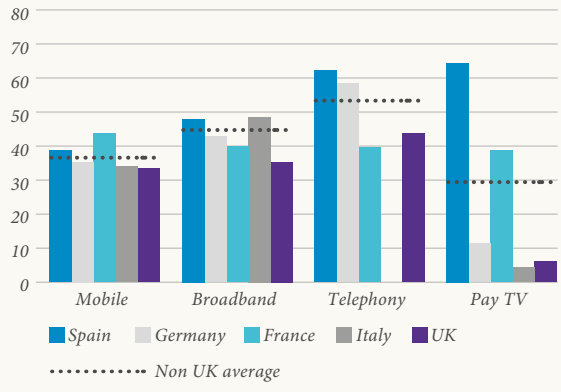
Conclusion

The proposed merger aligns with technology and customer trends in the market, supporting fixed mobile convergence, widely anticipated by Ofcom and others. Thus it enables BT to better meet developing customer needs. It also represents a necessary and rational (perhaps even inevitable) response to the sustained contraction of the telecoms sector.

Finally the resultant market position of BT/EE will be unremarkable by international standards. Given the complementarity of the two businesses, BT/EE's share of fixed and mobile will be little changed from the respective shares of the businesses separately. In fixed/mobile converged products, the entity will provide greater competition to the long-standing players already in this space.

These benefits are important context for an assessment of the public merits of the transaction.

Figure 3. Incumbent market shares *(post-transaction for UK (%))*[6]



BT/EE will have market shares well below average vs. the 5 main EU incumbents.

[4] See footnote [77] for sources
[5] Vodafone, Recommended Cash Offer for Cable & Wireless Worldwide PLC by Vodafone Europe B.V., April 2012
[6] See footnote [91] for sources and notes

2. Introduction

In February BT (the UK's largest fixed operator) announced that it had agreed definitive terms to acquire EE (currently the country's leading mobile operator)[7] for £12.5bn.[8] This transaction is subject to approval by the Competition and Markets Authority.

Naturally BT believes this transaction is in the interests of its shareholders, and indeed the company's share price rose 3% on the announcement.[9] Shareholders have since voted 99.7% in favour of the acquisition.[10]

This paper, commissioned by BT, undertakes an evidence-based assessment of the potential benefits of the transaction to consumers, businesses and UK plc more generally.

The first part of this paper looks at some of the key industry and customer trends for the years ahead; the opportunities they present; and how the proposed transaction can help address them.

The second part considers a merged BT/EE in market context – how would it sit in the UK market, how would it compare internationally, and what would be the regulatory and policy context?

Shareholders have voted

99.7%

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The telecommunications sector generated

£24.7bn

of gross value added in 2012

[7] If the Three/O2 transaction goes ahead, that merged entity would be the largest UK mobile operator
[8] BT, BT agrees terms to buy mobile network EE, 5 February 2015
[9] Ibid
[10] BT, General Meeting 30 April 2015, Summary of votes cast, 30 April 2015

3. Benefits of BT/EE for customers

This section considers how the merger may bring benefits for customers and the wider economy.

The telecommunications sector needs to be effective in meeting the needs of its customers, both because it is a substantial industry in its own right (generating £24.7bn of gross value added in 2012) and because it is also a vital enabling technology with substantial spill-over effects to many sectors of the economy. As DCMS has commented:

"It is vital that our digital communications infrastructure meets the needs of users in the UK. The UK must also be competitive on a global scale. It is imperative that the UK pays the same close attention as other countries to developing communications infrastructure to maintain the competitive edge essential to retain and attract business...

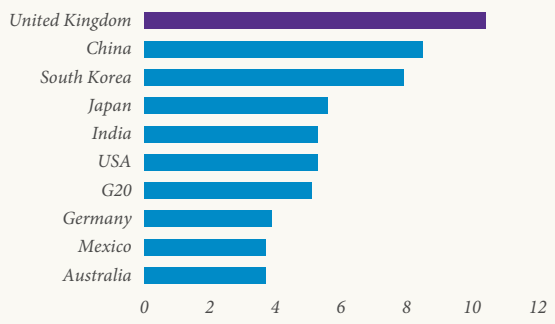
Digital communications are an essential part of everyday life for consumers, citizens and business, although their importance in underpinning economic and social activity is probably not fully recognised and appreciated."[13]

Goodridge et al report that telecommunications has been responsible for 37.4% of 1990-2008 UK total factor productivity growth. (TFP is a measure of the efficiency with which the economy uses inputs of capital and labour).[14]

Telecoms is particularly important in the UK, where (at 10.4%) the digital economy has the largest share of GDP of any G20 country (Figure 4).[15]

"in effect, consumers have received the mobile internet for free"

Figure 4: e-GDP as % of GDP (2015 forecast)



Source: BCG UK cGDP May 2015

[11] ONS, United Kingdom National Accounts, The Blue Book, 2014 Edition, 31 October 2014
[12] For a survey of studies in this area, see SQW, UK Broadband Impact Study – Literature Review, February 2013
[13] DCMS & HMT, Digital Communications Infrastructure Strategy, 6 August 2014
[14] Goodridge, Haskel & Wallis (Imperial College Business School & Bank of England), The "C" in ICT: Communications Capital, Spillovers and UK Growth, October 2014
[15] BCG, UK eGDP 2010-2018, May 2015

3. Benefits of BT/EE for customers *continued*

Market trends and the future potential for customers & UK plc

Given the pivotal role of telecoms, a country will have a competitive advantage if it has an efficient, innovative and flexible telecoms sector, well placed to address market trends.

There are five industry trends (on which there is likely broad industry consensus) which are particularly relevant to the transaction:

A. Demand for data and speed in fixed and mobile will continue to grow rapidly, and customers will expect continuing improvements in value for money;

B. There will be an increasing expectation of ubiquitous, seamless and reliable connectivity;

C. Organisations, and the public sector in particular, will be under pressure to enhance productivity and improve delivery through digitisation;

D. Connected devices will be numbered in hundreds of millions – and in time billions – owing to advent of the Internet of Things, placing additional demands on critical networks;

E. There will be increasingly rapid change and rising uncertainty in the telecoms industry.

These trends present a number of opportunities and challenges for the industry. But in our assessment the proposed transaction will support the UK's ability to meet them, in the ways set out as follows:

Figure 5: Market trends and associated potential benefits of the transaction

Trend

A. Growing demand for data & speed in fixed and mobile

B. Expectation of ubiquitous, seamless and reliable connectivity

C. Organisations under pressure to save cost through digitisation

D. Billions of connected devices

E. Rapid change and greater uncertainty

The remainder of this section sets out in more detail these trends; the associated opportunities and challenges; and how the transaction will contribute to meeting them in the years ahead.

Challenge/Opportunity	*Relevance of transaction*
Significant ongoing capex will be required	*BT/EE will have greater investment flexibility*
Customers expect continuing improvements in value for money, requiring substantial efficiencies	*Merger can deliver cost savings to meet this expectation* *Increased fixed/mobile bundles will also reduce costs*
High quality coverage both indoors/ outdoors, and geographic	*BT/EE can readily offer small cells and good in-building coverage* *Hybrid fixed/wireless solutions may be a cost effective way to 'top-up' broadband speeds for some users*
Resilient connectivity may be required for some users to provide superior reliability	*Hybrid can also offer diverse customer connectivity solutions, improving resilience*
Users do not wish to constantly manage wireless connectivity choices	*An integrated fixed/wireless network can deliver seamless connectivity and ensure traffic flows on the optimal network*
Such connectivity places heavy demand on spectrum, making spectrum efficiency important	*BT's high capillarity fixed assets and EE's mobile capabilities can support small/femto cells and other technologies to support spectrum efficiency*
Mobile data has been transformative for consumers – organisations have yet to capture equivalent benefits	*The combination of EE's mobile network and expertise and BT's systems integration capabilities and customer knowledge can address this*
High wireless coverage and low power requirements will be needed for the Internet of Things	*BT/EE can readily offer small cells and good in-building coverage, supporting low power connectivity*
The telco system will need to be increasingly innovative and flexible	*Combined skills and financial capacity will enable innovation and flexibility*
	BT/EE represents a 'missing' type of player in the current UK market, and will provide diversity

3. Benefits of BT/EE for customers *continued*

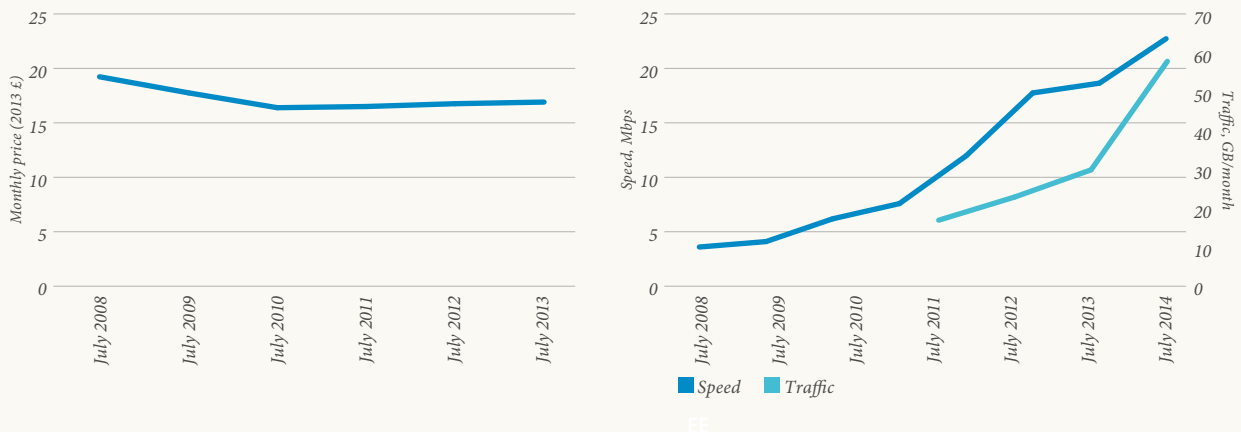
A. Increasing speed and traffic and improving value for money

UK operators (including BT) have delivered extraordinary value for consumers, investing to provide greatly increased broadband speed, while simultaneously lowering prices. Between 2008 and 2013, residential fixed broadband prices have dropped 12% in real terms. Over the same period, broadband speeds have increased by almost fivefold, and in just the three years to June 2014, traffic has more than tripled (Figure 6).

There has been a similar pattern in mobile, where the average subscriber paid 4% less in 2013 than in 2008, but now makes 13% more calls, and (more importantly) makes use of substantial mobile data. In that period, the number of phone subscriptions including data has tripled to 44.5m,[17] and usage per subscription has also grown dramatically (by 62% annually from 2011 to 2014).[18] In effect, consumers have received the mobile internet 'for free' in that they pay no more for mobile connectivity today than they did back when it was just a voice plus text service.

As a result consumers have developed an expectation of continuing substantial improvements in value-for-money. Any hope of continuing to meeting this expectation will require both ongoing investment and a constant drive to reduce unit costs.

Figure 6: Price and speed & traffic of residential broadband[16]



Investment to sustain growth

Demand growth is expected to continue. Over the four years to 2018 alone, fixed internet traffic is expected to double, and mobile internet traffic to increase by 6.4x. This will require telcos to invest both in their core networks and in their access networks. Mobile operators are currently spending substantially on 4G networks (EE alone anticipates spending £1.5bn between 2015 and 2017), but are already contemplating investment in 5G.[20] BT's widespread deployment of FTTC/VDSL superfast broadband is well underway (via its Openreach division), but it has already announced that it will be upgrading VDSL to G.fast (capable of up to 500 Mbps) in some areas, starting in 2016/17.[21]

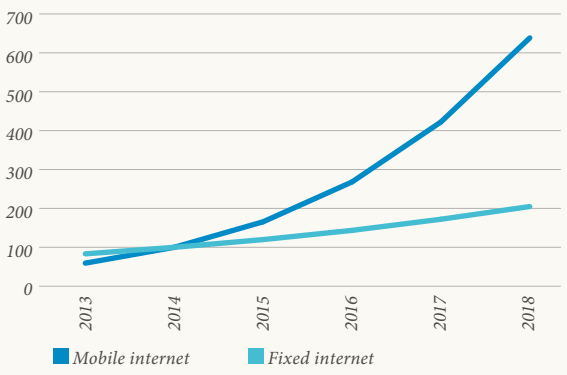
The investment to support growth will be both in R&D and deployment. In 5G for example, Korea has already committed $1.5bn to its '5G Creative Mobile Strategy'.[22] China and Japan are also investing heavily.

BT/EE will have a number of investment advantages over the two companies as independent entities. In their last financial years, BT and EE spent £2.4bn and £0.6bn respectively on capital expenditure.[23] A merged entity will have the flexibility to deploy capex across fixed and mobile (or converged services), whichever showed the greatest potential.

EE in particular may have greater nimbleness under new ownership. Currently it is a joint venture, needing the approval of two distinct parents for major decisions. EE must also compete for capital with the many global commitments of Deutsche Telecom and Orange. While BT does have international investments, they are much smaller than DT and Orange's. Moreover, the UK will be BT/EE's home market. Home markets tend to be 'first amongst equals' when making the case to a parent for investment.

Certainly BT has been willing to make very long term investments in the UK, accepting typical payback periods of 15 years on rural broadband deployment, and approaching 20 years in some regions.[24] The same long term approach may be expected (in the right circumstances) to carry over to the EE mobile business under BT ownership.

Figure 7: Forecast UK traffic growth (index)[19]



[16] Ofcom, Communications Market Report 2014, 7 August 2014, Ofcom Infrastructure Report 2012, 16 November 2012, Ofcom Infrastructure Report 2014, 8 December 2014, Ofcom, UK fixed-line broadband performance, November 2014, 26 February 2014. Note that price figures exclude line rental
[17] Ofcom, Communications Market Report 2014, 7 August 2014
[18] Ofcom Infrastructure Report 2014, 8 December 2014
[19] Cisco, VNI Forecast Widget (accessed 11 May 2015)
[20] EE, Signalling the Future, 11 February 2015
[21] BT, BT CEO sets out ultrafast broadband vision, 30 January 2015
[22] FierceWireless, China, South Korea commit to 5G leadership, while Japan and U.S. rely on private efforts, 8 June 2014
[23] BT, KPIs 6 year view, 7 May 2015; EE, EE Results for the Year Ended 31 December 2014, 5 February 2015
[24] "More cash needed to get broadband coverage in Devon, Somerset, and Cornwall – BT", Western Morning News, 7 April 2015

3. Benefits of BT/EE for customers *continued*

Consolidation to reduce costs

To meet the expectation of ever-improving value for money, cost efficiencies are key. Acquisitions are one path to such efficiencies, through savings on corporate overhead and so on. This was an important part of Vodafone's rationale for acquiring Cable & Wireless Worldwide, a UK and international fixed network operator, in 2012:

"Cost savings can... be achieved from combining UK procurement and rationalising network, IT and administrative functions."[25]

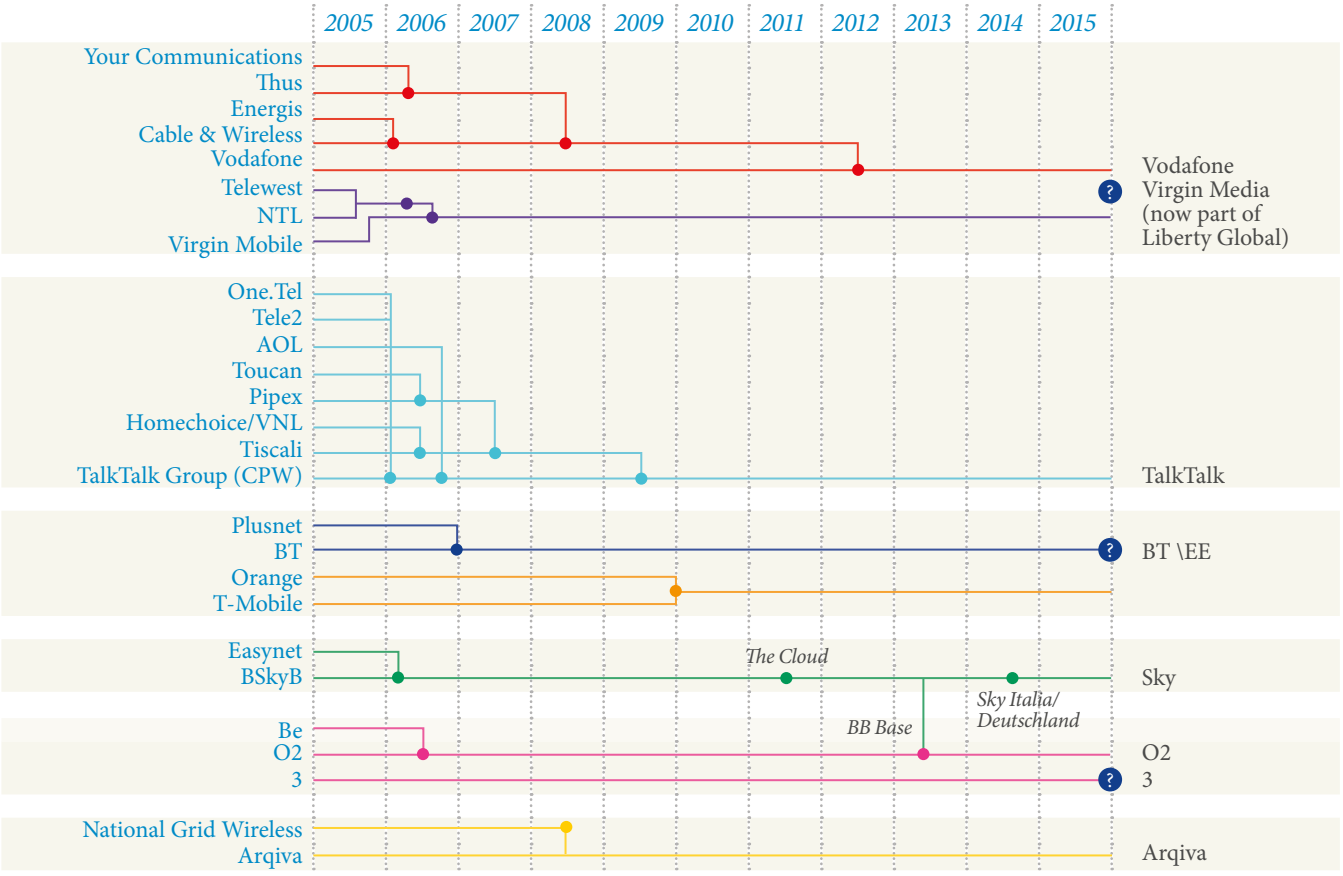
Unlike most of its key rivals, BT has not made a network acquisition in the UK for many years. However, there is clearly great potential for cost savings from consolidation with EE. These will include benefits from combining premises; core network and network operations integration; overhead reduction; and converging IT systems. BT has estimated these savings at £360m by year four, for a net present value of £3bn, net of integration costs.[28]

Fixed/mobile bundles to reduce costs

Another way to drive down costs is through bundling fixed and mobile services. The costs of customer acquisition can also be amortised across multiple services. Overhead can also be reduced, since a single bill, a single customer service call and so on can cover both aspects of a customer's needs.

These savings are in part passed through to consumers. Virgin, for example, offers a £5 discount (up to 50%) from its mobile tariffs when bought jointly with broadband TV or phone.[29]

Figure 8: Selected UK telecoms market acquisitions since 2005



However, adoption of such mobile bundles is currently far lower in the UK than in other European markets (Figure 9). In France, for example, 53% and 45% respectively of Numericable/SFR and Orange's broadband customers take a quad play offer.[31]

According to Moody's:

"The UK telecoms market currently lags other European markets in its preference for converged products, with BT the only European incumbent lacking a mobile network operator."[32]

This lag suggests substantial potential additional efficiency and thus savings for consumers are currently being foregone. By improving BT's ability to bundle fixed and mobile services, and thereby create cost savings that the company can pass through to consumers, the transaction will enable the UK to catch up in this area.

"HetNets" to reduce costs

Heterogenous networks ("HetNets") – those making use of a wider variety of access technologies, across licensed and unlicensed spectrum – are more cost efficient because the lowest cost suitable technology can be used in each circumstance. According to Cisco,

"To keep up the bandwidth growth economically, heterogenous networks [are] the obvious strategy."[33]

Clearly the combination of BT and EE – with both macrocellular capabilities and a widespread estate of customer premise equipment able to offer wifi and femto cell capabilities – will be just such a heterogeneous network.

B. Ubiquitous, seamless and reliable connectivity

Our second market trend is customers' increasing expectation of access which is ubiquitous, seamless and reliable – they simply want their devices to work, wherever they are and whenever they need them. According to the GSM Association,

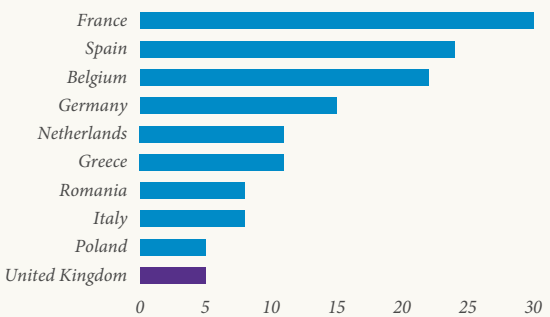
"Consumers increasingly expect access to content, contacts and applications in a seamless manner."[34]

Meeting these expectations is a substantial challenge. For several reasons set out below, it is likely to require a converged offer such as BT/EE will be able to provide, combining the capabilities of fixed and mobile networks.

Ubiquity

Ubiquity requires 'horses for courses'. Different networks have different strengths in different circumstances. Mobile networks are essential in most outdoor locations and while on the move, for instance.[35]

Figure 9: Households taking any bundle including mobile (%)[30]



[28] Vodafone, Recommended Cash Offer for Cable & Wireless Worldwide PLC by Vodafone Europe B.V., 23 April 2012
[26] Press reports. Excludes international acquisitions (inbound or outbound) not involving consolidation, such as Liberty's acquisition of Virgin, and acquisition of IT players, such as O2/2e2 and BT/Tikit
[27] In 2013 BT bought Tikit, a technology solutions and services provider for law and other professional services firms
[28] BT, BT agrees definitive terms to acquire EE for £12.5bn to create the UK's leading communications provider, 5 February 2015
[29] 30 day rolling contract. Virgin, Pay Monthly SIMs (accessed 11 May 2015)
[30] EC, E-Communications and Telecom Single Market Household Survey, March 2014
[31] Orange, FY 2014 results, 17 February 2015; Numericable/SFR, Q1 2015 Results, 12 May 2015
[32] Moody's, Moody's: Potential BT acquisition to speed up fixed-mobile convergence in UK market, 2 December 2014
[33] Cisco, Fixed/Mobile Convergence, 2014
[34] GSMA, Convergence through whatever means necessary (consolidation or organic), February 2015
[35] Wifi on public transport is itself dependent on mobile networks for connectivity to the wider internet

3. Benefits of BT/EE for customers *continued*

However, mobile networks can be less effective for indoor coverage. If the user is 'deep indoors', then mobile coverage may simply be unavailable. Even if there is a mobile signal, it may be inefficient to use it, since mobile networks use high power to reach users indoors, reducing the available capacity for other users in the same cell.

In such circumstances, it is better to use a fixed broadband connection to reach a building, and then employ low power wireless (be that wifi, 4G or something else) within the premises. This is the approach taken by Vodafone's 'Sure Signal Premium' product for example. According to Vodafone:

"With Sure Signal Premium, large businesses can satisfy rising indoor capacity and coverage demands in a highly integrated, well managed way... [It is] The first enterprise grade indoor mobile coverage solution of its kind in the UK... As the only UK company to own an integrated fixed and mobile network, Vodafone is ideally positioned to provide the best possible connection for large businesses."[36]

BT has adopted an 'inside out' approach, beginning with in-building coverage using femtocells, and then adding wide area coverage via bought-in cellular capacity. However, BT/EE will be able to use the same mobile core network across macro and femto cells, a simpler technological solution avoiding the need for inter-systems handover. This will accelerate and enhance BT/EE's ability to offer its own customers the same benefits Vodafone is offering to its customers.

Enhanced speed

As the internet becomes more embedded in daily life, functional broadband becomes vital. The Prime Minister has called superfast broadband "an essential building block of a growing economy".[37] However, there continue to be customers who seek higher speeds. One way to provide such speeds may be via hybrid fixed/wireless, combining fixed broadband with LTE (4G) using a specialised router. The fixed connection provides 'baseload' connectivity, but if the user needs more than their fixed connection can provide, then cellular capacity can be used to 'top up' their bandwidth. This approach uses expensive cellular capacity only when it is truly needed, and can be cheaper and faster than using a fixed solution to deliver the same maximum speed. It is already being offered by Deutsche Telekom in Germany, and has been piloted by Vodafone in Spain.[38]

Clearly a company strong in fixed and wireless, such as BT/EE, would be well placed to invest in such a solution. Other players could combine standard Openreach products, mobile capacity and the relevant hybrid equipment at the edge and the core to offer such a product. However, the scale of BT's retail business, along

94%

felt a reliable internet connection [was] critical to the success of their business[39]

[36] Vodafone, Vodafone Sure Signal Premium delivers high-performance indoor capacity and coverage for business, 31 January 2014
[37] DCMS, Fastest broadband in Europe: delivering infrastructure to boost UK businesses, 7 September 2012
[38] Deutsche Telekom, MagentaZuhause Hybrid ignites bandwidth turbo across Germany, 2 March 2015. Vodafone, Vodafone España presenta novedosas tecnologías que transformarán las redes 4G, 26 February 2015

with the customer knowledge, and 'owner economics' of EE's mobile network would enhance the returns and the targeting of such a product. (Ownership of the underlying assets brings lower marginal costs than simply buying in capacity. It also brings greater control of the direction of investment and innovation).

Reliability

Reliability of broadband is also increasingly important. A survey of members of the Federation of Small Businesses found that 94% felt "a reliable internet connection [was] critical to the success of their business".[39] Two-thirds of consumers report that the reliability of their broadband is more important than its speed.[40]

Hybrid products (such as Deutsche Telekom's) have potential here too. By providing diverse customer connectivity they can provide service even if one of the two connections fails, albeit at reduced bandwidth. The wireless connection acts as a backup to the fixed connection. Such a solution would also enable rapid provisioning – wireless service could be provided almost immediately, with the fixed component to follow. Once again, a converged entity such as BT/EE would be well placed to explore such possibilities.

This is not to say that only such an entity could provide such solutions, but the merged company would have the incentive and capabilities to experiment more readily, so as to accelerate innovation in this area. If the experiments proved successful, other UK market participants could be stimulated to follow the same trail.

An example of such stimulus to competition from a merger comes from the creation of EE itself. The combination of T-Mobile and Orange accelerated industry-wide deployment of LTE in the UK. According to the GSM Association:

> "The merger allowed EE to roll-out LTE faster than either Orange or T-Mobile would have been able to do absent the merger... EE's investments in LTE have prompted its rivals to roll-out 4G as quickly as possible, with both Vodafone and O2 aiming to have 98% population coverage by the end of 2015."[41]

Quality

Converged fixed and mobile networks can support quality in several ways.

One is by improving network selection. Increasingly, mobile devices will have multiple networks available to them in a given location, both wifi and mobile. Ideally the user's traffic would be carried on the network which has

"The merger allowed EE to roll-out LTE faster than either Orange or T-Mobile would have been able to do absent the merger."

[39] FSB, The fourth utility: Delivering universal broadband connectivity for small businesses across the UK, July 2014
[40] EY, The Bundle Jungle, December 2013
[41] GSMA, European mobile network operator mergers : A regulatory assessment, December 2014

3. Benefits of BT/EE for customers *continued*

most available capacity at that point in time. This both ensures the user gets the best possible experience, and helps reduce overall the cost of the network (by avoiding additional demand on already congested connections).

Managing this optimal allocation of traffic is considerably easier on an integrated network such as BT/EE will be. Such a network has the potential to be 'aware' of the capacity of the various alternate connections and route traffic accordingly. According to Ericsson,

"Only a common approach [to traffic management], across layers and technologies, can achieve a seamless user experience at maximum efficiency."[42]

Moreover, an integrated network like BT/EE has access to 'owner economics' – that is, it can base its decisions on the marginal cost. Contrast this to an MVNO, which is paying a fixed tariff per GB for traffic. If the underlying mobile network is empty at particular place and time, the marginal cost of additional traffic is zero. However, the fixed tariff would impact shifting traffic to that network, even though that was the optimal outcome. (Similar logic applies to wifi traffic, if wifi capacity is being bought wholesale from an operator such as Sky's The Cloud business on a per-GB basis).

Another way in which converged networks can support quality is via seamless transitions between networks. For example, a user may start a call on Skype or Facetime using a wifi signal, but then walk out of wifi coverage. Today that call would likely drop, but (assuming a cellular signal was available) a converged network such as BT/EE could ensure that the call continued uninterrupted, by transitioning from wifi to cellular. The merged company will have a combination of over 5m wifi hotspots[43] (over time enhanced with 4G capability using BT's 2.6 GHz spectrum); EE's fastest and most reliable mobile network;[44] and the integrated mobile core to facilitate seamless handover between the two.

Convenience

Today, one of the biggest barriers to out-of-home wifi use is the challenge of logging in to multiple hotspots. Passwords can be forgotten, users may not be aware which wifi networks they have access to, splash screens can interrupt usage mysteriously if using applications other than the browser and so on.

Frictionless login could address this, automatically connecting users to wifi networks they were entitled to use, based on their device ID. While technologies such as Passpoint are helping, frictionless login is appreciably easier to implement if a network – like BT/EE – has access both to the identities of the user's mobile devices and to the hotspots they are seeking to access.

5m

wifi hotspots[43]

[42] Ericsson, Heterogeneous Networks, September 2014
[43] BT Wi-fi, Our hotspots in the UK (accessed 15 May 2015)
[44] RootMetrics, The RootMetrics 2nd Half 2014 UK Mobile Network Performance Review, 10 February 2015

Efficient use of spectrum

Ofcom has said:

"Radio spectrum is a major asset to the UK, providing a critical input to a wide range of services including mobile communications, television and radio broadcasting services, emergency services and aeronautical communications and many more. By enabling this array of applications, spectrum use delivers substantial benefits to citizens and consumers."[45]

Spectrum is also a finite resource. At any time and place, a given band can only be used for one purpose. Moreover, only certain bands have the right physical properties to be suitable for any given application. For example, for mobile operators to provide in-building coverage, sub-1 GHz spectrum is much more efficient than higher frequencies. In this context, spectrum holders and users have an obligation to be efficient custodians of it.

Spectrum efficiency is particularly important in the context of the internet, since wireless connectivity – using either licensed cellular spectrum or unlicensed wifi spectrum – already underpins a majority of internet usage, and that portion is growing fast.[46] More than half of iPlayer TV requests and over 40% of visits to GOV.UK now come from tablets and smartphones, via wifi or cellular (and a further portion from laptop computers likely using wireless).[47]

The combination of rapid growth of internet usage and the shift of this usage to wireless devices will create increasing demand for spectrum, both licensed and unlicensed. While this is not an immediate challenge (not least because of the 2013 and expected 2015 auctions of 4G spectrum), in time there will be increasing pressure on available spectrum to sustain ever-growing internet use.

This is a global challenge, and countries which make the most efficient use of their spectrum will be competitively advantaged, able to provide more reliable, more universal, higher bandwidth and ultimately lower cost internet access to their citizens and businesses. Brian Williamson of Plum has argued that the starting point for forecasting mobile traffic should be (broadly steady) customer expenditure. In this model, spectrum efficiency leads directly to increased mobile usage, since more traffic can be provided for a given level of spend.[48]

Integrated fixed/mobile players, such as BT/EE are well placed to deliver efficient use of spectrum.

As discussed above, they are positioned to ensure that traffic shifts from congested to uncongested wireless links (from wifi to cellular or vice versa, for example). This improves the efficiency of both networks, and allows more demand to be met.

"Radio spectrum is a major asset to the UK, providing a critical input to a wide range of services..."[45]

[45] Ofcom, Spectrum Management Strategy, 30 April 2014
[46] Ofcom, Adults' media use and attitudes: Report 2015, May 2015
[47] BBC, iPlayer Monthly Performance Pack, March 2015, 24 April 2015; GOV.UK, Activity on GOV.UK: web traffic (accessed 8 May 2015)
[48] Brian Williamson (Plum), Do you need a mobile data forecast to estimate spectrum demand?, June 2014

3. Benefits of BT/EE for customers *continued*

Another way to make efficient use of spectrum is via small and femto cells. These allow spectrum to be reused more readily – the same band can be used for two users if the cells are small enough that the two users sit in distinct cells rather than sharing the same one. However, the challenge of this approach is that it requires connectivity back to the network core from each cell site, an increasing cost as the cells get smaller and their number increases. BT/EE would have an internal anchor tenant for wholesale products to support mobile networks, which could only increase the incentives on Openreach to develop such products. Given Openreach's obligation not to discriminate between its customers, this would benefit small cell deployment by all MNOs.

Further, certain experimental technologies which may dramatically increase spectrum efficiency are particularly well suited to converged operators. For instance, Artemis, a San Francisco start-up, believes its 'pCell' technology can deliver a 35x increase efficiency over standard LTE.[49] Rather than having a single cell tower serving an area, pCell makes use of multiple small transmitters with overlapping coverage.[50] This approach fits well with wireless operators who also have high 'capillarity' on the fixed side– that is, multiple widespread locations with connectivity where such small transmitters could be located. BT's estate of millions of routers on customer premises represents just such capillarity, at least for indoor coverage (and is already being used in a parallel way for BT Openzone and femtocells). Thus a converged player such as BT/EE could be well placed to deploy such technology.

The merged entity will therefore be able to contribute to spectral efficiency in several ways with multiple benefits for consumers and businesses – it can lead to lower prices, higher available capacity in the network and more reliable connections.

Industry expectation of convergence

For all the reasons above, there is widespread expectation that fixed and mobile networks will converge. Trade journal FierceWireless has commented:

"More tightly integrated fixed and mobile will be the hallmark of future networks and services with fast, reliable and economic delivery."[51]

Ofcom states simply:

"It is likely that fixed and mobile technologies and networks will converge over time".[52]

Vodafone expects:

"[A] continued trend towards unified communications such as bundled mobile, fixed and TV services. These provide a range of benefits for the user, including simplicity, flexibility and cost savings. The demand for these services is already established among enterprise customers and it is now becoming more visible in the consumer market."[53]

"More tightly integrated fixed and mobile will be the hallmark of future networks and services with fast, reliable and economic delivery."[51]

[49] Artemis, pCell – Wireless Reinvented, February 2015; readwrite, 5 Things To Know About pCell, A Bold Scheme For Super-Fast Wireless Data, 19 March 2015
[50] Note that this is distinct from more traditional small cells, which are sited to avoid overlap and interference
[51] FierceWirelessEurope, Mallinson: Fixed-mobile convergence is back, 28 March 2014
[52] Ofcom, Strategic Review of Digital Communications: Terms of Reference, 12 March 2015

Vodafone's CEO, Vittorio Colao, feels that this trend will lead to fixed/mobile mergers, saying "it is obvious that the technology is pushing for consolidation".[54] He has also stated:

> "[C]onsolidation should be seen as something positive. Now, if I see something as positive, I don't want a remedy, I don't want mitigation, I just say 'great, go ahead."[55]

Indeed, he has particularly objected to "remedies or undertakings that actually take away the advantage of consolidation".[56]

Summary

Converged solutions can contribute to ubiquitous, seamless and reliable connectivity in a variety of ways. The combination of BT and EE will ensure that these benefits will be delivered as rapidly as possible to as many customers as possible, not least the existing customers of the two companies. This customer base will represent a powerful incentive for BT/EE to innovate in this area.

C. Pressure on organisations to save costs through digitisation

Our third market trend is the pressure on organisations, particularly in the public sector, to digitise.

BT is not simply a network operator. It is now has a substantial managed services business. Its Global Services (GS) division had revenues of £6.8bn in 2014/15, or 38% of the company's total. It serves major corporates and the public sector in the UK and globally, with clients such as NATO, Fiat, Air China and the Port of Singapore. Services include a range of ICT support and outsourcing, including supply chain solutions, IT services, unified communications and so on (as well as more basic network products). Its most recent product launch is an ethical hacking service for connected vehicles.[58]

BT has been building this business for well over a decade, and at times the learning curve has been steep. However, it is now regarded as a leader, winning awards and recognition from IDC, Forrester and many others.[59]

Mobile operators' moves into enterprise services are at a much earlier stage. Fixed products have been increasingly commoditised for many years, and this has forced BT and other fixed operators to seek other ways to add value. There is now similar commoditisation pressure on mobile, but it is more recent. In part for this reason, mobile operators tend to be more consumer-centric.

Converged solutions can contribute to ubiquitous, seamless and reliable connectivity in a variety of ways.

[53] Vodafone, Annual Report 2014, 6 June 2014
[54] Mobile News, Vodafone CEO Colao calls for BT and Openreach separation, 18 February 2015
[55] Vittorio Colao (Vodafone), The Challenges and Opportunities Facing Digital Europe (speech), 1 September 2014
[56] Reuters, Vodafone may have $30 billion-$40 billion acquisition capacity: CEO, 10 February 2014
[57] BT, KPIs 6 year view, 7 May 2015
[58] TechWeek Europe, BT launches ethical hacking service for connected vehicles, 21 April 2015
[59] BT Global Services, Awards (accessed 22 May 2015)

3. Benefits of BT/EE for customers *continued*

BT GS will therefore bring distinct technology, skills and deep enterprise customer relationship and knowledge. EE will bring complementary mobile network assets and skills which BT does not have today (in addition to its own enterprise capabilities). In combination this should enable innovation and improved offers for UK organisations, particularly as mobility becomes an ever more important requirement. In turn, this will prompt other mobile operators to enhance their offerings in this area, a valuable competitive spur.

This will be particularly relevant for the public sector, where – to date – the internet's transformative effect has been less than that on consumers and businesses. Mary Meeker of KPCB has suggested that the impact of the internet on education, healthcare and government is "just beginning".[60] According to EY, in the UK:

"Without competitive pressures, the public services have been understandably slower to embrace Digital than the private sector. But there is no question that, with GDS leading the way, they are now running to catch up. Activity is driven in part by the austerity agenda and also by the changing social environment. Digital can enhance efficiency and transform the relationship between citizens and the public sector."[61]

BT is already working with a wide array of public sector bodies. To take one case amongst many, BT is working with Peninsula Community Health (an NHS service provider) to offer telehealth in Cornwall, providing care to 12,000 patients. One benefit of this system is that it has enabled predictive treatment for bladder infections, reducing the requirement for visits to a doctor or hospital.[62]

A merged BT/EE would be able to influence the path of mobile's development to support such opportunities. For example, patient confidentiality is vital, and so there is a particular premium on network security. BT GS and EE could jointly develop solutions in this area, making mobile a more powerful tool to support healthcare.

Note that I do not suggest that it would be impossible for BT to pursue such opportunities via a partnership with a third party MNO, rather than through ownership. However, as in the case of Cornwall, such opportunities are not, individually, necessarily very large. Negotiating an appropriate arms-length partnership for each such venture would introduce friction. In practice, it might not be worth it in many cases.

"the impact of the internet on education, healthcare and government is 'just beginning'"

[60] Mary Meeker (KPCB), Internet Trends 2015, 27 May 2015
[61] Stuart Robinson & John Levell (EY), Seven Public Sector Digital Themes, 28 January 2015
[62] BT, Will 2014 be the year of telehealth?, 6 May 2014

D. The Internet of Things

Our fourth trend is the Internet of Things. Historically, the internet has primarily been humans communicating with machines – streaming a video, looking at a web page and so on. However, increasingly the internet is also enabling machine-to-machine communication – connected devices communicating without any direct involvement of a human. Current examples of this Internet of Things include smart meters, Fitbits, traffic management systems and so on, but future applications in energy management, health and smart cities have the potential to transform the economics and efficacy of delivering essential services to UK consumers and businesses.

The connectivity needs of the IoT enabled devices are highly diverse. However, as Ofcom has noted:

> " While connectivity demands for bandwidth [for IoT] will generally be low, reliability, privacy, ubiquity and other performance needs may not be met by existing access technologies and networks."[63]

How these needs are best addressed is currently unclear. It is likely that a range of solutions from a variety of different providers will be required. Moreover, redundant solutions will be necessary in some cases. Applications such as telehealth and telecare may require high levels of reliability, calling for combined (redundant) fixed and mobile solutions.

Many devices will require widespread and low power networks (since they themselves are battery powered). For such cases wireless connectivity plus a high-capillarity network may be very relevant.

In this context, the combination of BT/EE's fixed and mobile networks and BT GS's enterprise relationships and expertise will all be valuable, and the combination with EE will give BT additional incentives to experiment in this area, accelerating UK adoption of IoT. However, this needn't mean that other organisations will be unable to replicate those experiments of BT's which prove successful.

E. Rapid change and uncertainty

Our fifth and final trend is increasing uncertainty and change in the telecoms industry. There are a number strands to this trend.

Rapid volume growth and revenue decline

As discussed, demand is growing rapidly, but prices are also declining rapidly. Forecasting the net effect of these two trends on revenue, and hence return on investment, is challenging.

"While connectivity demands for bandwidth [for IoT] will generally be low, reliability, privacy, ubiquity and other performance needs may not be met by existing access technologies and networks"

[63] Ofcom, Infrastructure Report 2014, 8 December 2014

3. Benefits of BT/EE for customers *continued*

Technology risk

Underlying technology is also changing very quickly. For example, in fixed access, G.fast (a new technology enabling very high speeds over copper) is triggering an international reassessment of the case for widespread deployment of fibre-to-the-premise (including fibre-to-the-home). According to Robin Mersh (CEO of the Broadband Forum):

"FTTH was seen for a long time as the 'future-proofed' solution, providing rapid connection speeds and increased bandwidth over long distances... [However] the practical and economic difficulties of FTTH deployment has given rise to copper extending technologies such as G.fast, which can provide ultrafast 'fiber-like' broadband at a fraction of the price."[64]

Consequently, markets such as Australia are moving away from an FTTP-only approach[65] to a 'mixed economy' approach, using both copper and fibre technologies as appropriate (which is BT's existing strategy that Australia's NBN has said it is keen to learn from).[66]

While many industries face technology risk, telecommunications is unusual in combining such risk with the need to make substantial upfront investments with very long pay back periods, and where there is no prospect for redeployment. A carrier which had deployed FTTH but then discovered that G.fast could deliver similar revenues at lower cost would have no way to recover the extra investment in FTTH, for example.

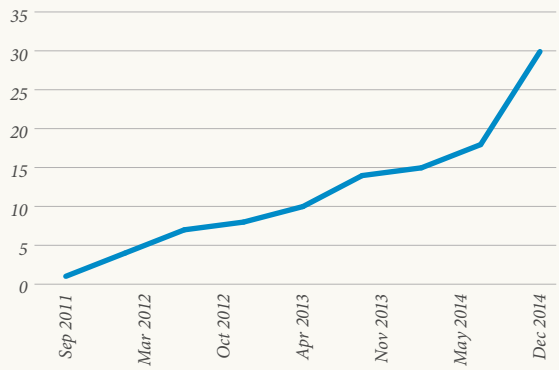
OTT players

OTT ('over the top') players represent another form of technology risk for telecommunications companies. These companies make use of internet capacity provided by telcos to offer services which were previously only available from those telcos, such as voice and messaging. This results in eroded revenues and margin for telcos.

Skype is a prime example of such OTT players, and has had a significant impact on the international calls market. It now carries far more international traffic than any traditional telco, with 248bn minutes in 2014. Already by 2013 it carried four times more international traffic than the largest telco (Vodafone), and in 2014 its volume growth was 30% more than that of all telcos combined.[67]

A similar transition is taking place in messaging. WhatsApp, an OTT messaging provider founded in 2009, now carries 30bn messages per day – 50% more than the total volume of text messages globally. This and other applications which substitute for text messages have had a severe effect on SMS volumes, which in the UK are down from a 2012 peak of 172bn to 110bn in 2014.[69] Associated revenues have dropped from £2.4bn to £1.3bn.

Figure 10: WhatsApp message volumes (bn/day)[68]



These developments are not bad for consumers – quite the opposite. These OTT services provide new features to consumers, and as substitutes for traditional telecoms services they have provided choice and competitive pressure on prices.

However, such rapid change represents a significant challenge for telcos, given the sharp effects on revenues – there can be few markets which have, like SMS, seen a £1bn contraction in the space of two years. To meet such challenges, telecommunications as a system must be innovative and flexible, not just in its own interest, but also in the interests of OTT players and consumers.

This is because, while offers such as Skype and WhatsApp may substitute for telecoms services, they in no way substitute for telecoms networks. Without fixed and mobile data networks, WhatsApp and Skype simply would not function. Thus underlying telcos, able to continue to invest in increasing capacity despite rapid change, are critical components to an overall system able to continue to provide innovation via OTT apps and other means.

Innovation from complementary capabilities

Thus telcos face considerable uncertainty and risk. In such a turbulent market, innovation is a vital response. In the six years to 2013, BT was the third largest spender on corporate R&D in the UK.[70] However, the merged entity is likely to have an even greater capacity for innovation. This is not because any merger supports innovation – that is certainly not the case – but rather because mergers between two companies with adjacent and complementary but not overlapping knowledge (such as BT and EE) are precisely those likely to have a positive impact. There are several academic studies that have reached this conclusion. For instance, according to M. Cloodt et al:

"the acquisition of related knowledge will have the most positive impact on a firm's post-M&A innovative performance. However, the acquisition of knowledge that is too similar to the already existing knowledge base is disadvantageous".[71]

According to Cassiman et al:

"when merged entities are technologically complementary, they become more active R&D performers after the M&A".[72]

BT was the third largest spender on corporate R&D in the UK.[70]

[64] Broadband Forum, Renewing the Value of Copper for Ultrafast Broadband, May 2015
[65] For 93% of the country – fixed wireless and satellite broadband was always planned for the last 7%
[66] The Australian, NBN Co unites with British Telecom on secrets of speed, 26 May 2015
[67] Telegeography, Telegeography Report, 13 January 2015
[68] Ben Evans, WhatsApp sails past SMS, but where does messaging go next?, 11 January 2015
[69] Ofcom, Telecommunications Market Data Update Q4 2014, 30 April 2015; Ofcom, Telecommunications Market Data Update Q4 2013, 24 April 2014
[70] European Commission, The EU Industrial R&D Investment Scoreboard; Communications Chambers analysis
[71] M Cloodt et al, "Mergers and acquisitions: Their effect on the innovative performance of companies in high-tech industries", Research Policy, 2 May 2006. See also Benjamin Schön & Andreas Pyka, "Mergers & Acquisitions – Their Impact on the Innovativeness of Single Firms and Entire Industries", AFSE conference paper, 25 June 2009
[72] Cassiman et al, "The impact of M&A on the R&D process. An empirical analysis of the role of technological and market relatedness", Research Policy, 2005

3. Benefits of BT/EE for customers *continued*

This is to be expected. Two firms capable of addressing the same problem but coming at it from different perspectives are the most likely to cross-pollinate, or to provide missing pieces of the puzzle to each other.

To take a practical example, as noted BT is coming at convergence with an 'inside out' approach. EE is tackling the same problem, but with an 'outside in' approach. It seems highly likely there will be benefits from combining the expertise and learnings of the two companies.

BT/EE will also have greater commercial flexibility, as a result of having 'owner economics' for both fixed and mobile network. This will expand the range of services which are commercially feasible, and thereby increase the scope for innovation.

Innovation from diversity

In addition to specific innovation benefits from the complementary capabilities of BT/EE, there is a more general benefit from having a more diverse ecosystem. Given a rapidly changing market, it is unclear which form of telco will be best placed to 'blaze the trail' for a particular challenge or opportunity. It might be a pure-play mobile operator, a cable network, a completely new platform or something else. Each will bring its own perspective, capabilities and approach. However, the greater diversity, the better the chance of there being players well suited to the case at hand.

In the context of broadcasting, Ofcom has noted the benefits of a 'mixed ecology', stemming from a range of broadcasters with differing business models and ownership structures. This is seen to benefit innovation and the range of offers available to consumers. Similar logic applies to telecoms.

The merger of BT/EE would provide one type of telco present in many other markets – the broadly integrated fixed and mobile network operator. Adding such a player to the mix will add to the diversity of approaches and the variety of innovation in the market.

Precisely how the benefit of a converged BT/EE might crystalise in the context of an uncertain market is itself uncertain. But (for example), according to Analysys Mason, integrated voice technologies are:

"more flexible and resilient to the changes in demand and access networks that are likely to occur over the next few decades".[73]

The merger of BT/EE would provide one type of telco present in many other markets - the broadly integrated fixed and mobile network operator.

[73] Analysys Mason, Roadmaps for the transition to new fixed and mobile voice technologies, 27 October 2014

Spillover benefits of innovation

Innovation and investment within telecoms also have secondary benefits for innovation in different sectors and regions of the economy. As an enabling technology, it opens up possibilities for many other businesses. For example, as we have already discussed, the provision of IP networks has enabled a wide array of completely new OTT businesses. IoT has the potential to transform a range of industries. Provision of improved broadband speed has had a transformative effect on Cornish businesses.[74] Thus by enhancing the telecoms industry, the transaction could increase innovation across the digital economy.

Flexibility

In addition to innovation, flexibility is necessary in turbulent markets. Telcos certainly have no entitlement to be shielded from technology risks – they are part and parcel of the wider market. But telcos, OTT service providers and customers are benefactors if telcos have 'room to manoeuvre' to respond appropriately to such risks. Such is the turmoil in the telecoms industry, not just in technology but also in demand and pricing, that there can be no guarantee that the status-quo is sustainable. Hence great care is needed in applying constraints to mergers in addition to the many industry-specific regulatory constraints already in place.

Conclusion

The transaction has the potential to bring substantial near term as well as long-term dynamic benefits to UK citizens, consumers and businesses. Cost efficiencies from the merger will support consumers' expectations of rapidly improving performance for no extra money. A deeply integrated fixed and wireless network will also support reliable, widely available connectivity. Combining EE's mobile network with BT's fixed network and systems integration capabilities will enable new services for enterprises, and in particular will support IoT. It should also support the UK's spectrum efficiency. Finally, it will contribute to the resilience of the UK telecoms sector in the face of increasing risk and uncertainty.

Some of these benefits will be delivered directly to BT's own customers, but there are a range of spill-over benefits too. High quality communications links contribute to the overall health of the UK economy.

[74] Dr Hazel Lacohée & Prof Andy Phippen, SME Benefits and Business Opportunities with Superfast Broadband: the Virtuous Circle of Connectivity, 15 September 2013

4. BT/EE in market context

This section addresses the commercial and policy context for BT/EE. It first considers the revenue trends for the UK market and BT, and the competitive landscape. It then looks at how the UK market, with BT/EE in place, would compare to other European markets. Finally, it discusses the regulatory constraints on BT/EE, and the trade-offs facing regulators and policy makers.

UK commercial context

Across all sectors, the UK telecoms industry has been contracting for a number of years. Between 2008 and 2013, total UK revenues fell at an annualised rate of 4% in real terms. Even mobile services fell at a rate of 2%. While volume demand for some services has been growing, this has been more than offset by rapidly declining unit prices. (Figure 11)

BT is no exception to this market trend, with revenues falling in real terms in each of the last six years. Even after the £12.5bn acquisition of EE, BT will be a smaller company in UK revenue terms than it was in the years prior to 2007/08 (Figure 12). Thus in no way does the transaction create an entity of unprecedented scale in the UK market.

BT has faced fierce competition from Sky, Virgin and Vodafone (amongst others), and all will remain robust competitors after a merger. Sky has a pre-eminent pay TV offer, with wide channel choice, important exclusive content and sophisticated, multi-platform content delivery. It is also in the process of launching a quad-play offer in partnership with O2.[77] Sky anticipates repeating its success in bundling telephony and voice with pay TV. In seven years since launch, it has grown to be the second largest player in home broadband (enabled by regulated Openreach wholesale access products), with 40% of its customers signed up to triple-play offers.

Virgin will continue to offer superior broadband speeds, based on its cable network, and will also have a deeper pay TV offer than BT. Virgin is also increasing its competitive challenge to BT (and other providers) by making a £3bn investment in expanding its coverage from half to nearly two-thirds of premises in the country.[78] (This expansion will focus on filling in gaps in the 70 cities and towns Virgin already serves).[79]

Vodafone will be in a preeminent position to serve customers with international mobile needs, given its operations in 27 countries and partnerships in a further 48.[80] It also (according to BrandFinance) has the most valuable UK brand, with a value twice that of #7 ranked BT.[81]

Figure 11: UK telecoms revenues (2013 £bn)[75]

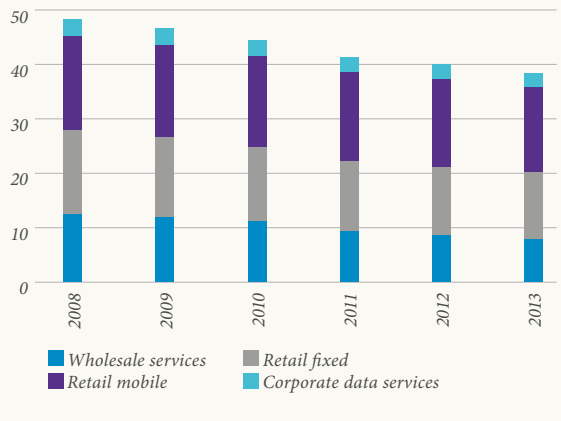
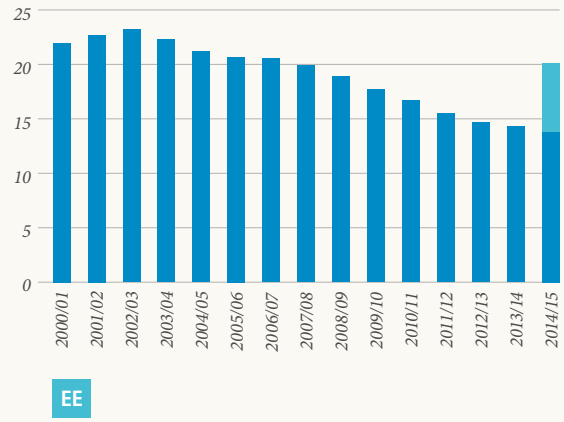


Figure 12: BT UK revenue, (2014/15 £bn)[76]



While BT will of course have its own strengths to offset these advantages of its competitors, it is clear that customers will have a diverse set of robust competitors to choose from. Neither the number of mobile nor the number of fixed players will be reduced by this transaction (though I note the proposed Three/O2 merger).

The transaction will enable BT to accelerate the provision converged fixed-mobile offers, but it will neither give it capabilities unmatchable by those willing to invest, nor give it a head start. Such converged offers have been available in the UK for at least eight years from Virgin Media. Virgin Media was created in April 2006 as a result of the merger of Telewest, NTL and Virgin Mobile.[82] The company launched its first quad-play offers (mobile, fixed telephony, broadband and TV) in September of that year.[83] Liberty Global, when acquiring Virgin Media, cited access to the company's mobile expertise as one of its reasons:

> "Virgin Media's market leading innovation and product expertise, particularly in mobile and B2B, will accelerate our own development of these business segments."[84]

Vodafone has also noted Virgin's strength in this area, offering figures showing that Virgin is a European leader in multi-plays.[85] As of December 2014, at least 17% of Virgin's customers were quad play and an even greater (unreported) percentage took mobile bundled with one or two other services.[86]

Nor is Virgin alone in having both fixed and mobile offers. Vodafone, for example, acquired Cable & Wireless Worldwide (a UK and international fixed network operator) in 2012. While Virgin is primarily consumer focused, Vodafone has a relatively greater focus on enterprise customers.[87] At the time of the acquisition it commented:

> "The combination of Vodafone Group and CWW will create a leading enterprise-focused operator in the UK that will be well positioned to capitalise on the growing market for unified communications and offer UK enterprise customers the opportunity to purchase advanced total communications services from a single service provider."[88]

TalkTalk launched its mobile offering in 2010, and now has 464,000 customers. As of March 2015, 12.3% of its phone and broadband customers take mobile, up from 7% a year prior.[89]

[75] Ofcom, Communications Market Report 2014, 7 August 2014
[76] BT annual reports; HMT, GDP deflators at market prices, and money GDP: March 2015 (Quarterly National Accounts), 2 April 2015. EE, EE Results for the Year Ended 31 December 2014, 5 February 2015; EE, EE Results for the First Quarter To 31 March 2015, 27 April 2015. Pro-forma total for 2014/15 overstated, since no elimination for BT revenue derived from EE
[77] Sky, Sky announces plans to enter the mobile sector, 29 January 2015
[78] Virgin Media, Virgin Media and Liberty Global announce largest investment in UK's internet infrastructure for more than a decade, 13 February 2015; Virgin Media, Virgin Media invests in the future of the British economy, 20 February 2015
[79] This is Money, Virgin Media to spend £3bn on urban cable rollout that will create 6,000 jobs – but rural and remote areas won't be included, 13 February 2015
[80] Vodafone, Annual Report 2014, 6 June 2014
[81] Brand Finance, Brands of British Origin 2014 (accessed 12 May 2015)
[82] The Guardian, NTL buys Virgin Mobile and prepares to battle with BskyB, 5 April 2006
[83] BBC, NTL launches quadruple-play deal, 27 September 2006
[84] Liberty Global, Liberty Global to acquire Virgin Media, 5 February 2013
[85] Vodafone, Cash offer for Kabel Deutschland – Investor presentation, 24 Jube 2013
[86] Virgin Media, Virgin Media Reports Selected 2014 Results, 13 February 2015. Virgin is unable to identify all its prepaid customers, and thus the 17% figure is an underestimate of the total number of customers taking all four services from them
[87] At time of writing, Vodafone and Virgin are rumoured to be considering a merger in the UK. If this came to pass, it would represent a combination of two of the leading providers of fixed/mobile offers in the country, making the additional competition provided by BT/EE in this area particularly valuable. The Telegraph, Liberty boss in secret talks over merger with Vodafone, 6 June 2015
[88] Vodafone, Recommended Cash Offer for Cable & Wireless Worldwide PLC by Vodafone Europe B.V., 23 April 2012
[89] TalkTalk, Preliminary Results, Year to March 2015, 14 May 2015

4. BT/EE in market context *continued*

Thus BT will not lack for robust competition even after the transaction, nor will have secured a leading position in bundled fixed/mobile products. Indeed, it will represent a valuable new source of competition to the existing players, to support the UK building a European leadership position in converged offers, to match its existing strong positions in each of fixed and mobile broadband.

The international commercial context

In creating a major fixed/mobile player, the proposed merger will in no way create a situation which is unusual internationally – quite the reverse. In most markets around the world, the incumbent fixed player is also a major player in the mobile market. Indeed, this was the situation in the UK until 2001, when BT spun out its 'Cellnet' mobile business (later rebranded as O2). In Europe the incumbent is the largest mobile operator in each of the five largest countries, excepting the UK (Figure 13).

Even after the transaction, at 34%, BT will have the lowest share of the mobile market amongst this group. A similar situation will exist in other segments of the market. BT will have one of the lowest shares in telephony and pay TV, and the lowest in broadband. In all segments its share will be lower than the average of the comparators.

Indeed, at 35% BT's share of broadband will be one of the lowest in the entire EU, where incumbents have an average share of 43%.[91] Only in Romania, Bulgaria and the Czech Republic will the incumbent have lower share.

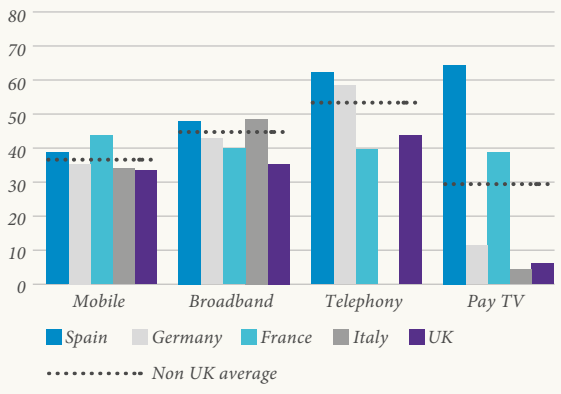
I note the CMA's interest in the consequences of the transaction for wholesale markets. An investigation of theories of harm is outside the scope of this paper, but both BT and EE have a long history as willing wholesalers. BT sells to other carriers on a largely unregulated basis through its BT Wholesale division as well as through its highly regulated Openreach unit (discussed in greater detail below). EE is the largest provider to MVNOs in the UK. It is not obvious that the deal would change these incentives.

The policy context

Continuing regulations

In addition to market constraints, BT (and other telcos) operates under a wide range of regulatory constraints. Policy makers and regulators have sought both to facilitate competition, and to intervene directly in the perceived interest of consumers, mandating pricing, coverage and so on.

Figure 13: Incumbent market shares (post-transaction for UK (%))[90]



[90] Figures are for Q3 2014. Share of revenues for mobile, share by volume for other services. Pay TV share for France is amongst IPTV households, the dominant platform for that market. Citi Research, The Phone Book, 15 December 2014; Orange, Investors data book, 28 April 2015; AGCOM, Quarterly Telecommunication Markets Observatory – Updated to 30 September 2014, 23 December 2014; Sky, Sky Italia Investor Field Trip, 3 December 2014; Reppublica, Broadband television, la strategia di Tim Vision, 6 February 2015

[91] EC, Digital Agenda Scoreboard [accessed 4 May 2015]

Figure 13: Sample telecoms-specific regulatory and policy interventions for the UK

To support competition	*To directly support consumers*
Functional separation of BT (creation of Openreach)	*Universal service obligation*
Interconnect requirements	*Mobile coverage requirements*
Spectrum caps in auctions	*Price controls (eg roaming, some leased lines)*
Price control of wholesale access products	*Consumer liability caps*
Price control of mobile termination rates	*Quality of service KPIs*
	Parental controls
Mandated switching process	

These constraints on BT will of course remain in place after a merger. Many of them also apply to its European comparators. However, the most important of the UK constraints – the 'functional separation' of Openreach within the wider BT Group structure – applies only to BT amongst this group.

35%

BT's share of broadband will be one of the lowest in the entire EU.

4. BT/EE in market context *continued*

Openreach is a business established in 2006 as a result of a binding agreement with Ofcom. It owns and operates BT's access network, and is functionally separated.[92] This means that it is obliged to:

- Keep management and staff separate from the rest of BT, with distinct incentives
- Operate from its own premises
- Comply with strict limits on the information it can share with the rest of BT
- Operate under a distinct Openreach brand
- Provide access services to BT competitors and other BT divisions on strictly equal terms, using a standard set of systems and processes
- Have its service delivery monitored by the Office of the Telecoms Adjudicator (created for this purpose)

Ofcom's objective in pursuing the establishment of Openreach was to neutralise any competitive advantage BT might enjoy in retail markets as a result of ownership of the access network.

In BT's functional separation, the UK is well ahead of most of Europe – only Sweden has anything close. (Italy has a much weaker version). Indeed globally, separation of any type is very rare. Australia, New Zealand, Singapore and Mongolia are non-European markets where separation has been applied.[93]

It is important to stress that Openreach will be untouched by the merger, and functional separation will continue unaffected. Its market position will be unchanged, as will that of EE relative to Openreach, and there will be no synergies exclusive to the two organisations. (Though with a mobile 'sibling', Openreach may be motivated to improve its service offering for mobile operators, to the benefit of all MNOs).

Thus the UK market will retain a substantial pro-competitive intervention absent from virtually all comparator countries.

[92] For a more detailed discussion, see Ofcom, Openreach Establishment – An Overview, 21 February 2006

[93] In these countries the access network is (or will be) entirely separately owned, in some cases by the government funding a complete overbuild of the incumbent's network

Policy trade-offs

Many of the regulations set out above were put in place at a time when telecoms revenues were growing. However, the market has been contracting for several years now. This creates a situation where the trade-offs facing policy makers are stark, requiring them to reconcile a number of competing imperatives. Telecoms policy aims to ensure:

- New services and improving value for consumers
- Investment incentives for operators (in support of innovation and to meet growing demand)
- Efficient use of scarce national resources, most notably spectrum

These objectives are in tension. For example, constantly declining spend by customers is clearly attractive to policymakers in the short term, but in the long run risks damaging investment incentives if there will be no motive for operators to continue to make the necessary capital expenditures to enable ongoing substantial growth.

For some business sectors with declining revenues and limited future, the right commercial approach is to 'milk' the business, accepting an inevitable decline and withdrawing cash to reallocate to growth areas. Telecoms is categorically not such a sector, both because it remains critical to the economy and because it requires continued and substantial investment to meet rapidly evolving customer demand.

However, in navigating a path through the challenges of falling revenues and continued demands for investment, the industry's room for manoeuvre is greatly limited by substantial industry-specific regulation. It is against this background that regulators must consider whether to further constrain room for manoeuvre when reviewing mergers.

The industry's room for manoeuvre is greatly limited by substantial industry-specific regulation.

5. Conclusions

The telecoms market is contracting, and has been for some years. In such circumstances, consolidation is a natural outcome.

Following a BT/EE merger, the UK market will remain one of the most competitive markets, with robust players such as Virgin and Sky retaining their own powerful competitive advantages over BT/EE and the other MNOs. BT/EE will have lower market shares than incumbents in other key European markets. Moreover, unlike most other markets, BT/EE will continue to operate under functional separation where it has significant market power, one of the most substantial pro-competition market interventions in telecoms globally.

This all argues for caution in foreclosing or delaying a merger, and doubly so since the BT/EE merger could make a range of positive contributions by:

- Supporting the continuing drive to provide greater speed and traffic while meeting expectations of ever-improving value for money, by enabling cost savings and facilitating investment
- Supporting ubiquitous, high quality and convenient internet, by combining the capabilities of fixed and mobile networks to provide coverage, diversity and seamless connectivity
- Supporting sophisticated mobile solutions for enterprise, drawing on the capabilities of EE and BT GS
- Accelerating adoption of the IoT in the UK
- Providing resilience to rapid change and rising uncertainty by enhancing innovation and adding diversity to the telco ecosystem

These benefits will help underpin the UK's position as the leading digital economy of the G20,[94] delivering the connectivity that businesses, consumers and government require, at prices they can afford.

[94] BCG, UK eGDP 2010-2018, May 2015

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