



The Royal Academy
of Engineering

Digital Britain

Department of Business, Enterprise and Regulatory Reform and the Department of
Culture, Media and Sport

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Background

This response to the BERR-DCMS joint consultation on 'Digital Britain' concerns specifically the following objectives of the Digital Britain initiative:

- Upgrading and modernising our digital networks – wired, wireless and broadcast – so that Britain has an infrastructure that enables it to remain globally competitive in the digital world
- Developing the infrastructure, skills and take-up to enable the widespread online delivery of public services and business interface with Government.

In particular, this response addresses the comments of Lord Carter in his speech to the 'All Party Group on Communications (apComms) and the Parliamentary IT Committee (PITCOM) on 4th March. In that speech he specifically gave priority to Innovative proposals on reaching the final 20% of UK coverage.

This response is an excerpt from a study being carried out by The Royal Academy of Engineering into the future competitiveness of the UK ICT Industry. The report of this study will be published later this year. One of the main recommendations of that report is highly pertinent to this consultation and the Academy therefore believes that early release of this recommendation and the evidence and findings that support it will be of great value to the Digital Britain consultation. The terms of reference of the broader study are included as an appendix below.

Introduction

It is increasingly clear that ubiquitous broadband access is a prerequisite for a modern knowledge based economy. It is essential that the UK, as a global trading nation, remains at the forefront of global broadband connectivity. It seems likely that, given the favourable regulatory environment now promised by Ofcom¹, fibre based broadband access for businesses in major cities and towns will be delivered through normal competitive market forces, including the £1.5Bn investment promised by BT but conditional on this regulatory support. Indeed, Government expects fibre coverage to reach a maximum of 80% of the UK population, but is seeking actively innovative ways of reaching the remaining 20%.² It is therefore even more important that the opportunities facilitated by affordable broadband access are made available throughout the UK, resolving broadband 'NotSpots' and providing an upgrade path for bit rates to at least 10Mbits/sec over the next three years. This will benefit small and medium enterprises (SMEs) in rural areas and is a vital element in addressing 'Digital Divide' issues. Major new developments, such as 'cloud computing', depend on fast and efficient broadband access. Lack of ubiquitous access would otherwise heighten divisions between urban and rural economies.

Evidence

The recent work of the Office of National Statistics (ONS) with their European colleagues at Eurostat³ suggests the following clear correlation: "...in other, mainly business and financial, service industries the strongest relationship with productivity over the first half of the 2000s comes from the proportion of workers with access to high speed internet". The work similarly notes that: "in manufacturing firms intensity of e-procurement shows the strongest relationship to productivity advantage" and "in

¹ Statement by Ed Richards CEO Ofcom on 3rd March 2009.

² Speech by Lord Carter of Barnes to apComm 4th March 2009.

³ Final report: Information Society: ICT impact assessment by linking data from different sources. Grant Agreement Number – 49102.2005.017-2006.128. August 2008.

distribution service firms the largest impact on productivity is related to the intensity of use of e-commerce for selling". In both these latter cases, the availability of broadband access is clearly important.

The first objective and action 17 from the Digital Britain consultation suggests that the UK Government is following the lead of the Irish Department of Communications Energy and Natural Resources (DCENR) which announced on 22nd January a €233m public investment plan to provide 100% broadband coverage in Ireland by September 2010⁴. The Irish plan contains contractual commitments to regularly increase the available bit rates throughout the five-year lifetime of the scheme. It is note worthy that the Irish competition, which involved both fixed and mobile providers, was won by the mobile provider Hutchison 3G Ireland with innovative provision of fixed broadband connection using mobile technology and self installed mobile repeaters to boost signal strength (and thus achievable bit rate) within homes and businesses. This Irish initiative harnesses the disruptive power of the latest cellular mobile technology. It came as a surprise to many that a solution based largely on mobile technology proved the most effective in rigorous evaluation rather than a more traditional fixed and mobile approach. This suggests that the approach adopted in the UK should allow for innovative solutions as well as the more traditional ones.

Genuinely pervasive broadband is the vital precursor to transform the Internet from a network whose primary use is to interconnect people and servers (a network of people) into a network whose dominant purpose will be to interconnect machines (a network of things). This will open up many new applications and markets, which the UK would be well positioned to exploit.

In the detailed interviews carried out for this study, many interviewees stressed the importance of pervasive broadband access that was regularly upgraded to achieve progressively higher upload and download speeds. In particular:

- Prof Andy Hopper (University of Cambridge): in 'Computing for the Future of the Planet'⁵ recognised that ubiquitous broadband access allows computing facilities to be relocated to areas with available 'green energy' and cooling.
- A senior defence industry interviewee noted: *"Governments need to step in where markets have failed. There is no doubt that Intel will keep producing chips and Microsoft software, or their successors will, but Governments need to intervene in those areas where there is regulation, such as the Transmission Layer. Particularly critical is their role in providing deregulation and investment incentives [need to make investment] to improve Broadband by taking us out of copper and into fibre [or create an environment where others will find it commercially attractive to invest.]"*
- A successful IT entrepreneur noted: *"Telco architecture will be a hybrid of optical fibre and radio with exceptionally high capacity."*

Interviewees also stressed the importance of applications that depend critically on affordable broadband access:

- A serving Permanent Secretary noted: *"The 'cloud' will become real. People at work will have a multiplicity of devices that they need to keep in touch and update*

⁴ Irish Independent 23rd January 2009 "Finally, its 'access for all areas' in €233m broadband rollout"

⁵ From The Royal Academy of Engineering's publication *Engineering Change Towards a Sustainable Future in the Developing World*
http://www.raeng.org.uk/news/publications/list/reports/Engineering_Change.pdf

(e.g. they will only want one version of their calendar and will want to download it from one location). We are only at the foothills of the digital home. Many people will have high tech equipment in their homes but it will be much more integrated."

- The Institution of Engineering and Technology noted: "*Web presence is fast becoming a pre-requisite for staying in business*" and "*As far as the younger generation is concerned, a business is invisible if it does not have a web presence*".

In these interviews the only major opposing view was from a Peer: "*I don't see the need to improve national Broadband capability for greater competitiveness. Only need 2Mbits per second. Firms that need higher data rates for transmitting design information for example will invest in fibre optic on their own. In new build, such as India for example, it may be economical to install a fibre optic network from the start.*"

A number of interviewees stressed the need to target much higher data rates, including an aspirational target of 1Gbit/sec to every home. The reality in the medium term is that we will need to see a mix of schemes with Fibre to the Home (FTTH) for new build, Fibre to the Cabinet (FTTC) enabling 50Mbit/sec VDSL services in urban and suburban areas and innovative wireless-based solutions in the harder to reach rural locations. Reasonable business cases can be developed for the FTTH and FTTC solutions but ubiquitous rural coverage at high data rates is unlikely to be achieved through market solutions alone.

Recommendations

1. The Government, working in co-operation with Ofcom, should continue to ensure that the appropriate regulatory reliefs are in place to support the necessary return on capital employed for pervasive fibre to the cabinet (and then onwards VDSL) access to homes and businesses within the major cities and towns of the UK. It will be important, in setting the regulatory controls, to ensure that investment in such networks remains sustainable.
2. In order to minimise the urban-rural broadband divide, and following the Irish model, the Government should hold a publicly funded European procurement on a five-year programme for the completion of 100% fixed broadband coverage in the UK with an initial minimum downstream bit rate of 4Mbits/sec and minimum upstream bit rate of 1 Mbits/sec. This should be technology neutral other than for a requirement for low latency. As part of the competition evaluation, extra benefit should be given to bidders who give contractual commitments for upgrade paths to at least 10Mbits/sec downstream over the five-year life of the programme and to progressively lower latency and contention ratios. Bidders should be required to set tariffs comparable to those set nationally, (e.g. no rural premium charge). The winning bid would be that which committed to the required performance and quality targets at the minimum level of public subsidy. The target would be for that subsidy to be for five years only with the business case self-sustaining from that point.

Explanation of recommendations

It is anticipated that normal market forces, in a favourable regulatory environment, will resolve pervasive broadband access, at least to the 50 Mbit/sec level, within the major cities and towns of the UK. However intervention will be required to minimise

the urban-rural disparity in broadband access. Pervasive fibre to the home has been projected to need a currently unrealistic level of investment at more than £25bn.

Satellite service will continue to be part of the solution, especially for extreme rural services, but those operating from geostationary orbit suffer inevitable (speed of light) transmission delays that raise the transmission latency to levels that are problematic in certain applications. There are proposals for mid-earth orbit constellations of satellites⁶ which would largely overcome these latency issues, but capacity and business model remain unproven. The proposed competition would however be open to such low latency satellite solutions.

A rural competition could be limited to a defined set of postcodes which represent geographies presently not covered by broadband, or only currently covered at data rates below the defined minimum. Recent advances in mobile radio technology (3G-HSPA now being deployed and by 2010 3G-LTE/ WiMax) offer the prospect of genuine competition between fixed and mobile providers for this rural fixed broadband market. The bidding rules should allow the successful bidder to offer a limited amount of coverage by satellite (say 5% of the geographic areas defined as subject to the scheme) outside the prescribed 'low latency' restriction. This identification of defined areas not currently adequately covered, should minimise market distortion and facilitate European Commission 'State Aids' clearance. The bidders should also be required to include in their bids funded proposals for 'demand stimulation', especially campaigns targeting SMEs and explaining the advantages of broadband enabled e-commerce. Previous initiatives (for example in the 100% broadband coverage of Northern Ireland) have focussed too much on supply-side provision and too little on facilitating and nurturing demand. Provision should therefore be made within bids for a realistic level of funding for appropriate demand stimulation campaigns. It is estimated that, for example the total investment required for a mobile broadband solution would be less than £5Bn.

Ofcom should be required to make clear that spectrum (potentially up to 2 x 20MHz) would be made available, as part of the release of 'Digital Dividend' former UHF television spectrum, to support a mobile broadband solution, should this win the rural procurement competition. Such additional spectrum would enable the vast majority of coverage to be achieved from existing sites, thus minimising both planning delays and 'green' concerns, as well as reducing the level of overall capital investment required. Given the need for public support and a competitive procurement process, it would be inappropriate to subject this new release of spectrum to a separate auction.

Response required and timescale

1. For urban access, there should be continuing support by the Government and Ofcom to the need for a positive investment case for a BT roll out of Fibre to the Cabinet (FTTC) within the major Cities and towns of the UK.
2. For rural access, a five year plan with defined targets and milestones. Contractual payments to the winning bidder conditional on achieving the interim roll out and bit rate upgrade targets. Independent end-to-end measurements of performance and quality of service (as seen by customers) to ensure adequate customer support, backhaul, interconnect investment and provisioning as well as local access. Robust security and availability plans, tested to demonstrate contracted levels of integrity and resilience

⁶ See "Connecting the other three billion" – IET E&T Volume 4 Issue 4

It would require a European Procurement, the minimum time to run this is around 12 months. Thus key dates could be:

- September 2009 agree policy and launch European procurement.
- September 2010 winning bidder selected.
- March 2012 100% coverage complete at initial contracted bit rate.
- September 2013 first bit rate upgrade completed.
- March 2015 second bit rate upgrade completed.
- September 2015 contract completes – network commercially viable.

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Appendix: Terms of Reference

The terms of reference of the “Implications of the changing nature of Information and Communications Technology on UK competitiveness” study are to:

- consider the importance of the ICT base for the UK economy;
- examine the present and projected state of UK ICT-related business activity in a global context;
- identify potential ways and means for improvement; and
- make policy and other recommendations.