Ofcom Strategic Review of Telecoms Phase 1 Consultation[1]

Broadband Stakeholder Group

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Introduction

As a starting point for this response, the BSG would reiterate the recommendations contained in its 3rd Annual Report, which are summarized in Annex 1 to this response. In the light of these recommendations and subsequent discussions within the BSG, we have sought to analyse the future of the sector and, hence, the areas for Ofcom focus, under the following headings since this is where we can reflect the wide range of BSG members' interests.

1. Characteristics of the current environment
2. Visions of a broadband, converged world.
3. Potential bottlenecks/natural monopolies in the supply chain
4. Options for competition, particularly at access level.
5. Encouraging capital investment, taking account of different risk profiles and investor expectations through the supply chain.
6. Options for regulation
7. The role of Government.
8. Answers to Ofcom questions

Context of the Review

The BSG fully supports the primary objective of this Strategic Review to *"take an over-arching look at the workings of the UK telecoms sector … to assess whether it is delivering benefits to consumers, its future prospects and the impact of alternative regulatory approaches"* leading to *"a new settlement for telecoms regulation".*

The BSG believes that the focus of this "new settlement" must be to create the investment climate for the successful delivery of next generation networks and services that it is, at least, as good as, if not better than, those of other leading global economies.

At the macro level, it is generally recognised that high quality communications infrastructure provides the lifeblood of an economy and that citizens and consumers will benefit only if either the state and/or the market invests efficiently. In the case of the UK, the private sector is expected to be the main source of investment.

It should also be recognised that the outcome of this Review, and the regulatory principles that are adopted, will dictate the evolution of the market and its structure (i.e. it will significantly influence the industry's planning and investment) for up to a decade ahead. (Note: in this

[1] **Please note: this response has been produced by the BSG Secretariat on the basis of inputs from a wide range of stakeholders over the past three years and in direct response to the points raised in the Consultation Document. It does not represent the views of any particular stakeholder or groups of stakeholders but aims to identify some key areas for Ofcom focus and further consideration in the next phases of this Review.**

context, the industry is defined as the total supply chain involved in delivering content and services to citizens and consumers.)

In its 3rd Annual Report published earlier this year, the BSG noted that the Communications Act 2003 had given Ofcom two principal duties and, in performing those duties, that it needs to have regard to 'the desirability of encouraging investment and innovation in relevant markets' and 'encouraging the availability and use of high-speed data transfer services throughout the UK'. In other words, Ofcom has a key role in the achievement of the UK's broadband objectives. Encouraging investment and innovation is not just desirable; it is *essential* if the long-term interests of consumers *and* competitors are to be met and moreover is critical to the UK economy.

The BSG believes that the target of regulation should be to promote both economic efficiency and investment at all stages in the supply chain and that Ofcom must aim to minimise the unintended consequences of regulation.

The need for significant further investment and efficient broadband competition has been a theme of recent Government statements. In April, the Government published its response to the 3rd BSG Report, commenting as follows:

"The broadband market will continue to evolve and develop and there will undoubtedly be a demand for more advanced broadband services. These services will require considerable further investment. We believe that a vibrant, competitive market provides the best environment to encourage companies to invest in the development of these new services. This policy has been highlighted in the UK National Broadband Strategy submitted by the Government to the European Commission as part of the eEurope Action Plan".

Whilst we have developed a sound policy framework (e.g. through the Communications Act 2003), we also acknowledge that the industry may face new challenges in investing in the deployment of these services".

Within the same response, Ofcom said that *"through its Strategic Reviews of telecoms regulation and the spectrum framework … it will be seeking to deliver a clear strategic framework for the promotion of broadband competition, which recognises the underlying cost structures, the scope for increased competition and new technologies in the market. The aim is to create an environment in which companies in the sector will have appropriate incentives to invest."*

The relationship between investment and the regulatory regime was highlighted in the House of Commons Trade and Industry Select Committee's Report on the UK Broadband Market in which it stated *"those looking to invest in the market need to have confidence in the robustness of the regulatory regime. It may be that the advent of Ofcom gives the opportunity to re-establish confidence in the regulatory regime where currently it is lacking".*

In response the Government noted that *"the Strategic Review of Telecommunications will clarify Ofcom's approach to competition at the different levels of the broadband supply chain and bolster confidence in the broadband market"* and Ofcom said that *"it will aim to ensure that regulation does not present a barrier to appropriate investment in such networks in the future".*

Thus, the context of this Review must be the wide acknowledgement that broadband success requires significant and sustained investment and that citizens and consumers will be best served if competing broadband platforms exist. This was also recognised by the Trade and Industry Select Committee that said *"we would naturally support any effort to ensure that investment in the existing network is sustained and that the rollout of other, alternative means to deliver broadband is encouraged"*.

The Government agreed that *"strong competition between broadband platforms will be important in ensuring both that broadband becomes available to all … to deliver the increasingly rich and sophisticated services that businesses and consumers will require … and*

that both sustained investment in existing networks and the rollout of alternative technologies are to be encouraged".

However, the Select Committee also recognised that there may be a trade off between the Government's competitiveness and the extensiveness goals and that a focus on rolling out broadband (i.e. achieving extensiveness) may be at the expense of competition.

The BSG agrees with the Committee. Consequently, both the Government and Ofcom must be clear which is to take priority in the immediate future and that it must *"make certain that the regulatory framework ensures that commercial decisions by private companies are aligned with the wider economic and social needs of the country".*

Since the outcome of the Review must deliver the 'broadband future', regulatory intervention must support longer-term vision and sustainable market entry. The Review must deliver a policy that will be stable for the foreseeable future, for up to a decade - the 'snakes and ladders' model of policy and regulation over the past two decades should be avoided.

In summary, the BSG believes that long term broadband 'success' requires (a) more capacity at local level, i.e. the final link with the individual user, (b) sustainable competition at this access level - so that users have the benefits of retail competition and content and service providers have the benefits of wholesale competition, (c) easy access for users to new and compelling broadband based/converged services and (d) new commercial models for the delivery of such services.

We assume that, with the convergence of telecoms and broadcasting services likely to gather pace over the next decade, probably towards a significantly IP based world, the outcome of the Telecoms Review will be aligned with that of the PSB Review (and the BBC Charter Review) since TV broadcasting will increasingly become a component of broadband access/delivery networks and interoperability of consumer/user equipment with access platforms and content/service provision will be key to the future success of the converged services supply chain.

1. Characteristics of the current environment

The BSG believes that the telecommunications market has reached a key inflection point with the deployment and accelerating adoption of the first generation of broadband services, signalling a move towards the convergence of multiple services over delivery platform(s) and a more 'on-demand' world.

We would characterise the current digital communications environment as one of very high growth (i.e. all communication, information and entertainment services will require the movement of more and more megabits of information) and an accelerating trend towards a more 'on-demand' world. This should suggest an attractive investment opportunity in virtually all parts of the supply chain.

It is predictable that users will increasingly demand higher bandwidth/overall capacity but there are significant differences between the views of early adopters (i.e. the bandwidth hungry users) and the mass market over the extent of capacity requirements.

On the one hand, there is a perception, particularly in the capital markets, that there is 'more than adequate' bandwidth available, although this is most applicable to backbone/longer distance networks than to local access. At the same time, there are demands, from both consumers and Government, for universal availability of higher bandwidth access (which could soon increase beyond the anticipated 512k that the majority of users could have access to by the end of 2005). Furthermore, content suppliers/applications developers argue that there is inadequate bandwidth to support innovative content and services.

As a result, there is a general climate of uncertainty over the level of potential demand and the extent of investment risk in different parts of the value chain that, together, could inhibit the

market from effectively satisfying the market's needs. Ofcom must minimise this uncertainty. The BSG believes that there is a huge opportunity if the market framework/economics can be delivered from this Review.

Institutional investors seem unclear about where the best opportunities lie (some believing that the UK market is too competitive compared to, for example, other European countries) and there appear to be concerns that capital expenditure is least justified where the BSG believes it is most required, i.e. for fixed and wireless local access, particularly in less densely populated areas. In addition, for newer wireless systems, because the processes are relatively undefined and cumbersome, the timescales needed to reach even the Public Consultation Stage prior to a spectrum auction are unacceptable for the investment community. It is unlikely that a more extensive spectrum trading regime will provide the answer.

Bearing in mind Ofcom's role in relation to the delivery of 'electronic communications networks and services', and its obligation to represent the interests of the citizen-consumer, the key focus for Ofcom must be to create greater certainty for investors through a commitment to deliver long term stability of the chosen regulatory regime that will ensure (a) that individual users have access to sufficient bandwidth to access their particular content and services packages, (b) that users benefit from the early introduction of new innovative services, (c) that users have a choice of supplier for both access and service and (d) that users have sustainability of services that they know how to use, they trust and, as appropriate, can easily pay for.

2. Visions of a broadband, converged world

Benefits for society as a whole - Broadband is a powerful enabler and a catalyst for accelerated change for consumers, companies, organisations and nations. It disrupts existing processes, business models and industry value chains. When fully absorbed, broadband changes people's behaviour and drives much more intense and productive use of ICT and online content applications and services[i]. We believe that societies that adopt, adapt and absorb the benefits of broadband-enabled ICT, services and applications quickly and deeply will achieve significant benefits in terms of productivity, innovation, growth and quality of life as well as significant competitive advantage over societies that don't.

To remain competitive in a globalising world and to ensure the delivery of world-class public services we believe it is vital that the UK exploits the broadband opportunity to the full. Our global competitors are raising their game and we need to as well. [ii]

The importance of broadband to future economic development is widely understood and recognised by international economic bodies (incl. OECD, ITU, EU) and national governments, some of which have taken an early committed,[iii]decision to invest directly in their broadband infrastructure (particularly: South Korea, Japan, Sweden and Canada[iv]). Recent research supports the assertion that new communication services can lead to very large increases in consumer welfare and GDP growth in the US[v] and UK[vi].

Achieving these economic benefits will be critical in a world economy that is becoming more competitive. Globalisation is a long standing trend but the rapid deployment and take-up of business broadband around the world has accelerated this process, leading to the outsourcing of business service and process operations. This is now extending across national economies, e.g. SMEs with broadband now have the communications capacity to outsource business processes, such as accounting, overseas. [vii]

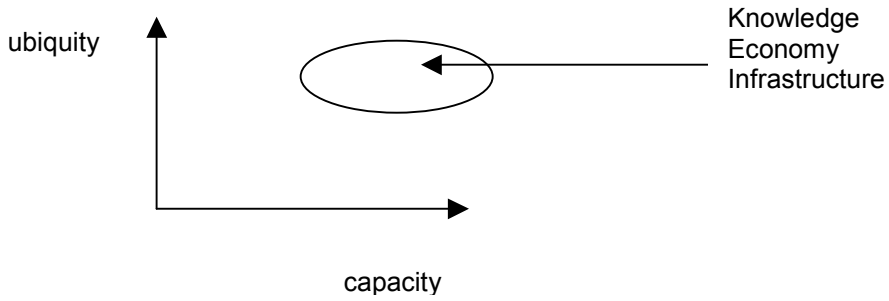
In this context of increasing global competition it is critical that the UK achieves increased innovation to drive the creation of new economic sub-sectors and improved productivity to make UK firms more competitive and therefore at less risk to being outsourced.

The UK has real strengths in creative media and software development, very often at the SME level. As broadband take-up continues to grow rapidly around the world, there is a major opportunity for UK companies and UK talent to exploit this new global market for broadband-

enabled media, content and applications. However, the development of a strong domestic broadband market in the UK will be essential for UK companies to develop new innovative products and services for the emerging global market.

Similarly, Government wishes to exploit the full potential of ICT to improve the quality of their public services while also driving down the cost of delivery. This will enable them to either plough the savings back into the public sector to deliver even better outcomes in terms of health, education etc, or to reduce the tax base to increase the competitiveness of their economies. There are many examples of private sector companies transforming their competitiveness through the full exploitation of ICT. There is no fundamental reason why Government cannot do the same[viii].

To achieve the vision, we will need ubiquity and capacity and the policy and regulatory environment must be visionary enough to achieve both. As mentioned elsewhere in this response, trade offs between extensiveness and competitiveness will mean that the full benefits for UK plc and delivery of a true knowledge economy, which we illustrate below, will not accrue.



For individual users – Convergence implies consumption of bandwidth for entertainment, information and communications services, both 'real time' and 'non real time', and users could increasingly look to access these services on a single platform (or on a minimum number of platforms) rather than use specific platforms for each service.

Early adopters, both business and residential, ought to be the mass market drivers, i.e. the promoters of the value proposition and key targets for new services and the drivers of uptake could be compared to the introduction of mobile telephones, colour TV, satellite TV, etc. In addition, it is important to recognise that new generations of user, who will become consumers over the next decade, will be more demanding and will exhibit different usage and behavioural patterns.

As more tele-working, tele-education, tele-medicine and other entertainment and gaming applications emerge users are likely to need the 10Mbs access capability that is now being considered in a number of countries.

Internet experience has produced a more on-demand world and broadband will accelerate this trend. This trend is already being experienced in the broadcast world where TV is moving from 'push only' to 'push and pull', from scheduled linear broadcasting through time-shifted linear broadcast and enhanced/interactive broadcast services towards NVOD (near Video on Demand) and VOD. Significant extensions of VOD are on the horizon. In addition, PVRs are changing viewing patterns, as will extensions of PC functionality for PVR and content storage. At the same time, other content (e.g. internet) is also moving to 'push and pull', with content and service providers pushing unsolicited information and advertising.

There is also a growing need for IP broadband on the move with significant potential usage by both public sector users (e.g. health care delivery, utility services) as well as business and residential consumers.

Technology - There are predictions that most services could become IP based within the next decade and BT's recent announcement of its 21st Century Network investment is evidence of this trend. TV and IP based services are already being combined over the same access networks and it is probable that new developments such as high definition television (HDTV) and then interactive HDTV will also have a significant impact. In this respect, we understand that there are proposals by FIFA to cover the 2006 football World Cup in Germany in HD and make it available on demand. We note, also, the current trial by UEFA of subscription based, broadband delivery of Euro 2004 matches.

There are similar predictions regarding the future role of the TV set; if it is to become a means of accessing more than just linear broadcast and text, it could become a 'basic screen' or 'display' rather than a standalone piece of consumer equipment with integrated, platform specific technology. It is possible that consumer demands will drive change towards a 'black box' solution, combining PC capability and tuners/access control for broadcast, etc.

In relation to convergence trends, the recent BBC submission to DCMS in relation to digital switchover refers to the probable changing role of the TV set and the emerging role of broadband in support of digital switchover as follows:

"The digital television receiver is likely to become the most widespread means for consumers to access entertainment, education, news and ecommerce services as well as digital TV programmes and channels and … 2004 should see the commercial launch of DSL services which will include the retransmission of linear digital TV services

Broadband take-up is growing rapidly and it has the potential to deliver digital TV to households for which traditional digital TV platforms may be unattractive, unavailable or impractical. Kingston Interactive Television has offered linear digital TV channels to TV sets for a while and Video Networks (Home Choice) has recently started to do so. In addition, several xDSL operators offer, or are considering offering, linear digital TV channels to PCs.

It has to be borne in mind that PVR technology, and consumer expectations carried over from online, are re-shaping digital TV into much more of an on-demand medium such that (rights permitting) broadband could have a considerable role in helping to take analogue viewers into a future of digital consumption of audiovisual media".

In addition, in promoting its Interactive Media trials, the BBC wishes to make current and archive material (which includes wider IP-based news and other content services as well as TV programmes and films) available on demand and says that it "*intends to work with partners to make broadband more attractive and accessible".*

Broad conclusions - For users to benefit fully, it could be argued that any individual user needs more than just adequate bandwidth for today's needs and that access networks should have the ability to cope with significant demand fluctuations; in other words, 'excess' [ix]capacity may be the key to new service development.

The factors that will determine individual bandwidth needs will continue to change. At present, users tend to adapt their usage to circumstance; e.g. if working from home, they will expect less facility. But perhaps we should view usage as consumer specific rather than location specific; i.e. if an individual is to work at home, is there any reason why they should not expect the same capacity, functionality and convenience that exist in an office location and also why their other communications and entertainment needs would not result in their individual bandwidth needs being higher at home than at work?

The nature of communications traffic will change as new content and applications achieve widespread use and significant demand fluctuations in bandwidth requirements will also arise as consumer usage patterns for downstream v. upstream bandwidth develop. Predicting the level of the new peaks of bandwidth demand will be difficult and current usage patterns may not be an appropriate base. In other words, from Ofcom's perspective, 'evidence' may not be a

sound base for setting regulatory proposals (although there is clear evidence globally that those countries with better communications capabilities have better economies and broadband is the next phase in the communications journey). If we were to accept that, for example, interactive video based services, both commercial and public sector, could become very bandwidth hungry, the question is 'how far should access networks plan for innovative or disposable bandwidth to allow third party service providers to test new services?' In this respect, there is probably a need to review more closely the concept and viability of 'liquid bandwidth' or 'bandwidth on demand' models.

If the 'excess is better than adequate' philosophy is adopted, a key question is whether we should attempt to set a target for 'bandwidth per consumer' at, say, 10Mbs. Such a target, which is already being considered by operators of fibre-based networks in Europe, will require a longer-term perspective (or vision) and risk must be manageable. This requires a policy framework that will ensure that such risk investment is recognised/rewarded.

Furthermore, bandwidth at local access level is only one element. Other parts of the supply chain will require adequate capacity (e.g. servers, backhaul, etc) which points to the need for Ofcom to view the supply chain as an integrated, interactive whole rather than 'broadband access'.

The BSG conclusion from the above is that regulation will have to tend towards a 'visionary' philosophy rather than an 'evidence based' approach (i.e. it must help to create the future rather than fix the problems of today) and address efficient operation of the whole supply chain.

3. Potential bottlenecks and natural monopolies in the supply chain

The BSG views the broadband supply chain ranging from consumer equipment (which is principally related to specific platforms with integral components and software) through access networks, local hubs/switches/servers, backhaul and core networks to content and service packagers (e.g. broadcast channels, ISPs, etc), content owners/creators.

Today, various technological and competitive bottlenecks exist within this supply chain arising, for example, from technological incompatibility related to equipment standards or, at the competitive level, the desire to protect commercial interests, which may lead to limitations imposed by, for example, network owners on third party access and content and rights owners on content distribution, etc.

The regulatory regime must attempt to address all bottlenecks and, in addressing one particular bottleneck, it should understand the consequences for other parts of the chain. However, bottlenecks tend to change in nature over time; i.e. not all bottlenecks will be enduring, many might be just transitory.

In relation to broadband, the European Commission has referred to the 'broadband bottleneck' as the last mile connection to the final user. The BSG would see this definition as too simplistic. Over the past two years, the BSG has viewed the final drop or 'last mile' as having two separate components of (a) passive infrastructure, i.e. ducts, poles, masts and buildings, and (b) active infrastructure, i.e. the cables, the wireless spectrum and the associated equipment housings. The reason for this division is that the former has a much higher cost but much longer life expectancy (e.g. 25-30 years) than the latter (say 5-10 years) and each has a different earning capability. In addition, by making this distinction, it is possible to look at the extent of the bottleneck. For example, is the highest cost component the prime candidate for natural monopoly definition?

Another reason for making this split is to look at ways of reducing the cost of access bandwidth, particularly if there is a demand for excess bandwidth to support innovation.

The BSG believes that all options for reducing final 'drop' costs need to be considered, including transmission technology options and alternative underground or above ground distribution. The lower the costs and, hence, risk, the more likely that some infrastructure competition can be delivered without the need to replicate every component of the last mile.

We need to be realistic when assessing whether new technologies might reduce or remove natural monopolies, i.e. if the passive element of local access (e.g. ducts) were considered as a natural monopoly, new cable burying techniques (without ducts) could significantly reduce cost and disruption, and wireless or free space optics could provide options for user connections.

However, we should not expect particular technologies to be panaceas but, if new technologies are to emerge, there is a need to encourage risk investments in these technologies.

At this time, the BSG believes that the most enduring bottleneck, and potential natural monopoly, is the passive component of the last mile but not the active component; therefore, regulation should consider these as distinct items.

Further into the supply chain, other natural monopoly prospects could emerge over time (e.g. it has been suggested that the IP backbone may be a natural monopoly). **Bottlenecks will also be presented by, for example, proprietary standards and content ownership** but, if the mass market demands an 'any information, anywhere, anytime, any device, any network' solution, there could be natural market evolution towards such a model. The BSG foresees good progress towards this goal over the next few years and therefore, would urge that proposals for regulatory intervention to address today's bottlenecks should be subject to sound, supply chain impact assessment.

4. Options for competition at access level

Following on from the points above, although the BSG acknowledges that Government and Ofcom would like to see both more capacity/bandwidth at access level as well as more sustainable competition, both retail and wholesale, the question is whether this is feasible. The latter (i.e. more wholesale competition) implies more competitive access infrastructure over a greater proportion of the country as well as easier access to all networks, which might involve Ofcom imposing access obligations, although not necessarily terms and conditions, on all access networks operators.

Realistically, the options for providing fixed network end user access (over the last mile or final drop) are limited, in broad terms, to the choice between monopoly supply or limited oligopoly. However, as either option currently requires private sector risk funding, (needing to attract what could be regarded as international 'footloose' investors), the potential for competition will depend on investor returns related to the risk profile.

This would suggest the regulatory intent should be to create a climate that will stimulate infrastructure investment rather than pursue a philosophy of infrastructure competition and here we return to the need to be very clear about the potential competitiveness of the different components of local access.

Some would view infrastructure competition and service competition as distinct options; others argue that they are interdependent. The BSG believes that they are interdependent to the degree that service competition cannot be fully effective without infrastructure competition but service competition does not lead naturally to more infrastructure competition. Therefore, we need an environment that encourages investment in infrastructure that will support the future competitive delivery of services, applications and content.

The BSG believes that there is a strong case to progress fibre much closer to users and the regulatory framework should make this possible sooner rather later but this is not the only solution to the broadband access problem. Copper based solutions will continue to have a role as, for example, VDSL and ADSL2+ continue to extend the life of copper and, with sub loop

unbundling, it is argued that around 10Mbs could be provided over such systems. In addition, there is a role for satellite, particularly where the major demand is for downstream bandwidth.

An area that tends to attract less attention than it deserves is the strategic use of spectrum for access networks. The BSG believes that the pace of spectrum policy making needs to accelerate.

At present, demands for license-exempt, rather than licensed, spectrum are significant due to the long delays in opening up licensed spectrum. These delays arise because the procedures are largely un-defined which means that the investment community cannot predict the impact of the procedures on timescales for implementation. Consequently, some license-exempt cases may be exaggerated and the portfolio of available spectrum possibilities at any time does not match the viable wireless technologies.

The BSG Wireless Working Group examined the commercial and regulatory reasons for the lack of progress in terrestrial wireless broadband deployment to date and explored the regulatory measures that could be taken in the short term (2003-2005) by Ofcom to help facilitate the development of this market. The Group also looked at the longer-term requirements for spectrum (post 2005) for wireless broadband. Its conclusions were included in the 3rd Annual Report, notably:

"There have been a number of positive developments over the last 12 months there have also been set backs … including the lack of a clear strategy for enabling wireless broadband.

While the regulatory framework is by no means the only determining factor to the success or failure of wireless broadband services, it does have a profound impact in a market where access to scarce spectrum resources is so fundamental. Unfortunately, regulatory timescales have repeatedly slipped and consultation processes on wireless broadband issues are not regarded as having been particularly effective. Whilst the BSG recognises the complexities involved there is a strong perception that spectrum policy needs to keep pace with technological and market developments and that there is a need to develop a more integrated market orientated approach to spectrum management that provides greater regulatory clarity while minimising regulatory intervention.

Going forward, it is clear that there will be a need for a balance of licensed spectrum (exclusive use model) and unlicensed spectrum (commons model). A more flexible approach to spectrum management is required and the BSG therefore welcomes the high prioritisation given to spectrum management issues by the Ofcom board. The BSG believes that the FCC's Spectrum Policy Taskforce offers a policy precedent for how these issues could be taken forward by Ofcom."

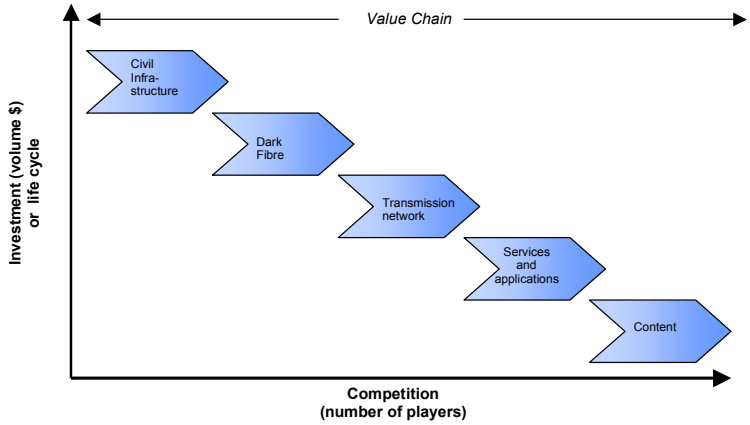
5. Encouraging capital investment

In the BSG's 3rd Annual Report, we made the point that the reason that 'broadband' represents a much more complex supply chain than telecommunications or broadcasting alone is because of the two fundamental features of the electronic communications industry. First, the supply chain is subject to quite different economic and competitive forces at different stages of the chain. Secondly, consumers are becoming increasingly active participants in the creation of networks as well as passively consuming products.

There is a need to recognise that investors at different levels in the chain have different time horizons and competitive pressures at each stage are also markedly different. For example, in upstream markets, competition may be limited, investment cycles can be measured in decades and markets tend to have high barriers to entry.

Further downstream, competition is likely to be more intense as product lifecycles can be measured in just a few years or even a few months. However, in many cases, downstream competition remains dependent on upstream inputs from integrated operators, which also compete in the downstream market.

Economic Fundamentals in the Broadband Supply Chain



In the light of the above, regulatory remedies at each stage need to address different issues and must be considered in terms of the potential impact on other parts of the chain.

We are aware of the 'ladder of investment' concept but we question whether encouragement of market entry and investment in lower risk areas of the supply chain will lead to expansion and investment further up the chain; for example, whilst there might be good prospects for moves from bitstream use to LLU, we believe that there is less likelihood of the move from LLU to own build, particularly if an altnet is faced with high civil works costs; in other words, we reiterate our earlier doubts about the extent to which service competition naturally leads to infrastructure investment under current conditions.

However, the movement from LLU to own build could be facilitated by changes in sector regulation, e.g. incumbent provisioning processes, as well as in non-sector regulation such as planning rules, tax regimes, etc.

Hence, this leads to the conclusion that we need a regulatory approach that will ensure that (a) more capacity is provided at local level and that (b) sustainable competition is achievable at this level - so that users have the benefits of retail competition and content and service providers have the benefits of wholesale competition. Ofcom should look particularly at the new commercial models that may be required to achieve this outcome.

6. Options for regulation

As we have indicated above, the current market is characterised by uncertainty although improved broadband access is a key objective. However, broadband access is still a relatively nascent market and bottlenecks in nascent/uncertain markets may be only transitory and, therefore, sensitive to regulatory intervention.

Because Ofcom has a requirement to consider the strategic benefits to the national economy of high-speed multi networks and availability of services, it has to be forward looking.

The past 20 years of ex-ante regulation and changing policy models have probably delivered more benefits to consumers than to investors and not achieved the extent of competition in access network market that was a core objective. For investors, the changing policy and regulatory models have probably shifted the goalposts too often and changed expectations of investors, both corporate and institutional. For example, as the consultation document points out, the infrastructure competition model supported by regulatory policy during the mid 1990s

was probably too short for what is probably the highest risk area for investment within the supply chain.

Furthermore, the cumulative effect of incumbent price controls has had an indirect effect of margin expectations across the market; i.e. a regulatory stimulated margin squeeze on all players has had its effect on investor confidence.

Over the next decade, the key objectives of the regulatory environment should be to deliver greater availability, access and choice of content and service to all users aligned with an investment friendly climate, where risk will be rewarded proportionately.

The BSG sees the following options:

- At one end of the range, Ofcom could adopt a policy of forbearance and let the market resolve its own issues relying solely on competition law.

- The other end of the range is a centrally defined and managed regime but this would be unacceptable in our mixed market economy so we have to find a sustainable mid range option.

- The least intrusive step could be a focus on behavioural regulation (covering competition and arbitration roles).

- The only other alternative is for Ofcom to support a particular market model and make it clear that this will apply for an extended period to provide the market with clarity and stability; this can involve the promotion of either infrastructure competition (particularly for local access and/or middle mile) or services competition.

Whatever option is chosen, it needs to be maintained over a prolonged period. In addition, a high priority should be given to regulatory impact assessments so that the unanticipated consequences of regulation could be minimised.

Ofcom should also be clear on what it intends from proposed regulation. For example, the recent decision on LLU is seen to assist broadband objectives but it is not clear that it will offer better coverage of less dense areas and may just add another element of competition where competition exists. In this respect, we note the following comments made by Ofcom as part of its broadband framework announcements on 13th May;

"We should … focus regulation on the monopoly local loop … Ofcom believes that LLU offers the greatest potential for downstream service and price competition but requires substantial facilities and network investment by competitors. ***It will tend, for several years at least to be economic only in metropolitan/dense urban areas".***

As part of the same announcement, Ofcom also said *"we have made clear our desire to see sustainable long-term competition. Service-based and infrastructure - or facilities-based - competition are interdependent. We will exercise our regulatory discretion towards creating a framework which provides proper incentives and reward for investment for scale and reach.*

In relation to the latter comment, we need to be clear about what is most important to those competitors/entrants that are most dependent upon LLU or other access services (i.e. altnets and ISPs) and whether their longer term objectives can be aligned in any way with the objectives of access network providers. For example, in generating revenues and profits, is it non-discriminatory access to the incumbent's local loop or is it low cost access that are most critical to success? And, in the case of the latter, how long is it appropriate for Ofcom to determine prices and what level of pricing, or other regulatory obligations, will ensure the necessary investment in the access network?

Although the current market structure is likely to generate conflicting views on the preferred market model and regulatory options, there should be some common ground between the distinct interests of players in different parts of the supply chain – i.e.

access networks, altnets, service providers, etc. This is most likely to be that none of these are likely to be successful unless adequate investment is made in the underlying access infrastructure. If regulation can deliver this outcome, entry into other parts of the supply chain should be easier.

In this respect, the target of regulation must be to lower the cost of providing bandwidth such that the price of bandwidth does not inhibit applications development (including experimentation!) but allows suppliers, retail and wholesale, to expect a reasonable return, subject to efficient operation. However, it should not attempt to sustain the unsustainable.

In summary, we conclude that future growth of broadband requires more capacity at local level and some sustainable competition at this level, so that users have the benefits of retail competition and suppliers have the benefits of wholesale competition.

We believe that Ofcom should focus on monitoring transparency and ensuring non-discriminatory prices and operational processes, rather than pricing intervention, i.e. behavioural regulation throughout the supply chain, in support of an explicit goal of sustainable investment in the broader UK communications market.

In addition, Ofcom should keep all broadband access regulation under review such that it doesn't inhibit the provision of higher bandwidth access nor limits the extent to which content and service providers can differentiate their products.

Finally, although it may not be a primary responsibility of Ofcom to ensure universal availability of high bandwidth networks and services, as we mention above, understanding the extent of the potential for market failure beyond the more dense areas could be a key task for Ofcom since this could give greater clarity to Government, and the Regional Developments Agencies in particular, as to how they could support infrastructure development in their region.

7. The Role of Government

We have referred earlier to the Government's (and Ofcom's) responses to both the 3rd BSG Annual Report and the Report of the Trade and Industry Select Committee where it has stated its belief that a vibrant, competitive market provides the best environment to encourage companies to invest in the development of new broadband services and that this policy has been highlighted in the UK National Broadband Strategy submitted by the Government to the European Commission as part of the eEurope Action Plan.

Government has acknowledged that the industry may face new challenges in investing in the deployment of these services and the DTI has committed to work with all stakeholders to ensure that, as far as possible, the regulatory and policy frameworks support the further development of the broadband market.

In line with our comments above, we believe that Government should commit to a stable policy and regulatory framework that will allow the market to deliver extensiveness as far as possible but that it should work closely with Ofcom to determine where market failure might occur and then address this issue specifically.

8. Answers to Ofcom's Questions

Question 1: In relation to the interests of citizen-consumers, what are the key attributes of a well-functioning telecoms market?

BSG Answer: The BSG regards the key attributes as consumer choice (of networks and services), ongoing availability and sustainability of new services, ease of access to those services, availability of sufficient network capacity to support access – and competitive prices.

Question 2: Where can effective and sustainable competition be achieved in the UK telecoms market?

BSG Answer: The BSG believes that sustainable competition could be achieved everywhere except, possibly, in the passive/civil components of local access; i.e. where the high costs of the passive element of the user connection is the most inefficient part of the overall investment.

However, effective competition implies both a willingness to invest and the need to ensure that effectiveness and sustainability are not undermined by market power abuses in any part of the supply chain – see Question 3 below.

Question 3: Is there scope for a significant reduction in regulation, or is the market power of incumbents too entrenched?

BSG Answer: In relation to the first part of the question, the objective ought to be that there is scope for a significant reduction but this needs to be qualified based on the latter part of this question. In other words, if Ofcom determines that incumbents' market power is too entrenched, it must assess to what extent this been sustained by the form of regulation applied to date and recognise that there is a danger that this could be perpetuated by a purely 'evidential' approach to regulation.

If Ofcom accepts that, to achieve broadband targets, there needs to be a more 'visionary' approach, this may not require a 'significant reduction' per se but a different regulatory approach that veers towards behavioural regulation (i.e. ensuring non-discrimination) with a concentration on the application of competition controls and managing potential abuses of SMP. This should consider the potential impact of SMP in all parts of the supply chain, not just access, i.e. including content and technology.

In the case of wireless, the focus should be to reduce the complexity and delays involved in spectrum acquisition. In return for spectrum being made more readily available, Ofcom could apply more stringent conditions surrounding its use, including requirements for release of spectrum if it is not used.

The objective to make sector regulation pro investment and pro innovation is strongly supported by the BSG. In this respect, Ofcom should aim to take account of the fact that the sector (and, hence, broadband success) will be impacted by a wide range of legislation and regulatory bodies, e.g. ICSTIS, FSA, ISPA, Home Office, Department of Transport, ODPM, etc. Ofcom should aim to influence the wider environment in the best interests of the communications sector.

Question 4: How can Ofcom incentivise efficient and timely investment in next-generation networks?

BSG Answer: Ofcom has a key role to translate Government objectives into reality as both broadband and digital broadcasting objectives require significant private sector investment. The BSG has previously made the point that, if Government wants the UK to be a G7 leader in both broadband and digital broadcasting, when each of all competing G7 countries have similar

objectives, it suggests that the investment climate in the UK ought to be better than in the other G7 countries.

Therefore, the conclusion must be that Ofcom should create an environment where potential returns on investment are not threatened by both competitive pressure and regulatory intervention. Market entrants must be able to foresee margin opportunity related to risk and while they will accept margins may be eroded as competition increases in the market, they will not be able to contend with a parallel, possibly unforeseen, regulatory threat.

This suggests that Ofcom's main focus must be to create certainty over the longer term (which could mean certainty of capital availability) and protect entrants from market power abuses but, at the same time, be conscious of the indirect effect on entrants of any regulation applied to those with SMP.

Question 5: At varying times since 1984, the case has been made for structural or operational separation of BT, or the delivery of full functional equivalence. Are these still relevant questions?

BSG Answer: The questions are still relevant although this is not an area where the BSG believes that it should comment save for the fact that Ofcom would need to take account of potential disruptive effect and/or practicality of any solution. This type of approach in US has led to both advantages and disadvantages and, today, it could be argued that it is not delivering all expected outcomes.

Arguments for separation tend to reflect the comparative lack of success with the changing policy and regulatory approaches adopted to date which have seen BT maintain a high share of certain markets.

In terms of the future, much will depend on Ofcom's perspective of a market model; e.g. if it were to support a predominantly 'service competition' model, the separation arguments would continue unless Ofcom used this Review to end the debate over the matter in the interests of market certainty. However, the BSG does not see a predominantly 'service competition' model as the best option for long-term broadband success.

In any event, it is unlikely that separation would dramatically change the investment needs of the access network and, hence, the potential price of such access. In fact, it is possible that the price of access could increase to cover upgrade investments.

Consequently, the balance of argument tends to favour a model that promotes infrastructure investment and, where sustainable, competing infrastructures. The latter objective could be more achievable if (a) a full replication of all components of an access network was not necessary, (b) other access options were available (such as open access ducts and poles, cheaper fibre laying techniques and more efficient spectrum use, etc) and (c) regulation aimed at ensuring non-discrimination could be made to work (via forms of 'transactional' or 'functional equivalence').

Question 6: How successful is the UK telecoms sector currently in delivering benefits to citizens and consumers?

BSG Answer: Over the past two decades, the UK telecoms sector has delivered significant benefits to citizens and consumers in telephony with call prices for long distance calls showing dramatic reductions. Those consumer benefits have been significant in choice, price and services but arguably offset by wasted consumer expenditure, time and inefficiencies in dealing with a changing environment.

A range of competitors and new services has also emerged but there have been only moderate advances in terms of capacity for new services compared to some other countries and content/service developers needs. In other words, the UK sector may be delivering static

economic efficiencies but failing to deliver dynamic efficiencies on a wide enough scale across all of society and, we believe, this is where Ofcom needs to focus.

Question 7: How rapidly and extensively will fixed and mobile networks become substitutes for one another?

BSG Answer: For voice, they are both substitutable and complementary. For data the best network principle will apply; users will select the service/network/platform that is most suitable for what they are trying to do wherever they are. For example, it is unlikely that a tax return will be completed on the move with a mobile device but a text message providing information about a rebate or requesting particular data would be useful. For video material, the effectiveness of the viewing experience in relation to the content will be the driver.

Perhaps a more relevant question is whether fixed and wireless networks are substitutable; i.e. to what extent can they provide users with equivalent access bandwidth necessary for their broad content and services needs. This will depend upon the economics of both initial provision and the comparative cost of delivering the same quantity of data over a mobile as opposed to a fixed network. However, the ability to explore the competitive and operational potential for wireless broadband is significantly limited by the problems of timely access to spectrum and the associated investment issues.

It is worth noting that the messaging market has many alternatives, via broadcast, web, fixed and mobile networks, but these can be as much complementary as substitutable.

Question 8: What impact will Voice over IP have on the telecoms market?

BSG Answer: VoIP has been around, in core and international networks, since the mid 1990s and its impact has been significant in terms of reductions in long distance call charges and it will continue to be so.

At the consumer level, it may be seen as a disruptive technology and its further success will depend on issues such as quality, availability of terminals, consumer convenience, pricing models, etc. We would eventually expect voice to be just another application that will be provided as part of an bandwidth package but operators will need to achieve adequate access pricing models, moving towards bandwidth use pricing rather than timed use.

Question 9: How rapidly and extensively will broadband be taken up in the UK, and what are the regulatory implications of such growth?

BSG Answer: Is this the right question? Evidence to date has shown strong growth in uptake but relatively low levels of bandwidth utilisation, which is negatively influencing some attitudes towards provision of more capacity. But should we be too concerned about average utilisation today when meeting users' peak needs may be the appropriate target?

The BSG has previously addressed the need to bridge the chasm between the mass market and the early adopter concluding that the more compelling the value proposition, the quicker the pace of market adoption but that the value proposition is as much a factor of what broadband enables (i.e. the content applications and services) as the price per megabit.

The issue for regulation, inferred in other parts of this response, is to find ways to continue to keep pace with the needs of the early adopters such that a platform for serving the mass market across the whole of the country can be constructed.

However, we could continue to face considerable difficulties in some geographical areas for the market to deliver true broadband access to users and there may be societal and economic arguments for considering specific measures to rectify this.

Question 10: What scope is there for new, competing broadband platforms to be rolled out, and which technologies are most likely to be used?

BSG Answer: See Section 4 above. Although it is argued that service competition stimulates investment in infrastructures, the circumstances under which this will occur are probably little different from those influencing the decision to invest in (competing) infrastructure. As mentioned earlier in this response, service provision involves a shorter-term vision (than infrastructure provision) and service providers will need to see real added value in self provision of infrastructure, particularly if they have access to adequate infrastructure at prices that are low. This suggests that encouraging service competition will not lead readily lead to new broadband platforms.

The second element to this is that those entrants considering investments in competing platforms will have to take a much longer-term view and be comfortable that a reasonable return for greater risk will be achievable.

In practical terms, the continued resistance of investors, particularly institutional investors, to large CAPEX projects, arising from the hangover from the 90's deregulation boom, is likely to limit new platforms emerging until there is greater clarity over the way the infrastructure investment will be rewarded. Although some investors are starting to look at the market again, the focus tends to be on smaller niche opportunities, or on content and applications companies, rather than the upstream parts of the value chain (i.e. the access network) where poor returns are envisaged. The objective for Ofcom should be to reinvigorate the appetite for large capital investments and deliver continually improving, nation-wide pervasive broadband.

Question 11: When are operators likely to move towards 'all IP' architectures, if at all?

BSG Answer: There are operators today with "all IP architectures" but they are not pervasive nationwide or catering for all applications. However, the recent BT announcement of its 21st Century Network, and that of SBC Communications in the US re its planned $4-6bn investment in fibre to the node access network upgrade for IP based services, starts to address this question.

The BSG view is that a move towards 'all IP' is highly probable although timeframes are difficult to predict. It is worth noting that European fibre based network operators are looking at 20-50% in the short to medium term and virtually 100% in the long term.

Similarly, newer wireless access systems are ready, compliant with IETF standards, and we are likely to see new operators emerge

Question 13: Is there likely to be widespread demand for services that require 'broaderband' networks to be rolled out and, if so, how will such infrastructure be supplied?

BSG Answer: The answer to this question can only be 'yes' as higher bandwidth is available to users and content and service developers look to use this capacity. It will be possible to deliver higher bandwidth services over copper but the key question will be where to draw the line between sweating older copper assets and/or pushing fibre deeper into the access network or making better use of wireless technologies; both of the latter have a role to play.

Different views exist as to what the target for bandwidth per individual user should be (and how it could be supplied) but, considering developments elsewhere in the world (and particularly other parts of Europe), the BSG believes that 10Mbps is a reasonable target. But this raises the investment challenge; who will do it and what incentives can Ofcom or the Government offer to BT and other operators to do it?

Question 14: How rapidly are broadband content businesses likely to emerge, and what factors will affect their viability?

BSG Answer: The first part of this question represents the typical 'chicken and egg' scenario, particularly as content creators argue that bandwidth must come first to enable experimentation/innovation but bandwidth providers want evidence of the demand in support of the business case. However, the BSG believes that services incorporating reasonable quality, video based content are being inhibited today although the businesses exist.

For example, we understand that US movie majors won't allow material to be used at less than 4.5 Mbps and even the BBC is having to calibrate its video clips at 256kbps which makes their appeal fairly niche.

Question 15: How will future network evolution, such as growth of intelligence at the edge of networks, and the increased importance of control over technical standards and interfaces, affect the requirements of telecoms regulation?

BSG Answer: There is already evidence that consumers wish to create own 'private' networks – similar to the old model of business private networks – and some are creating their own public 'access' and community networks. There could also be a trend towards greater storage/content caching and applications management nearer the network edge.

Question 17: Are consolidation, alliances, market entry or other forms of market evolution likely? What will their implications be for telecoms regulation?

BSG Answer: Comparisons with other international markets suggest that there is scope for consolidation in the market. ISPs are starting to generate returns, which means that they will become increasingly attractive acquisition targets. The same could apply to network operators at both local access and backbone level, particularly if investment in IP backbones is required. In relation to the latter part of this question, we question whether the scope of Ofcom's powers over electronic networks and services, as defined in the European Directives and the Communications Act 2003 allow Ofcom the scope to deal with all issues; e.g. can Ofcom regulate software/firmware providers or those using proprietary standards?

Question 18: What impact do different regulatory approaches have on investment decisions in telecoms, and what regulatory approaches does this imply that Ofcom should adopt?

BSG Answer: Regulatory impact on investment decisions is profound – a common heard quote from one New York fund manager is "I'm not betting against the regulator".

The market requires clear signals from a definitive policy decision that presents a vision of a long-term market model rather than the relative uncertainty of a looser 'let market decide' option. As we suggest in the body of this response, the focus for Ofcom must be to create greater certainty for investors (and recognise that it has an obligation to protect investors' rights as well as those of citizens-consumers) through a commitment to deliver long-term stability of the chosen regulatory regime. This regime should aim to ensure (a) that individual users have access to sufficient bandwidth to access their particular content and services packages, (b) that users benefit from the early introduction of new services, (c) that users have a choice of supplier for both access and service and (d) that payments systems and trust applies across the supply chain.

In addition, Ofcom should aim to factor in the potential impact of non-sector legislation into its regulatory proposals.

Question 19: What is the right role for consumer policy? What impact do different approaches have on telecoms companies' perceptions of risk and return?

BSG Answer: The primary objectives for consumer policy should be consumer protection (in terms of supplier behaviour in providing access to the content and services) and consumer education (in terms of media literacy and knowledge of how to access content and services).

Question 20: What role should Ofcom take in signposting, providing, or ensuring that the market provides clear information to consumers, enabling them to make effective choices?

BSG Answer: The more competitive the market the less clarity there is likely to be for consumers although this does not mean that consumers will suffer unduly; as with other competitive markets, such as cars and consumer electronics, the market will probably meet consumers' needs without offering the clarity of, for example, utility markets. However, there is evidence that, in many aspects of competitive offerings, from credit cards to junk mail, that the disadvantaged in society (e.g. the aged, infirm, less educated, etc.) are confused and distressed by complex offers and a continually changing landscape.

Ofcom could play a key role here, to work with and encourage consumers' associations to provide the necessary guidance, but it should not place the primary responsibility on suppliers to ensure that consumers are able to make effective choices. In any competitive market, suppliers will wish to differentiate their service offerings and this should be encouraged. However the social obligation should be accommodated.

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[i] For the impact on Consumer behaviour see Fat Pipes – Connected People iSociety 2003. For businesses, broadband enabled ICT provides opportunities for radical cost reduction, streamlined processes and re-configured organisations. Broadband also reduces the importance of geography, creating export opportunities for businesses regardless of location. To a certain extent it is only the degree of business creativity that will limit the benefits to be derived.

[ii] Achieving a knowledge economy is a key theme in the EU's Lisbon Strategy to make the EU the world's most dynamic and competitive economy. However, four years on, there is an undiminished need for reform according to the European Commission. It is already clear that EU will miss its mid-term Lisbon targets in 2005. In its recent Spring Report the Commission called for much more action by the Member States. The Commission's first priority for 2004 is more investment in networks and knowledge.

[iii] Several countries around the world have taken the decision to make large-scale public sector investments in the development of their national broadband infrastructures, for example through the provision of soft loans or direct subsidies. These investments were made on a 'leap of faith' rather than on the basis of hard economic evidence, largely because the evidence base simply didn't exist at the time. They were justified on the intuitive case that such a step change in the communications infrastructure would inevitably lead to increased innovation and improved productivity and would deliver significant economic and public value.

[iv] See international case studies prepared for the ITU's Broadband Workshop in April 2003 and the subsequent report entitled the Birth of Broadband.
http://www.itu.int/osg/spu/ni/promotebroadband/

[v] Crandall, Jackson and Singer (2003) estimated that the total annual consumer benefit from broadband in the United States would be between US $ 64 and 97 billion per year if 50% of US households adopted broadband and could be more than US $ 300 billion if broadband were to achieve universal diffusion in the United States. The authors also found that ubiquitous adoption of broadband would increase total US GDP by US $ 180 billion and create 61,000

new jobs per year. See Competition in Broadband provision and its implications for regulatory policy', DotEcon and Criterion Economics, (page 10)

[vi] In November 2003, CEBR (Centre for Economics and Business Research ltd) produced a report for the Broadband Industry Group entitled "The Economic Impact of a Competitive Market for Broadband". Its key findings on the economic benefits of broadband, were that due to the growth in the number of broadband connections, by 2015: annual UK GDP could be up to £21.9bn higher than it would otherwise have been; annual UK fixed investment is likely to be around £8bn per annum higher than would otherwise have been the case; annual government borrowing is likely to be around £13bn per annum lower.

[vii] The industry expects that exploitation of broadband connectivity will accelerate the 'off shoring' of many more service sector jobs from the UK A 2003 report from the Institute of Business and Economic Research, Berkley CA, estimated that 11% of all occupations (14 million jobs) were at risk to outsourcing in the US.

[viii] The City of Liverpool recently won Beacon Council Status for Social Inclusion through ICT. This is the second year that the City Council has won this Beacon Council Status "the highest recognition for quality in public services." The City of Liverpool is at the leading edge of new and innovative projects that enable customers to contact local government easily and receive professional advice and assistance. Liverpool has a vision of becoming as well known for electronic service delivery as it was for its seaport in the early 20th century (their seaport to e-port strategy).

[ix] The term 'excess' capacity is used in this instance to describe a situation whereby bandwidth supply stays ahead of the demand curve with the intent to provide sufficient capacity that will allow individual users to access new, higher bandwidth services.

ANNEX 1

In Chapter 5 of the BSG Report, five challenges for 'Broadband Beyond 2005' were identified as follows:

Creating, Delivering and Exploiting Value – i.e. the need to build the broadband proposition to ensure that the whole broadband value chain is able to work effectively to deliver a wide range of high value and highly valued services rather than just low cost commodity access.

Building a Thriving and Competitive Content Services and Applications Sector in the UK – i.e. the need to optimise the potential for UK companies and talent to exploit the growing global market for broadband enabled media, content applications and services … and to leverage unique national assets (such as the BBC) in a pro-competitive way to enhance the broadband value proposition … and grow the UK broadband market for the long-term benefit of all stakeholders.

Encouraging Investment in 'Next Generation' Broadband Infrastructures and Services – to meet the ever increasing demand for bandwidth … and to deliver the next generation of broadband services as widely as possible across the UK will require significant new investment in a range of different technologies ahead of the demand curve. Government must focus on how it is going to encourage investment in the next generation of technologies that will be essential for maintaining momentum on the broadband journey.

Developing New Broadband Environments – i.e. the need to consider the integration of fixed broadband, wireless LAN (WLAN) and mobile devices and services … for the creation of 'pervasive broadband environments' where users will be able to chose the type of connectivity that is most appropriate to where they are and what they want to do … and to develop interoperability between platforms, services and devices to meet the ultimate vision of a broadband world with the potential to permit the users to access any service over any device.

Bridging Digital Divides – i.e. the need to break down barriers to the availability and use of broadband services … to get as close as possible to the universal availability of the first generation of broadband services by the end of 2005, but also to make sure that no-one is left behind on the broadband journey.

In Chapter 4 ("Regulatory Issues"), the following recommendations were made:

New commercial models need to evolve for the broadband supply chain – i.e. in a world where consumers will wish to access their 'content and services pack' over a variety of platforms, the new supply chains will require the development of new revenue streams and new payments systems … and the market will need to evolve new commercial models … with support from the regulator, where it encourages efficiency and competition.

New interconnection and interoperability issues will arise in the broadband supply chain – as the new broadband supply chain will increasingly require a consumer's 'content and services pack' to be delivered by a variety of means … which will require content, software, consumer equipment, wireline and wireless networks to interact in various ways … there is a need to better understand the range of technology and competition issues raised by 'interconnection, interoperability and interactivity' within the supply chain.

Ofcom should examine its regulatory philosophy before intervening in the broadband market area in the light of the fact that (i) investors at different levels in the value chain have different time horizons; (ii) that competitive pressures at each stage are also markedly different and (iii) that new competition and substitution effects are likely to emerge with the development of new broadband enabled services.

In the light of the above, the **BSG recommended that Government and Ofcom should work with industry stakeholders to set an appropriate regulatory and policy framework to stimulate future investment in next generation broadband infrastructure and services.** The Ofcom consultation is a key part of this process.