FOUNDATION
FOR
INFORMATION SOCIETY
POLICY

Digital Communications Infrastructure Strategy
Response to Consultation August 2014

Executive Summary

The consultation document, issued on the 6th August 2014, outlines the steps and broad areas that the Government is considering before it finalises its digital communications infrastructure strategy, which we understand is targeted for the end of 2014. The areas covered include the role of government, future infrastructure requirements and demand, competition and regulation, and investment.

FISP is pleased to have the opportunity to input into this very important strand of work and this response broadly follows the structure of the document and builds on the first paper produced by the Foundation (FISP) in February 2013[1] and on our comments on the Terms of Reference in March 2014[2].

The essence of our response relates to two fundamental issues:

1. The state of infrastructure investment in UK, which, we believe, is not currently sufficient to meet future demand.

2. The role of the Government, which should be a fully informed, decision making body providing a level of market confidence that is required for these investments to occur.

The consultation document states the Government's ambition as:

> *"The UK should have a communications infrastructure that is comparable with other leading nations, that meets the needs of users, including those who may see the UK as a place in which to do business or invest".*

Whilst we can learn from other countries, whether or not the UK is *"comparable with other leading nations"* is, in our view, secondary to ensuring that the needs of UK users are universally met. If Government takes the opportunity to be visionary in pursuing the latter, the former will follow naturally and the UK would, in consequence, become a world leader.

Therefore, we believe that it would be more appropriate to state the ambition as:

> ***"The UK should have a communications infrastructure that is resilient, secure and has universally available capacity that will allow every citizen or business, wherever located, to fully engage***

[1] The need for a clear communications infrastructure policy (FISP No.1)
[2] Digital Communications Infrastructure Strategy – Comments on Terms of Reference
[2] Digital Communications Infrastructure Strategy – Comments on Terms of Reference

with the local, national and global economy and to have full confidence in future unconstrained economic development".

Strategy and Demand

We agree that the UK needs a strategy for the next 15-20 years. Within this time, we are likely to see new market models and some unexpected outcomes but this should not inhibit Government from providing vision and direction so that the industry may start to prepare *now*.

Critical to success is the transparency of the decision making process and a clear understanding of the costs of achieving the above ambition. In this respect, we feel that that the main thing missing from the consultation document was robust financial data.

We believe that the goal of a strategy conceived in 2015 should, as a first step, look at least 10 years ahead with rolling five-year targets beyond that time. For example, a universally available service of at least 100Mbs by 2025, preferably via both fixed and wireless networks, is not an unreasonable target if we are to respond to the need for every individual to be assured of high quality service, for both business and social use, wherever located. However, any target must be capable of constant review and adjustment throughout the next decade.

With respect to demand, the Government should recognise that forecasts of demand that seek to depress expectation to levels commensurate with the current pace of investment should be seen for what they are. The focus should be much more ambitious.

Regulation and Investment

The regulatory framework, while trying to address the issues of the future, has tended to use the tools of the past, which, in turn, have tended to favour the incumbent. Furthermore, whilst attempting to support the creation of new business models, the framework has not really led to the market meeting either business, consumer or policy makers' expectations.

It is widely recognised that there is a lack of serious incentives to unlock the flow of investment into infrastructure and, it is noticeable that, despite substantial levels of inward, foreign investments in other areas, investments in the telecommunications sector are comparatively insignificant.

The major changes that are happening in the sector will require new business models to be developed by the private sector. Although infrastructure is not visible or fashionable, the strategy should be developed on the basis that infrastructure is 'king' (without which content and services cannot be delivered) and can, and should, be highly profitable.

As the Government rightly acknowledges, the scale of required investment is large and this is likely to require new investors in the market. We proposed, in our response to Terms of Reference in March 2014, some possible structures that the Government might usefully consider, notably the establishment of the investment holding company and we reiterate these points later in this response.

The time has come to recognise the strategic importance of investing in our critical communications infrastructures.

Introduction – The Role of Government

The Government maintains that competition has served the customer well and that competition itself can, along with innovation, stimulate investment.

From this, we sense that the Government would prefer to leave it to the market to deliver infrastructure(s) that are resilient, secure and provide fit-for-purpose service levels that are universally available but would like to influence the pace of, and areas that will benefit from, investment – rather than commit the state to major investments.

In the consultation document, Government suggests that its role could involve one or more of the following:

1. To set the challenge and desired outcome, and seek to achieve a level of consensus about that outcome.
2. To act as a facilitator between players where this is appropriate to address the challenges faced.
3. To consider intervention in the event of certain forms of market failure, particularly in the event of failure to invest, and thus achieve its policy objectives.
4. To align its own policies where the consequences of these are to make demands on future communications infrastructure or impact how these are managed or run.
5. To ensure that any interventions are necessary, well targeted, evidence based and proportionate.

Q1 What should be the role of Government?

While we agree with the list of possible roles and actions that the Government might want to take, we believe the Government's role is significantly more important, and should be more practical and measurable in practice.

The roles should align with Government strategy to:

a. *Ensure that the UK takes advantage of the growth potential of the communication sector, including boosting innovation and creativity, maintaining global competitiveness, and ensuring we realise the benefits of having world-class infrastructure.*
b. *Facilitate and encourage private sector investment.*
c. *Provide an appropriate regulatory framework.*
d. *Coordinate policies, programmes and investment.*

In all instances, investment in infrastructure is the key to unlocking the Government's ability to implement its plans. Communications networks typically require long-term commitment and entail substantial risk. Government should ensure that its own decision-making process is as transparent, informed and comprehensible as possible to raise consumer awareness and provide support and confidence for new players to invest. In general, the most successful and practical vehicles might be those that commit Government to a stake in a venture and/or setting up a channel of funding that supports private expertise.

In respect of point d, one particular action that would be beneficial would be for Government to have a central point of responsibility for digital

communications infrastructure and all of the issues surrounding its funding and provision.

If the current rapid development of innovative new services is to be accommodated and the Government is serious about 'digital by default' targets, we do not believe that perpetuation of the status quo is an adequate approach.

Finally, Government needs to ensure that its policy makers are able to work effectively in a partnership with industry to evolve a common strategy that ensures that the UK's communications infrastructures are continuously being upgraded ahead of rising demand, and broadly in the direction of the ideal capacity and technical targets.

Section 1 – Existing and planned communications infrastructure and the current infrastructure market

The consultation document acknowledges that *"digital communications are a feature of everyday life"* and that *"increasingly people expect the right information to be available all the time, to have access to communications services when they want them and where they want them".*

It then goes on to refer to the range of public and private services that are increasingly digital *"including remote health diagnosis and monitoring, massive open online courses and the cloud storage of records"* and that *"millions of autonomous sensors, machines, gadgets and devices are being connected to a cloud based infrastructure to form the Internet of Things".*

We fully support the view that these need ubiquitous, secure and resilient infrastructure in terms of networks and data storage.

However, we see daily evidence that existing communications infrastructures are failing to meet the above needs of service providers and users alike. This is why we believe that we must develop a strategy to move the capabilities of our infrastructure ahead of the demand curve rather than trailing in catch-up mode.

Q3 If migration to IPV6 is required, are there any barriers to that migration and if so how might these be addressed?

The most formidable, and thus far insurmountable, barrier could be a lack of conviction that there is a real issue. The Y2K scenario is widely held up, perhaps wrongly, as an exemplar. Why should businesses suffer significant expenditure and the operational risk of re-drawing routing tables when there is no discernible benefit in the foreseeable future?

Section 2 - What might future demand look like?

The consultation document points to recent studies looking at potential demand levels and these suggest that the average household requirements will range from a (median) 19Mbps to a high-end 35Mbps (looking out to 2023) or between 15Mbps and 52Mbps (looking ahead to 2018). **A key point here is that 'median households' could exist in the more remote areas as much as in higher density areas – so the median should really be interpreted as the absolute minimum requirement.**

But even these projections might prove to be unambitious in 10 years time. Whilst the 'build it and they will come' philosophy has its detractors, it cannot be denied that history has shown that if capacity exists, services and applications will be developed to use it. We should not overlook that, in 2000, many had dial-up Internet access only or were starting to benefit from the 'always-on' service of 512Kbs that was just being launched. We are now seeing broadband services of 100Mbs+ becoming widely available and taken up.

Experience in other countries shows that, given the choice, users prefer to buy a 'future-proofed' capability, even if they do not need the capacity immediately, reassured by the scope for easier upgrading without any change in technology.

Today, new application and service development is moving rapidly but these services could still be inhibited because service levels are not sufficiently widely available – which limits the market size, and commercial viability, for service providers. Lack of capacity, leading to poor performance and slow response times, often results in users giving up on services.

Government believes that, through *"a combination of competition, private and public investment, and regulatory intervention, the UK can expect to have widespread availability of superfast fixed broadband, in excess of 24Mbps, to the vast majority of the country, with a minimum service of 2Mbps to the remainder provided by a combination of fixed networks, fixed wireless and satellite".* **We do not believe that UK users should accept "a minimum service of 2Mbs", however small that percentage of users might be.**

Lack of symmetry inherent in current superfast architectures should also be tackled – but **adherence to a policy of providing connectivity to "the majority of users" masks the reality of significantly large communities being denied access to Government and other services.**

A similar comment could apply to the Government's view that, when mobile 4G indoor coverage (to at least 98% of the population) is included, (which should equate to 99% population coverage outdoors), this will be sufficient to meet demand for "the majority" of users. This may be true for the next 5 years but we question for how long this will be the case.

The strategy should recognise that a key determinant of future demand will be how the behaviour and expectations of the user base will change over the next decade. For example, it is the 8-16 year olds of today that are likely to have a significant impact on demand in 2025 with today's pre-school children significantly influencing requirements in 2030.

Widespread adoption is usually dependent upon a service's relevance, its ease of access and of use, combined with immediate availability and fast response times. It is likely that the user base will become even more impatient over the next decade as the Internet changes from a transaction network to a data-driven decision network.

Q4 Is an on-going disparity of provision of broadband services inevitable? If so, should this be addressed and how might this be done most effectively?

It should be far from inevitable, given sufficient determination at policy and execution levels.

Key areas to address should be:

- *To acknowledge that universal infrastructure competition, particularly in fixed access, has not been achieved and that a quasi-monopoly has emerged for significant areas of the UK. This requires either a different regulatory construct or a different interpretation and focus on provisions within the current Communications Act 2003, to restore effective competition in the fibre era.*

- *To consider powerful incentives to encourage private investment.*

The objective should be a clear, unambiguous policy that sets targets and responsibilities.

Q5 How symmetrical will digital communications networks have to be in the future? Will this differ across user types? What implications does this have for fixed and wireless broadband provision?

Future networks should aim to provide 100% symmetry when required to do so. Consideration of different user types is irrelevant, given the mobility of users.

Q6 Which countries should be our benchmarks on communications infrastructure to ensure that businesses remain in the UK and continue to invest?

Whilst we can learn from other countries, we do not consider that comparison with other countries is a priority.

Q7 What metrics do you think should or will become relevant in comparing network performance in different countries?

It would be more useful to ask: "what metrics should most appropriately be used as the basis to set objectives for Government policy?" Latency, packet loss, upload speeds and symmetry are more useful indicators of quality than headline download speeds.

Section 3 - Scenarios of future demand

Whilst the consultation document presents three possible scenarios that will each have their supporters, we need to acknowledge that the market has seen significant change over the past 10-15 years. As mentioned above, in 2000, we were only just moving from dial-up Internet access to an 'always-on' service but at comparatively low download speeds – and at the time of the Broadband Stakeholder Group's Second Annual Report in November 2002, 1Mbs services were only just being introduced.

We now see the availability of, and significant demand for, multi-Megabit (even Gigabit) services over both fixed and wireless networks. The next 10-15 years could see even greater change and the UK needs to be ready for it.

Therefore, we are convinced that Scenario 3 is the only one with a realistic prospect of meeting national aspirations.

FISP agrees with Government's objective that the strategy should define a clear target of where the UK wants to be by 2025/30. Digital communications are an essential part of everyday life for business, citizens and communities, with the

adequacy of the UK's infrastructures an increasingly critical imperative for economic and social activity. Not to act now to ensure that the UK has a future-proofed communications infrastructure in the relatively near term would be damaging for the UK economy in the medium to longer term.

We acknowledge that whatever needs to be done to achieve that goal by 2025-2030 will have to take account of what is currently available, or will be available in two to three years once the current known investments are complete. In this respect, there have been a number of well-intended interventions by Government and investments from new entrants in recent years, and these have still to run their full course. But we consider that they are unlikely to provide an acceptable and universal service level that users require across all infrastructures.

Therefore 2017/18 should be seen as the start of the next phase of major infrastructure upgrades. In other words, now is the time to be bold and to seize the opportunity to avoid the trap of a 'steady as she goes' approach and 'behind the curve' regulation that could become a brake on progress for the next decade or more.

We recognise that the least disruptive option would be to leave it to a competitive market to deliver what it can, when it can (and Government and users would have to be willing to accept the consequences of such an option). Whilst this may deliver reasonable service levels to the majority, it is unlikely to deliver the best outcome of a universally available 'fit-for-purpose' service for business and social use, wherever the user is located.

Another option would be for the Government to develop policies that look to direct the market - maybe involving some structural changes and a culture shift - and to incentivise more rapid investment, potentially through a revision of regulatory provisions and other measures.

In this respect, concern about the level of investment is one that is common across most of Europe and has been seen as the main barrier for more than a decade. However, considerable progress has been made in cost reductions of electronics, operational costs and civil works over that period and there is now a better understanding of the value of such investment, Therefore, it would be timely for Government to review the drivers of universal deep fibre (FTTP) viability.

Scenario 1

Q8 Do you agree with this scenario or elements within it?

> *We do not agree that demand will be modest and we have to accept that the key users that we have to provide for are not just today's 16-24 year olds but also those that will enter this age group over the coming decade and a half.*

Q9 What are your views on the technology commentary underpinning this scenario? To what extent might the infrastructure/technology discussed evolve irrespective of demand and how far will it be a direct consequence of the level of demand?

> *Underlying bearer technologies (fixed and wireless) are the bedrock on which incremental developments take place. It is important to distinguish between those developments that are long-term game-changers (such as 5G) and those that merely extend existing capabilities by relatively small*

amounts (such as G.fast) in order to exploit existing assets.

The former is seen as an exciting investment opportunity, based on forecasts of massive traffic growth: the latter is manifestly less so and is characterised by conservative estimates of future traffic.

We believe that the true situation lies somewhere between these extremes – demand estimates for wireless are overblown while estimates for fixed connectivity are underplayed, largely for pace-of-investment/competitive reasons.

Scenario 2

Q13 Do you agree with this scenario or elements within it? Where do you agree/disagree? If you disagree, what alternative scenario do you envisage?

Whilst some assumptions within this scenario will probably apply, we do expect to see significant change in user adoption of services and new technologies by 2025.

Q14 What are your views on the technology commentary underpinning this scenario? To what extent might the infrastructure/technology discussed evolve irrespective of demand and how far will it be a direct consequence of the level of demand?

Continued investment in copper is a dead-end in terms of meeting future demand. There will continue to be incremental developments in bit rates, bandwidth occupancy, noise reduction and compression techniques but accrued benefits will taper off as natural limits are reached while demand continues to rise. Eventually, probably well within the period of any new strategy, demand for symmetrical, very high bandwidth, fit-for-purpose connectivity is likely to require a deep fibre (FTTP) architecture, supported by a 5G overlay.

Scenario 3

Q18 Do you agree with this scenario or elements within it?

If the core objective were to be defined, as suggested above, as "to provide infrastructures that will support current, anticipated and new services as yet unforeseen", this scenario would be the most appropriate but clearly implies a requirement for even greater levels of speculative investment and risk than in many other industries.

As a commercial reaction, we should look to move away from the view that all such services are necessarily price sensitive. Other areas of technology innovation have benefitted from the willingness of the 'earlier adopters' to pay premium prices – such as Pay TV, smartphones, etc. If the service has real value and is seen as essential, users will pay the price. There is also the option to move towards differentiated pricing as with other utilities.

It can be argued that premium pricing for 'earlier adopters' will ready the market pricing for the 'followers'.

(As a footnote, we must add that all three 'scenarios' hint at a lack of

imagination and ambition. All past predictions about acceptable data rates in the future have proved puny in comparison to what was actually achieved. BT's earlier reluctance to invest ahead of demand has been proven unduly cautious by the success of its superfast roll-out programme which, we understand, is running ahead of schedule and anticipated uptake).

Q19 What are your views on the technology commentary underpinning this scenario? To what extent might the infrastructure/technology discussed evolve irrespective of demand and how far will it be a direct consequence of the level of demand?

This scenario suggests that the objective should be to get to a universal deep fibre outcome by 2025 with a universally available wireless solution for one infrastructure to provide back up to the other.

The current mobile wireless operation increasingly needs high capacity backhaul from local base stations – so, one vision is that fibre should be extended deep into all local communities with wireless providing an optional connection to the user. In such a model, the provision of adequate backhaul for the mobile networks is provided and users will have the freedom to access services in either fixed or mobile mode.

Q23 Are there factors, for example technical or unrelated to the regulatory framework, that could create bottlenecks and delay future infrastructure deployment in the UK in this timeframe, that would result in demand not being met or the UK not being seen as a leading digital nation?

FISP sees the postulated alternatives as curious: "that would result in demand not being met or the UK not being seen as a leading digital nation". If the focus of a strategy is to successfully satisfy demand with fit-for-purpose connectivity as demand increases, it matters not how UK is seen.

Likely bottlenecks include:

- *The continued dominance of the incumbent in the local loop, expressed in terms of undue influence over policy-making.*
- *Lack of innovative approaches to private investment vehicles, including incentives, such as those applied to the creative content sector.*
- *Taxation imbalances, such as those applied by the VoA.*
- *Restrictions on national policy imposed through EU regulatory initiatives. We would like to see the UK playing an even more dynamic role in influencing EU policy. It did so in the 1980s and 1990s, but such influence is less apparent today – although the difficulties in doing so are recognised.*

Q24 Do you expect commercial providers to deliver future infrastructure and meet demand on a purely commercial basis, or is some form of public intervention likely? If public intervention is likely how might that work with the commercial provision of infrastructure? What form might that intervention take?

A future strategy must provide sufficient incentives for private investment to the extent that public subsidies are unnecessary.

Such an approach might consider:

a. *Creating a Government infrastructure vehicle into which private investors in risky projects could 'put' the project and exit if it failed. They profit if it succeeds, but recover their money (but no more) from the Government if it fails. Alternatively, consider the digital equivalent of 'export credit guarantees' to underwrite the risk of some infrastructure investments. In short, we must devise financial instruments to make risky infrastructure investment more attractive in the UK.*

b. *The principle of inter-generational transfers. What we are asking is for today's consumers to fund a network that will really realise its potential for future generations. Similar issues are already addressed in energy, water and environmental policy. It is time to apply some of these ideas to the challenge of broadband subsidies.*

c. *Other areas that should be considered are (a) changes to the rating regime (which has been an on-going debate for at least the past decade), (b) a review of the restrictions imposed on access to BT's passive infrastructure and (c) the continued refusal by BT to supply dark fibre.*

Q26 Do you have views on which scenario (or combination of scenarios) is most likely and should influence the development of future strategy?

This question lies at the heart of the consultation. Any future strategy must be future-proof and that this dictates the choice of Scenario 3. In some other countries, future proofing is a significant part of the sales approach.

Section 4 Competition and regulation

The consultation document points to Ofcom's policy for the past ten years that has been to encourage competition at the deepest level in the network where it is efficient and sustainable to do so. This has seen provisions to allow local loop unbundling (LLU), sub-loop unbundling (VULA) and passive network access (PIA).

The key words here are *"where it is efficient and sustainable to do so".*

In our view, the initiatives have not led to the level of competition hoped for and it raises the issue of how much infrastructure based competition, particularly at the local access level, is sustainable. It is acknowledged that some degree of regulatory support to encourage and assist market entry is necessary, but long-term sustainability should rely on competition law and not require long-term regulatory protection.

The challenges of major infrastructure investment, particularly at the civil works level, suggest that we might have to accept that a fixed network duopoly at the access level is the best that can be achieved in the areas with reasonable population but not necessarily universally – unless, of course, local initiatives provide the second player in less dense areas.

This is why universal wireless coverage by one or more operator is essential – and why we have argued that national roaming should be considered alongside site/facility sharing.

Whilst we recognise that the Government maintains that competition has served the customer well and that competition itself can, along with innovation, stimulate investment, we would question whether the UK has the right form of competition and whether there may even be too much competition.

In particular, we suggest that there is an overdue need to revisit the applicability and validity of BT's undertakings (which gave birth to Openreach) in the context of fibre broadband access and whether the competition concerns that led to them (under the threat of Ofcom's referral of BT to what is now the CMA) are still relevant and, if so, whether they will be adequately addressed in future by the combination of those undertakings and Ofcom's reliance on its proposed price-margin regulation.

Because of the challenge of maintaining sustainable business models, that tend to be measured over shorter terms by private sector investors, we would anticipate either (a) more consolidation of fixed network operators, whether owners or wholesale customers, or more probably, (b) the convergence of fixed and mobile operators to provide the economies of scale that still seem to be required to sustain major infrastructure operation.

The likely requirement over the coming 10-15 years, as inferred under Scenario 3 above, is that we need 'fat pipes (fibre)' much deeper into local communities with either fixed and/or wireless tails. But who will provide the 'fat pipes' to all communities? BT is best placed to do so from its current passive infrastructure coverage but does it have the commercial arguments to deliver?

However, if Openreach were either more open to competitors or a structurally separated business, would it be a more attractive investment opportunity and/or likely to be able to justify such investments? It should be a valuable asset due to its coverage footprint and, with investors other than BT, it could lead to network upgrades being carried out more rapidly – which could be beneficial to all service providers, BT Retail included.

Q27 How might efficient investment in communications infrastructure be supported, for example by changes in the regulatory framework?

> *We believe that opening up access to BT's passive infrastructure, and removal of restrictions on the provision of dark fibre, are essential parts of any approach to unlocking private investment. The impact on competition would be on a par with that of LLU. The imminent introduction of the European Regulation (Civil Engineering and Broadband), together with the existing Growth and Infrastructure Act 2013, should be seen as long-overdue enablers and vigorously enforced.*

Q28 Are there any further measures necessary to incentivise the rollout of future mobile infrastructure in currently underserved areas?

> *It is important that Government takes independent advice on the introduction of national roaming and its impact on the industry. The threat of losing traffic (and maybe customers) to a competitor because of a failure to invest in not-spots would be a powerful wake-up call to improve coverage. We also note that, to date, Ofcom has presented much the same objections to national roaming as have the MNOs. We can only comment that prices are unlikely to rise when costs are reducing, that resilience is already absent when customers lose connection to their own operator's mast/cell and that coverage is unlikely to be worsened in the context of widespread evidence of many mobile not-spots.*

Q29 Is there a role for a revised USO or USC to ensure that minimum consumer demand requirements are met and to reduce the potential for a new digital divide? What might this look like?

If the need for a USO/USC is examined in the context of the status quo, then the answer must be "no" because of the risk of increasing the incumbent's dominance. However, a USO/USC in a scenario where Openreach were independent would be an essential weapon in the regulator's armoury. The existing copper-based USO is widely seen as a significant benefit to BT and not, as the company has claimed, a burden.

Q31 Are there changes to the EU Framework that the UK might seek to encourage more competition in UK markets?

A study review and re-appraisal of the status of infrastructure competition, including cost-benefit analysis, and the application of the regulations in each Member State, is needed.

Q32 Should Government seek changes to the European Framework which put more reliance on competition law and how might this be done?

Because of the increasing lack of competition at the wholesale level in UK, sector-specific regulation will be essential for as long as the current regulatory environment endures.

Q34 How can the regulatory framework keep up to date with new business models and changes in technology?

The regulatory framework will never keep pace with new business models and changes in technology. Indeed, anticipating such changes with regulation can impede innovation and chill investment. The regulator must continue to keep abreast of technological and commercial developments, and try to anticipate as much as possible where tensions will arise and whether in such cases (a) established ex-ante regulation will either be adequate or should be upgraded or (b) it should wait until a problem emerges and then use its ex-post competition powers.

Q35 Are there any changes to legislation other than the Communications Act that would incentivise the provision of communications infrastructure?

The longer-term future of broadcast TV 'over the air' should be considered. It is possible that distribution over a high capacity fixed network could become a better option in time and help justify the costs of upgrading local fixed access networks. However, this would require a long transition period such that any user would not be denied service.

Section 5 – Facilitating and Encouraging Investment

The consultation document points to the fact that investment in recent years has taken place in an environment where telecoms revenues have been on a downward trend and mentions that a number of 'commentators' have claimed that investment is not keeping pace with demand. FISP is one of these 'commentators'.

This view is underpinned by reference to observations in two World Economic

Forum reports[3] that *"Europe's digital health requires many things but without infrastructure investment, it is difficult to see rapid digital growth taking off"* and *"low investment in telecommunications puts at risk not only future consumer benefits but also the European region's overall competitiveness".*

We acknowledge that there have been several well-intended interventions by Government in recent years. There have also been willing market entrants investing in new infrastructure, such as KC, Hyperoptic, B4RN, Gigaclear and CityFibre but, with a few exceptions, these tend to be small investments and are not having a significant market impact in terms of coverage. In addition, a number of local community projects have seen new localised networks being built.

In parallel, although the mobile operators are projecting c.98% indoor coverage with 4G by 2017/18, this only goes so far towards the universality objective.

Whilst we accept that these various initiatives have still to run their full course, they are unlikely to provide a fully universal service level on all infrastructures that users may require.

The future strategy must guard against stranded investment, whether private or public. Therefore, we would reiterate a point from our response to the Terms of Reference earlier this year; i.e., given access to backhaul (almost invariably, but not necessarily successfully, sourced from BT), local initiatives could accelerate local access network upgrades that are not priorities for the mainstream operators, such as BT, and, if such access networks were to be built in a way that is complementary to what they have to connect to (i.e., principally BT), could this be beneficial to the UK as a whole, whilst also benefitting BT?

Historically, significant investments have been made by new players entering the UK market and developing new products and services. For example, following the duopoly review in 1990/91, some £12-13bn was invested, primarily by US Telco's and cable companies, to create what is now the Virgin Media network.

Similarly, existing and new mobile operators invested some £23bn a decade ago for 3G licences and more in building out their infrastructures.

Figure 1 in the Section 5 of the paper shows the major investment growth during the years 1995 to 2000, followed by flat spending since, and yet the growth in internet connections and the growth in data traffic has been massive. Clearly, this has been the result of earlier investments made and proper spare capacity planning. Equally, it may well be that the networks are now close to or even short of capacity, such that greater investment is now urgently required. Without facts and proper transparency in the actual investment spend of major players, the Government and other stakeholders can only speculate. Regrettably, Section 5 of the paper only gives total investment numbers, with gaps for some years and total lack of financial analysis by market, operator or by an investment type.

The flat level of capital investment is surely a great concern for the UK. It is never possible to predict the future but it is well recognised that network infrastructure providers have to plan and build for many years ahead and, whilst this has happened in the past, it does not seem to be happening to the same degree now.

[3] Delivering Digital Infrastructure – Advancing the Internet Economy April 2014 and The Global Information Technology Report 3013

While recognising the difficulty in predictions, the consultation rightly requires us to try to look ahead as far as 2030. In this respect, consideration of earlier investment activity, particularly during the 1990s, could offer some guidance.

Following the 1990/91 duopoly review, the 1990s was a key period for communications infrastructure investment in the UK. In addition to the cable companies, a number of network infrastructure players entered the market, such as Cable and Wireless, Energis, COLT and MFS, all of which invested heavily in backbone and local networks throughout much of the UK. The UK was a world leader in the sector at that time.

Today, there are fewer players but the original network investments of the 1990s are very much in operational use today, providing services and generating good financial returns for operators. Consolidation in the market has clearly shown that such earlier assets have been worth acquiring by new owners/players.

We have some public data on investments; for example, in 1994, BT's investment on its Balance Sheet for 'property, plant and equipment tangible assets' stood at £15.45bn (net book value). Today, the BT Balance Sheet shows £13.84bn (net book value) for fixed tangible assets. However, there is a general lack of historical financial data from operators that, if available, could give some illustration of investment expenditures to help inform the strategy going forward.

In mobile, BT Cellnet (now 02) could be held up as an example of growth. For example, it had just 1m customers in 1994 and was launching GSM. Today, it has a total customer base close to 24m and is launching 4G. Other mobile operators have seen similar growth. Substantial investments in the mobile sector have been made to meet massive customer and traffic growth in mobile over a long period.

The consultation document provides a good summary of the challenges, particularly for the private sector (paragraphs 5.6-5.14) and for the policy makers and regulator (paragraphs 5.15-5.22). We agree with all of the points made. However, these are much the same points that have been made in previous policy iterations (and in a number of reports in recent years).

Therefore, the strategy has to find a way to address the challenge that has been constant over the past two decades – which is that the returns on investment in large-scale infrastructure tend to be medium to long term (e.g., 10-15 years) and, a significant part of the capital cost is passive infrastructure.

Against this background, investors need reasonable confidence that the climate for such investment in the UK will be sufficiently attractive and better than exists today. There are clearly risks that investors will need to take that are business related. However, the Government, through transparency of its actions and clarity in the decision making process, could minimise market risks and, in this way, meet its objective of encouraging investment.

In reality, whilst BT, for example, is investing, it still has some way to go to bring its access networks up to the required level – and it is noticeable that no new really big player seems to have the confidence to enter the market – notwithstanding Liberty Global's moves towards greater consolidation across Europe and Vodafone's push into more fixed access network ownership.

In summary, and we reiterate what we said in our response to Terms of Reference in March 2014, with respect to infrastructure investment, the Government could consider:

- Setting up an investment holding company that would oversee specific technology programme/projects. Critical to the success of this type of venture would be the speed of the commercial decision making process, and intelligent assessment of current infrastructure capabilities and profitability. Additionally, the size of this type of venture should ensure that economies of scale are maintained, resulting in quicker investment recovery, lower customer acquisition cost and lower cost of capital. Government, financial institutions, pension funds and telecom equipment providers could jointly own the venture.
- Acting as an intermediary between the providers of finance and the new ventures through a fully autonomous holding company free from political interference and bureaucracy.
- Influence regulatory policy so that it includes a clear market strategy that favours investment and provides the transparency required to raise the level of confidence among all market players.

With respect to investment in technology led solutions, the Government could:

- Contribute towards the cost of technology programmes for school leavers with a set of predetermined standards of achievements and simple access to funding institutions.
- Introduce subsidies and tax breaks specifically for start-up companies within the technology sector.
- Ensure greater involvement of businesses, including small and medium enterprises, within the decision making process.
- Ensure all infrastructure projects have easy access to academic facilities so as to ensure ideas are captured at an early stage, and there are clear and well publicised ways for project/ideas development.

Q37 How might copper access networks evolve over time alongside other access technologies? Is there a role for policymakers in helping manage any transition from copper to other access networks?

> *FISP believes that any policy based on the retention of copper access is short sighted and would act as a brake on a wider and more extensive deployment of fibre. A copper recovery programme is an essential part of future strategy.*

Note:

The Foundation for Information Society Policy (FISP) is entirely independent of political parties, communications & network providers and any significant commercial interests in technologies, products and services.

FISP was established in 2012 specifically to provide inputs for policy and regulatory development that will support maturity in the digital economy.

The Directors of FISP are Malcolm Taylor, David Harrington, David Brunnen, Michael Rowbory, Bob Franklin and Anna Coast and papers are produced with the support of independent, experienced advisors.

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