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The non-monolithic Internet

Introduction

In recent years, policy debates have exhibited a tendency to talk about the Internet as if it were a single, unified phenomenon to which everyone must have nondiscriminatory access. I would like to examine this proposition critically and explore the policy implications that might follow if it turned out not to be true. Exploring the ways that the Internet has already deviated from this “single Internet” vision in the past and is likely to continue to do so in the future may provide insight into how best to shape Internet policy.

IP-based networks that bypass the public backbone

Despite the fact that discussions often somewhat casually treat the Internet as a single entity, the Internet is widely recognized by those familiar with its operation to be a “network of networks”, composed of many smaller networks interconnected together. All of those networks exchange information through a uniform standard known as the Internet Protocol (IP), which represents the glue that binds the components into a larger coherent whole. In addition, Internet traffic has traditionally traversed backbone providers that exchanged information at public exchange points. When this was the case, networks exchanged traffic in a largely uniform manner.1

Over time, an increasing amount of traffic has begun to deviate from the traditional pattern. Most importantly for our purposes, some firms rely on the Internet Protocol, but transmit their data over proprietary networks. For example, during the Internet’s early days, the acceptable use policy imposed on the NSFNET (the National Science Foundation Network) prohibited uses unrelated to research and education. This prompted the creation of private backbones such as PSI, UUNET, and CerfNET, which operated in parallel with the NSFNET backbone without interconnecting with it.

In later years, firms began providing IP-based voice services without traversing the public Internet in order to ensure improved security or greater guaranteed quality of service, which caused these services to be called “IP telephony” or “voice over Internet protocol” (VoIP) instead of Internet telephony. This prompted the creation of private backbones such as PSI, UUNET, and CerfNET, which operated in parallel with the NSFNET backbone without interconnecting with it.

Hybrid networks

A large amount of additional IP-based traffic employs hybrid systems that rely on proprietary or non-IP based technologies to form part of the connection. For example, third-generation wireless networks employed hybrid systems that used legacy, non-IP based technologies to connect from the Internet gateway to the end-user device.2

Still other networks are moving away from exchanging data on the basis of IP in favour of technologies that support greater functionality. One of the most popular of these is Multi-Protocol Label Switching (MPLS). Instead of routing based on IP addresses, MPLS adds a label to the front of each packet and routes on the basis of that label. In addition, each flow (known as a forwarding equivalence class) is assigned a specific path through the network. Information about the label and the associated route are propagated to other MPLS-enabled routers.3 Because labels are shorter than IP addresses, routers can direct traffic more rapidly. The fact that the route for a particular flow is defined in advance gives end users greater control over security. In addition, MPLS can support load balancing simply by dividing traffic between the same two endpoints into two separate forwarding equivalence classes and assigning them different paths.
Most importantly, in determining the particular path that a flow will travel, the MPLS router can match the quality of service demanded with the resources available along possible paths. MPLS can also recover more quickly from route failure. While once used exclusively within a single network, MPLS is now being employed across multiple networks, although doing so requires elaborate coordination between the networks to exchange the necessary information about the labels.

In short, a significant amount of data traffic relies on proprietary or hybrid networks rather than the public Internet. A leading industry study estimates that more than 22% of all IP-based traffic did not rely exclusively on the public Internet in 2010, and it forecasts those numbers to remain more or less stable for a few years before tailing off to 16% by 2016.

The ability to reconfigure routers dynamically illustrates the problem with framing the decision as a choice between two diametrically opposed alternatives. Instead, the competing visions of a single, openly accessible network on the one hand and a completely Balkanized universe of non-interconnected private networks on the other represent polar extremes on a spectrum of possible policy responses. Only by understanding the countervailing considerations can one understand the forces that determine where along that spectrum social welfare would be optimized and what types of changes in the economic and technological environment might cause the optimal balance point to change.

Private networking as an exit option

The assumption that the Internet must remain open and universally interconnected also overlooks the fact that the imposition of government regulation rarely results in a stable equilibrium. Instead, the ultimate impact of such regulations can only be understood after the series of reactions and counter-reactions that the regulations are likely to engender are taken into account.

Consider the likely impact of mandating interconnection and nondiscrimination on a best-efforts basis. Providers who need quality of service guarantees would have strong incentives to bypass the public Internet - and the accompanying regulations - simply by shifting their resources to private networks. The problem is that shifting to dedicated networking resources eliminates one of the central efficiencies created by the Internet by preventing multiple users sharing resources. In particular, network operators who need quality of service assurances will generally find it most efficient to offer their bandwidth to others on a secondary basis, available only when the primary owner does not need it.

Those who advocate mandating open access in the name of preserving a unified Internet thus must consider the possibility that such a mandate might create incentives toward greater fragmentation.

In addition, restricting network owners’ ability to share surplus capacity threatens to increase the cost of broadband where it is available, while at the same time worsening the digital divide by reducing the geographic areas in which such services can break even.
Conclusion

Any assessment of claims that unity and openness are critical features to the Internet’s success must grapple with the extent to which the Internet has been disunified in the past and in the present. In fact, the Internet is not and never has been a monolith. It is a collection of standards with respect to which people have always had the option to opt in or opt out, either partially or completely. Indeed, many have and will continue to do so.

Moreover, the unqualified manner in which this “single Internet” claim is often advanced obscures the fact that important policy decisions typically involve a trade-off between competing considerations. Mandating open interconnection implicitly presumes that the exclusive source of value to end users is raw increases in network size. Framing the issue in this manner fails to consider that end users typically place a premium on being able to reach a small number of locations and run a discrete number of applications.  

The policy analysis must also take into account that end users are likely to maintain more than one connection and that any attempt to mandate open access is likely to provoke a series of reactions and counter-reactions that may frustrate the goals of the initial regulation.

On a broader level, policymakers would benefit from taking seriously the possibility that the days of a “one size fits all” approach to Internet regulation may well be over and that looking backwards for the lessons of the past may not always be the best way to promote future success. As anyone can attest who experienced how quickly AOL keywords shifted from the critical way to access customers to near-complete irrelevance, the technological and economic environment surrounding the Internet is constantly undergoing rapid, dynamic change. The policies developed for a world dominated by PCs using cable modem or DSL services in which the browser was the critical platform may no longer be the right framework for a world increasingly dominated by smart phones attached to wireless broadband networks in which the critical platform is now the app store and the wireless operating system. The growing heterogeneity of the technologies, end user demands, and business relationships underlying what is now often referred to as the Internet ecosystem may require reframing the issues in a fundamentally different manner.

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By Ewan Sutherland

Opening and linking data

Introduction

In the not so distant past reports, newsletters and statistics for media and telecommunications were published on paper - indeed the IIC once maintained a library of such documents. Access to databases was quite expensive, with a requirement to purchase a subscription. Then material moved online, though typically in PDF formats, sometimes locked to limit re-use. Gradually, this model seems to be changing as governments adopt an open data or open government data (OGD) approach. There is a parallel and complex debate in the academic world about moving journals from behind pay-walls to open access.

In the previous issue of Intermedia, Mike Nelson set out the importance of “big data”. Telcos and media corporations are obliged to think how data analytics can change their businesses, with a promise of superior performance if they can master the techniques. The importance of the analysis of data at the level of politics was illustrated by Nate Silver in his very accurate predictions of the US presidential elections, calling all fifty states correctly.

Much of the information behind the pay-walls maintained by specialist providers is derived from public sources. The justification for charges will increasingly depend on adding real value, rather than just “scraping” public websites and press releases.

Linked open data

Everyone is familiar with the world wide web (WWW) and its uniform resource identifiers (URIs), operating at the level of documents, pointing to an EU Regulation or a white paper by a Japanese ministry. One challenge is to disaggregate the documents into data and to use meta-data to connect them as linked open data (LOD). A second is to convert government datasets, typically available “raw” or “as is”, into structures and formats with semantic meaning suitable for machine processing.

Giving third parties access to government data is intended to generate economic growth by harnessing innovative talent available to the private and voluntary sectors. Such roles have often proved difficult for governments.

The Obama Administration has been very keen to open up government data, in order to keep citizens better informed about its activities. For example, the FCC now provides open data access to information about 3 million licenses, though not yet to its Electronic Comment Filing System (ECFS) system of comments filed on regulatory matters. The Securities and Exchange Commission (SEC) not only publishes data in open formats, it also accepts data from corporations which can file their accounts using a version of the eXtensible Mark-up Language (XML). Data from the Federal Election Commission is being used by third parties to track contributions to political parties and individual politicians, which can be linked to voting records, to understand influence within the US Congress.

Those familiar with the European Commission implementation reports on telecommunications markets, later the Digital Agenda Scoreboard, will know them as PDF files. For re-use the charts could be cut and pasted or the data retyped. Now, through an EC-funded research project known as LOD2, the underlying data are available in machine-readable form. Similarly, data from Eurostat is available allowing linkages to be created by third parties.

The United Nations has a portal to a considerable volume of data, including historical runs of statistics. Data can be extracted to build charts (see Figure 1 overleaf). Google provides tools to manipulate data, accessing them via APIs (e.g., Eurostat, US Census Bureau and the World Bank), allowing the creation of charts similar to Figure 1.

The EC is developing Europeana, a project that exposes data to allow search and discovery among more than 17 million items held by 1,500 cultural institutions. It incorporates the approaches of different groups (e.g., museums, and libraries) to ensure a rich metadata. The collection includes text, images and video, (e.g., many photos of television and studios, telephones and exchanges).
Broadband data

In the USA, information on the provision and quality of service of broadband Internet access is provided as the National Broadband Map (NBM), a multiagency effort, with input from the NTIA, FCC and state governments and utility commissions.\(^6\)

The previous efforts at 5-digit ZIP code or census tract level for data collection were seen as misleading and so were reduced to the census block, a much smaller geographic unit yielding more and better data.

Additionally, there is data on the Broadband Technologies Opportunities Program (BTOP) and Broadband Initiatives Program (BIP) applications.\(^7\) By comparison, other countries appear to have very much less data and what they have is seldom available. Unusually, New Zealand has a broadband map.

Conclusion

There are ambiguities in the term “open government data”, with open government suggesting releasing information previously held back, while open data is merely a technology that greatly eases access and enables third party innovations.

The concern for those making and seeking to influence policy-making and implementation is to make data more readily available and more easily processed.

To date, open data is much less common amongst regulators than ministries. Yet it offers interesting tools to reduce the cost of data collection from operators and to improve access to data that has been collected.

Potentially, vastly more data could be processed allowing for improvements in regulation by allowing operators and third parties access to data. Those overseeing regulators would also be better able to determine how well they perform their work.

Legal information should also be made available in open data forms, including legislation, regulations and court judgements.

For some players the opening of data represents the threat of disintermediation - displacement from the value chain. For the rest, it represents access that is easier, cheaper and more flexible, enhancing evidence-based policy formulation and implementation.

Figure 1 Mobile telephone subscriptions per 100 population in Caribbean islands\(^5\)

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Introduction - back to basics

Telephony in India has shown remarkable growth, with the number of subscribers increasing from 205 million in Q1 2007 to 865 million by the end of Q4 2012. In contrast there were just 15 million broadband subscribers, with broadband penetration at 1.2% compared with teledensity of 75%. This paper looks at why this might be so and what can be done about it.

A decade ago, broadband was unknown in India with Internet access being low speed dial up. The Broadband Policy of 2004 set ambitious targets, but was flawed and failed to deliver.

It was not until the end of 2011 that the focus shifted back to broadband, with the government declaring “broadband for all” as a national priority. In the National Telecom Policy 2012, the government set a target of 175 million broadband connections by 2017 and 600 million by 2020, with the provision of broadband access to all village panchayats or councils (250,000) by 2014 and to all villages and habitations (600,000) by 2017.

Presently, over 60% of broadband subscribers live in the top ten metros/tier-I cities and more than 75% of connections are in the top 30 cities. Just 5% of broadband connections are in rural areas, compared with about 35% of total telephone connections in such areas. According to the latest IMRB survey, there are 38 million users, 4.6% of the rural population, who have accessed the Internet at least once in their lives. Although 70% of India’s population lives in rural areas, most Internet users are urban.

In order to develop broadband, an ecosystem supported by the four pillars of access, backhaul, content and devices is required (see Figure 1).

Figure 1 - ABCD of the broadband ecosystem

The infrastructure - supply-side issues

The primary cause of low penetration of broadband, especially in rural areas, is the non-availability of backhaul connectivity and lack of access networks for the last-mile, due to the absence of a sustainable business model.

i) Lack of a nationwide backhaul network

In October 2011, the Government of India approved the creation of the National Optical Fibre Network (NOFN) to provide connectivity to all 250,000 village panchayats. The existing core Optical Fibre Cable (OFC) network, used by different service providers, covers state/district/block headquarters, but does not extend to most panchayats. The plan intends to connect all the gram panchayats through optical fibre, with extra fibre being laid by the existing Public Sector Unit (PSU): Bharat Sanchar Nigam Limited (BSNL), RailTel and Power Grid. The estimated cost of USD 4 billion, over 2 years, is to be met from the Universal Service Obligation Fund.
To manage and operate the NOFN and to ensure non-discriminatory access to all service providers, a Special Purpose Vehicle (SPV), Bharat Broadband Network Limited (BBNL), has been incorporated. Tripartite agreements have been signed by the government, BBNL and state governments/union territories for free use of rights of way (RoW).

The backbone network thus created will be available to service providers to provide broadband services in rural areas on an open access basis, at nominal lease charges, just to recover operation and maintenance costs, with the CapEx funded by USOF as a “sunk” cost.

ii) Non-availability of access infrastructure

Another important factor in the slow growth of broadband is the inadequate access infrastructure, both in rural and urban areas. While next generation access (FTTH and LTE) provides a solution for urban areas, innovative business models are required to ensure rural access.

iii) NGA challenges

While the high cost and shortage of spectrum is a challenge for LTE growth, the hurdle for FTTH has been the cumbersome and expensive access to rights of way, as well as regulatory ambiguity for active infrastructure sharing. As both NGA technologies have high CapEx, it is not possible for a single owner to exploit their full potential without infrastructure sharing. Also access infrastructures are considered to be natural monopolies and their duplication by service providers is not economically justified. Policy makers and regulators have to help by removing bottlenecks such as access to rights of way and ambiguities regarding active infrastructure sharing.

iv) Last-mile access as a managed service

There is a need for independent infrastructure providers who have the vision, expertise and CapEx, who are willing to create and share infrastructure in a neutral and open manner to enable high-speed connectivity to customers in a timely, efficient, reliable and cost effective manner. This trend seems to be developing in urban India with a ‘special breed’ of entrepreneur being created.

v) Exploiting existing last-mile infrastructure

Another way to increase urban broadband penetration is to utilise the existing 32 million copper loops. Currently, about 85% of total broadband connections are being provided using DSL, with cheap customer premises equipment and low overall cost, it should be affordable. The incumbent, BSNL, has an extensive network with 28,000 rural exchanges connected through optical fibre and owns around 22 million copper loops, of which only 9 million have been upgraded to DSL. The balance can provide DSL within a 3-4 km area around exchanges. However, penetration of copper loops is not widespread in rural areas (6 million) and in some cases the poor quality and long length of the loop does not support high-speed DSL.

vi) Utilizing cable TV networks - convergence

Cable TV networks in India have access to about 100 million households. Most cable networks are analogue and one way, the data suggesting that only 10% of existing networks are capable of providing broadband access. Moreover, only about 8% of this capacity (i.e., 0.8 million broadband connections) had been reported by December 2012. To provide broadband, these networks would need to be upgraded and digitised.

vii) Rural access infrastructure - wireless

Because of the higher cost of deployment and absence of return on investment (ROI), there seems to be no business case for the creation of traditional or next generation access infrastructure for rural areas. Fortunately innovative technologies, especially using wireless, are being developed. These provide a competitive access solution in areas with no communications infrastructure, or where the existing infrastructure cannot be easily and economically upgraded. In view of ease of deployment and faster rollout, wireless is expected to be a major contributor to the growth of broadband in rural areas.
Broadband in India

Figure 2  Multi-technology networks for broadband

viii) Wi-Fi - the licence-exempt spectrum

Wi-Fi technology, which uses unlicensed spectrum, can provide affordable broadband access in rural areas. This option is low-cost and has a wide ecosystem, is easy to install and can be used to provide adequate capacity for supporting broadband services with a mix of legacy and ethernet traffic. Figure 2 depicts such a multi-technology network.

Content and devices - demand side

i) Content and applications

IP-delivered content for education, health and government services makes it possible to overcome geographic and financial barriers that have made it difficult to reach poor and marginalized segments of the population.

In 2006, the Department of Electronics and Information Technology (DEITY) initiated a nationwide plan to deploy 105,000 Community Service Centres (CSCs) using a public private partnership (PPP) model in rural areas under the National e-Governance Plan (NeGP). The scheme envisaged CSCs as the front-end delivery for such services, managed by local village level entrepreneurs (VLEs).

The mass adoption of broadband requires relevant applications. Most web-based content is in English with the English literacy rate in India only around 7%. Consequently, there is a need for content and applications in vernacular languages and the development of suitable software.

ii) Awareness and skilling about broadband

Another reason for low uptake is the lack of awareness of the benefits of, and applications enabled by, broadband. There is a move to address this through awareness campaigns.
iii) Devices

The high cost of broadband access devices is a hindrance to the growth of broadband in rural areas, although prices are declining.

The government under the National Mission for Education through ICT is providing “Aakash” tablets to students at a cost of INR 2,250 (USD 40). It plans to extend the scheme to rural areas and to develop e-content for these tablets.

Need for a business case

As discussed above, one reason for the low availability of broadband in rural and remote areas is the absence of a viable and sustainable business model. Operators are not sure about the ROI or demand. A World Bank study showed the affordability level of a broadband connection is about 3% of per capita income, about INR 100 (USD 2) per month for rural India. Thus, an innovative business case is needed to demonstrate that broadband network infrastructure can be deployed and sustained through the joint efforts of stakeholders in a PPP model.

On the regulatory side, niche “class” licences/authorisations, without any entry barrier and revenue share obligations for local operators, are needed for small towns. Government needs to support local entrepreneurs and increase their sustainability by allowing “bill-and-keep” revenues from on-net communications and localized content. The local community should be required to contribute through initial seed funding and facilitation.

A possible business model would be franchising by the service providers, using local entrepreneurs to provide broadband services, for example, the VLEs who manage the common service centres and are already computer and Internet literate.

A business plan for rural broadband - Panchayat (Community) Public Private Partnership (4P) model

In the absence of the ROI for the expected CapEx, as well as the restricted potential for revenue due to the constraint of affordability, the success of the rural broadband business will depend upon the government’s policy and regulatory environment, with investment support and incentives provided by local bodies for creating the underlying infrastructure.

Also, the involvement of a local entrepreneur or community under a PPPP model with an opportunity to create a business case through government-funded infrastructure is key to the sustainability of broadband in rural areas.

Government and local financial support will be required to create the infrastructure for village level broadband service centres (VLBSCs) and to help get funding from financial institutions to meet business case requirements. The VLBSC will become the franchisee/agent of an ISP/licensed telecom operator and will install, operate and manage Wi-Fi access infrastructure, working as single point of contact for rural broadband services, billing, customer support, etc. VLBSCs will also use this infrastructure to generate extra revenue by providing content, value added and application services.

The ISP/telecom operator would provide interconnectivity to the VLBSC’s access network through the backhaul network. In the absence of an existing backbone, the operator may need to use satellite-based backhaul to the network. Since the operators will link to the rural franchisee at a marginal cost, they should be obliged to provide these services on an incremental cost basis and share the revenue with the franchisee.

Some of the innovative rural broadband network solutions are self-contained, maintenance-free, low OPEX, renewable energy based systems involving local entrepreneurs for maintenance and operation, including backhaul connectivity and service provisioning. These solutions need to be emulated throughout the country to help the spread of broadband.

It goes without saying that regulators must play a facilitating role and adopt a light-touch/hands-off approach to encourage innovation as well as cost reduction through the removal of any artificial levies. Also, the franchisee arrangement between the service providers and local entrepreneur/communities has to be permissible without any onerous conditions. As an immediate step, the regulator should create a category of “class licence” for local service providers with light regulatory conditions and obligations. One such example, from a World Bank report, is shown on the next page.
Broadband in India

Licensing local operators - class licensing

Niche licenses for local operators allow specific solutions targeted for small towns. By this, governments support local entrepreneurs and increase their sustainability by allowing revenues from on-net communications.

Vendors are developing solutions for such local-oriented models. Nokia Siemens Networks (NSN), for instance, is currently testing its “Village Connection” model in India. This model allows entrepreneurs to manage a GSM access point in their community. The access point can manage call completion within each village (supporting up to 80 subscribers) with a standard personal computer, reducing investment and the need for communication with regional access points (done in IP and only for long-distance calls). However, this model may not require the establishment of a local license regime if a franchise or reselling approach is adopted.

In the Dominican Republic, the Dominican Telecommunications Institute (Indotel), the regulatory agency, launched in 2007 a rural broadband tender aimed at installing broadband connections for 500 communities under an output-based aid (OBA) scheme. These points of presence have allowed local entrepreneurs that already were operating telearceters (known as “Informatics Training Centers”) to work as local ISPs within their communities, offering broadband Internet access to private users and VoIP.

The main characteristic of this approach is that it gives the opportunity for local entrepreneurs to serve their communities with tailor-made solutions in a self-sustainable manner, leveraging low-cost technical solutions and minimizing public funds requirements.

The way forward

i) What has been done
   1. Adoption of the NTP-2012 policy envisioning “Broadband for All” with ambitious targets of 175 million by 2017 and 600 million by 2020 with broadband speed reaching 100Mbps.
   2. USO funding of NOFN for 4 billion USD and creation of BBNL.
   3. Tripartite Agreement with state governments for free rights of way.
   4. Pilot projects for NOFN in 3 states.

ii) Work-in-progress
   1. Execution of NOFN through government PSUs: BBNL, BSNL, Railtel and Powergrid.
   2. Tendering for passive and active equipment.

iii) What is required
   1. Involvement of industry in NOFN through PPPs and timely execution.
   2. Planning for and funding of access networks in rural areas.
   3. Creation of niche “class licence” for broadband services.
   4. Making more Wi-Fi spectrum licence-exempt.
   5. Extension of VLE concept to VLBSC through community participation/support.

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References:
By Catherine Middleton

Competing visions of next generation broadband: insights from Australia’s NBN

The Australian National Broadband Network (NBN), under construction since 2009, is described as “the most ambitious public [next generation broadband] intervention in the OECD”. With a federal election scheduled for September 2013, and the opposition determined to change the nature of the NBN, an examination of the competing approaches in Australia is timely, and provides some general insights on the development of next generation broadband infrastructure.

Labor Government’s current plan

Plans to build Australia’s National Broadband Network were announced by the federal Labor government in April 2009. Its objectives were to extend faster broadband connectivity across the country and to restructure the Australian telecommunications sector to foster competition. To do so, the National Broadband Network Company (NBN Co), was, established as a government business enterprise in 2009, wholly owned by the Commonwealth of Australia and tasked with designing, building and operating a wholesale-only broadband network to provide service to all Australian premises.

Upon completion in 2021, the NBN will serve 93% of Australian premises through fibre-to-the-premises (FTTP), 4% with fixed wireless and 3% with satellite. By the end of 2013, the fibre network will offer download speeds of 1 Gbps (400 Mbps upload), an increase from the 100/40 Mbps top tier service available today.

Fixed wireless will provide 25/5 Mbps speeds by mid-2013. An interim satellite service offers just 6/1 Mbps speeds, but when the NBN’s long term satellite service begins (planned for 2015), download speeds will increase to 12 Mbps.

Changes to the telecommunications sector resulted in the structural separation of Telstra (the incumbent telephone network operator), and an agreement was struck to allow NBN Co to use Telstra’s existing infrastructure where possible in building the NBN. Additionally, Telstra will be required to move its customers from its copper and cable networks to the NBN. Optus (the second largest telecommunications company in Australia) will also be required to migrate customers from its cable broadband network to the NBN, resulting in the elimination of competing fixed-line broadband infrastructure.

The NBN is a regulated monopoly network, providing non discriminatory open access wholesale broadband to any approved retail service provider. NBN Co is prohibited from offering retail services, instead offering a number of wholesale products, providing different levels of quality of service for different applications. Voice and best effort data services (enabling Internet access) are available now on all three technical platforms, with different speed combinations available for data services. Multicasting is currently available only on the fibre network, enabling cost-effective delivery of video content, including Internet protocol television (IPTV), and software as a service (SaaS). Future products will enable prioritized video and data transfer for businesses, and support mission critical applications.

The NBN is funded with government equity until the company can take on private sector debt. As of August 2012, the estimated government equity contribution needed to complete the NBN rollout was AUD 30.4 billion and the total capital expenditure required to build the network to 13 million premises by 2021 was estimated at AUD 37.4 billion. The project will deliver a 7% return on investment. NBN Co confirmed its confidence in these financial projections in April 2013.

Although planning for the NBN is well-advanced, the actual rollout of the network is behind schedule. As of mid-April 2013, there were close to 50,000 premises connected to the NBN, of which about 20,000 are connected to the fibre network. Approximately 68,000 homes had been passed by the fibre network by March 2013, about half of the target outlined in the most recent corporate plan. Delays have been attributed to slower than anticipated negotiations with Telstra, Optus and the ACCC (the competition regulator), and problems with contractors not meeting their construction targets. NBN Co CEO Mike Quigley recently assured a parliamentary committee investigating the NBN rollout that NBN Co is “confident that we can bring the project in on time for that end date [2021] and on the budget that we have set ourselves.”
The Coalition plan

The Labor government’s parliamentary opposition, a coalition of the Liberal Party of Australia and the Nationals, announced its plan for ‘a better NBN’ in April 2013.8 Promising to deliver fast affordable broadband sooner than the government will, the Coalition’s goal is to deliver minimum speeds of 25 Mbps to all households and businesses by late 2016. Speeds of at least 50 Mbps are to be available to about 84% of premises by 2019.9 Capital expenditure for the Coalition’s plan will be AUD 20.4 billion, about AUD 50 billion cheaper than its estimate of the capital expenditure on the Labor plan.10

The Coalition proposes to use a fibre-to-the-node (FTTN) architecture to serve about 70% of premises, deploying FTTP only in newly constructed premises or where the existing copper network cannot provide reliable connectivity and must be replaced. Stating that “Australia is unique in the world in deliberately stamping out competition between fixed line networks,” the Coalition notes its preference for continued use of existing cable broadband infrastructure.11 Subject to renegotiation with the operators, the Coalition would re-enable competition among fixed-line providers, who would be required to open their networks to access seekers.

Comparing the plans

Regardless of who wins the 2013 Australian election, the next government will be committed to building a fixed line broadband network delivering download speeds of at least 50 Mbps to the majority of Australians by 2019. Either approach, if realised according to the respective plans, will meet the objective of extending high speed broadband connectivity to Australians. As Table 1 illustrates however, there are many differences in the approaches. The discussion below explores some implications of the differences, and concludes by highlighting questions that are relevant for the development of next generation broadband networks in any country.

Table 1  Comparison of Government and Coalition NBN plans

<table>
<thead>
<tr>
<th></th>
<th>Existing NBN plan (Labor)</th>
<th>Coalition NBN plan</th>
</tr>
</thead>
<tbody>
<tr>
<td>Completion date</td>
<td>2021</td>
<td>2019</td>
</tr>
<tr>
<td>Estimated capital expenditure (AUD Bn)</td>
<td>37.4</td>
<td>20.4</td>
</tr>
<tr>
<td>FTTP coverage</td>
<td>93%</td>
<td>22%</td>
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<tr>
<td>FTTN coverage</td>
<td>0%</td>
<td>71%</td>
</tr>
<tr>
<td>Fixed wireless and satellite coverage</td>
<td>4% fixed wireless, 3% satellite.</td>
<td>4% fixed wireless, 3% satellite.</td>
</tr>
<tr>
<td>Guaranteed fixed line download speeds by 2016</td>
<td>1 Gbps</td>
<td>25 Mbps</td>
</tr>
<tr>
<td>Guaranteed fixed line upload speeds by 2016</td>
<td>400 Mbps</td>
<td>No information provided.</td>
</tr>
<tr>
<td>Guaranteed fixed line download speeds by 2021</td>
<td>1 Gbps (to 93% of population)</td>
<td>50 Mbps (to 84% of population)</td>
</tr>
<tr>
<td>Services offered</td>
<td>Variety of quality of service levels, multicast.</td>
<td>No information provided.</td>
</tr>
<tr>
<td>Nature of competition</td>
<td>NBN Co operates a monopoly fixed line network, open access. Regulated by ACCC.</td>
<td>NBN Co operates a fixed line network, competition from other fixed line providers, open access regulated on all fixed line networks. Regulated by ACCC.</td>
</tr>
<tr>
<td>Pricing</td>
<td>Uniform wholesale price across network.</td>
<td>Wholesale price cap.</td>
</tr>
<tr>
<td>Role of Telstra (incumbent telco)</td>
<td>Contract in place to provide access to existing infrastructure for re-use in NBN construction, migrate customers to NBN.</td>
<td>Coalition will renegotiate to get access to existing copper; FTTN network operated by NBN Co. Telstra remains structurally separated but can compete with NBN Co using cable network.</td>
</tr>
</tbody>
</table>
Infrastructure or just faster internet?

Both NBN plans will improve broadband speeds, though Labor envisions more than fast broadband, requiring NBN Co to build “a significant piece of Australian critical infrastructure that will underpin the provision of a range of essential services to the Australian community.” ¹³ This view of broadband as infrastructure is reflected in the uniformity of the network. By connecting every premise through NBN Co, services can be provided to any Australian over a single network, engineered to support a variety of levels of quality of service. Service providers still need to recognise that the lowest common denominator for connectivity is determined by the slowest speed on the network (a 12/1 Mbps speed profile, once the long term satellite solution comes online in 2015). As explained by NBN Co, “for the first time in Australia, service providers will have access to a nationally available set of capabilities and prices on which to build their broadband and Ethernet-based services.

This is expected to result in greater competition for end user business, high quality offerings and a greater variety of services being available.” ¹⁴ Projects like US Ignite are developing innovative, transformative ‘next generation’ applications that require higher quality of service guarantees than the commercial Internet, applications that can be delivered through Labor’s model of broadband infrastructure.¹⁵

It is not clear whether the Coalition’s version of the NBN would support the varied service quality offerings now being developed by NBN Co. However, given that the Coalition’s approach will encourage multiple physical networks, built to differing standards by different providers, the Coalition NBN would not offer uniform connectivity to all Australian premises. Both networks would allow Internet service providers to deliver faster Internet, but both do not provide uniform infrastructure that enables provision of next generation applications.

Different types of competition produce different outcomes

The difference in the two proposed approaches demonstrates that different models of competition produce different outcomes, an observation that holds true beyond Australia. Infrastructure competition provides consumers with a choice of technologies, but results in a patchwork of providers who may offer different technical capacities without uniform quality of service options. Speeds and network reliability are impacted by technology and engineering choices (e.g. cable networks often offer quite low upload speeds, and the speed of copper connections is influenced by distance from the node). It is complicated to regulate non-discriminatory access to competing infrastructures. While there are also challenges in regulating a monopoly network, this approach can deliver a very high quality and uniform network that can foster thriving competition among a wide range of service providers, without the need for service providers to negotiate network access or build their own infrastructure. As the different approaches come with different price tags, it is important to determine whether uniformity and guaranteed quality of service are critical to meet demand for better broadband, or whether a fast network that enables Internet access and ‘over the top’ service delivery would suffice.

Project timelines

The Coalition argues that a FTTN rollout will improve broadband connectivity across Australia much more quickly than Labor’s FTTP approach, though with the Telstra network currently being repurposed for fibre-to-the-premises, a switch to FTTN may take longer than the Coalition anticipates. Liberal Leader Tony Abbott recently observed that “rolling out fibre to a few thousand nodes is obviously a vastly less daunting engineering undertaking than rolling out fibre to some 12 million households,” adding “That’s why we [the Coalition] are very confident that our NBN is deliverable in a way that Labor’s NBN obviously is not.” However, it is suggested that the Coalition’s FTTN build will require installation of approximately 60,000 nodes across the country.

As each individual connection requires some hands-on work, it is very likely that the complexity of planning the network and shortages of skilled tradespeople will impact the Coalition’s ability to speed up the NBN rollout, just as they have delayed NBN Co’s current activities.
Upgrading broadband connectivity to 12 or 13 million households is an enormous task, regardless of the preferred technology. With the NBN build underway, Australia's private telecommunications providers have not been upgrading their competing infrastructure at the same pace as broadband providers around the world, so a shift in policy will not immediately result in increased availability of faster broadband, despite seemingly quick upgrades elsewhere.

A need for speed?

The Coalition believes its FTTN network will offer speeds that are sufficient for the foreseeable future, thus avoiding or at least delaying the expense of building Labor's FTTP NBN. The Coalition argues that demand for speeds in excess of 100 Mbps has not yet been demonstrated, with Liberal party leader Tony Abbott assuring the press that "we are absolutely confident that 25 megs is going to be enough, more than enough, for the average household." The history of networking suggests that applications emerge to make use of available network capacity, thus it would be extremely surprising if demand for higher speeds did not follow increased capacity. To date, about 30% of NBN Co's fibre customers have chosen the fastest package (currently 100/40 Mbps) but NBN Co cautions that early adopters may not be representative of the broader public.

Nevertheless, there is demonstrated demand for very fast broadband, with many households connecting televisions, gaming consoles, computers, tablets and mobile phones to the network. Once fibre is rolled out, the network can be upgraded without modifying the physical fibre. The same is not true of FTTN, which requires significant reworking if it is decided that the copper connection into each premise should be switched to fibre, an outcome that many consider to be the end game for broadband infrastructure. The Coalition's analysis argues that it is cost effective to build a FTTN network instead of FTTP as long as the FTTN network can meet user demands for at least three years. The Labor government rejected a FTTN design in 2009, believing that moving directly to fibre would be a more cost effective investment in national infrastructure.

Big broadband questions

Australia is unique in the proposed scope and extent of government intervention to date in its National Broadband Network. The discussion above highlights a number of questions that must be addressed in any project to upgrade broadband infrastructure. Both the government and opposition are attempting to manage the triple challenges of cost, implementation speed and network quality. The government's plan centres on network quality, based on the rationale that benefits of developing very high quality, uniform, upgradeable broadband infrastructure outweigh the costs. The Coalition justifies its plan by focusing on the benefits of a cheaper, more quickly implemented solution, arguing that a higher quality, uniform network is simply not yet needed, and a shorter-term solution to extend faster broadband across the country is the appropriate one for current needs.

Thus an underlying dilemma, not unique to Australia, is that of investing for the future versus finding a quicker fix. The discussion above notes that investing for the future allows for the development of infrastructure, offering flexibility and capacity for innovative service delivery. It is also simpler to develop broadband as infrastructure when building a single open access network rather than encouraging competition among infrastructure providers. However, investing for the future, especially in a single large scale project, is an expensive proposition, so any decision must be made with as complete an understanding of the costs and benefits of proposed investment as possible.

In deciding whether to invest now or later, estimation of the timing of demand for increased broadband speeds is needed. The Coalition is betting that demand for the speeds that can only be provided by fibre networks is several years in the future. It argues that "Uncertainty over demand is why many private investors are choosing to defer investment in FTTP and, if they are incumbents or otherwise able, to instead deploy FTTN. FTTN puts less capital at risk. Deferring an expensive and irreversible investment commitment such as FTTP, to the extent this is possible, is prudent commercial management if it permits more information about actual usage and investment returns on fibre to emerge." But when a government-owned enterprise takes a longer-term perspective, it may make different decisions. As NBN Co's Quigley notes "because we are a GBE (Government Business Enterprise), our aim is not to maximise profit; our aim is to give a return to the government above the bond rate and to get those wholesale prices down as low as we possibly can. ...That is just a function of who we are."

The future direction of Australia’s National Broadband Network will be determined by citizens of Australia when they elect their next government. This paper has illustrated some of the issues to be considered when choosing between two approaches.

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2 For an overview of the Australian broadband market prior to the NBN announcement, see Given, J. (2010). Take your partners: public private interplay in Australian and New Zealand plans for next generation broadband. Telecommunications Policy, 34(9), 540-549.

3 This refers to 100 Mbps download speed, 40 Mbps upload speed.


5 See the Australian Competition & Consumer Commission’s website at http://transition.acc.gov.au/content/index.phtml/itemId/1082349 for details of Telstra’s Structural Separation Undertaking.

6 These figures are detailed in NBN Co’s Corporate Plan 2012 - 2015.

7 Joint Committee on the National Broadband Network (2013). Committee Hansard - Friday, 19 April 2013, Sydney.


9 93% of premises are in the fixed-line footprint, and the aim is to cover 90% of them (~84% of the total).

10 In background papers released with its plan, the Coalition argues the total funding required to build Labor’s NBN will be more than $90 billion. NBN Co and the Minister for Broadband, Communication and the Digital Economy insist that NBN Co’s proposed costings are accurate.

11 Liberal Party (2013). The Coalition’s Plan for fast broadband and an affordable NBN.

12 The Coalition notes Telstra’s copper network has ‘minimal economic value’ and anticipates an easy negotiation to get free access to Telstra’s copper network. Others suggest that the Coalition is underestimating the challenge of re-opening negotiations with Telstra.


15 http://us-ignite.org/


17 Liberal Party (2013). The Coalition’s plan for fast broadband and an affordable NBN: Background Papers.

18 Joint Committee on the National Broadband Network (2013). Committee Hansard - Friday, 19 April 2013, Sydney.
By Khawar Iqbal & Damian Radcliffe

Bridging the digital divide in Qatar

At the heart of Qatar’s National Vision 2030 is a roadmap to creating a knowledge-based economy. This cannot happen without digital inclusion, as ICTs will play a crucial role in this new economy. To help achieve this, the country’s National ICT Plan set the target of a 90% adoption rate of ICTs by 2015.

This would be a challenging target for any country, not least one as demographically diverse as Qatar, but this is not a country short on ambition. We recognize the transformative power ICTs can play, and the need to ensure people have the ICT skills and knowledge required to support their personal and professional needs.

The Supreme Council of Information and Communication Technology (ictQATAR) and its Digital Inclusion Department define digital inclusion as:

The process of reaching out to all segments of the population of Qatar, who are currently unaware of the benefits and potential of technology or are not using it effectively, and ensure they have access to, and skills to use, technology and are therefore able to participate in and benefit from Qatar’s growing knowledge and information society.

The work of the Digital Inclusion Department is on-going, with projects supporting Qatari women, expatriate labourers, people with disabilities, and those living in remote areas, with plans to address intergenerational learning through developing Qatari youth as ICT champions.

In this article we share some of the ictQATAR Digital Inclusion Department’s experiences in working towards these goals, including how we have adopted international best practices and adapted them to the needs of the country.

Typical approach

Historically, efforts to address the digital divide have focused on ICT access and the provision of basic computing skills. This provides what has commonly been referred to as ‘first order’ digital skills and is primarily aimed at people who are not online. In Qatar this means groups such as housebound non-working Qatari women, older people and those living in rural communities, as well as groups where there is no access to technology and the motivation to use it unclear.

The diversity of the country’s demographics also means that for other target groups such as low skilled workers - part of a large transient labour force often working in construction or the oil and gas industries - additional barriers such as working hours, language and literacy levels, must also be considered. Providing access, explaining the benefits of ICTs and offering culturally relevant support, are essential as these audiences embark on the start of their digital journey.

Developing digital skills requires more than just access and basic ICT skills. ‘Second order’ digital skills are needed to help online users develop a richer understanding of how ICTs can benefit them. We recognize that the ICT needs of female entrepreneurs, people with special needs or those who did not continue to higher education, are often different.

The final tier - or ‘third order’ - of skills involves the ability to become critical users of the Internet and creators of digital content. This means having the ability to question, analyze and evaluate online information, as well as understand an individual’s responsibility and then creating, contributing to - or distributing - content. This is just as important in the Middle East as it is anywhere else.

Our approach

In developing a strategy for digital inclusion in Qatar we have sought to build on this proven approach whilst also developing four further general principles to guide our work. This has included:
1. Collaborating with and building capacity in local organizations that work with digitally excluded target groups
2. Taking account of local cultural issues
3. Contextualizing awareness, content and training
4. Reflecting the literacy levels and language needs of each target group.

These principles are important for a number of reasons.

Firstly, Qatar does not have a large voluntary sector, and there are few specialist organizations serving the needs of particular parts of society.

Secondly, issues such as gender segregation, as well as religious and cultural norms and values, need to be understood and reflected. This is especially important in terms of highlighting relevant and appropriate content that meets the needs of local audience.

We cannot explain the benefits of ICT if it is described in terms not relevant to their lives.

**Digital inclusion for women**

Qatar has many well-educated and very successful women. But at the same time, there are some Qatari women who, for culturally sensitive reasons, have not yet been able to take advantage of the opportunities available to them.

In working with this group we need to reflect a number of key considerations. This includes ensuring that access and training is provided in circumstances which are acceptable to the wider family. We have also needed to recognize that this broad target group contains many subsections, including:

- Non-working Qatari women: most likely housebound, potentially without access to technology, the knowledge of how to use it, or the motivation to learn. Some may, for cultural reasons, also have limited access to educational establishments.
- Parents with low ICT skills: want to develop skills to support their children who can be accessed through their children’s schools.
- Single Qatari women (divorced, widows and separated women): sometimes segregated from the rest of the family, leading a reclusive lifestyle with restricted activities. They may be hard to reach.
- Women seeking to be entrepreneurs: accessible through women’s networks, interested in marketing their businesses online. These women are generally well-educated, with strong networks. They are role models in their community.

To reach these groups ictQATAR’s Digital Inclusion Department launched a number of programmes to initiate support for women. These have used Qatari female trainers and mentors, who provide tailored training in Arabic, offering content sensitive to the cultural and religious values of the trainees. Fashion and cooking are the topics these groups of women are most keen to explore. To overcome access issues, training often takes place in locations acceptable and familiar to the family, such as girls’ schools.

Dr Haya Al-Meadhadi, General Manager of one of our partners on the project, the Al Fursan Center, noted the impact of these efforts by telling us, “We reduced the gap between the grandmothers and granddaughters… They now have a different relationship with technology and will hopefully be contemplating new activities and a new life, completely different to what preceded the projects.”

One person for whom this is already a reality is Mariam Ahmad. Although she has eight grandchildren, her education stopped after her first preparatory class, “I’m no longer asking my grandchildren how to log on to the Web. But what excites me the most is that I can now use Twitter, Facebook, and search for topics, such as women’s interests, cooking, and healthcare… I have collected on a flash drive new ideas for a restaurant project I would like to invest in.”
Bridging the digital divide in Qatar

Digital inclusion for labourers

ictQATAR has embarked on two pilot programmes aimed at providing ICT facilities in migrant workers’ places of residence. A major outcome of these pilots is a blueprint providing detailed recommendations and guidance for employers and owners of their accommodation, as well as digital literacy materials made available in a range of languages - English, Arabic, Hindi, Tamil and Malayalam.

For employers a key driver has been the recognition that ICTs can improve the quality of life of their staff, and thus their productivity. With this in mind, content has been designed to help individuals in a social context, but which also meets their employer’s needs. Examples include an ‘Introduction to Qatar’ and ‘Safety in the Workplace’ which were produced in Hindi and Sinhalese; the two most common languages spoken amongst Qatar’s migrant construction workers.

Digital inclusion for people with impaired vision

ictQATAR’s Digital Inclusion Department embarked on a partnership programme with QSCCB (Qatar Social and Cultural Centre for the Blind) and Mada (Qatar Assistive Technology Centre) to support individuals with special physical, mental and learning needs, in line with the country’s e-accessibility policy.

The benefit of this was summed up by David Banes, Mada’s CEO, “Working with the Qatar Social Cultural Centre for the Blind allows us to directly impact the lives of the visually impaired in Qatar in a way that increases their opportunities in education and employment.”

The Digital Inclusion Department provided computer equipment and assistive technology to equip two labs at QSCCB, whilst Mada offered expert advice and guidance which included needs assessments, technology recommendations, installation, training and support. In addition to installing large monitors, Arabic screen readers, Braille printers and screen magnifiers, training was given to staff and users of QSCCB.

Connected communities project

Just 30 kms from Qatar’s capital, Doha, lies Simaisma, a small, rural community, of 3,000 residents, most of them Qatari.

It is also the home of a pilot project designed to support an entire community on their digital journey by promoting access to government services, introducing alternative entertainment/lifestyle options, enhancing education and generating additional employment opportunities.

To do this the project is bringing together businesses, government service centres, schools and a local youth centre, with the latter being designed as a community hub equipped with state-of-the-art technology. Residents will be able to learn to use technology, use online services and gain access to virtual branches of major service providers, for example utilities and telecoms, through teleconferencing. To improve connectivity free Wi-Fi is also provided in the Simaisma public park, on the beach, and in public buildings.

To support the community on their digital journey, ictQATAR’s Digital Inclusion Department has also sought to involve selected community members as change agents. Their role is to address and help break down barriers, i.e. fear of technology, lack of awareness and confidence, as well as cultural barriers that prevent disadvantaged target groups from entering the digital age. These champions raise awareness of ICTs and digital inclusion opportunities within the community by going into people’s homes and community venues such as mosques and majlises, gaining access - and harnessing trust - which would be very difficult for people outside such a tightknit community to replicate.

Final thoughts

The experience gained from these pathfinder projects - and the other initiatives we have begun in Qatar in recent years - offer best practice and a blueprint for similar initiatives in other communities and other countries in the region.

Like many of the communities we are working with, our work is at the start of a digital journey. As new technologies come on stream so our work will evolve. The result of this is that we will continue to remain vigilant and innovative in the work we do supporting communities to benefit from ICTs. It has been, and will continue to be, a fascinating journey.

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1 Places where men can socialise
Investment, infrastructure and competition in European telecom

This article looks at the way in which the telecommunications industry investment framework of yesterday takes account of the technological developments, consumer preferences, and business models of tomorrow. It considers the investment framework changes necessary to ensure deployment of high-speed and ultrafast networks in Europe and additional needs. The research and discussion focus on the assessment of potential changes to increase the likelihood of reaching the goals of Europe’s Digital Agenda.

The Digital Agenda for Europe set a number of broadband targets:
- Bring broadband to all Europeans by 2013
- Access for all Europeans to 30 Mbps or above by 2020
- 50% or more European households with connections above 100 Mbps.

Several countries have incorporated these targets into their national broadband plans.

Table 1 Targets in national broadband plans

<table>
<thead>
<tr>
<th>Country</th>
<th>25-30 Mbps</th>
<th>100 Mbps</th>
<th>Year</th>
</tr>
</thead>
<tbody>
<tr>
<td>Austria</td>
<td>100%</td>
<td>2020</td>
<td></td>
</tr>
<tr>
<td>Czech Republic</td>
<td>30%</td>
<td>2015</td>
<td></td>
</tr>
<tr>
<td>Denmark</td>
<td>100%</td>
<td>2020</td>
<td></td>
</tr>
<tr>
<td>Estonia</td>
<td>100%</td>
<td>2015</td>
<td></td>
</tr>
<tr>
<td>Finland</td>
<td>100%</td>
<td>2015</td>
<td></td>
</tr>
<tr>
<td>France</td>
<td>100%</td>
<td>2025</td>
<td></td>
</tr>
<tr>
<td>Germany</td>
<td>75%</td>
<td>2020</td>
<td></td>
</tr>
<tr>
<td>Spain</td>
<td>98%</td>
<td>2020</td>
<td></td>
</tr>
<tr>
<td>Sweden</td>
<td>90%</td>
<td>2020</td>
<td></td>
</tr>
<tr>
<td>United Kingdom</td>
<td>90%</td>
<td>2015</td>
<td></td>
</tr>
</tbody>
</table>

An examination of the current deployment of three high-speed broadband technologies - fibre (FTTH), DOCSIS 3.0, and LTE - suggests that countries might not hit these targets. At the end of 2012, FTTH covered only 11% of the population, with a mere six million subscribers in the EU27 countries. Certainly some countries (such as France, Spain, and Portugal) experienced healthy growth rates nearing 36%, but other countries in this group witnessed growth rates as low as 7%. The EU27 demonstrated an average take up rate of 21%, with Scandinavia well ahead of this curve with 30%.

On the other hand, DOCSIS has experienced strong deployment rates, although the subscription rate hovers at 7.5 million subscribers. While more than two-thirds of European Internet-capable cable networks have been upgraded to DOCSIS 3.0, not all end users have the equipment necessary to adopt the technology.

In contrast, LTE covers less than 1% of total mobile subscribers. If forecasts hold true, by 2017, less than 20% of total mobile connections in the EU27 will have migrated to LTE. To put this number in perspective, LTE already accounts for roughly 28% of subscribers in South Korea and 8% in the United States. The lack of spectrum in the 800 MHz band hampers network coverage expansion, as existing spectrum bands used for LTE services (mainly in 2600 MHz bands) do not allow operators to deploy the technology efficiently outside major urban areas.
Reaching the targets will require a combination of technologies and not simply one technology “winning out.” Country-specific conditions and economic environments will determine the optimal balance of technology deployment. While most Member States could reach 50% coverage of 100 Mbps with the support of copper through vectoring and pair bonding (including phantom mode), countries with an existing cable footprint would benefit most from DOCSIS 3.0 to reach the same speeds. Rural areas, however, could benefit from LTE in the 800 MHz band, which could deliver 30 Mbps speeds.

To understand the potential that public policy, regulatory, and management changes could have on driving the achievement of Digital Agenda targets, three themes are worth exploring.

Firstly, until now, the industry has focused on supply-side issues such as infrastructure deployment and high coverage rates. The pendulum must now swing to encompass demand-side issues, paying particular attention to such themes as the high-speed broadband value proposition, affordability and the lowering of costs, elasticity of demand, and the stimulation of adoption.

Secondly, it is critical to examine the effectiveness of state aid. An assessment of past and present experience indicates that the availability of subsidies and state-supported high-speed broadband deployment often detracts from the development of a robust business plan. The industry needs to consider this factor, examining where the numbers close and identifying potential strategies to increase uptake while avoiding the observed over-optimism in predicted customer uptake.

Finally, the role of regulation should relate to its impact on high-speed broadband roll-out, as regulatory intervention can delay target achievement in a number of ways. For one, there are risks of asymmetric regulation, particularly when involving an incumbent, which could raise the return on invested capital hurdle to an unsustainable level, thus discouraging the deployment of these technologies, particularly FTTH. Regulation could also hinder operators’ ability to squeeze as much as possible from the legacy infrastructure by the premature disconnection of copper networks, which will impair the use of vectoring technology.

**Figure 1 Regulation versus innovation and investment**

The effect of the policy variable: Competition

Admittedly, asymmetric regulation and pro-competitive policies can potentially address market failures relating to innovation and investment. Within competitive markets, consolidation increases incentives for innovation. While high levels of competition promote a greater focus on operating efficiencies and cost reduction, lower levels of competition reduce the possibility of innovation. However, research has also shown that there comes a point where the incentives to invest begin to decline and sector restrictions on foreign direct investment (FDI) result in a limited willingness to innovate, producing an inverted ‘U’ (see Figure 1). Unless we alleviate the regulatory pressure, especially in unserved areas, investments will not materialise.
To test the hypothesis that correcting for market failures can reach a point where it results in a negative outcome, a model was created that examines the rate of adoption on non-voice mobile services such as messaging, data and mobile broadband. The underlying assumption is that consolidation in competitive markets increases incentives for innovation. On the other hand, high levels of competition may focus on operating efficiencies and cost reduction, which results in less innovation. The market then witnesses lower levels of competition as there are fewer players in the market to share in the revenues. Ideally, regulation should push the cost side of the equation, open the markets, and fragment the supply. Increasing innovation requires an agreement on an optimal level of consolidation. Additionally, the telecommunications industry sees sector-specific issues in the model. These issues can include the customer switching cost and the impact of churn on increased product differentiation. Examining regulator independence can show this impact and the potential to generate revenue.

The model results suggest that market concentration can have a positive impact on innovation. Consolidation offers operators a higher certainty of potential returns on investment, particularly when looking at wireless data development. Number portability is important and years of policy enactment of the portability decision is also important, not so much because churn rises, but because the threat of churn acts as a positive incentive for companies to start pushing product differentiation on mobile broadband in order to preserve their customer base. Regulatory independence appears not to have any impact, as market potential is the key. The first conclusion is that the issue of consolidation in the industry is important, and this might affect developments in Europe, particularly across borders.

**The effect of the policy variable: Taxation**

Fiscal policy is another key variable that could potentially affect the rate of investment in high-speed broadband. Data from the United States, for instance, show that unless the tax burden on equipment purchasing is reduced, broadband deployment will be limited.

In 2010, US telecommunications and cable companies invested USD 42 billion in broadband, which equates to a per capita investment of USD 137, of which 66% (USD 28 billion) was on equipment subject to sales tax. Taxation on telecommunications equipment is not homogeneous across the country - 20 states and the District of Columbia do not tax telecommunications equipment while 19 states do not tax cable TV equipment.

To understand the effect of equipment taxation, a study was conducted to examine the impact of lowering the tax rate and its effect on economic contribution.

**Figure 2 The effects of sales tax on equipment purchases in North Dakota**
The state of North Dakota eliminated sales tax on equipment purchases in 2009 and broadband investment increased threefold. South Carolina, on the other hand, increased sales tax in 2007 and saw a subsequent decline in broadband investment. Clearly telecommunications and cable companies react to a reduction in the tax rate or, in the case of North Dakota, its elimination. It is important to remember that, for operators, CapEx in year two is driven to a large degree by the inertia of year one because networks require long-term planning.

Additionally, the econometric model showed that a reduction in sales tax does have a positive effect on investment both in terms of broadband deployment and in terms of economic well-being (not only in the construction of the networks, but also with more efficiencies in healthcare, financial services, etc.).

Making FTTH work

As supported by the model, this article argues that, unless some of the basic assumptions upon which the FTTH business case is made are changed, FTTH is unprofitable.

Figure 3 The effects of sales tax on equipment purchases in South Carolina
This is an investment model, with a classical structure of a business case. In effect it says:
- there are deployment plans and costs
- there is a market share to be taken
- there are average revenue per user (ARPU) revenues and operating costs
- after tax, one can look at the free cash flows and calculate a net present value (NPV) to see if money is being made.

The assumptions made in the model allow for aspects such as capital investments and revenues to be adjusted.

Analysis demonstrates that the model is very sensitive to the uptake rate and retail output. Deployment occurs in areas where operators can maximize the uptake rate, which leaves out or creates unserved areas. Similarly, if it is not possible to capitalise on the ARPU, the net present value that the model predicts will drop. The deployment of fibre in areas where copper DSL is already offered requires an increase in fibre retail pricing to compensate for cannibalization; the model shows this increase to be approximately 15%. As a result, the operator must decide if it will raise prices, change the pricing structure, or add new services enabled by new infrastructure. The experience in Japan adds a note of caution. In this situation, customers did not perceive FTTH to offer better value than the copper-based services to which they had grown accustomed.

**NGN in low density areas**

As Figure 5 shows, there are three main drivers of NGN project success. The project context has already been described, but the project sponsor is closely linked to the success of the project, especially in situations involving state aid. We need to understand why some projects fail on the NGA, municipal, or departmental level. Several factors were identified. There is sometimes limited support in negotiating financial terms with a lender syndicate. Independent of the subsidy these projects might receive, they sometimes have to negotiate with a bank or lender that requires a commercial rate. Also, since the project is treated as an infrastructure subsidy by central government, little attention is paid to the robustness of the business plan. Finally, there is the issue of competitive retaliation, whereby the build is based on state aid and proven demand. In this case, the incumbent enters, invests, and leaves the municipality with a stranded investment.

**Figure 5 Three drivers of NGN project success**

<table>
<thead>
<tr>
<th>Project Context</th>
<th>Investment Model</th>
<th>Financing Model</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Competitive environment (existing players offering broadband access)</td>
<td>1. Average revenue per user</td>
<td>1. Sources of funds (equity, public funds, debt)</td>
</tr>
<tr>
<td>2. Competitive substitutes (VDSL, Docsis 3.0)</td>
<td>2. Wholesale access rates</td>
<td>2. Financial investors (institutional, banks, venture capitalists, angel investors, governments)</td>
</tr>
<tr>
<td>3. Industry structure (number of players, existing service-based players)</td>
<td>3. Wholesale/retail mix</td>
<td>3. Lending terms (limited or non recourse, rate and tenor, seniority, collateral, covenants)</td>
</tr>
<tr>
<td>4. Project sponsor (incumbent, municipality, alternative service provider, etc.)</td>
<td>4. Deployment costs</td>
<td></td>
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<td></td>
<td>5. Subscribers/homes passed</td>
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Therefore, organisations benefiting from state aid should consider the context of the project slated for deployment, the investment model, the use of profit, the financing model and source of funds, the investors, and the lending terms.

Municipalities can finance fibre deployment in a variety of ways.

While the direct subsidy model can finance deployment, it encourages an on-going reliance on state aid. As a result, the product may never stand on its own merits. Another model, local investment, impacts local taxes because the money is borrowed and has to be repaid. If the debt cannot be serviced, there is the risk of bankruptcy. The private credit financing and public/private credit financing models obviously require commercial rates. Then there are also public/private partnership models (PPP). No single model works in all situations, and the selected financing models must fit local conditions (see Table 2).
In urban and suburban environments such as Stockholm or Amsterdam, the municipality as an investor has a good business case. Where you have enough density and enough demand, the municipality can step in and the numbers look good. In rural areas, however, PPPs work best, particularly for credit financing. There are a number of possible funding schemes, such as a joint venture funded from the cash flows of the incumbent and even cost sharing models. This selection requires a long-term perspective to ensure success.

Table 2  NGN financing models have to be selected carefully

<table>
<thead>
<tr>
<th>Financing strategies</th>
<th>Geographic mix</th>
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<tr>
<td></td>
<td>Urban</td>
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<tr>
<td>Municipal/Regional</td>
<td>Municipality as an investor</td>
</tr>
<tr>
<td>Public/Private Partnerships</td>
<td></td>
</tr>
<tr>
<td>Operator-funded</td>
<td>Incumbent funded</td>
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<tr>
<td>Operator-funded and public policy</td>
<td></td>
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<tr>
<td>stimuli</td>
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This article recommends the creation of a pooled financing model for smaller municipalities, many of which likely require a maximum of USD 6 million each to deploy fibre. Several lenders would assume pro rata exposure to each of the projects, which would be majority-owned by public sector sponsors, although the private sector could have an ownership stake. The target size of each pooled facility would be USD 20 million, sufficient to handle 5 or 6 small NGN projects, and would be ring-fenced. It would have support from a public lender, which would provide credit enhancements such as loan guarantees equal to 50% of the total amount and projects could apply, through the pooled facility, to receive output-based aid from public funds. Each project would be structured using a project finance approach and project sponsors would develop the NGN projects with technical and operational assistance provided by government entities. By ring-fencing the lending, service revenues coming from the fibre would pay for the debt incurred by the municipality.

Figure 6 Structure of pooled financing facility
This model has been used extensively in public project financing, and it would be interesting to see how it worked for NGA.

**The NGN value proposition for the end user**

Examination of emerging markets shows a number of variables at play in terms of non-adoption of broadband in homes (Table 3).

**Table 3 Stages of broadband adoption**

<table>
<thead>
<tr>
<th>Stage 1</th>
<th>Stage 2</th>
<th>Stage 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Broadband population adoption</td>
<td>&lt;= 3%</td>
<td>3-20%</td>
</tr>
<tr>
<td>Ownership of access devices (e.g., computers, smartphones)</td>
<td>Low adoption</td>
<td>Medium adoption</td>
</tr>
<tr>
<td>Availability of web applications and services</td>
<td>Very low</td>
<td>Limited</td>
</tr>
<tr>
<td>Factors driving non-adoption</td>
<td>Service coverage</td>
<td>Affordability</td>
</tr>
</tbody>
</table>

While coverage plays a critical role in adoption, affordability is critical at stage two where there is 3-20% penetration. Above the 20% penetration mark, literacy and cultural relevance become important due to the value provided. The demand gap stems from a mixture of structural and socio-economic factors as well as drivers for adoption such as affordability. Overcoming the affordability obstacle requires a reduction of the costs of access to the service and devices as well as a reduction in taxation for the end user. The price elasticity of broadband plays a particularly important role in the early stages of development.

While elasticity curves may not necessarily apply to NGA (i.e. that dropping prices increases adoption), mobile broadband studies show that more sophisticated services demonstrate higher elasticity. With a mobile broadband plan with a cap of 5GB, elasticity particularly on dongles is proportionally higher than at lower levels of service.

In regards to taxation, as Figure 7 shows, not only should taxation of equipment purchasing be cut, but taxes on end user purchasing should also be reduced. Studies support the argument that a continual increase in taxation on the end user results in an unsustainable industry.

**Figure 7 Taxation versus adoption of data services**
Digital literacy and relevance of services and applications also drive uptake. It is vital that applications with high network effects are introduced and services with high social and welfare impact are launched. As other studies have shown, it is also important to deliver locally relevant applications and content.

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**Events Diary**

<table>
<thead>
<tr>
<th>May 2013</th>
<th>July 2013</th>
<th>November 2013</th>
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<tr>
<td><strong>June 2013</strong></td>
<td><strong>September 2013</strong></td>
<td><strong>October 2013</strong></td>
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<td></td>
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<td>IIC Annual Conference 9-10 OCTOBER London, UK <a href="http://www.iicom.org">www.iicom.org</a></td>
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<td>International Telecommunications Society 20-23 OCTOBER Florence, Italy <a href="http://www.itseurope.org">www.itseurope.org</a></td>
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<td></td>
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<td><strong>November 2013</strong></td>
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The search for silver bullets in European telecoms policy: the case of the ‘single market’

By Richard Feasey

European policymakers have woken up to the fact that its telecoms industry is struggling. Growth has stalled for the past five years, and investment lags behind regions. Many of the ambitious targets of the Commission’s Digital Agenda look likely to be missed.¹

Various plans have been advanced to remedy this situation. Last December saw the efforts of some European operators to shift economic relations between network operators and Internet players stall at the ITU World Conference on International Telecommunications (WCIT) in Doha.² Commissioner Kroes’ proposed €7bn Connecting Europe Fund suffered a similar fate in February this year.³ Kroes had more success with her announcement last July, in which she proposed to give investors in next generation fibre networks greater wholesale pricing flexibility and to put a floor under copper prices.⁴ Investors welcomed this attempt to reintroduce price inflation after decades of regulator-driven cuts, although the national regulators still seem unconvinced.

With broadband and the digital economy seen as key drivers for Europe’s broader economic fortunes, the search for ‘silver bullets’ to restore the industry to health continues unabated. In March, EU leaders asked the Commission to come forward in October with proposals to ‘complete the Digital Single Market by 2015’ and ‘establish the single market in Information and Communications Technology’, something that has long been a cherished goal of European policymakers.⁵

Given the tight deadlines set by the European Council we might expect there to be clarity about what a single market in telecoms might consist of and what steps are necessary to attain it. However, it is apparent that there are in fact many radically different views. Those I present below are not intended to be exhaustive, nor are they mutually exclusive.

Anything that supports industry or investment

At one extreme, the single market is taken as a proxy for any policy which improves the financial outlook of the industry. Commissioner Kroes’ proposals on NGA pricing last July persuaded many observers that the Commission is now much more sympathetic to industry, or at least fixed incumbent operator, concerns than national regulators (or than she was previously).

On this view, any ‘single market’ proposals which emerge from the Commission are also likely to be helpful to the industry and proposals which attribute greater powers to the Commission and take powers away from national regulators are viewed positively.

Specific policies which might underpin this view include a more sympathetic approach to in-market mergers between mobile operators, or the withdrawal or softening of regulation in areas such as mobile termination rate setting which have proved a significant drag on the sector in recent years or the interventions by regulators in some markets to support MVNOs.

The focus of many of these policies is the mobile sector, where the Commission has yet to do anything to alleviate pricing pressure, as it did for fixed networks last July by allowing fixed wholesale prices to reflate. Since European mobile operators are not required to offer regulated wholesale access like their fixed counterparts, the silver bullet proposed last July for NGA is not appropriate for the mobile sector.

The debate on in-market mergers is complicated firstly by merger policy being the preserve of Commissioner Almunia (and formerly the preserve of Commissioner Kroes) and secondly by a tendency to confuse in-market mergers or consolidation (i.e., mergers between non-competing firms in different Member States) with cross-border mergers or consolidation (i.e., mergers between non-competing firms in different Member States). Almunia remains sceptical about the merits of a soft line on in-market mergers. The most recent example, between Hutchison and Orange in Austria, was approved, but only with what most industry observers regard as egregiously onerous requirements to support new MVNOs.
In truth, whilst these ideas might improve the prospects of European industry or otherwise have merit, it is difficult to see any very coherent or plausible connection to strengthening a ‘single market’.

**Pan-European scale**

Although Commissioner Almunia appears sceptical on in-market mergers, both he and Commissioner Kroes are far more enthusiastic about cross-border mergers which create European telecoms operators serving multiple markets (although Almunia often notes that the ownership structure of the European mobile sector is already relatively concentrated in the hands of a small number of multi-national players).

Many European industry commentators (including this author) have in the past bemoaned the fragmentation of the European telecoms industry structure and the relative lack of scale (measured in terms of subscribers) relative to US, Indian or Chinese peers. It is less clear precisely how this disadvantages the European sector, nor whether cross-border mergers are necessary to remedy it. For example, one common concern has been that European operators are too small to exercise much influence over the global supply chain which delivers new technologies or which supplies the Internet services which run over the European networks.

It is argued that global suppliers tend to be located in, and more responsive to, markets in other parts of the world. But other measures, such as better co-ordination of the release of radio spectrum (which is already proposed by the Commission) or European standardisation of technology requirements would address some of these concerns without the need for large cross-border M&A.

At the same time, the industry and its investors appear unexcited by the prospect of greater pan-European scale – unless it could somehow be achieved in conjunction with greater opportunities for in-market mergers, about which the industry and investors are far more excited. National politicians may also be reluctant to support a single market which envisages the sale of ‘national champions’ to foreign investors (which may be one reason why EU leaders declined to ask for proposals for a ‘single telecoms market’ in their March communiqué).

Aside from the uncertain benefits of greater scale, Almunia and others sometimes appear to consider that a change in the ownership structure of the industry is a necessary condition for some of the more far reaching changes in the way the market performs. Some (including this author) have previously argued that pan-European mobile operators would be better able to ‘internalise’ roaming traffic in Europe and so avoid wholesale charges which have otherwise inhibited the industry’s ability to reduce roaming prices as far or as fast as politicians would like. However, that argument was largely ignored in 2006 and the Commission instead decided to regulate wholesale roaming charges directly. In doing so, the Commission weakened the incentives for cross-border mergers.

This is one reason why the Commission’s recent enthusiasm for cross-border mergers is likely to be largely unheeded by the industry or its investors unless new incentives can be found. It is worth noting that one early Commission idea along these lines - to auction radio spectrum licences on a pan-European basis and thereby force the industry to reorganise itself so as to bid accordingly - looks likely to be (wisely) abandoned before it is subjected to attack by national Finance Ministers and the industry.

**The digital single market**

For many years the Commission has been pursuing a variety of initiatives which aimed to make it easier for European consumers to use websites in other countries and easier for European Internet start-ups to scale their operations across Europe. Measures include reform of copyright licensing (to allow pan-European licences), consumer protection and redress (to build confidence and protect consumers who make purchases with suppliers in other Member States) and harmonisation in privacy and data protection.

This is the traditional ‘Digital Single Market’ project, the fulfilment of which is said by the Commission to deliver large economic benefits to Europe. It appears to be what the Heads of State had in mind in March. These aims command widespread support within the telecoms and digital services industry (with opposition more likely to be found in non-digital sectors), but most observers think they will take another decade to achieve and that the economic benefits are more likely to accrue to digital service providers and consumers than to the traditional network operators. It is hard to see how more cross-border e-commerce will restore the European telecoms sector to health or that proposals along these lines would meet the expectations of the industry or investors in October.
The end of cross-border charges

European policymakers have long complained about international call charges in Europe, unfavourably comparing the cost of calls between Paris and Berlin to those between New York and California. More recently, the costs of mobile roaming have been a very visible target for regulators and politicians, with most agreeing that a ‘true single market’ would see the elimination of such charges. For many, this is the most visible and populist manifestation of the single market agenda.

There is therefore a large constituency which regards a single market in telecoms as synonymous with the elimination of mobile roaming fees and international call charges within Europe. Strenuous efforts have already been made to substantially reduce these costs through regulation, but in the most recent revision of the Roaming Regulation the Commission quietly backed away from its original target of eliminating any remaining differences between domestic and roaming prices by 2015. The current Regulation has only just been adopted and the industry is currently working on ambitious measures which are intended to inject new forms of competition into the market in mid-2014. It would be surprising for the Commission to revisit this position in October.

Supply across borders

A classical conception of the ‘single market’, as applied to other goods and services markets, envisages German, Italian or Swedish suppliers all competing for the custom of British or French consumers. This is relatively obvious when supply is highly mobile – when professional services providers can practice in any Member State or when physical goods can be exported and distributed across borders - but the application of this conception to telecoms network services, is very challenging. Most advocates of this idea talk about the ability of British consumers to purchase mobile SIM cards from non-UK providers (the idea of ‘pan-European MVNOs’ is already included in the Roaming Regulation) or to buy their broadband supply from French or German suppliers, just as they buy their energy from EDF or RWE. Any move in this direction would likely require the structural separation of networks from service provision and the introduction of pan-European regulated access prices which retailers from all Member States could then utilise to serve their customers.

One immediate feature of any such concept is that competitive intensity in the industry - at least at the retail level - can be expected to intensify because barriers to entry are lowered.

Wholesale access prices would also likely be more intrusively regulated than before. Lower prices are generally seen as the key benefit of the single market for consumers, and generally explain why attempts to extend the single market are often resisted by national interests. It may also make this option unattractive to the Commission in the current context - if the aim is to improve the telecoms sector’s financial health and confidence then a bold attempt to use regulation to reconfigure markets and increase competitive intensity is very unlikely to achieve this, at least in the medium term.

There is much more that can be said about the disruptive measures that would be required to move to a single market of this kind, and the incentives and capacity of the affected firms to sabotage or resist these efforts. Some European policymakers look longingly at the United States as an example of what they are seeking - single prices across the continent, very large operators, no roaming charges - but the US did not attempt to create a ‘single market’ by regulatory fiat. European policymakers would be straying into unknown and potentially explosive territory if they did.
More power to the Commission

Finally, we should not exclude the possibility that the single market debate is also a convenient veil behind which the long-standing institutional rivalries between the European institutions and the national regulators and governments are again being played out. We have seen passing references to the need for a ‘single European regulator’ in recent months - an idea which surfaced under Commissioner Reding during the review of the Telecoms Regulatory Framework.

The rationale for more regulatory oversight by the Commission is likely to be twofold. The first is the lack of harmonisation that has been achieved by national regulators operating under existing arrangements and the claim that greater harmonisation will facilitate the realisation of the single market (although precisely how is often left unstated). The second is that we are increasingly seeing the development of genuinely ‘pan European’ markets, such as that for services to multi-national customers, which require review and oversight by a similarly pan-European body.

Concluding thoughts

The Council has now asked the Commission for proposals to complete one single market and establish another. Many observers assume that anything that is proposed by the Commission to achieve these objectives will also support the European telecoms industry. I am not sure the position is so straightforward: there are many policy initiatives that are likely to improve the health of the European telecoms sector which have no obvious relationship to anything we might recognise as a ‘single market’, whilst there are a number of conceptions of the ‘single market’ that I think would either have no impact for, or would be positively harmful to, the prospects of Europe’s telecoms operators.

Clarity is not helped by the fact that some of the proposals will be unpalatable to one side or another, and so proponents hide them behind empty phrases which everyone can support so long as they remain empty.

This is an important, perhaps historic, opportunity for Europe’s telecoms policy to take a new direction.

More clarity in the language we use and precision in the ideas we have will be needed if we are to grasp it.

Richard Feasey is Group Policy Advisor at Vodafone Group plc.

Views expressed in this article are personal to the author.

2 http://www.itu.int/en/wcit-12/Pages/default.aspx
In March 2013, the IIC Telecommunications and Media Forum (TMF) in Brussels considered a range of legal and regulatory challenges for the European communications sector. After some opening remarks from Catherine Rutten (Member of the Council, Belgian Institute for Postal Services and Telecommunications) calling for stakeholders to step out of their comfort zones and to give customer needs more attention, the Forum addressed the future of European telecoms regulation, spectrum allocation policy, principles of copyright protection in a single digital market, the ramifications of WCIT, and the impact of connected television.

The future of investment, structure and competition for European telecoms

In the chair for this session, Marc Furrer (President, Swiss Federal Communications Commission) depicted the rapid changes in the telecoms market and in consumer expectations. He explained that services such as cloud computing and video required enormous bandwidth, which the current PSTN-based network architecture had difficulty supporting.

Remodelling the regulatory framework?

The panel noted that current regulation tended to segment markets based on technology. By contrast, consumers demanded speed, access everywhere, and quality (especially for enterprises). It was suggested that consumer demands be reflected in the market definitions to be adopted by the European Commission, rather than focussing on rapidly shifting technologies which do not necessarily provide a robust frame of reference for future-proof regulation.

Stimulating investment

Several panellists argued that regulatory pressure should be alleviated, and that taxation on the investments required for broadband deployment should be reduced. Additionally, it was argued that efforts to date placed too strong an emphasis on infrastructure subsidisation while overlooking the effects of business plans.

Business perspective

Industry players expressed the view that there was a business case for next generation networks and that their investments were driven more by commercial, rather than regulatory, reasons. The issues of legal certainty, predictability and level playing fields did arise, but these were primarily fuelled by discrepancies in regulation and by the behaviour of local authorities. A panellist argued that there might be too much emphasis by policymakers on deployment costs, argued that greater power over pricing was required to justify next generation network investments.

Spectrum allocation

Pearse O’Donohue (Head of the Spectrum Unit, DG CONNECT, European Commission) emphasised that, over the past five years, an increasing number of people had come to understand the fundamental role that spectrum policy plays. Although the digital dividend enabled regulators to mature in their understanding of what needed to be done, much had yet to be accomplished (e.g., a policy format for sharing spectrum and enforcing the 800 MHz Decision). In the view of the speaker, a first step might be to identify available spectrum bands, including those that are in use, and to determine how to improve spectrum use through efficiency measures, while ensuring that current users of spectrum would not be deprived of their rights.

The spectrum inventory

The European Commission had yet to determine a specific timetable for the spectrum inventory. It was committed to pursuing its in-depth analysis, and hoped to have taken important decisions regarding the 700 MHz band by WRC-15. There was an expectation that the inventory would be up and running in June 2013 and that certain bands would be prioritized.

The notion of efficiency

How one defined “efficiency” was critical in determining the appropriate allocation of spectrum. The European Commission was building its knowledge on what constituted efficiency by using a bottom-up approach. In any event, the Commission would be under an obligation to consult users and operators in preparing its Impact Assessment.
Copyright in a single digital market
The panel weighed the relevance of current copyright law against the dramatic changes brought about by use of the Internet. The extent to which “fair use” sufficiently addressed the increase in the sharing of copyright materials was discussed, as well as the accessibility and preservation of cultural works.

Copyright enabling innovation
A panellist expressed the view that copyright facilitates innovation by allowing companies to introduce their products in varied formats, while ensuring a fair return on their investments. For instance, companies could offer a digital copy to users purchasing a movie in disc format.

Reforming copyright?
Another panellist opposed copyright law and stated that sharing is paramount in the digital era and should not be adversely affected. It was noted that enforcement over the Internet had been rendered much more complex for technical, legal and societal reasons. It was also noted that enforcement policy should take note of the demand from civil society for greater flexibility in access to knowledge.

After WCIT
US Ambassador William E. Kennard gave his view on the United States’ position during WCIT. The Ambassador proposed a return to the “first principles” of the Internet, which had led to unimaginable economic and social benefits. According to the Ambassador, though many take the Internet’s success for granted, only two billion people had access to it, and there was a responsibility to ensure that the next billion who would join in the next few years had access to the same freedoms that the first two billion users have enjoyed.

A panellist argued that the Internet was causing some measure of culture shock, as the two billion people with Internet access are but one click away from one another. In order to address that issue, dialogue needs to continue, including with persons who are not enfranchised under the present formal structures.

Another panellist stressed that it was important that the freedom to innovate and the freedom to price according to demand should be recognised.

“Connected TV” in the European market
The panel, composed of regulators and private parties, considered the future of television, given that the platform is undergoing considerable changes in relation to Internet connectivity.

The EC’s Green Paper on connected television had yet to be published. However, there were indications it would take a broad view, for instance, with the inclusion of tablets as a display mechanism. Connected TV adoption was quite low but was on the rise, and incumbents were facing strong competition. The EC was expected to address the protection of minors and accessibility, especially given the many display mechanisms available.¹

One panellist suggested that “windowing” does not make sense and that it is the sources of content that should occupy the centre of attention, rather than the final display mechanism. In that perspective, it would be useful to rethink the Audiovisual Media Services Directive.

Conclusion
The Forum successfully addressed many of the burning issues that confront EU telecommunications and media policy and regulation, with participants expressing their interest to continue discussions at the IIC Forum in Istanbul, scheduled for June 2013. Although many of the issues discussed were “work in progress”, positive policy outputs nevertheless were keenly anticipated by the end of the year on many of the topics discussed.

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Introduction

In 1999 the parliament of the United Kingdom “devolved” powers to a newly created Scottish parliament, including press regulation, but not for competition, broadcasting or telecommunications. To complicate matters, an assembly was created in Wales and, following the peace settlement, another assembly in Northern Ireland. Each was different, with the UK Parliament holding different powers in respect of England, Northern Ireland, Scotland and Wales.

In 2011 the Scottish National Party (SNP) won the elections to the Scottish Parliament, promising a referendum on independence. Following agreement with the UK government on the necessary powers, it is to be held in September 2014. The possibility therefore is for partitioning off around 8 per cent of the UK ICT ecosystem, splitting markets for telecommunications and media, for which there are no applicable precedents.¹

It is presumed that Scotland would become a Member State of the European Union, compliant with the *acquis communautaire* and participating in the various European regulatory networks (e.g., BEREC). The mechanism for membership is disputed, but it should be a simple matter.

The easiest way to comply with the *acquis* would be to make existing UK laws for media, telecommunications and competition into Scottish acts. These could then be modified, for example, to change the names of the institutions and to reduce the size of boards. The new ministries, regulators and appellate bodies would need to be created before independence when they would take over full powers.

The SNP has proposed merging many of the existing sector regulators with the new competition authority, while removing broadcasting regulation, previously the responsibility of OFCOM, to a body for all media regulation.² This approach may require new transpositions of the EU directives - certainly it necessitates complex primary legislation that would take time to enact.³

The Scottish Parliament lacks the powers to create the legal frameworks until after independence, so that it would have to obtain from the UK Parliament the necessary authority.

Broadcasting

The biggest challenge for media with independence is the continuation of the television licence fee. The prospective loss of output from the BBC would provide those opposed to the licence fee an opportunity to seek its abolition in Scotland.

The need to negotiate with the BBC the purchase of some of its output presents editorial and financial challenges. Someone would have to buy enough to satisfy viewers and listeners, while retaining sufficient money to pay for increased Scottish content, but with various additional calls on the money already evident.

A new broadcaster, built on those parts of the BBC in Scotland, would face immediate competition from Scottish Television (STV). It would also have to face Sky, which is a very strong player in the UK and Irish markets, not only in output, but in the purchase of media rights to sporting events.

Prior to the digital switchover, a commission was created by the Scottish government to examine broadcasting.⁴ It argued for increased local production capacity, seeking a greater share of the commissioning from the BBC and Channel 4, while it advocated a new Scottish digital channel. Independence would bring something built on the BBC in Scotland, but the BBC in London and Salford would no longer have the same need to commission foreign production.

There has been considerable discussion in the UK about the issuance of royal charters by the Privy Council, a committee of senior UK government ministers, dating back almost to Norman times.⁵ It is proposed this be used to create the body to regulate the press, following the Leveson Report.⁶
Regulation of the press being a devolved matter and in the absence of the exemplary damages awarded in English courts, the Scottish government created an expert group to evaluate the findings of Leveson. The resulting McCluskey Report, while still seeking to avoid prescription by statute, proposed a universal regime for publishers.7

However, the Scottish Government quickly distanced itself from this proposal. There is a continuing debate on the form of regulation for the press, including how to regulate bloggers.8

As a member of the EU, broadcasts from other Member States to Scotland, including those from England, would be governed by the amended Audiovisual Media Services Directive.9 This has not yet been a factor in the debate in Scotland.

There is no shortage of broadcasting capacity with digital radio and television networks in place: DAB and Freeview. The challenge would be to fill the capacity.

Should the referendum fail for the SNP then the Scottish government would need to reconsider its role in the UK-wide media ecosystem and whether to seek devolution of some additional powers to Scotland.

Telecommunications
Becoming a Member State of the EU in March 2016 would require immediate action for telecommunications. The necessary legal instruments would have to be drafted in advance of the referendum, in order that legislation could be laid before a suitably authorised Scottish Parliament, soon after a yes vote. Creating a proto-regulator would need to be begun quickly in order to recruit suitably qualified staff, to rent offices and to set up administrative arrangements.

While UK licences and general authorisations could be “rolled over” or grandfathered for Scotland, it would be necessary to make some changes. Consequently, a consultation would be needed on the licensing framework, followed by consultations on the licences and general authorisations, with the possibility of appeals to a new Scottish competition appeal tribunal. Scotland has about one quarter of the population density of the UK so that coverage obligations might need to be varied or the costs of the additional coverage set out in the impact analyses that accompany the consultations.

The SNP administration in Edinburgh seems unhappy with the levels of rural coverage for mobile and broadband, suggesting it wants tougher licence conditions. A further issue is that since most of the rural broadband developments are being funded by the UK government, it would need to commit to at least the same level of spending.

Perhaps the biggest problem is of information asymmetry between the operators and the proto-ministry and proto-regulator. An operator might challenge the regulator to be allowed to raise wholesale or retail prices because of higher costs, but the regulator would lack the underlying cost information to determine if the request was valid or a bluff. Scotland would need to apply to ISO for a two-letter country code to replace .UK, though the obvious combinations are taken.10 Once independent, Scotland would apply to join the United Nations and once membership was granted, it could apply to ITU for a country code to replace the existing use of +44.

Conclusion
The lessons from the independence exercise are of interest not only in Scotland, but are also relevant to Flanders, Wallonia, Catalonia, the Basque Country and, perhaps, Northern Italy.

The approach of the SNP administration in Edinburgh seems to be to complicate matters unnecessarily. It is proposing a remarkably short transition of 18 months from the plebiscite in September 2014 to independence in March 2016. The white paper setting out its detailed plans for post-independence Scotland is due only in November 2013. It would have to negotiate complex financial matters, the removal of nuclear bases, the writing and adoption of a constitution, EU membership and new laws and regulatory frameworks for media and telecommunications. At best, such haste risks errors by government, parliament, regulators and operators.

Splitting off part of a regulated single market and of the various integrated ecosystems is far from impossible, but does require considerable care.

Opinions polls suggest there is little chance of the SNP winning the referendum, with the no votes very likely to predominate. Thereafter, it is likely that the devolution arrangements will be re-examined, not only for Scotland, with some thought having to be given to how to regulate the media and telecommunications in a quasi-federal state.
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The views expressed are the views of the author and are not intended to represent the views of the IIC.


5 http://privycouncil.independent.gov.uk/

6 http://www.levesoninquiry.org.uk/


9 Directive 2010/13/EU on the coordination of certain provisions laid down by law, regulation or administrative action in Member States concerning the provision of audiovisual media services.

10 http://www.iso.org/iso/home/standards/country_codes/iso-3166-1_decoding_table.htm

News

An end to anonymity

A study of fifteen months of human mobility data for one and a half million individuals found that traces were relatively unique. Four spatio-temporal points were enough to identify uniquely 95 per cent of the individuals in a set of their hourly locations generated from mobile operators. Even coarsening the granularity of the data provided little more anonymity.


Massive open online courses

One of the recent applications on the Internet to generate excitement is the offer of Massive Open Online Courses (MOOCs), which enable free or very low cost university-level education on truly enormous scales. Kevin Werbach (@kwerb), well known from Supernova and as an advisor to the US Federal Communications Commission, offered a 6-week course from 1st April on Gamification: “the application of game elements and digital game design techniques to non-game problems, such as business and social impact challenges”. He signed up over 50,000 students at https://www.coursera.org/course/gamification

Concerns include the true openness of MOOCs and the extent to which they can meet the needs of those underserved by the university market.
The open data on these courses suggests completion rates can be low, typically less than 10 per cent.

http://www.katyjordan.com/MOOCproject.html

**Africa**

The African Development Bank (AfDB) has launched a programme to improve data management and dissemination in Africa. Ultimately, it will support improved data quality and facilitate dissemination and wider public access to official statistics and thus better policy formulation, monitoring and evaluation. Work is underway at the African Union and 13 countries. The AfDB plans to complete the installation of data portals in all 54 African countries and 16 sub-regional and regional agencies by the end of July 2013 on a common IT platform with live links between countries.


**infoDev work programme 2013-15**

The infoDev programme has evolved from its focus on ICTs for development to being a facilitator and supporter of innovation and technology entrepreneurship for jobs, livelihoods and sustainable economic and social development. Its flagship project has been the Mobile Applications Laboratories (mLabs), funded by the government of Finland and implemented by infoDev in partnership with Nokia, delivering a pioneering intervention to invent and deploy mLabs to help create the next generation of apps entrepreneurs. It has supported over 1,600 developers and entrepreneurs in developing countries, bringing 120 new mobile applications to market, with over 40 of them have secured investments, which totalled more than USD 13 million.

Its new three-year programme aims to improve employment, competitiveness, and sustainable, inclusive growth for these innovative, technology-enabled ventures.


**Protecting and empowering consumers in the purchase of digital content products**

The OECD has published a report on ways to improve consumer experience in purchasing digital content products. Availability has been improved by the spread of broadband, mobile devices and online and mobile payments, which enable products to be downloaded, streamed or accessed through IPTV on a range of networks, including online retail platforms and social media. While demand has increased rapidly, the OECD found challenges that undermined confidence in the market including:

- Inadequate disclosures about product usage or interoperability limitations;
- Product access and quality problems;
- Unclear rules on the collection, usage and sharing of data provided by consumers as a condition for purchasing products; and
- Inadequate dispute resolution and redress mechanisms.


**France - Data protection**

In 2012, the Article 29 Working Party of EU data protection authorities investigated Google’s privacy policy to determine if it met the requirements of the European Data Protection Directive (95/46/EC). In October 2012, they called on Google to comply with their recommendations within 4 months.

A working group, headed by the French Commission nationale de l’informatique et des libertés (CNIL), continues the investigation, hoping to make significant progress before the summer.


**France - Voice telephony as a criminal offence**

Registered in Luxembourg, Skype offers French users of the Internet the opportunity to make telephone calls to numbers in France. The French regulator, the Autorité de régulation des communications électroniques et des postes (ARCEP), has declared that the service, is in effect, telephony and should be registered as such in terms of Article 33-1 of the Post and Telecommunications Code (CPCE). ARCEP, having repeatedly asked Skype to declare itself as an operator, has referred the matter to the Paris Prosecutor since the failure of a telecoms operator to register is a criminal offence.

http://tinyurl.com/franceskype

**Myanmar**

The political and economic reforms continue in Myanmar at a stiff pace. The government intends to issue mobile licences and has attracted a remarkable level of interest. Ninety companies submitted expressions of interest, filtered down to a dozen.

For example, Denis O’Brien leads a consortium with partners from Singapore and Myanmar, while China Mobile has joined up with Vodafone, and the Lebanese-backed MTN Group and the Singaporean SingTel are among those hoping to win a licence. The “concessions” are expected to cost USD 200 and 500 million, with the process expected to be completed in June 2013.
China

A remarkable number of firms manufacture equipment in China, but there are only three mobile operators: China Mobile, China Telecom and China Unicom. The majority of their stock is still owned by the State-owned Assets Supervision and Administration Commission of the State Council (SASAC), though some shares have been floated on the stock exchanges of Hong Kong SAR, Shanghai and New York.

In January 2013, the Ministry of Industry and Information Technology (MIIT), opened a consultation on the possibility of increasing competition by allowing mobile virtual network operators (MVNOs) access to the three networks. The contenders to be the MVNOs appear to be domestic Chinese firms (e.g., Alibaba and Tencent).

USA - Privacy and the Internet of things (IOT)

The Federal Trade Commission (FTC) has launched a consultation on consumer privacy and the security issues posed by the growing connectivity of consumer devices, such as cars, appliances, and medical devices. It has invited comments on these issues and will hold a public workshop in November 2013.

Universal service funds

The GSM Association has called for governments to reassess the levies raised for universal service funds. It has found that the funds were failing to deliver wider access to services and has called for market-based solutions which it says are more effective. In some cases the collected fees have simply not been spent. “There is no evidence that Universal Service Funds are an effective way to achieve universal service goals and in fact they may be counter-productive, as taxing commercial investors in such a way makes rural investments less likely.”

Australia's NBN

The Australian Communications Action Network (ACCAN), funded by the government, has published research on the first users of the National Broadband Network (NBN).

Of 282 households participating in the survey, half reported no real change in the price they paid for Internet service. People were willing to pay a little more for higher speeds Internet and larger download allowances, while some made savings by switching to VoIP from a traditional phone.


USA - Transition to all-IP interconnection

After several years of discussion and preparation, the Federal Communications Commission (FCC) has launched the transition to all-IP interconnection. It will authorise IP-based providers to obtain telephone numbers directly from the numbering administrator and has invited comments on the issues around databases and routing that would have to be resolved to enable the transition to all-IP interconnection.

State of the Internet

Akamai reported that quarter-on-quarter, the global average connection speed rose 5 per cent to 2.9 Mbps, while year-on-year average connection speeds grew by 25 per cent. Hong Kong again claimed the highest peak connection speed at 57.5 Mbps, a rise of 6.2 per cent from the previous quarter.

Eight mobile network providers demonstrated average connection speeds in the “broadband” (>4 Mbps) range, while a further sixty-four providers delivered average connection speeds greater than 1 Mbps.

Japan

Since 1973, the Japanese government has published an annual white paper on information and communications. The Ministry of Internal Affairs and Communications (MIC) is now consulting on the contents of the 2013 paper. In order to understand the views of the general public it is soliciting opinions via Social Networking Service (SNS) to create a “reader participatory White Paper”, allowing individual citizens to express their interests and concerns about ICTs. The “White Paper on Information and Communications in Japan created by everyone” can be found on Facebook as MINNAdeICThakusho (みんなで考える情報通信白書) and as ☰ICT_hakusho

http://www.akamai.com/StateOfTheInternet

http://www.shanghaidaily.com/nspbusiness/2013/03/26/private+firms+may+provide+mobile+services+directly/

The first undersea cable between China and Chinese Taipei, the Taiwan Strait Express (TSE-1), was launched earlier this year.


http://www.ftc.gov/opa/2013/04/internetthings.shtm

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http://tinyurl.com/GSMAusf

OECD - The economics of personal data

A new report taking an initial look at methodologies to measure the monetary value of personal data, which is seen as creating economic and social value at an increasing pace. However, it is difficult to measure or to estimate the value being generated, because of the huge amount of data being generated, but also because of the many different ways it is being used.

http://tinyurl.com/OECDpersonal
First person: Interview with Binali Yildirim, Minister of Transport and Communication, Turkey

What is your most important priority at the moment?

Without a doubt, it is the constantly evolving Internet.

The hype surrounding the Internet began in the 1990s, but it has now become a reality, an integral part of our lives. Back in the 1990s, few fully understood the importance of this invention, today it is one of the most frequently used items in our daily lives.

Only 10 years ago Turkey had 7 Gbps for the whole country with dial up Internet connections. While much of the world now has broadband Internet connectivity, we are still lagging behind. The present situation is unacceptable and becoming an information society is now a priority for Turkey.

Broadband Internet began in 2002 and we have now reached over 20 million subscribers and 50 million users. As a result of initiatives carried out across the country, we now have almost complete GSM geographical coverage. This year we initiated and signed a contract to provide GSM coverage to the remaining areas.

Thus, Turkey will be the only country in the world in which the entire population has mobile coverage. Turkey now has a real sense of becoming an information society. We have made a serious breakthrough and have also implemented e-government projects.

Education, health, social security and agriculture are among the areas covered by a total of 637 online services provided by public institutions and already serving 3.14 million users.

There are also critical infrastructure needs in our country. We are dependent on imports for products, and we need to develop domestic technology and know-how for the production of national solutions. So we attach great importance to research and development.

We are looking to develop the area of technology and to play a part internationally. To this end, we put a strong emphasis on research and development in the Electronic Communications Law. There is seed funding for private research and development projects in the ICT sector to encourage domestic innovation.

An annual R&D fund of up to TL 300 million has been established. We have added specific research and development articles to the Electronic Communications Law and we have started to transfer funds for R&D activities. These funds came into effect in January 2013 and we aim to raise the IT sector’s share of R&D expenditure to 50% through to 2023. These authorizations are central to the R&D infrastructure and will allow companies to grow, to invest further in R&D, and to produce and, hopefully, export local products.

With the development of the IT industry and the spread of the Internet it is also important to combat emerging cyber threats. Cyber security is now very important. TÜBİTAK, our national research and development organization with which we have long collaborated, will work to meet the cyber security requirements of our country. Citizens’ personal information, proprietary and confidential state information, which are electronically processed, will be given special attention.

For this reason, as well as to ensure we identify and coordinate the implementation of these measures, a cyber security body has been established. This Cyber Security Council, along with other public institutions and organizations, will ensure that information and data are protected and will determine the relevant procedures and guidelines to be followed. To this end a national cyber security strategy document and action plan are being prepared.

Given the very large rural areas in Turkey, which mechanisms are the government using to ensure they are provided with fixed and mobile broadband?

The answer to the previous question gives some indication of what we are doing. The government really cares about this issue and we have worked hard to improve the situation, including the use of legal instruments.
We launched a project called “the establishment and operation of infrastructure in areas that have no mobile network coverage” through which mobile communication infrastructure will be provided in 1,799 settlement areas which have a population of less than 500 people.

It is required that, within three years, the entire population in metropolitan municipalities be reached. Furthermore, within six years, populations in provincial and district municipalities must have network coverage and within eight years, all settlements with a population of more than 5,000 people. In ten years all settlements with a population of more than 1,000 people should be provided with network coverage.

In addition, at the request of operators, we are prioritising the development of 3G infrastructure and we aim to expand this to populations in less dense rural areas. Over time, in accordance with operators’ obligations to give rural areas 3G coverage, mobile broadband coverage will be increased.

**Turkey has had to engage with the EU approach to legislation and regulation of the telecoms and media sectors. In what ways have you had to tailor this to fit circumstances in Turkey?**

Turkey has been a candidate member since the 1999 Helsinki Summit. There has been intensive work in the field of electronic communications to ensure regulatory compliance.

In 2008, Turkey began accession negotiations on Chapter 10 (ICTs). Since then, there has been even closer cooperation with the European Commission.

I am pleased that Turkey has made significant progress in terms of legislative alignment in this area. Our goal is to promote competition, but also to protect the rights and interests of consumers and to develop appropriate policies. In this context the EU regulatory framework and the European Digital Agenda are our starting point.

**You have a large and growing software and IT services industry, what are the roles of government in supporting this?**

Each year, operators working in the electronic communications sector (hardware and software) must put at least 40% of their investments into R&D projects in the field of information and communication technologies. An R&D centre has been established in Turkey. All supplier companies who make at least 10% of their products or systems in Turkey are obliged to pay funds to this centre.

On the other hand, in keeping with the Law on Electronic Communication, and as set out in the regulations established by the Ministry, grants for research, development and training activities related to the electronic communications sector must not exceed 20% of the current revenues of the Authority who will transfer the allocated resources to the Ministry.

**What role do you see for foreign investors in Turkish ICT markets?**

Since 2003, the ICT sector in Turkey has grown 2-3 times faster each year than in the previous year. This has been due mainly to steps taken to eliminate regional disparities.

Nevertheless it is clear, at this point, that the level of public investment is not sufficient for the development of the sector. We must ensure direct investment by the private sector and through public/private partnerships.

As a Ministry, which includes transport as well as information and communication technologies, it is difficult to reduce deficits (which occurred before 2003), and, at the same time, endeavour to focus on achieving long-term solutions.

We have the Electronic Communications Law, private research and development for the sector and R&D activities to provide funds for the R&D Fund created in January 2013. This should raise the ICT sector’s share of R&D spending to 50% by 2023.

In addition, global mobile device manufacturers, as well as local companies, are investing in domestic R&D with the aim of improving the sector. We believe that Turkey will become an important trading partner in this sector internationally, and we will offer support and incentives for firms to invest in Turkey.

I should point out that under the laws of the Republic of Turkey, companies who wish to offer electronic communications services are only subject to authorisation for a particular service. To carry out necessary related activities such as for equipment sales and installation, maintenance, repair and any consultancy activities, joint stock or limited liability companies must be established.

In this context, a foreign company that wishes to establish a joint stock or limited liability company and so invest, can enter the sector in Turkey.

In addition, there is no distinction made between domestic and foreign persons in terms of the ownership of companies that offer electronic communications services.

You will also be aware in relation to the policies governing the operation of the Internet, that ICANN, the body that is responsible for names and numbers for the Internet or, put simply, the “United Nations of the Internet”, has decided to create three global centres.

Under this new setup, Turkey is the administrative centre of the Internet for Europe, Middle East and Africa. One third of the Internet will be managed from a centre in Istanbul.

This is an important development for our country and a major opportunity for foreign investment.

These management centres are of great importance in determining the future of world Internet strategies and, for the ICT sector in Turkey, are the most important indicator that the future is full of great opportunities.