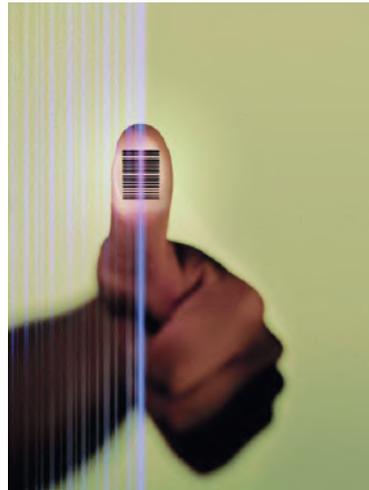


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by Fabio Colasanti

Where is the telecom sector going? Do we need to tweak again the regulatory approach?



The liberalisation of the telecom sector that we have witnessed throughout the world has been based on two tenets: a) reliance on the private sector for the roll out of networks and the provision of services and b) the imposition of “economic” regulation aimed at creating in the sector the conditions that would exist if full competition prevailed.

This approach has reached an almost “elegant” formalisation in the regulatory framework adopted by the European Union in 2002, but it is also the basis of the policies followed in many other industrialised countries. The first “tenet” mentioned means also that the state will intervene directly in the construction of the networks or in the management of services only in the presence of a clear “market failure”. The second means that regulation is used extensively to create conditions where alternative operators have access to the existing infrastructure under conditions as similar as possible to those enjoyed by the retail arm of the incumbent. In addition, regulation aims to arrive at a situation where durable competition is achieved thanks to the existence of competing infrastructures and “service competition” is only a temporary stepping stone to the ultimate goal.

This approach has been criticized by the incumbents, especially when applied to new networks (e.g., NGA), but it is usually credited with having contributed significantly to the development of the sector. Over the last few years the criticism from the incumbents has become more vocal, especially in Europe where many large operators are facing stagnating revenues. The approach was intensively discussed in the European Union from 2006 to 2009 on the occasion of a revision of the basic directives, but it survived the exercise unchanged in its fundamental provisions.

No one, apart from the incumbents, is openly challenging the approach, but a number of actions and initiatives prompt questions about the extent to which policy makers still support it wholeheartedly.

Policy makers seem to be unhappy with the pace of the roll out of very fast communications networks by the private sector. Money is being invested in fibre developments in some of the most advanced parts of the industrialised world, where it seems difficult to argue there is a “market failure”. In certain cases, governments are discussing the setting up of public companies tasked with the building up of a new national fibre network. A number of countries - recently Australia - have gone ahead with such a plan. Do policy makers still believe that the private sector can deliver the networks our societies need?

In 2000, the United States departed somewhat from this approach, relying on the competitive pressure coming from cable. But most other countries followed it. Last year, however, the Brazilian authorities decided to grant a nine year “regulatory holiday” for new fibre networks. Less extreme forms of “tolerance” have appeared in the decisions of other regulatory authorities.





Ten years ago, competition rules were ruthlessly enforced in the European Union, even to the point of covering “passive infrastructure”. Today, in the face of popular resistance to the proliferation of masts and antennas and confronted with the high costs of investment in NGAs, regulators are encouraging operators to cooperate and share more than simply “passive infrastructure”. European policy makers have also appeared to take a more direct regulatory approach to the roll out of NGA networks with suggestions that some cost orientation decisions may be tweaked to discourage reliance on the old networks or to encourage the roll out of new ones. Recently, a story appeared in the *Financial Times* saying that the major European telecom operators were considering pooling together their networks in a European-wide single network (which would have certainly been severely regulated; a sort of voluntary “structural separation”?). The story may have been true or may have been apocryphal, but the shares of most companies went significantly up during the few hours that followed the publication of the story. Do policy makers still believe that infrastructure competition is the ultimate goal? Just as important, do the markets believe that infrastructure competition is the best option from the point of view of the investors?

These are some of the most obvious indirect challenges that are being raised against the current regulatory approach. There is a need to discuss them and see whether regulatory changes are indeed necessary. In addition, there seem to be important diversities appearing. North America seems to be an area where the sector is developing at a healthy pace, but also thanks to relatively high prices. Most of Europe seems to be offering “low cost” telecom services: prices are low, but the service is not exceptional. Yet even the European landscape is not a uniform one, a few large companies are doing quite well.

More generally, policy makers throughout the world should ask themselves where the telecom sector is going. They should try to understand what are the major factors that are shaping the evolution of the sector. Certainly the desire of consumers to access content from different devices is a powerful factor and one that should be accommodated. How different will the telecom networks be from the content delivery ones? Where will the “telecom cum audiovisual” sector be in five or ten years from now?

Regulatory changes take a long time to produce effects. The lead times are very long, especially in the European Union, and industry has to be given sufficient time to adjust. Discussing changes today, may mean regulatory changes in two or three years from now, their implementation in three to five years and changes on the ground even later.

The International Institute of Communications believes that attention has to be paid to the many important issues that are on the table now (spectrum, data protection/privacy, OTT vs. telcos, cloud computing, governance of the Internet, etc.), but that it is also necessary to start discussing again more fundamental issues and will make its contribution through the Telecom and Media Forum Series, its Annual Conference, its International Regulators Forum and through *Intermedia*.

Fabio Colasanti is President of the International Institute of Communications. He was previously a Director-General at the European Commission, responsible for the Information Society and Media, before which Enterprise. <http://www.iicom.org/>

The views expressed are the views of the author and not intended to represent the views of the IIC.

by Bill Melody

Ultra-fast broadband in Europe: Platform for resurgence of the incumbents

Progress toward the EC Digital Agenda targets

Universal access to “fast and ultra-fast” broadband to support the European Commission’s Digital Agenda is the new long range (up to 2020) EU policy intended to establish seamless European markets in digital products, services and applications. It is claimed this will make Europe a world leader in the highly competitive global information age economy. Grand goals have been announced by the EC, with the Member States requested to develop national broadband plans that meet the coverage, speed and take-up targets defined in the Digital Agenda for Europe (EC, 2010).

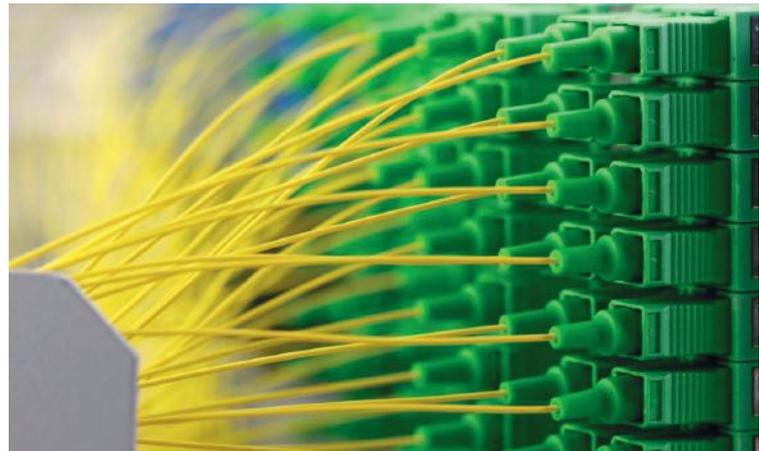
The EC states that to keep up with the global leaders, South Korea and Japan, Europe needs Internet connections with download speeds of at least 30 Mbps for all households and 100 Mbps for at least 50 per cent of households subscribing to Internet connections by 2020. Mobile networks should meet the target of 100 per cent coverage of 30 Mbps broadband by 2020, but only fixed networks can be expected to reach the 100 Mbps target. These Digital Agenda targets will be achieved by stimulating investments in broadband infrastructure and next-generation digital access networks. However, the telecom sector has been pretty slow out of the starting blocks.

So far progress has not been nearly rapid enough to reach the desired targets. The EC claims that by 2013 the entire EU population is expected to have access to some form of broadband service, and there will be almost 50 per cent coverage with 30 Mbps access. But only 8.5 per cent of fixed lines are capable of delivering speeds of 30 Mbps or higher, and coverage with 100 Mbps is marginal. The main reason is that most broadband is provided using 3G mobile technology, and most fixed network broadband is supplied over the copper network infrastructure of incumbent operators, neither of which has, nor is expected to have the technical capability of providing ultra-fast broadband in time to meet the EC targets (EC, 2010).

The broadband success to date in Europe has been driven primarily by smartphones and related mobile handset developments. Mobile broadband penetration in Europe passed fixed network penetration in 2008, and by 2011 had almost twice as many subscribers, with 43 per 100 people. Fixed network broadband penetration was 27.7. At the end of 2011, 75.6 per cent of fixed broadband subscriptions were provided with ADSL over copper networks. Only 3.5 per cent were provided over fibre networks (FTTx) and only 1.2 per cent over fibre to the home (FTTH/B) connections. Of the FTTH/B homes passed, 30 per

cent were provided by incumbent operators and 70 per cent by competitive operators, municipalities and other public organizations. Thus, only 0.36% of fixed broadband subscriptions were provided by incumbents over fibre networks, despite being the overwhelmingly dominant providers of telecom infrastructure (ETNO, 2012).

Although 4G and other advanced mobile networks are expected to play an important role, the prime technology for providing the desired ultra-fast broadband infrastructure enabling next-generation digital access is fibre because it is the only technology seen as being capable of providing 100 Mb/s to the home. The investment the EC is promoting most heavily is in fibre networks but, while essential to meet the 2020 Digital Agenda broadband objectives, the rate of investment is embarrassingly slow. A major challenge for the EC is fashioning policies to stimulate the needed investment in ultra-fast broadband fibre network infrastructure capable of delivering 30-100 Mbps to the home.



Stimulating Network Investment: 2012-20

EU Policy 1987-2012: Market Liberalization

Since the Green Paper in 1987 began the telecom reform process in Europe, a central theme of the evolving policies and programmes has been providing new opportunities for competition in the formerly monopolized national telecom markets. Enhancing competition has been the prime vehicle for stimulating market development, efficiency, innovation and new investment.

The first wave of liberalization reform focused on the introduction of competition into the telecom sector, and the second wave into the converged ICT sector, providing the enhanced infrastructure for the Internet. The current third wave of reform, the Digital Agenda, is focused on establishing a further upgraded European telecom/ICT/Internet infrastructure as the foundation for driving economic growth in the new digital economy and information society (Melody, 2013b).

The original objective of liberalising access to national markets as a step to establishing competitive European single markets in telecom network provision and services

remains unfulfilled, as neither fully competitive markets nor European single markets have been achieved. The EC sector review that led to the Digital Agenda notes that although competition had grown in some markets and countries, it had not done so in many others. The European market is still largely fragmented, with few operators offering services across several Member States. The review concludes, as did past reviews, that, “the revised rules would focus regulation on those market sectors where competition is still lacking, and develop stronger EU-level regulation to foster the development of the internal market” (EU, 2012).

European Industry Structure in 2012

New initiatives to strengthen competition and regulation, and stimulate investment in ultra-fast broadband across Europe must be developed from an understanding of the current industry structure and the incentives for the market players to invest. The main types of players are fixed network incumbents, established and potential competitors, and government agencies.

During the first and second waves of reform, the entry of competitors brought new investment. It also stimulated incumbents to invest

more than they would have without a realistic threat of competition. Both competitors and incumbents paid more attention to market development and took greater risks in promoting it, demonstrating a basic principle of market economics. Incumbents also took defensive economic and political steps to restrict and delay the growth of competitors, making it more difficult and risky for them to climb the ladder of investment, thereby reducing the level of investment from what it would have been in an effectively competitive market. Government subsidies supported investment in network extensions to provide universal access to essential services.

For the ultra-fast broadband infrastructure, it is already clear that government subsidies and public investment will play a much greater role than they have in the first two waves of telecom reform in Europe. The EC has proposed a budget of €9.2bn for broadband investment from the Connect Europe Facility in the Multiannual Financial Framework for 2014-20. The national broadband plans required by the EC to meet the rollout targets of the Digital Agenda all contain significant universal access broadband subsidies.

For example, the UK government set aside £530 million as part of its 2010 spending review to fund the rollout of high speed broadband to rural areas, plus £150 million in 'super-connected cities' and £150 million to improve mobile coverage (DCMS, 2013). There will also be government initiatives at the local level in many countries.

The criteria used to allocate these very large public investments to the operators that will build these network extensions will play a fundamental role both in shaping the future structure of the industry and its markets. They provide an enormous opportunity to enhance significantly the role of competition and finally achieve the goal of competitive European markets; or they could be the vehicle for the resurgence of the incumbents in their respective national markets and the retrenchment of their monopoly power. A closer look at the incentives of the other players is in order.

Incumbents still have significant market power in most major markets. National telecom regulation varies significantly across countries. It is weak in many countries, and regulations are not applied evenly or consistently. As former national champions, incumbent operators still exercise significant political influence. Competition has a noticeable presence in national markets, but few markets qualify as effectively competitive. Incumbent monopoly power reduces the competitive threat that would stimulate

incumbents to move beyond their comfort zone and take the higher risk of longer term investment in fibre. At the same time, it increases the risk for competitors and potential new investors to do so. As a result, the current industry structure does not foster investment in longer-term capital-intensive fixed broadband infrastructure.¹

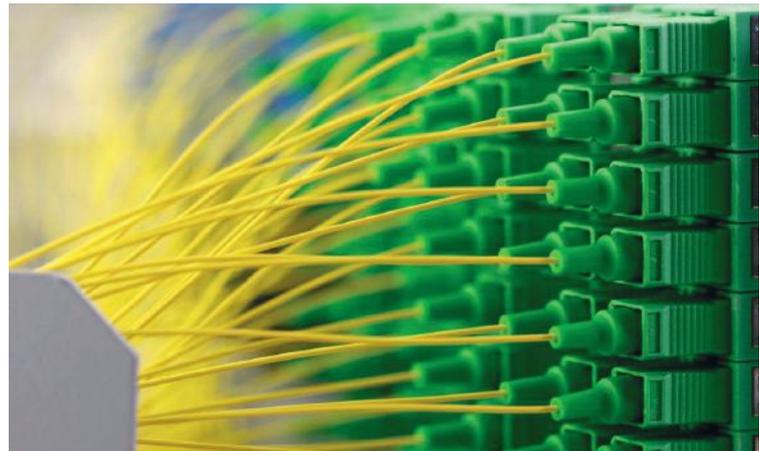
Network Competition: Copper v. Fibre Infrastructure

The most important factor influencing the incentive to invest in fibre network infrastructure is the copper infrastructure, the most important element of competition between incumbents and competitors. The copper infrastructure is a long-term, capital-intensive investment in a fixed asset-specific resource that has already been made. It is characterized by significant economies of scale and scope, and is the foundation of the revenue flows and market dominance of the incumbents. Its capabilities for higher capacity services continue to increase even though these are less than some services and users require (Melody, 2012).

The proportion of Internet services and customers that cannot be provided over the copper infrastructure is at present relatively small compared to those it can provide, and most competitors must use incumbent local networks to reach their customers. Moreover, competitors cannot provide these advanced services without incurring very large investments in alternative infrastructure (mostly fibre). Such investments carry high risks associated both with the growth of uncertain demand and the defensive reaction of the incumbents now dominating the market.

For incumbents, an enormous investment in fibre infrastructure would add only a small gain in revenues from the advanced network services. At the same time it would render obsolete their copper networks and all the advantages they provide. Financial calculations comparing copper and fibre networks must consider copper as an almost free network as the investment has been sunk, it is location specific and it has no good alternative uses.

¹The mobile sector is characterized by stronger competition and long-term network investments that are less-capital intensive and for shorter periods. But even with advanced technologies such as 4G, the allocation of additional frequencies and improvements in spectrum management, mobile is seen only as a significant player in providing capacity up to the 30 Mbps Digital Agenda target, not the 100 Mbps target.



It will be more profitable to make incremental investments to improve the capacity of the copper network until the anticipated revenues from advanced services that cannot be provided over copper justify the very high investment required for an advanced fibre network. Moreover, this principle should be applied on a block by block, not a universal, basis.

In the meantime incumbents have a powerful incentive to raise the barriers and risks to other parties that may consider investing in fibre, thereby extending the profitable lifetime of the copper infrastructure and their dominant market position. This is why incumbents have shown little interest in fibre investment. This can even make it financially justifiable in some circumstances for incumbents to buy a partially developed fibre network developed by others and not develop it further.² The bottom line is incumbents are financially required to preserve the financial viability of the copper network and delay as long as possible major investments in fibre infrastructure.

²For example, the Danish incumbent TDC purchased the fibre network from Dong Energy and has not developed it further.

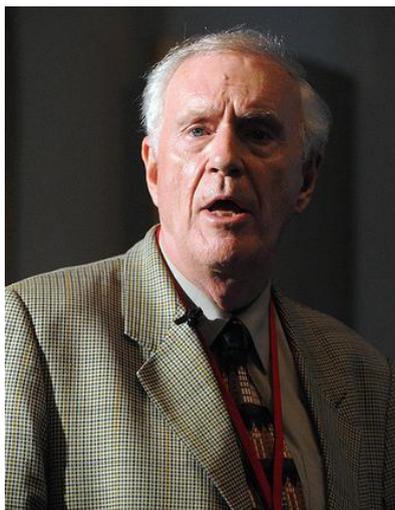
It is only competitors without significant past investments in capital-intensive, asset-specific infrastructure that can consider the revenues from all the services to be supplied over a new fibre network when assessing the financeable viability of such an investment. They are the champions of fibre in the copper versus fibre competition. For them the major risks are the uncertain growth rate of advanced services, competition for those services that can be provided over the copper network, and the threat of anti-competitive activity by the dominant incumbents.

New investment from competitors generally is prepared to assume higher market risk than would the established dominant firms. It seems clear that if the EC targets for ultra-fast broadband rollout by 2020 are to be met, it will be because of investment by competitors, including new players and new investors, and government agencies.

The Digital Agenda Broadband Investment Plan: Coaxing Incumbents

Although the Digital Agenda programme included the usual rhetoric about the EC commitment to further strengthening competition and regulation, it provided no significant new pro-competitive initiatives. The replacement of the European Regulators Group (ERG) with a now 27 country member Body of European Regulators for Electronic Communications (BEREC) with a remit to facilitate national implementation of EC Directives and to advise on EC policy and programme proposals introduces no new substantive changes, other than the movement of the head office from Brussels to Riga, Latvia. Its first major task is to assess which telecom markets can be released from regulation and which require continuing regulation (BEREC, 2013).

The obvious deficiency of investment in the rollout of ultra-fast broadband infrastructure has prompted two major responses from Neelie Kroes, the European commissioner for the Digital Agenda, both focused on the failure of incumbents to take up the investment challenge.



Initially she threatened to impose direct regulation reducing wholesale rates that incumbents charge competitors for access to customers. Such a change would be inconsequential with respect to the incumbents' copper versus fibre financial comparison, although it could help some competitors climb a rung on the ladder of investment.

More recently the commissioner changed her approach. On 5 December 2012 the EC issued a proposal intended to strengthen national regulation by providing more specific direction on cost calculations for incumbent wholesale services, as well as increased pricing flexibility and new opportunities to charge higher wholesale prices to competitors (EC, 2011). Although incumbents like these proposals, they too are inconsequential with respect to their fundamental infrastructure investment decisions. However, it would make it more difficult for competitors to climb the ladder of investment.

Tinkering at the margins of wholesale price determinations cannot provide a significant stimulus for expanded investment in fibre infrastructure. The very modest current level of investment in fibre has been provided by the competitors and public agencies. The most notable recent development is that incumbents have won virtually all of the public sector subsidy awards for infrastructure investment. On the present trend public sector investment in broadband

infrastructure will be the platform for the resurgence of the monopoly power of the incumbents in their national markets, without committing significant amounts of their own capital.

Although the commitments of public funds to help meet the ultra-fast broadband 2020 targets is extensive, it will be far from sufficient if their allocation to incumbents simply increases incumbent monopoly power, as this will reduce private investment both from incumbents and competitors. If the targets are to be met, the Digital Agenda programme must adopt significant initiatives to leverage public investment commitments to enhance competition and stimulate new private investment (Melody, 2013a). Attempting to coax the incumbents with small favours to lead the ultra-fast broadband initiative cannot succeed, and it will create new barriers to competition and the development of a European common market in digital services.

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by Jonathan Jacob Nadler, Steve Lederman, Douglas Svor
and Preston Thomas

IIC TMF Washington 2012: Policy frameworks adapting to industry changes

The IIC Telecommunications and Media Forum in Washington, DC in November 2012 explored the challenges of adapting legal and regulatory regimes in the light of rapid technological and market changes. The two-day conference included panels on the spectrum crunch, policy paradigms for Internet-based services, and privacy and data protection issues.

Solutions to the spectrum crunch

The panelists agreed that the increasing use of mobile broadband and smartphones has resulted in explosive growth of data usage over wireless networks, thereby creating a shortage of spectrum. The speakers discussed solutions to the "spectrum crunch," including using technical solutions, deploying more spectrum, sharing spectrum, and conducting secondary market transactions.

Technical solutions. The panelists supported technical solutions to ease the spectrum shortage. Representatives from US wireless carriers stated that their companies are moving to more spectrally efficient technologies as they upgrade their networks. For example, 4G Long-Term Evolution (LTE) networks are 45 percent more spectrally efficient than 3G networks.

Wireless carriers are also using network management techniques to address the increasing demand on their networks. For example, wireless carriers are using Wi-Fi to offload data traffic from their cellular networks. In addition, carriers are deploying more towers and splitting cells to increase capacity in a given geographic area. However, a panelist from a wireless carrier noted that, while this approach is effective, it is also expensive.

Deploying more spectrum. The speakers expressed contrasting views regarding whether more spectrum needs to be made available and, if so, where it should come from. Wireless carriers supported deploying more spectrum, while a television broadcast industry representative challenged the assumption that it is

necessary to provide more spectrum for wireless broadband. One panelist contended that, while the Federal Communications Commission (FCC) has made efforts over the past few years to deploy additional spectrum, much of the remaining spectrum that wireless carriers seek is used by TV broadcasters or the government - entities that currently have little incentive to relinquish spectrum.

One speaker expressed the hope that the TV broadcasters will relinquish a substantial amount of spectrum as part of the FCC's upcoming incentive auction - in which broadcasters will voluntarily relinquish spectrum usage rights in exchange for a share of the proceeds from auctioning that spectrum - but noted that this will depend on how many broadcasters participate in the auction. A broadcast industry representative noted that the growth of mobile broadcasting could affect broadcasters' willingness to give up spectrum.

Sharing spectrum. One panelist discussed the high cost and challenges of clearing US federal government spectrum and supported the recommendation of the President's Council of Advisors on Science and Technology (PCAST) that federal and commercial users share certain federal spectrum. The panelist noted that PCAST is seeking to develop "spectrum superhighways" with large "lanes" of spectrum that can be shared by federal and commercial wireless services. Sharing could get federal spectrum to commercial users in three years, which is faster than the eight to ten years it would take to clear such spectrum.

A wireless carrier panelist contended that federal agencies do not have incentives to use spectrum efficiently and cited an example in which one agency with an analog system used 20 MHz of spectrum while another agency with a digital system only used 5 MHz for similar purposes.



Another panelist suggested that adopting a sharing approach would make federal systems more efficient in the short-term, while clearing federal spectrum over time.

Secondary market transactions. Several speakers noted that the secondary market for spectrum has been very active in the past few years. Wireless carriers have engaged in a number of swaps and trades to rationalize their spectrum holdings and obtain contiguous spectrum. Transactions have included Verizon Wireless acquiring spectrum from SpectrumCo, AT&T acquiring Wireless Communications Service (WCS) spectrum and working with the FCC to modernize the WCS rules, and T-Mobile merging with MetroPCS Communications.



Policy chasing the platform

The ongoing evolution from the traditional telco model to mobile and Internet-based services also generated much discussion at the Forum. One panelist noted that one-third of customers in the US no longer have a wireline phone. At the same time, significant voice traffic is migrating onto IP-based networks. Several speakers addressed the consumer benefits that have resulted from these developments, as well as the challenges and opportunities that this has created for many industry members.

One panelist noted that, as broadband usage has grown, European telecommunications providers' revenues have declined, and suggested that operators

were not capturing a sufficient portion of the revenue generated by the growth of broadband services. Another panelist described different regulatory approaches to "sender pays" arrangements, in which Internet Service Providers (ISPs), such as Comcast or AT&T, charge content and application providers (CAPs), such as Google or Amazon, for delivering traffic to the ISPs' end users. The FCC's "Open Internet" rules expressly prohibit this practice in the US, while current EU regulations appear to allow it, and a proposal made by a group of facilities-based European telecommunications operators would make it the international norm.

The panelists went on to discuss Verizon's pending appeal of the FCC's "Open Internet" Order. Verizon argues that the agency impermissibly imposed legacy "common carrier" requirements on ISPs by requiring them to deliver all CAP traffic on non-discriminatory terms and that it violates the ISPs' constitutional freedom of speech rights by precluding ISPs from exercising "editorial control" over what they carry on their networks. One conference participant warned that if the court of appeals were to accept Verizon's constitutional argument, it would eliminate the ability of the US Congress to adopt policies governing basic elements of the telephone network, such as the duty to provide universal service. One of the panelists responded that, if the court agreed that the FCC had impermissibly imposed common carrier regulations on ISPs, it would be unlikely to decide the constitutional issue. In that case, both Congress and the FCC would retain significant latitude to impose regulation on ISPs.

The panelists agreed that, given rapidly changing technologies and evolving business models, regulatory uncertainty is likely to continue for the foreseeable future.

Privacy and data protection

The privacy panel opened with a presentation of new research into users' perspectives on personal data management. Examining the habits of average users in Canada, China, Germany, and the US, the research provides a qualitative look at the types of information users are most sensitive about, the factors that affect their sensitivity, and their self-help strategies for negotiating data transactions. This research shows that users increasingly expect privacy options to occupy a middle ground between complete secrecy and complete disclosure. Users want to be able to permit limited release or use of information, while remaining confident that the limitations they impose will be complied with after the information moves beyond their control.

The panel considered whether robust consumer privacy regulation is at odds with sustainable economic development. The speakers noted that, despite increasing sensitivity toward data collection and personal data protection, consumers routinely provide personal information voluntarily in order to obtain services. For example, a customer who uses a store "loyalty card," which typically offers discounts on specific products, provides the store with significant information regarding the items the customer purchases. Users' willingness to provide the information reflects their perception that the value of the benefit received exceeds the risk that their sensitive information will be used inappropriately. Users decide whether to make such exchanges based on their perception of the trustworthiness of the entity to which they provide the information. In making this assessment, users consider typical insignia of trustworthiness, such as website appearance and brand familiarity. Users' confidence is also affected by how consistently privacy protections are applied by different entities and in different countries.

The panelists discussed whether the Fair Information Practice Principles (FIPPs) continued to foster an environment in which users are willing to disclose personal data, given the difficulty of adapting them to current realities of data collection and use.

The FIPPs are baseline principles – including notice, consent, access, and, redress – that have formed the basis for US and European privacy regulation since the 1970s. Panelists noted that the FIPPs assume users are an active part of the process, an assumption that has been called into question by the proliferation of machine-to-machine (M2M) transactions and the sheer volume of data collection that modern users encounter. For example, while "consent" is a fundamental FIPPs principle, the vast number of times a consumer discloses personal data every day makes "opt-in" regimes – in which the consumers must affirmatively consent to the use of their data – cumbersome.

Europe's forthcoming General Data Protection Regulation, due out in 2013, drew both optimism and caution. Panelists noted that the Regulation will recognize that the sensitivity of data varies and that data that is particularly sensitive or connected to fundamental rights requires a higher level of protection than other data. This distinction, if carried into practice, is seen as a way to temper the potentially large regulatory burden of the new Regulation by permitting greater flexibility with regard to less sensitive data. On the other hand, the potentially broad definition of "data subject" could bring new and expansive types of data under the Regulation. Panelists also expressed concerns that the requirement that data breaches be disclosed to the regulator and to the data subject within 24 hours could result in so many notifications as to be a burden to both businesses and consumers.

Conclusion

The Forum advanced the dialogue regarding the spectrum crunch, Internet-based services, and privacy. Regulators and the communications industry will continue to discuss policies to address these topics in 2013.

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by Mike Nelson

The big picture on big data

Big data was the technology buzzword of 2012 and, despite a lack of agreement on its meaning, it is driving investments of billions of dollars in data storage systems, analytics software, and telecommunications services. The term “big data” is quite misleading. It actually covers:

- Big data - Millions and billions of measurements (e.g., cash register data)
- Fat data - Thousands of measurements per person (e.g., cellphone geolocation data)
- Fast data - Rapidly, constantly changing data (e.g., highway traffic flow)
- Distributed data - Information collected and stored in thousands of places that must be combined
- Messy data - “Noisy” or improperly entered numerical data and unstructured data (e.g., text, audio, video)

But while “big, fat, fast, distributed, messy data” would be a far more accurate term, it does not fit in a headline. What is different about big data? First, it is too large, changing too fast, or too dispersed to be managed using traditional database software and computer systems. Second, big data and the tools used to analyze it are giving companies and governments new insights to new markets, new threats, and new ways to better serve their clients. And the opportunities are increasing; the flood of digital data more than doubles every two years, according to most estimates.

Big data does not just mean numbers in spreadsheets, it is also text, video and images. It includes structured data in table form and unstructured data, such as e-mail messages, tweets and Facebook posts. According to a 2010 Gartner report, 80 percent of the business data produced each year is unstructured.

Why the sudden surge in interest in big data? The dramatic reduction in the cost of computing and storage made possible by cloud computing services and the spread of easy-to-use, open-source analytic tools have enabled thousands of startups and established companies to create new big data tools for research, business, government, and the non-profit sector.

Examples include:

- Marketing and online advertising (e.g., targeted coupons, Twitter trends and Google AdWords)
- Health care (e.g., epidemic tracking using Google search terms, treatment outcome analysis and fraud reduction)
- Utilities (e.g., smart grid to manage electricity production and consumption and water quality data)
- Logistics and transportation (e.g., Walmart’s supply chain management and highway traffic alerts based on smartphone data)
- Government services (e.g., more detailed weather forecasts and faster disaster response after Hurricane Sandy)
- Security, intelligence and law enforcement (e.g., spotting crime trends or tracking terrorists).

Big data is forecast to drive \$34 billion in worldwide information technology spending in 2013, a 21 percent increase from \$28 billion in 2012, according to an October 2012 report from Gartner (2012). Most of this new spending will go to buy the IT systems and software needed to store, manage and process the flood of data, which worldwide will increase by a factor of 50 between the start of 2010 and the end of 2020, according to a study by IDC (2012). The big winners will be established IT vendors such as IBM, EMC, Google, and NetApp, as well as big data start-ups such as Splunk, Kaggle, and Cloudera.



Startup companies that develop big data technologies and services will see rapid revenue growth and more market opportunities - if they can keep pace with the flood of data and make it more useful. Information technology companies that can integrate big data solutions into their offerings will give clients a new reason to invest more in computer hardware and software. Firms in sectors ranging from finance and telecommunications to petroleum and agriculture could reduce the cost of operations, improve marketing, reduce risk and launch new data-driven services. For many businesses, data could soon be as important to the bottom line as labour and capital.

A comprehensive approach is needed

Alan Blatecky, director of the Office of Cyberinfrastructure at the National Science Foundation (NSF), describes what he calls the big data cycle (see Table 1), a comprehensive approach that addresses each step of the cycle needed to harness the full power of big data.

Most of the media hype, much of the venture capital invested in big data start-ups and much of the government funding for research and development has focused on step four, the analysis of big data. A recent Bloomberg analysis found that non-defence agencies and the Pentagon spent \$3.15 billion on analytics in fiscal year 2011. However, without a comprehensive approach that includes funding for all nine steps, big data will fail to reach its potential. Analysis is only useful if the data being analyzed is properly collected, tagged, managed and explained

The role of governments in big data

Governments could and should play a critical role in spurring the growth of big data tools and services, just as they played a key role in spurring the growth and spread of the Internet and the World Wide Web.

The US government has funded core technologies for analyzing, visualizing and assessing Big Data. Federal research grants have generated new technologies that the private sector could exploit. In March 2012, the White House announced a Big Data Research and Development Initiative (White House, 2012) to encourage and coordinate development of tools and technologies needed to collect, analyze, and curate the massive quantities of data generated by government agencies and researchers. Government research programmes not only fund development and testing of new technologies and they also fund the education and training of data scientists needed to build and use big data applications. According to a report by the McKinsey Global Institute (2011), the US will face a shortage of 140,000 to 190,000 big data analysts by 2018, which could hinder the ability of businesses and governments to leverage the power of big data.

Table 1 The big data cycle and key challenges

| | |
|---|---|
| Step one - Collecting the data | |
| Get data from sensors, clickstream data and Web surfing behavior, sales data, satellite and aerial imagery, government databases, and computer models | Challenges: Volume of data; combining and reconciling disparate data types |
| Step two - Verifying the data | |
| Determine the source (provenance) and the collection technique(s) used; assess the accuracy | Challenges: Develop standards for provenance and quality |
| Step three - Tagging the data | |
| Use standards to indicate the category, quality and provenance of data | Challenges: Develop standards and tools for metadata (“data about the data”) and automated curation tools |
| Step four - Analyzing the data | |
| Use statistical methods and visualization to understand the data | Challenges: Create easy-to-use, affordable software that scales to terabytes of data (e.g., Hadoop and MapReduce) |
| Step five - Applying the data | |
| Ensure managers and executives can understand the power and limits of big data | Challenges: Develop curriculum for MBA and executive education programmes to avoid being “blinded by the data” |
| Step six - Sharing the data | |
| Use online collaboration tools, social media and other tools to get results to people who can use them | Challenges: Manage access control, digital identity |
| Step seven - Protecting the data | |
| Ensure the data is not stolen or corrupted | Challenges: Develop affordable, interoperable tools to protect large and distributed online databases |
| Step eight - Archiving the data | |
| Determine what data to keep and what to toss - and when | Challenges: Create standard procedures to assess value of data, legal requirements, redundancy of systems |
| Step nine - Repeat, reuse, remix (return to step one) | |

Governments can also spur the development of big data services by accelerating efforts to make more government data readily accessible in useful formats. Since early 2009, the Obama administration has made more than 440,000 databases have been put on the data.gov website along with more than 1200 applications for using that data. The UK government has also been a leader in make its data more useful and, in December of 2012, the European Union announced a new EU-wide Data Portal (EC, 2012).

While new applications of big data are being announced every week, there are several barriers to wider use of big data tools and services. The biggest obstacles to widespread application of big data are issues related to privacy, security and transparency and public perception that big data equates to big government, big business, and Big Brother. It is clear that the growth of big data will require new approach to privacy protection. Unfortunately, in the European Union, 20- to 30-year-old data privacy laws have held back applications of big data in marketing and fraud reduction. Regulations that require personal data be collected for a specific purpose and not be reused for other purposes will block some of the most exciting, new, big data applications that involve remixing different data sets to spot surprising trends and correlations. Concerns extend beyond protecting and restricting the use of personally identifiable information. Some privacy

advocates worry that companies could essentially decode information intended to be private or anonymous by cross-matching data sets. This would allow a company to develop a detailed digital dossier that could be used to infer what someone buys, where they travel, and with whom they associate. The solution will probably require new government imposed disclosure requirements so consumers can know what information businesses and governments are collecting about them and how it is being used.

Governments and the courts will need to address liability issues if data are incomplete or inaccurate and leads to conclusions that may be costly or even dangerous.

Laws need to be clarified on how databases are licensed, what intellectual property rights database creators have, and how data can be reused. In 2005, the European Union evaluated its data protection Directive 95/46/EC and found that it had discouraged investment in database services while the US database industry has grown rapidly.

Reconciling legal and regulatory treatment of databases will be a major challenge for companies trying to create integrated, global big data solutions. Fortunately, European officials are discussing these issues with their US counterparts. Companies such as IBM, SAP and Google have been at the forefront of efforts to encourage governments to adopt

policies to foster growth of big data applications, often working through trade associations such as TechAmerica. The policy issues are difficult and new challenges are arising as new technologies and new applications develop.

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You can follow him on [Twitter](#) @MikeNelson

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Events Diary

• February 2013

UNESCO: Towards knowledge societies: First WSIS+10 review meeting
25-27 FEBRUARY
Paris, France
<http://tinyurl.com/a5kcpkf>

• March 2013

IIC: Telecommunications and Media Forum
19-20 MARCH
Brussels, Belgium
www.iicom.org

• May 2013

WSIS Forum 2013
13-17 MAY
Geneva, Switzerland
www.wsis.org/forum

ITU World Telecommunication/ICT Policy Forum
1-15 MAY
Geneva, Switzerland
www.itu.int/WTPF

• June 2013

IIC: Telecommunications and Media Forum
12-13 JUNE
Istanbul, Turkey
www.iicom.org

CommunicAsia 2013
18-21 JUNE
Singapore
<http://www.communicasia.com/>
2013 IAMCR Conference
25-29 JUNE
Dublin, Ireland
<http://iamcr2013dublin.com/>

• July 2013

ITU 13th Global Symposium for Regulators (GSR)
3-5 JULY
Warsaw, Poland
www.itu.int/gsr13

• September 2013

TPRC41
27-29 SEPTEMBER
Arlington VA, USA
www.tprcweb.com

• October 2013

IIC International Regulators Forum
7-8 OCTOBER
London, UK
www.iicom.org

IIC Annual Conference
9-10 OCTOBER
London, UK
www.iicom.org

• November 2013

ITU Telecom World 2013
18-21 NOVEMBER
Bangkok, Thailand
www.itu.int/TELECOM

• March 2014

World Telecommunication Development Conference 2014
31 MARCH-11 APRIL
Sharm-el-Sheikh, Egypt
www.itu.int/en/ITU-D/Conferences/WTDC

by Dean Bubley

Is ubiquity in communications services over-rated?

Telecom operators, industry bodies and equipment suppliers often praise the “ubiquity” of traditional services, such as the PSTN or SMS, and the universal “reachability” of E.164 telephone numbers. This is contrasted with the “islands” of connectivity represented by Internet-based communications such as Skype or Facebook.

The desirability of ubiquity is taken to be a “self-evident truth”, an unarguable benefit, and something to be maintained at all costs, even as we move towards all-IP networks and an explosion of consumer choice through the Internet and mobile apps. However, this has five implicit assumptions that do not bear close scrutiny:

1. That the phone call - and phone number will remain our primary and optimal mode of communication.
2. That IP-based versions of those services (generally IMS-based) are “entitled” to ride on the coat-tails of their ubiquitous circuit-based predecessors, and will inevitably become ubiquitous.
3. That the classical model of each telecom company owning its own (commodity) switches and applications, and interoperating/federating them, will remain central.
4. That communications services will remain as billable “services”, rather than becoming “products”, or just “features” or “functions” of apps.
5. That consumers always prefer interoperable and universal services, rather than fragmented or “silo” alternatives.

Facebook has already passed a billion users and mobile operators holding back commercial VoLTE (Voice on LTE) rollouts until 2014, there is clearly a reality-check needed about what will be “ubiquitous” and when. Indeed, if that is even a desirable goal.

The phone call was revolutionary 100 years ago, but was not a true reflection of how ideal human spoken communication, being interruptive, suffering from the

“hegemony of the caller”. It brings a host of social, technical and legal rules as baggage. You only need to look at how a person’s behaviour and body-language change when they’re on the phone, to realise that it’s not a perfect equivalent to face-to-face spoken communications.

It is fine for certain types of interaction, but inadequate for others, with many people now pre-scheduling calls, or “escalating” from IM or SMS chats. We see the emergence of new forms of voice communication (e.g., “ambient”, app-embedded or in-game chat). Some markets like the UK have gone past “peak telephony”, with minutes-of-use falling.

Voice is much more than just “telephony”, splintering into many forms, each defined by its intention and context. For example, we will book a cab with a taxi app, with a “speak to the driver” function if we cannot find where the vehicle is parked when it arrives, rather than a phone call.

Some users will “cut the number” entirely and move to alternative ID systems, while some operators may offer “cloud numbers” decoupled from access line subscriptions or SIM cards. Increasingly, we will have multiple access providers (especially as we use multiple devices and assorted third-party WiFi connections). As a result, there will be ever-less argument to have a single “master” access against which everything is tied.

Today phone numbers and phone services are indeed ubiquitous. They emerged in an era in which there were no alternatives, offered reliability and extra features like emergency connectivity. This has served us well and gained popularity. The PSTN earned its ubiquity, with billions of people having seen it to be good, and buying into it. Mobile telephony (and SMS) gradually usurped fixed telephony and extended its reach.

The problem is that the IP-based successors of telephony - such as IMS-based VoLTE - have conspicuously not yet earned their ubiquity. Rich Communication Services (RCS) messaging - branded "Joyn" by GSMA - is another example. Some in the industry are assuming ubiquity, though they have not yet been given a "mandate" by end-users, and in the new world of choice they may not. Worse, the technologies have significant teething problems, and considerable costs - just when alternatives are bringing down prices, cutting into profits, and raising the bar for quality and innovation.

Operator-based services will not be the only game in town, with *Facebook*, *Skype* and *WhatsApp* already more "ubiquitous" than IMS-based services. Even for fixed telephony, IMS-based VoIP solutions compete with simpler NGN-VoIP, third-party services such as Vonage or *Skype* over "naked DSL", and of course circuit telephony, which is still leading after 10 years of grindingly-slow substitution.

While many in the industry claim that so-called OTT players are "silos" or "islands", that is neither accurate nor relevant. In its current state, it is IMS that is the silo, albeit one managed by an arguing committee rather than an individual company. There are many ways by which Internet-based services can and do interoperate - not all the time, or for all examples, but it is a trivial problem where there is demand. (Indeed, email is the best example of an OTT communications application which interoperates perfectly.)

It seems abundantly clear that users actually like silos. (Note to regulators and ministers: users are also voters). By and large, people do not seem to mind that *Twitter*

or *Facebook* are run by individual companies, and they have plenty of choice if they do mind. It is also clear that users do not always mind about variable quality or reliability either, if something is either free or well-featured.

"Ubiquitous reachability" seems to be a straw-man. Increasingly, people don't want to be reached, preferring something more nuanced - easy reach by specific people (e.g., friends, clients, colleagues), more difficult or filtered reach by some (e.g., loose contacts), and no reach at all by others (e.g., telesales). *Facebook*, *LinkedIn* and other social networks build in ideas like "mutual contacts", contact requests, "how do you know X" functions and so on.

In a busy, multitasking world, we don't want ubiquitous reach

The problem is that IMS proponents, most vendors & operators, and industry bodies, never think much about behavioural psychology, or social anthropology. They develop technical standards based on engineering rather than human principles. End-users, behaviour and preferences are rarely considered before technical issues like interoperability. This is why the classic "federation" approach to telecoms fails, not only does it take far too long to evolve, but the underlying economics are flawed. A federation of services means that each operator produces, distributes and sells the same commodity. You can call these "dumb services". No other industry has over one thousand vendors of an undifferentiated commodity with falling prices and zero shipping costs.



Federation and interoperability should occur after services are successful, when the owners/users think there is a good rationale. The successful companies will federate from a position of strength, not in anticipation of it. This avoids the risk of creating a brittle, inflexible, slow-moving bureaucracy which is incapable of backtracking when it makes a mistake.

There needs to be a mechanism for end-users to force a change in “ubiquitous” services where they perceive a problem (e.g., with pricing or privacy). Companies like *Facebook* are aware that any changes or problems risk users abandoning the service and switching allegiance, taking hundreds of friends with them. This is right and proper in a competitive marketplace.

There is no path for end-users to petition the 3GPP to change the nature of deep-packet inspection, or the role of SIM cards. For federated services, churning does not help, because there is no competition at the basic layer of service features and capabilities. You have to take what you are given, or perhaps trust to the slow grind of regulation and politics for the largest issues (e.g., Net Neutrality).

Unsurprisingly, in a world of choice and crowd-sourced product direction, users are now rejecting federated services for better, more-tailored and often free/cheap alternatives, delivered via open Internet access and apps.

Emergency calling is often misused as an excuse for continuing the controlled, centralised, federated-telco model. While good emergency communications are essential, there needs to be a bottom-up rethink for innovative and fragmented services and applications. We could decouple emergency communications from the telephone network and look at evolutionary paths. For \$50-100 billion, we could probably find a global 5MHz of spectrum, build dedicated networks and give every person on the planet a cheap cellular emergency

key-fob or bracelet. Alternatively, banging together the heads of Microsoft, Google, Apple, *Facebook* and the telcos could yield a rich and extensible “Emergency API” that far exceeds today’s voice-only 911.

Overall, it is time to rethink the term “ubiquitous”. What ought to be ubiquitous is the right for the individual to be contacted primarily on their terms, not those of whoever is trying to contact them. If we want a lowest-common denominator telephony service in perpetuity, then we should optimise GSM and circuit voice for maximum efficiency, lowest cost and power consumption - especially as telephony revenues are likely to fall sharply in future.

GSM, unlike VoLTE, RCS or IMS, has earned its ubiquity. IMS and VoLTE might succeed and become ubiquitous eventually (RCS certainly will not), though the industry should not assume or pretend that it is inevitable. The transition to telco-run, “federated” IP-based communications services is slow and the services offer little that is new. This is spectacularly bad timing, as it is happening when newcomers are launching innovative, functional and often “cool” alternatives.

Telcos - as well as regulators and governments - need to be aware of these changes as they have far - reaching ramifications. They also need to grasp that communications is going to be a blend of billable “services” and humble “features”, as capabilities like voice transmission get absorbed into the basic properties of the web. They need to recognise that ubiquity is earned and not assumed.

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by Chris Boam

Privacy in transition: The US and EU strive for meaningful change in the emerging 'economics of trust'

In the fall of 2002, I was involved in a lengthy meeting among industry attorneys debating whether a highly publicized (for the time) data breach the day before would or should change standard privacy compliance practices or depth of focus. The answers - many and varied - proved less memorable than one colleague's comment: "The American public's concern for privacy bad news is blissfully short." I remember that, not so much for the fact that what was said was - at the time - true, but because some of us around the table were sensing a rapidly approaching time when you could not say that and still keep your job. This was long before a public outcry would change the course of data usage for *Instagram*, or for that matter, when the changes to the privacy policies of Google or *Facebook* would be eagerly awaited by the user public and blogosphere like the prospect of a new Harry Potter movie. Almost as remarkable a moment for me came nearly a year later, in Brussels, when I had a meeting with an EU official. After I'd heard an extremely prolix description of how he viewed a provision of the data protection directive should be interpreted, I said, "It may be impossible to comply with that." His response - "Does it matter?"

Of course, neither of these colleagues had been engaged to view the US Federal Trade Commission's (FTC) struggle with the first iteration of the Children's Online Privacy Protection Act (COPPA). Likewise, neither had

participated in the long protracted march from passage of the EU Directive 95/46/EC through vast piles of definitional interpretations and dense compliance recommendations to practices, procedures and costs that - though never truly comfortable - would only occasionally cause an executive to scowl or emit steam from the ears. Even so, the best and brightest might not have anticipated 2012. In one year, we saw the US introduce a cross-sectoral Consumer Privacy Bill of Rights (CPBoR) and a European Commission proposal seeking - among many other things - both data protection harmonization and dynamic views of what is "consent." How far have we come?

One of the most forceful articulations of privacy in US law is the 1967 decision of the Supreme Court in *Katz v. US*.¹ John Marshall Harlan II's concurring opinion established the "reasonable expectation of privacy" test, which contains a subjective component (actual expectation of privacy) and an objective component (reasonable expectation of privacy). However, it was the objective element that has had the unfortunate distinction of evolving into what has become known as the "third party doctrine" in the US - by which one diminishes or even loses an expectation of privacy through voluntary turnover

¹<http://supreme.justia.com/cases/federal/us/389/347/case.html>

of data to a third party (the quality of "voluntarism" is often a key factor in the application of this doctrine). The Obama Administration's 2012 CPBoR and accompanying white paper were introduced amid extensive deliberations by both the Federal Trade Commission (FTC) and Department of Commerce's National Telecommunications and Information Administration (NTIA).² Rather than a specific set of rules, the CPBoR is an affirmative statement of values - key among them are affirmation of the well-known Fair Information Privacy Principles (FIPPs)³ and statements on the criticality of transparency (fundamental to what is "voluntary" under the Katz line of cases), access and user control. In addition to moving the ball quickly through work with industry on web-based do-not-track technology, the Administration has also engaged the NTIA to begin the multi-stakeholder process to better define key issue areas of data collection and use and applicable practices.

²<http://www.ftc.gov/opa/2012/03/privacyframework.shtm> and <http://www.commerce.gov/sites/default/files/documents/2010/december/iptf-privacy-green-paper.pdf>, <http://www.ntia.doc.gov/page/privacy-report-introduction>, respectively.

³e.g., <http://www.ftc.gov/reports/privacy3/fairinfo.shtm>

The Asia-Pacific Economic Cooperation (APEC) Cross Border Privacy Rules (CBPRs) system, although begun and developed through the Bush Administration, though US participation was only announced in July 2012. Acting US Commerce Secretary Rebecca Blank signaled the CBPRs as a key element to facilitate critical cross-border data flows in setting forth a common baseline of voluntary data privacy practices⁴ for companies doing business among the 21 member countries of APEC and their 2.7 billion consumers. Many critical (and contentious) details remain to be debated in the US, including the scope of what constitutes “personal information,” what equates to “consent” and in what way is it expressed, and what dynamic means of user control can and should be enabled. Remember, the CPBoR in the US, if embodied in law, is expected only to supplement existing statutes such as Gramm-Leach-Bliley Act on financial data, the Health Information Privacy Protection Act (HIPPA), and the Children’s Online Privacy Protection Act (COPPA), among others. One need only review the commentary from the NTIA’s most recent multi-stakeholder meeting (largely on mobile do-not-track issues)⁵ or comments on the FTC’s proposed revision of COPPA (e.g., covering sites “directed” (not targeted) to children)⁶ to get a glimpse of the battle lines.

⁴<http://www.hldataprotection.com/uploads/file/White%20Paper.pdf>

⁵<http://www.ntia.doc.gov/other-publication/2013/privacy-multistakeholder-process-mobile-application-transparency>

⁶<http://www.ftc.gov/opa/2012/08/coppa.shtm>

And of course, none of this touches upon what Congress may do in 2013, or for that matter, whether whatever the US may do will overcome foreign criticisms (particularly from the EU) over the voluntary nature of current proposals, the lack of a central enforcement agency for privacy, and other inhibitions to the US being recognized as an “adequate” environment for cross-border data transfers.

European Commissioner for Justice, Viviane Reding, announced sweeping proposals to change the Data Protection Directive 95/46EC in January 2012 in the form of a draft regulation. Among the many shakeups for data protection law in the proposal is the creation of a single supervisory authority (for companies in multiple EU jurisdictions), a broader concept of “personal data” and a slate of new definitions (e.g., “biometric data,” “main establishment,” and “personal data breach”), extra-territorial coverage, the “right to be forgotten,” and substantial proceeds-based sanctions.⁷ EU-based and multinational industry have praised the notion of replacing the directive with a regulation, which as a self-implementing instrument should greatly improve on harmonization among the 27 EU Member States over the decade-long game of ‘over-and-under’ that has been the national progeny of Directive 95/46/EC. Industry has been swift to recommend further improvements, for instance, to clarify what it means to have a “main establishment” and how this will impact your “supervisory authority,” the inclusion of “privacy by design” and “privacy

⁷http://ec.europa.eu/justice/newsroom/data-protection/news/120125_en.htm

by default” concepts under the proposed rules, and how the new regulation would interplay with amendments to the Electronic Communications Data Protection Directive 2002/58/EC concluded as part of the Telecom Framework revisions of 2009.⁸

Thankfully, the notion of a “right to be forgotten” (RTBF, the proposed ability to wipe clean your net-based existence) seems to be dying of its own weight. However, even the conclusion by the European Network and Security Agency (ENISA) in November 2012, that the RTBF is “impossible,” was embedded with problematic alternatives.⁹ ENISA’s proposed half-solution is to have search engines ‘blacklist’ data that a user would not want to be found. Imagine what such a tool could be used for in morally questionable hands, or for that matter, the mess it would make of the right to free expression under Article 10 of the European Convention on Human Rights.¹⁰ On data breach notification, European Commissioner for the Digital Agenda Neelie Kroes is forging ahead with a proposal to both introduce and harmonize an EU-wide set of requirements - also an aim of the proposed regulation - to supplant the existing patchwork of mandatory (e.g., Germany) and voluntary (e.g., UK) national rules. With the right balance clearly struck, to harmonize procedures and deadlines only when notification would be necessary and useful to consumers, the requirements could potentially alleviate the costs of current single market confusion on the issue.

⁸e.g., <http://www.ectaportal.com/en/PRESS/ECTA-Press-Releases/2011/Industry-Joint-Statement-on-EU-privacy-framework/-print/>

⁹<http://www.enisa.europa.eu/activities/identity-and-trust/library/deliverables/the-right-to-be-forgotten>

¹⁰http://www.echr.coe.int/NR/rdonlyres/D5CC24A7-DC13-4318-B457-5C9014916D7A/0/Convention_ENG.pdf

Industry engagement on these issues in Brussels has been among the most focused and consistent I've seen in a number of years. Emblematic is the input of the International Chamber of Commerce (ICC),¹¹ which seeks improvements to the draft regulation to facilitate clear but limited obligations combined with flexible compliance options (e.g., greater flexibility for the use of binding corporate rules (BCRs) and model contract clauses). Many in Europe understand the stakes and concur that a desire to overhaul data protection is in no small measure a goal to both further enable net-facilitated economic growth (through clarity) and not inhibit technical innovation (through a continued density of EU rules). Unlike my colleagues of 8-10 years ago, many today not only "get it," but also, are working feverishly to achieve change. Whether you agree with, for instance, Lord McNally's September 2012 testimony before the UK Parliamentary Select Committee on Justice that the proposed regulation could or should be converted into a directive,¹² or German Member of the European Parliament Alexander Alvaro's proposal for rules outlining "lifecycle data protection management,"¹³ you cannot deny that these and many others are fully and thoughtfully engaged.

¹¹<http://www.iccwbo.org/Advocacy-Codes-and-Rules/Document-centre/2013/ICC-comments-EU-Gen-DP-Reg-Issues/>

¹²<http://www.parliamentlive.tv/Main/Player.aspx?meetingId=11425>

¹³<http://www.alexander-alvaro.de/inhalte/lifecycle-data-protection-management-a-contribution-on-how-to-adjust-european-data-protection-to-the-needs-of-the-21st-century/>

They have to be. As the New York Times reported on January 16, 2013, 4 in 10 EU consumers avoid making online purchases because concern about the security of their personal data.¹⁴ In truth, I believe that the 4 in 10 are less concerned with whether it is indeed secure than with how do they know that it is and who to and under what authority do they seek to address a problem. As MEP Alvaro observed, the Commission proposal does not "solve the problem that many consumers are simply overwhelmed by the amount of information they are provided with." Similarly in the US, Brookings Fellow Allan Friedman observed, consumers need statements that are "easier to understand, and control easier to enact."¹⁵ Transparency needs to be concise, meaningful and useful. And, while the need for a clear 'check box' of consent is - for lawyers - a holy grail on both Atlantic coasts, the consumers (and their choices) far too often fall down the rabbit hole of interminable language as they pull the lever labeled, "I agree." This, in part, treads upon the notion of what is or is not truly "voluntary" in the Katz line of case law in the US.

Despite how much has changed since 2002-03, and all the attention paid to each and every edit to industry privacy practices, some consumers still do not care, and that's fine, since it is to be expected. However, a growing number vocally do care. Gone are the days when "shame based regulation" - a firm would overstep some boundary and get momentarily pilloried in the press - can represent the worst of expectations.

¹⁴http://www.nytimes.com/2013/01/17/technology/17iht-data17.html?pagewanted=all&_r=0

¹⁵<http://www.brookings.edu/blogs/up-front/posts/2012/02/29-internet-privacy-chat>

US and European consumers still stand to know more about what their browser and computer is daily telling the world, and take advantage of browsers, plug-ins and other practices that minimize data sharing. In the midst of legislative shifts on privacy as significant as those signaled in 2012, as Allan Friedman of Brookings puts it, "competition based upon the 'price' of less intrusive data collection" is moving ever closer to an elemental part of good business. As Marc Rotenberg, head of the Electronic Privacy Information Center, said in September 2012, "how do you consent to the disclosure of your information if you don't know which of your information will be disclosed, to whom or for what purpose?"¹⁶ In such an environment, where such questions continue to linger and are debated in the blogosphere, finding ways to engage customers in the dialogue, while respecting their privacy and giving them control over their own data, may ultimately create far more opportunities for innovation. In the absence of this engagement, the 'economics of trust' - the moment when a lack of comfort, either in transparency or follow-through translates to a consumer's decision not to press "send," "purchase," or "I agree" may become an ever more measurable reality.

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¹⁶http://news.cnet.com/8301-13578_3-57516501-38/senators-prepare-to-vote-on-netflix-and-e-mail-privacy/

by Mohamed El-Moghazi, Jason Whalley and James Irvine

World Radiocommunication Conference 12: Reflections on the Spectrum Policy Debate*

Largely overlooked in current debates is the influence of the international spectrum management regime on national spectrum policies. While both were formalised at the turn of the twentieth century to resolve the interference issue and to enforce government control over spectrum, the way spectrum is utilised has changed since then due to two main reasons. Firstly, the Internet's IP platform has enabled the delivery of different applications on the same device. Secondly, while there used to be enough frequencies to accommodate most of the users, many countries are currently facing a shortage in spectrum due to the high demand for data services. This has motivated several countries to review their national policies and to consider the two principal alternatives to command-and-control, namely spectrum trading and commons. While the former calls for allowing a secondary market of flexible spectrum usage rights, the latter is based on managing the spectrum in a decentralized way. With this in mind, this article addresses three of the activities at the ITU World Radiocommunication Conference (WRC-12) in order to show the impact of the international spectrum management regime on the trading versus commons debate.

Enhancement of the international spectrum regulatory framework

WRC-12 discussed introducing more flexibility into international spectrum allocation. Service allocation flexibility is a key element of spectrum trading. The issue was discussed from two perspectives. The first focused only on convergence between fixed and mobile services, while the second addressed spectrum allocation issues more generally. During the conference, with the exception of the European countries, most of the regional organisations called for retaining the current practice with regard to spectrum allocation principles, arguing that there was sufficient flexibility within the existing regulatory framework and that the WRC process does not impede the introduction of new technologies. With regard to convergence between fixed and mobile

services, most of the participants also called for retaining the definitions within the Radio Regulations with regard to these services. Eventually WRC-12 decided not to change current spectrum allocation practices with regard to the two issues, and to continue studies on the revision of the definitions of fixed service, fixed station and mobile station till WRC-15.

One possible explanation for this decision is that according to the ITU rules, countries applying full service allocation flexibility cannot claim protection for their radio stations from harmful cross-border interference or cause harmful interference to stations operated in compliance with ITU Radio Regulations in other countries. Furthermore, the harmonisation of spectrum allocation is important to minimise possible cross-border interference between neighbouring countries when they operate different services in the same spectrum band. In addition, the practice of trading in the countries that encourage market determination of service allocation has not proven to be widely successful. Moreover, the IP platform of the Internet has enabled delivering different applications including data, video and voice. This partially renders the need for spectrum flexibility.

The main implication of the WRC-12 with regard to spectrum trading is that it has shown that most countries are not in support of the full service allocation flexibility concept, as it does not provide them with any significant benefits that exceed the potential risks of interference and losing international recognition to their frequency assignments.

* A version of this article has been presented to the 40th TPRC conference. The authors are solely responsible for the opinions expressed in this paper.

Regulatory measures required to introduce CRS technologies

The second key issue at WRC-12 is the regulatory measures that could enable deployment of cognitive radio systems (CRS). CRS are a main enabler of spectrum commons as they are capable of transmitting dynamically in the temporarily unused frequencies without the need of exclusive allocation. During WRC-12 some concerns were expressed regarding interference between CRS and space, passive and safety services. Countering this, however, others argued that national regulators can set operating parameters for CRS devices through equipment authorization requirements to ensure they will not cause interference. Ultimately, WRC-12 did not decide on any particular measure with regard to CRS, and recommended that any radio system implementing CRS technology should operate in accordance with the provisions of the ITU Radio Regulations.

The WRC-12 decision on CRS can be explained by the fact that if the conference decided to introduce specific regulatory measures with regard to CRS, this might have generated calls for a similar approach for other emerging technologies. Therefore, it is argued that there was support not to change the ITU Radio Regulations rather than to promote CRS. Accordingly, CRS were recognised as a collection of technologies that could enhance spectrum utilisation efficiency and provide additional flexibility.

Therefore, the main implication of the WRC-12 with regard to spectrum commons is that it has given a clear signal that the concept of spectrum open access is not under consideration. However, the WRC-12 decision could promote the development and deployment of CRS technologies within the current international spectrum management regime.

Additional spectrum allocation to mobile services

While the previous two issues were items on the agenda of WRC-12, allocating additional spectrum in the 694-790 MHz band for mobile service in ITU Region 1¹ countries was not. Nor, for that matter, had the issue been studied by ITU-R. This issue was discussed primarily due to the pressure from the Arab and African countries. They called for an immediate additional allocation of spectrum in the 694-790 MHz band for mobile service, which is already allocated to broadcasting service, to meet growing broadband demand. They also argued that the 694-790 MHz band is already allocated in ITU regions 2 and 3 for mobile service and using this band would decrease the cost of deploying such systems. On the other hand, the European countries opposed such proposals because the 694-790 MHz band is mainly allocated for broadcasting service in their territories and a large investment has already been made to fund the transition to digital television. In addition, it was argued that the issue was not a WRC-12 agenda item and had not been studied by ITU-R, and that some countries largely depend on terrestrial TV broadcasting due to the relatively low prevalence of cable television networks. WRC-12 decided eventually to allocate the 694-790 MHz frequency band in Region 1 to mobile service on a co-primary basis with broadcasting service.²

¹The ITU divides the world into three regions in terms of spectrum allocation. Region 1 comprises Europe, Africa, the Middle East west of the Persian Gulf including Iraq, the former Soviet Union and Mongolia. Region 2 covers the Americas, Greenland and some of the eastern Pacific Islands. Region 3 contains most of non-former-Soviet-Union Asia, east of and including Iran, and most of Oceania.

²The allocation is effective immediately after WRC-15 upon refinement of the lower edge of the allocation.



The conference decision has clearly shown the dynamic interactions that occur within the international spectrum management regime. More specifically, although the European countries were against the Arab and African position at WRC-12, they are currently reconsidering their 700 MHz spectrum plans. In addition, WRC-12 has highlighted the increasing role in the ITU of some of the developing countries, such as Egypt and Nigeria. Furthermore, the conference witnessed lack of conformity with the regional spectrum allocation within the ITU three regions. More specifically, while the Arab and African countries are located in ITU Region 1 along with European countries, WRC-12 has witnessed the tendency of them to align themselves with Asian and American countries when it comes to the issue of allocating additional spectrum for mobile services in Region 1. Additionally, the decision to allocate spectrum to mobile services in the 694-790 MHz band during WRC-12 without being one of the agenda items or having studied beforehand was, to say the least, a significant challenge to the decision making procedures within the international spectrum management regime. Moreover, introducing mobile service allocation to the 694-790 MHz band in addition to the existing broadcasting service allocation is considered as facilitating partial spectrum flexibility. Hence, it is argued that countries tend to adopt concepts such flexibility in indirect ways if there are clear benefits.

Trading vs. Commons

It can be argued that neither the advocates of trading nor commons have succeeded in creating a paradigm shift that away from the traditional models implemented in national policies. In other words, the benefits from adopting both policies are not enough to change the traditional view of spectrum management for most of the world. This is mainly because trading and commons weaken state control over a valuable asset that has become a source of revenue for many countries. While the former transfers control over spectrum to the private sector via exclusive and flexible access, the

latter transfers control to end users via spectrum access etiquettes. Moreover, both would decrease the extent of global harmonisation of spectrum allocation as trading enables full flexibility and commons provides spectrum access on demand rather than through a fixed spectrum allocation.

Last but not least, it seems that the ITU has created a cycle of regulatory lock-in, where national regulators are legally and culturally bound by the treaty-making nature of the ITU. This has largely influenced national spectrum management policies preferences and caused a resistance to changes. In addition, WRC-12 has proved that the main drivers for change in the international spectrum management regime are business opportunities for the industry and the presence of clear benefits for national regulators.

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by Ewan Sutherland

White space

The University of Strathclyde inaugurated its Centre for White Space Communications (CWSC) on January 22, 2012 (CWSC, 2013). The keynote speaker was the UK Minister, Ed Vaizey MP, from the Department for Culture, Media and Sport (DCMS), who both congratulated the University and made the case for industry/university cooperation in innovative technologies, talking of the “porous university”, evidently in contrast to the isolation of the ivory tower. Aside from white space, he joked that he was responsible for the UK’s AAA credit rating, since it depended on the successful outcome of the 4G spectrum auction, begun that day by OFCOM, with the funds needed by HM Treasury. The minister encouraged OFCOM, though noting its independence, to press forward with the regulations necessary for white space and announced the formation of a UK Dynamic Spectrum Access Group (DTG, 2013). A couple of days later, a ministerial colleague announced £24 million for Glasgow to become the UK’s first smart city again involving Strathclyde University (BIS, 2013).

White space technology is intended to use gaps in the pattern of spectrum usage, rather than merely those frequencies not been assigned to another user. While this is expected to allow cheaper services because it is licence exempt, it raises the question of whether in developing countries the failure to contribute to the national exchequer discourages its adoption, given the need of governments for funds and the established pattern of substantial payments from telecom operators through fees and taxes (ultimately paid by end users). Given the paucity of television channels in use in most developing countries, there is no shortage of spectrum that could simply be sold, if governments were minded to do so. Moreover, the customer premises equipment (CPE) for white space technology was intended to be mounted on a roof or a wall, at a time when developing countries are seeing their broadband adoption predominantly on 3G and LTE networks.

The results of two United Kingdom (UK) white space trials, temporarily licenced by OFCOM, were reported by CWSC and by BT Research. The first for the southern part of the Isle of Bute was aimed at proving signals could be received in hilly or mountainous areas, the second to determine the scalability of the technologies. There were also tests of a base station using renewable energy from photovoltaic cells, a small wind turbine and batteries (McGuire, Brew, Darbari, Weiss, & Stewart, 2012). A complication in the UK is the relatively low levels of use of cable television and consequently the very high dependency on terrestrial broadcast signals, with any interference to these likely to generate significant levels of justifiable complaints. It had proved not merely to be a matter of identifying the channels being used at any given location, because more signals from adjoining areas were causing interference than expected. By comparison, in the USA there was greater use of cable television, less intensive use of the TV channels and also a considerable number of wireless ISPs interested in using white space technology. In the UK many ISPs relied on the Openreach platform, pointing to the need for efficient operational systems that would allow them to make white space technology part of their portfolio of technologies.

One of the surprising findings was that some television receivers were much more sensitive to interference than others, requiring white space users to reduce their transmission power. This was aggravated by many televisions in the UK being relatively new and thus unlikely to be replaced, having been purchased as part of the digital switchover, with its widespread and relatively successful adoption of Freeview, and the analogue switch-off to be completed in 2013 (Digital UK, 2012) (Iosifidis, 2005).

The BBC took an interesting position, presenting itself both as a broadcaster and as a provider of content over the Internet, with its famous iPlayer (TV is accessible only to UK IP addresses, though radio is available globally). It was thus interested in higher speed Internet provision and saw its content as an enabler for Internet adoption and thus for ISPs, with consumers seeking more flexible access to content than is possible with digital terrestrial television (DTT). The BBC had undertaken an enormous mapping exercise requiring several years, building up the signal strengths in sectors of 100 x 100 metres, allowing for both set top and roof top antenna. Sky similarly saw itself as being on several sides, as a satellite and terrestrial broadcaster, but also as an ISP and as a provider of video coverage of events.

The UK regulator had concluded a consultation on use of the UHF TV band for white spaces on January 10, 2012, which addressed the provision and use of geolocation information to white space devices (OFCOM, 2012). It seems to have attracted less enthusiastic responses than the USA, where some 35,000 comments were filed (Marcus, 2005). The USA has a model of two competitive offers from database providers that share information: Telcordia and Key Bridge. That work had been spurred on by the report to the President on realizing the full economic development potential of government-held spectrum (PCAST, 2012).

As noted elsewhere in *Intermedia*, the ITU's WRC-12 concluded that no changes were needed to the Radio Regulations (RRs) in order to accommodate cognitive radio systems (CRS), though studies continue within ITU-R. In Europe, the Electronic Communications Committee of CEPT is undertaking work on CRS (CEPT, 2011) (CEPT, 2012) (CEPT, 2013), as is ETSI, under EC Mandate M/512, in its Broadband Radio Access

Networks (BRAN) and Reconfigurable Radio Systems (RRS) groups. Yet more work is being undertaken by the IEEE through its Dynamic Spectrum Access Networks Standards Committee (DySPAN-SC, 2013), which is developing the IEEE 1900 family of standards, and by IETF through a working group on Protocol to Access WS database (PAWS, 2012).

Microsoft has been a long-term advocate of the use of white space to allow cheaper broadband access for those unable to afford existing services. It had been involved in trials in various parts of the world, including those in the UK and Singapore (iDA, 2012), the latter was the subject of an IIC seminar in October 2012 (IIC, 2012).

In some respects the arguments and the case being made for white space broadband were like those made a decade ago for power line communications (PLC). Then the regulatory might of the telcos faced and saw off the powerful electricity companies, based on arguments about interference. The failure to generate economies of scale with PLC meant that equipment suppliers had limited interest and consequently prices were too high to be attractive. The resulting vicious circle of regulatory doubt, commercial uncertainty and high prices killed off PLC and must be a risk for white space broadband.

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by Gita Sorensen

What shape competition in a bundled services market?

Consumer preference for buying bundles may threaten the viability of single or dual-service providers of electronic communications, but it could also be the vehicle for true inter-platform competition. Current regulatory frameworks and principles are challenged by the increase in triple and some quadruple-play service bundles in the market.

The pace of service bundling in the electronic communications sector is picking up. It is popular with providers as well as consumers and looks to be here to stay. Yet many regulators view service bundling with unease for a number of reasons, including concerns about anticompetitive pricing, tying of competitive and non-competitive services, and margin squeeze. However, it is important to recognise that service bundling is popular with consumers who value cost savings and the possible reduction in administration. This article explores the potential market impact of increased service bundling.

The electronic communications sector comprises four groups of providers: fixed network operators, mobile network operators, entertainment platform operators, and providers without networks or platforms. Four service groups can be combined to form double, triple, or quadruple-play service bundles (see Table 1).

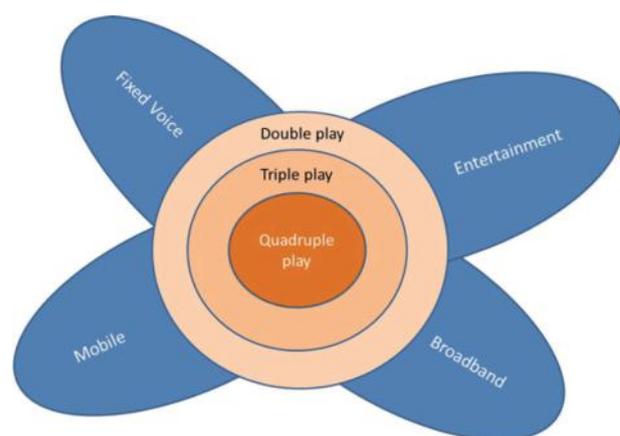
Each single-service provider seeks access to the other three services in order to offer the largest and most attractive bundle to existing and prospective customers (see Figure 1).

In contrast to service-specific analogue networks, digital networks are multi-service. Operators can therefore add services to their portfolios at relatively low incremental costs, achieving economies of scope and indeed scale through increased network utilisation. The increased provision of Voice over Internet Protocol (VoIP) and IPTV services are examples of this technological development.

Table 1 Service bundle options

| Double-play | Triple-play | Quadruple-play |
|-------------------------------|---|---|
| Fixed voice and broadband | Fixed voice, broadband, and mobile | Fixed voice, broadband, mobile, and entertainment |
| Fixed voice and entertainment | Fixed voice, broadband, and entertainment | |
| Fixed voice and mobile | Mobile, entertainment, and broadband | |
| Entertainment and broadband | | |
| Entertainment and mobile | | |
| Mobile and broadband | | |

Figure 1 Combinations of services



In Europe, the regulation of fixed telecommunications network operators has made wholesale access to fixed networks available to other operators. Therefore, the provision of bundles including fixed voice and fixed broadband can be offered by a large number of providers.

Bundled Services

The importance of bundling to the consumer can be seen in these UK data:

- In July 2012 Ofcom, the regulator, reported for the first quarter:
 - o 57 percent of UK consumers purchased electronic communications services as part of a bundle
 - o 19 percent purchased a bundle of fixed voice, broadband, and multichannel TV services
 - o 27 percent purchased a bundle of fixed voice and broadband.
- Virgin Media, the cable operator, reported in October 2012 that 81 percent of its customers purchased triple or quadruple-play bundles: 65 percent purchased triple-play, and 16 percent purchased quadruple-play.
- BSkyB, the satellite operator, reported that its customers purchased an average of 2.7 services. As BSkyB only offers three services (fixed voice, broadband, and multichannel TV), this suggests that the vast majority of its customers purchased bundles.

Why do providers bundle?

A customer’s switching decision is believed to be more complex when buying several services from the provider. Comparing service bundles can be complex, as few are identical in content or contractual terms. Further, if the services in the bundle are sold at a price below the sum of the stand-alone charges, the stand-alone services become unattractive. Service bundling increases the “stickiness” of the services included in the bundle.

Providers may also experience economies of scope and scale from bundling, reducing the unit cost, which could make them more competitive in both bundled and stand-alone service markets.

Why do customers buy bundles?

Research suggests that customer preferences for service bundles lie in two areas: cost savings and convenience. Research by the Finnish regulator FICORA confirmed that pricing is the strongest driver, closely followed by convenience (see Figure 2) (OECD, 2012). This is confirmed by Ofcom (see Figure 3).

Figure 2 Reasons consumers cite for wanting a bundled package (2009)

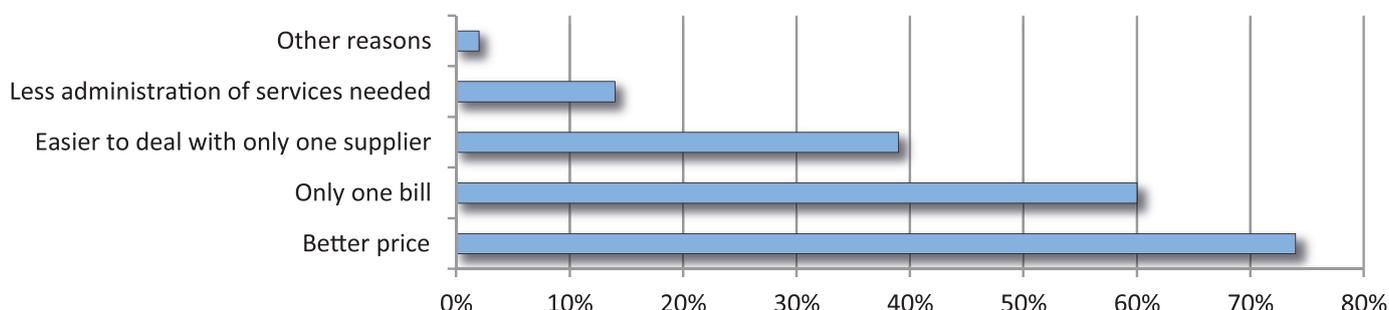
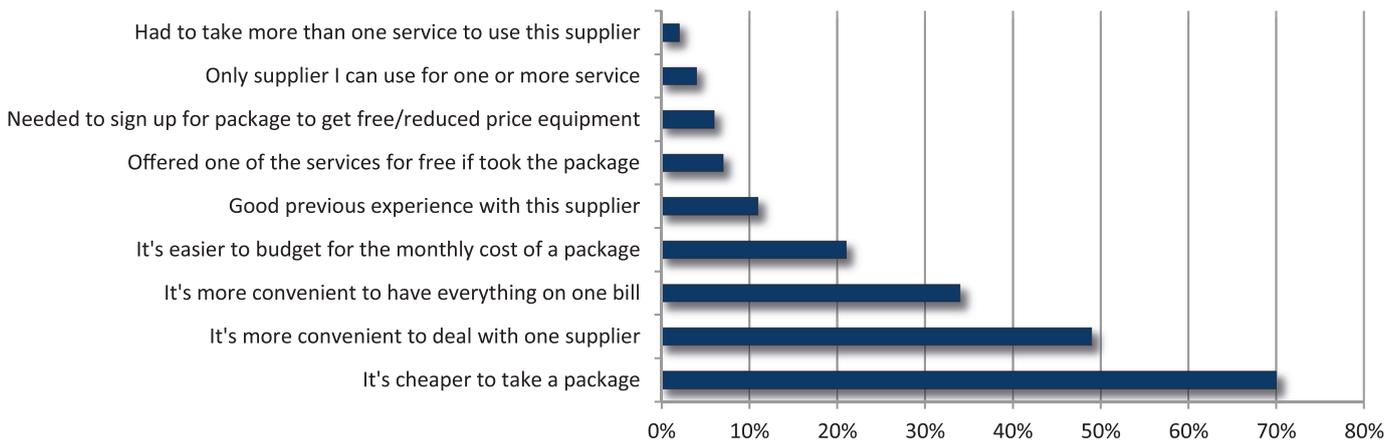


Figure 3 Reasons for deciding to take a bundle of services



Source: Figure 47, Saville Rossiter-Base, 2010

How does service bundling impact the different market players?

The four groups of providers mentioned above have an important recent addition: over-the-top (OTT) providers (e.g., Skype and Spotify).

Of the four conventional provider groups illustrated in Table 2, the three that control networks or platforms would need to add services from the others' networks/platforms in order to enter the triple-play market; the fourth group (those without networks or platforms) depends on purchasing access to networks/platforms for all its services.

OTT providers offer their services over the internet. Broadband access is conventionally purchased by consumers, so OTT providers have not depended on access to networks. However, they frequently use content delivery networks (CDNs) to ensure consumers have easy access to their offerings

Fixed network operators already offer fixed voice and broadband services. The SMP providers (those with Significant Market Power) typically have near-ubiquitous coverage and would not need to purchase access to other fixed networks. However, providers with only partial geographic coverage would need access to fixed voice and broadband services from the SMP provider. This is often facilitated through regulated wholesale access services.

Many SMP fixed operators also operate mobile networks. Therefore, in principle, they should be able to offer a triple-play bundle of fixed voice, broadband, and mobile services. Those that do not operate mobile networks would need to purchase access to mobile services to offer triple-play. In most countries, there is no regulated wholesale access to mobile services; therefore, access needs to be on a commercial basis.

Many fixed SMP operators are also developing entertainment services in the form of IPTV. To a limited extent, smaller fixed network operators are also developing IPTV services. The attractiveness to consumers of IPTV services depends critically on the availability of premium content, including sport, movies, and premium television news and entertainment programs. Content rights are heavily guarded commercial property and may only be available to a small group of providers. IPTV could, in principle, enable some fixed network operators to offer a quad-play service bundle.

Mobile network operators need to access fixed networks for broadband services in order to offer the triple-play bundle. Many countries regulate wholesale access to fixed networks, so many mobile network operators should be able to offer the triple-play bundle.



Few mobile network operators have developed IPTV services, although the advent of 4G/LTE networks facilitates IPTV. To offer quad-play, mobile operators would therefore need to negotiate commercial access to content platforms.

PayTV providers fall into two categories:

- *Satellite operators* own and aggregate content and operate the PayTV platform. To provide triple/quadruple-play bundles, they would need to purchase access to other networks. They could use regulated wholesale broadband services to offer a triple-play bundle of PayTV, fixed voice, and broadband services. Access to a mobile network to offer quad-play would be on a commercial basis.
- *Cable operators'* networks are designed to distribute both entertainment and telecommunications services. Content is typically purchased from satellite operators and other sources. Cable operators do not typically have ubiquitous geographic coverage, but concentrate around larger conurbations. Where they have networks, they could (and many do) offer a triple-play bundle. Outside their network areas, they would need to purchase access to fixed-network wholesale products, and even then would only have a double-play service bundle. To make this a triple/quadruple-play bundle, the cable operator would need to negotiate access to a mobile network or find a way of offering content services using regulated wholesale broadband access.

Non-network providers operate no infrastructure and need to purchase access to all services. Fixed-network access is typically regulated and should present limited problems. Access to mobile services and/or PayTV services would be on a commercial basis.

OTT providers offer services across internet connections purchased by the consumer, or have so far. In a recent agreement, Google has agreed to pay Orange in Africa for delivery of content (Spence, 2013).

In summary, provision of service bundles is heavily reliant on regulated wholesale access to fixed networks, and many current providers face significant challenges in developing triple-/quadruple-play bundles (see Table 2).

Table 2 Current regulation of access

| | Fixed voice | Broadband | PayTV | Mobile |
|-------------------------|-----------------------------|--|---|--|
| Fixed network operator | Yes | Yes | Only via IPTV or commercial arrangement | Sometimes; otherwise by commercial arrangement |
| Mobile network operator | Yes, using regulated access | Yes, using regulated access | Only by commercial arrangement | Yes |
| PayTV platform operator | Yes, using regulated access | Yes, using regulated access | Yes | Only by commercial arrangement |
| Non-network provider | Yes, using regulated access | Yes, using regulated access | Only by commercial arrangement | Only by commercial arrangement |
| OTT provider | N/A | N/A, although challenged by Orange/Google deal | N/A | N/A |

What - if anything - could and should regulators do?

The flip side to the positive service stickiness for providers, from a regulator's perspective, is that it increases barriers to switching (e.g., makes it less likely for consumers to switch supplier). Finding a comparable bundle may prove difficult. Only a few providers can offer triple-play bundles, and most would rely on regulated wholesale access and commercial negotiations.

The fixed voice and broadband markets have multiple providers in most developed economies as well as in many developing economies. Many of these do not operate networks and could not offer triple-/quadruple-play unless successful in commercial negotiations for mobile and/or PayTV. Network and platform operators have few, if any, commercial incentives to provide commercial access and so enable increased competition in the market for triple- and quadruple-play service bundles.

Should regulators intervene? The European Union framework for electronic communications regulation (used extensively around the world) is based on defining relevant markets and imposing regulation if one or more parties are found to hold significant market power in such a market.

- If consumers prefer to purchase electronic communications services in bundles, should regulators start to define markets of bundled services?
- If so, if SMP is found in the relevant markets, should the EU extend current regulatory interventions to include access to PayTV services and mobile (e.g., mobile virtual network operator access) in order to enable replicability of the triple-/quad-play bundles? Do they have the power to do so?
- Or, alternatively, should regulators reduce or remove current regulations of fixed networks to encourage commercial inter-platform negotiations and competition?
- If so, what would be the future for providers without networks?

These are critical issues that face the sector now - not in three or five years. Inter-platform competition is in many ways a positive development, but should it be to the exclusion of service competition? The EU has built its regulatory framework to encourage infrastructure investment, but it has embraced service competition as a stepping stone to infrastructure competition and as a permanent market feature, presenting continued price competition to infrastructure operators.

Whether bundling represents an opportunity or a threat is likely to be a matter of perspective. Whether consumers' interests are best served by bundles is yet to be seen.

How markets are defined and regulated could determine the future shape of competition. The European Commission is currently reviewing the relevant markets that national regulatory authorities in member states must review; the outcome could be critical in this regard.

The views expressed are those of the author and not intended to represent those of Research Group or other experts at BRG.

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by Ewan Sutherland

News

Predicting the future

Each New Year it is traditional to make predictions about what will prove important or disruptive, with perhaps less emphasis on reviewing the success or failure of the predictions of the previous year.

The Consumer Electronics Show (CES) in Las Vegas has already presented many potentially exciting new devices, though how long that excitement will last is never certain. Indeed manufacturers leaked product details two weeks before the show opened, to ensure adequate coverage. We know that yet higher definition television is becoming affordable, even if we may need wall-sized screens to obtain the full benefit given the limited resolution of the human eye. A few devices are emerging to help people keep fit, arm bands that record vital signs and energy used in exercise, which link to apps that monitor health and fitness, with additional telemetry from bathroom scales that report weight and fat levels. The personal fitness instructor may yet be disintermediated, going the way of the librarian and the travel agent. For those seeking to thwart facial recognition from CCTV cameras there are glasses with embedded LEDs, though sadly there is software that

can identify you by your gait, so the glasses may prove insufficient. For the more paranoid or 007-types there are tazer-proof vests, Faraday cages, that disperse and earth the electrical discharge.

Joi Ito (2012) from the MIT Media Lab calls himself not a futurist, but a “nowist” preferring the fluidity and agility of the moment. He pointed to the opportunities for faster, fleeter hardware start-ups, a change from expecting service and app beginners, in part due to the rise of 3D printing otherwise known as additive manufacturing (AM). 3D printing has become sufficiently prominent that it is to be the, doubtless contentious, subject of proposals for legislation in order to stop the home manufacture of firearms, magazines and ammunition (Biggs, 2013). It seems doubtful, for the present, that downloading and printing workable weapons constitutes a real threat, except perhaps to the owner (Defense Dist., 2012). By way of a parallel, historians tracked the diffusion of alcohol distillation technology across Mediaeval Europe by the adoption of laws against drunkenness.

Analysys Mason (2013) offered ten predictions for telecommunications:

1. LTE arrives, but with limited impact before 2014
2. The ‘big switch-off’ of legacy infrastructure will accelerate
3. Social media giants to further shake up IP-based messaging
4. VoLTE investment case to come into the spotlight
5. Smartphone penetration growth rate to slow markedly
6. Apple’s market share of tablet sales will fall to less than 50%
7. Multi-device subscription pricing to emerge
8. Traditional TV under more pressure
9. Wi-Fi to the rescue
10. Operators in emerging markets come of age

Deloitte (2013) makes predictions for TMT markets:

- Technology:
 - o P@\$\$1234: the end of strong password-only security
 - o The button stays beautiful
 - o Let's get together: crowdfunding portals bring in the bucks
 - o Enterprise Social Networks: another tool, but not yet a panacea
 - o The PC is not dead: it's about usage not units
 - o Bring your own computer: a tale of two interpretations
- Media:
 - o 4K kicks off (Ultra High Definition and digital cinema)
 - o Connected TV: hits and misses
 - o Over-the-top may lift legacy broadcasters and distributors more than pure plays
 - o Dual video screening readies for prime time
 - o The reality of "cord cutting" in North America
- Telecommunications:
 - o A strong year for LTE adoption
 - o All-you-can-app
 - o Smartphones ship a billion but usage becomes simpler
 - o The looming spectrum shortage: worse before it gets better



Elsewhere in *Intermedia*, Dean Bublely takes up some of these issues, including VoLTE.

The federal question

One of the issues which has fascinated some Americans for over two hundred years is the division of responsibilities between different levels of government, involving exogesis of the Constitution. Similar issues in the European Union tend to be treated in a more political and less juridical fashion, notionally guided by the principle of subsidiarity, some of the national arrangements may well be in need of review.

At the end of 2012, the National Association of Regulatory Utility Commissioners (NARUC) created a task force to examine telecommunications and federalism in the USA. It will produce its report later this year proposing:

- A framework for the role of States, how States interact and how they react to decisions by the Federal Communications Commission and other federal agencies;
- A revised framework for any revisions to federal telecommunications law; and,
- Principles to evaluate State-level telecommunications legislation.

Africa

One of the problems in Africa has been the lack of healthcare, with the increasingly ubiquitous mobile telecommunications expected to help on several counts. A serious problem is of fake medications, with no or very little active ingredient, which is beginning to be tackled by authentication systems. In Ghana, a free SMS can be sent to the mPedigree database with a code number from the product, allowing it to be authenticated (mPedigree, 2013). Sproxil offers an authentication service in Nigeria, by sending a free SMS to 38353 with the number revealed on a scratch strip in order to determine if it is legitimate (Sproxil, 2013). PharmaSecure in India offers a similar service as Verify My Medicine (2013).

One of the more practices adopted in a number of countries has been the retrospective registration of SIM cards, requiring the millions of mobile phones in circulation to be identified with specific owners. This presents real problems in terms of the lack of national identity cards, even of proper addresses, combined with the limited reach of operator information systems (Donovan & Martin, 2012). Thus companies have been forced to try to capture ambiguous details of individuals using paper systems in rural areas to be taken to cities for computer entry, with double risks of transcription errors. Now governments are forcing operators to switch off service to unregistered SIM cards, in the case of Kenya 2.4 million such cards. There is very little evidence that registration is delivering significant benefits in fighting crime.

The state of the Internet

Akamai, the leading content delivery network (CDN), provides a highly informative quarterly report on the state of the Internet, based on the data arising from its many millions of transactions and delivery requests (Akamai, 2013).

For the third quarter of 2012, Akamai had a global average connection speed of 2.8 Mbps, a decline of 6.8 per cent in the quarter, but up 11 per cent year-on-year. Canada averaged 6.7 Mbps, while the USA was 7.2 (with Delaware and DC having the highest speeds at over 10), there were markedly higher speeds in Asia with 4.9 in Singapore, 9.0 in Hong Kong SAR, 10.5 in Japan and 14.7 in South Korea.

Globally, adoption of broadband offers of more than 10 Mbps grew 8.8% in the third quarter to 11 per cent, with South Korea remaining the highest adopter at 52 per cent. Average connection speeds on surveyed mobile network providers ranged from a high of 7.8 Mbps down to 324 kbps.

The “average peak connection” speed represents the maximum connection speeds across all of the unique IP addresses from a particular country, being more representative of Internet connection capacity. The leader was Hong Kong SAR at 54.1 Mbps, followed by South Korea at 48.8 and Japan at 42.2, then three European countries: Latvia (37.5), Romania (37.4) and Belgium (32.7).

Governmental Advisory Committee - rejecting gTLDs

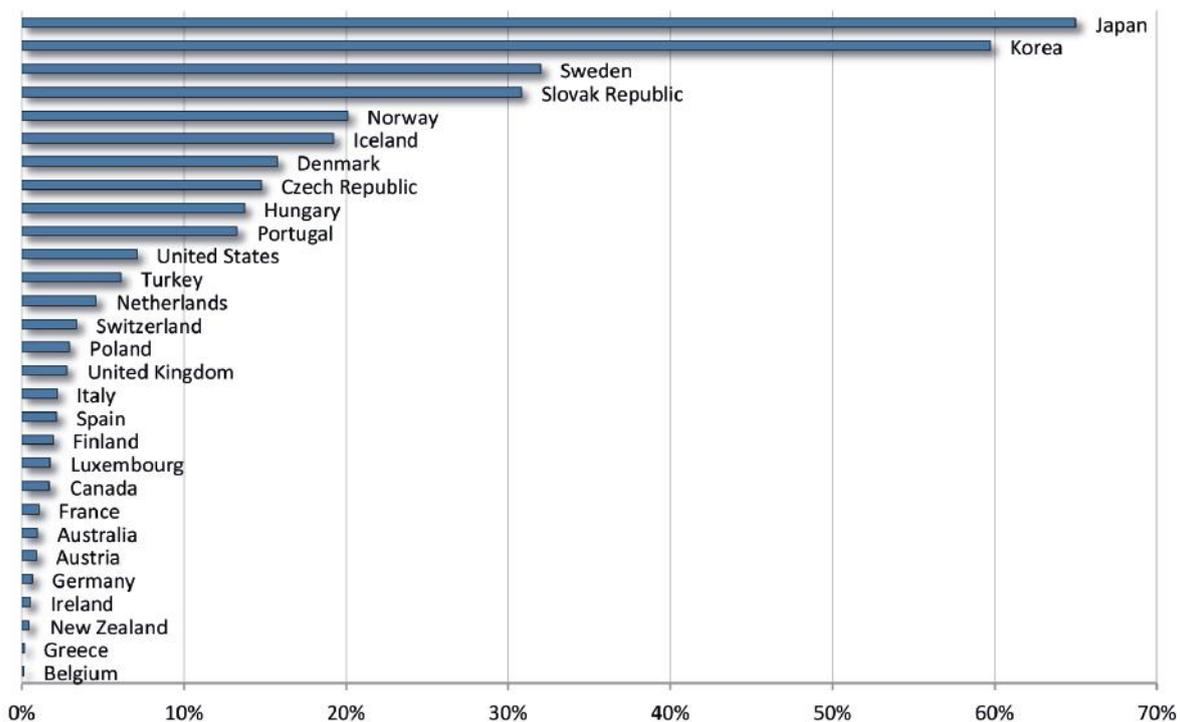
ICANN is busy with its process to create a large number of new generic top level domain names (gTLDs). Part of the procedure is to pass the proposed list before the various countries that participate in the Governmental Advisory Committee which has provided an “early warning” against a number of the proposals (GAC, 2012). While some of the concerns are relatively obvious, others are a little opaque, with some countries filing many objections, while others were silent.

Thus the African Union Commission and a bunch of African governments have objected to the use of dot Africa, while Brazil and Peru home to the river have opposed Amazon the retailer. The USA and India objected to dot Army, while Greece does not want dot basketball. Germany objected to several bids for dot GmbH, while the Czech Republic opposed three requests for dot Green. France and Mali opposed dot Health. Chile objects to dot Patagonia, while four Arab states on its shores object to dot Persian Gulf. In the long list of Australian objections are dot gripe, dot sucks and dot wtf.

OECD Broadband

The OECD has published data for its member states at June 2012, showing modest changes in overall rankings, with the top fixed broadband countries per household: Switzerland, Netherlands, Denmark and South Korea. There remain enormous differences in the extent to which consumers have access to fibre connections (see Figure 1).

Figure 1 Percentage of fibre connections in total broadband in OECD countries (June 2012)



Your Own Device

In the relatively recent past employees of a corporation would expect to be given mobile phones and computers with the running costs paid for them. These were controlled or locked down in a variety of ways to ensure consistency, to reduce supports costs and to increase security (e.g., a remote facility to wipe data). In the face of the consumerisation of devices, corporations have been obliged to accept, initially implicitly and grudgingly, policies enabling Bring Your Own Device (BYOD). This is at different rates, for example, Gartner found that US CIOs expected 38 per cent of corporate workforces to use personal devices at work by the end of 2012, while Europe lagged at about half that rate.

BYOD is said to increase productivity by allowing employees to use their own equipment for work and by using them in leisure hours extending the working day, while familiarity with their own devices reduces the need for training before they can use them to maximum effect. Yet even where they have a register of devices, corporations will not know all the software and apps being used, which can result in differences in productivity and obstacles to management of the practices and learning from their experiences. It requires conscious efforts to seek out the potential benefits of devices and apps, which can then be shared with other employees.



Media plurality

A high level group working for the European Commission has presented its report on media pluralism and freedom. It recognised potential restrictions or reductions of journalistic freedom from political influence, commercial pressures, changing media business models and the rise of new media, together with the damage done by the misconduct of some journalists. The report makes a series of recommendations, including that the EU be able to act to protect pluralism within member states, based on the treaties. It also called for greater harmonisation, enforcement of competition rules (while recognising the value of plurality), that plurality be a factor in evaluating accession countries and that the EU should promote plurality in global inter-governmental bodies.

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First person: Interview with Fadi Chehadé, CEO of ICANN



1. The reverberations from WCIT are still being felt and it is suggested that ICANN's vision of "one world, one Internet" could be replaced by "one world, many Internets". Is this your take on the result of the meeting?

WCIT was inconclusive and that is disappointing, as all of the major players were attempting to build consensus. However, I do not share the view of some who have suggested we might see the emergence of a cold war of sorts relating to the Internet; nor do I think WCIT was the start of a process leading to the end of a global Domain Name System (DNS).

The key question should be where do we go from here? In May, the fifth World Telecommunication Policy Forum (WTPF) will take place in Geneva and it is possible this meeting will see further developments and opinions adopted, which relate to Internet governance. It is important to remember that this is a non-binding forum.

The World Summit on the Information Society (WSIS), out of which arose the Internet Governance Forum (IGF), is currently under review by the UN and that process; starting with a major Conference hosted by UNESCO in February is likely to have more significant implications for the future of the Internet than did the WCIT.

During the WSIS Review, our hope is that member states would endorse the multi-stakeholder approach, virtually ensuring the continued success of the one world, one Internet approach.

I firmly believe the multi-stakeholder approach will prevail, but this will only happen if we continue along the path of open dialogue and transparent engagement.

2. In summing up after WCIT, you (Mr. Chehadé) said that while no consensus was reached on supporting the multi-stakeholder model, 'real progress' had been made. What are the principal areas where such progress has been made and how do the industry and policy-makers move the debate forward?

WCIT did reach some conclusions. A new Treaty was adopted (and will come into force in 2015), featuring several positive points, including a focus on accessibility for the disabled, mobile roaming price transparency and energy efficiency.

Concerning the multi-stakeholder model, there are challenges that also present opportunities. For ICANN, the opportunity is to convince skeptical countries that the multi-stakeholder model is the best way forward.

It would be unrealistic to expect that all countries can be completely convinced. In our view, engaging with developing economies via the multi-stakeholder model is critical.

Those societies need to realize that the social and economic benefits made possible through an open and free Internet should help define their future course. Through the multi-stakeholder model, industry and policy-makers can move the debate forward.

3. You have begun work on the DNS (Domain Name System) value chain. You talk of needing to be ready to meet the challenges - what do you see those as being? How is ICANN preparing for these?

The scale of the expansion of the DNS is simply unprecedented. It is possible that almost 1,900 top-level domains will be added to the DNS through the gTLD process. That much of an expansion of any sector over a relatively short period of time is going to present challenges.

Some of the challenges, such as ensuring that we have the right business frameworks in place, so that we can scale and mature as an industry are clear. Others have yet to be defined, but we fully realize that such massive change always brings unanticipated challenges.

For this reason, we are meeting with leaders of this marketplace to exchange ideas and information about the forthcoming challenges. Sharing this information will help me gain a better understanding of what to expect, and how best to lead ICANN in partnering effectively with all stakeholders as the DNS sector grows and matures.

I am hosting a series of CEO Roundtables throughout 2013 to engage directly with leaders of the DNS industry. Our talks will focus on macro trends affecting the DNS sector, the impact of new gTLDs, and the need to evolve the frameworks that govern relationships among DNS industry participants.

The first of these roundtable discussions has just taken place with some leading registrars. Others will follow, including meetings with the registries and other key players in the DNS ecosystem.

Throughout the year, I plan to share the content of these discussions and engage across the spectrum of ICANN stakeholders.

4. How do you see the new gTLDs (generic top-level domains) affecting industry? Will they change the way in which the internet works globally? Can the seemingly divergent ideas of governments be brought together or must some make concessions?

New gTLDs represent the biggest change to the Internet since its inception. They will offer new opportunities for industry - most notably for the many companies (both major corporations and start-ups), that have applied to operate an Internet registry, which is what one commits to do when applying for a new gTLD. What these companies have done is effectively to apply to own and operate their own piece in the Internet infrastructure. This

brings with it great opportunity, whether through the sale of domain names, new marketing opportunities or other innovative uses for their domain.

gTLDs will change the way the Internet works globally. Consumers will be afforded new choices in buying a domain, though that is only the beginning. When these new registries start to come online, we will see the real impact on the Internet from a user perspective. Many of them will offer users new opportunities and services that will improve their online experience. As an example, we have seen a large number of applications for gTLDs in non-Latin scripts, such as Chinese. When these domains are launched, more Internet users will be able to use the DNS in their native language.

The gTLD program truly reflects the multi-stakeholder approach; an approach that involved all parts of the ICANN Community over a period of several years.

5. Is there a role for competition at a global level in the assignment of domain names? Has this changed over the last five years? Who are the key players for the future?

There is definitely a place for competition in the DNS, in fact it is a fundamental rationale for the gTLD programme. In voting to proceed with the gTLD programme in Paris, in June 2008, ICANN was, in effect, saying there was no longer a good

reason artificially to restrict the number of top-level domains in the DNS, thus endorsing competition in the industry and affording maximum consumer choice.

It is fascinating to look at the list of gTLD applicants, which have come from entities as varied as major brands, cities, churches, media organizations and start-ups. As operators of domain registries, all successful gTLD applicants are potentially key players in the Internet's future.

6. Are policymakers in general equipped to encourage developments for the Internet?

Yes, of course, governments have taken significant steps to encourage the development and evolution of the Internet, especially with respect to Broadband provision.

However, the continued growth of the Internet cannot be dependent solely on policymakers, it is dependent on the involvement of all the stakeholders who have made the Internet what it is today - arguably the most powerful communications network man has ever created. Success speaks for itself. The Internet's global value speaks to its success, and by extension to the model that has facilitated its growth, specifically the multi-stakeholder model, which has been validated by the Internet's growth and impact around the globe.