

# Agenda

## Advancing economics in business

### Next generation networks: old generation rules?

**European telecoms incumbents are planning to replace parts of their legacy networks with fibre-based elements. These next generation networks will boost the speed of broadband and are expected to deliver new services to end-users. What regulatory challenges does this development present? Should incumbents be obliged to provide access to their fibre-based access networks? And is there a trade-off between innovation and fair competition?**

Fixed-line telephony and communications network operators across the world are having to decide whether and when to invest in next generation technology. These decisions are being made on the basis of the costs of the investment compared with the cost savings that could be generated, and the potential returns achieved through the provision of innovative services, subject to the constraints that regulation of this new technology may impose.

'Next generation' is a rather loose term that includes either or both of two factors:

- **core network investments**—to enable the ubiquitous use of Internet protocol (IP) technology throughout the core networks;
- **next generation access network (NGAN) investments**—to replace the copper wire traditionally used in the access networks (ie, those linking consumers' premises to the networks) with fibre-optic cables.

Of these, investments in next generation technology in the core networks are of less interest from a regulatory perspective for a number of reasons:

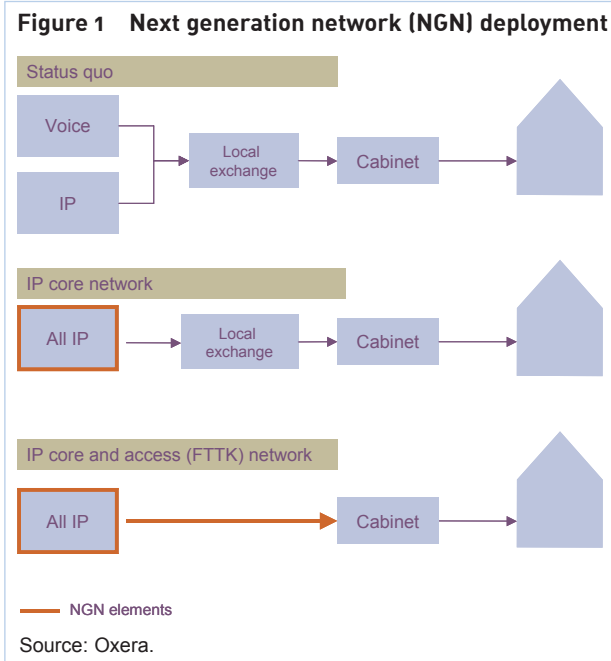
- they do not lead directly to a fundamental change to the network topology, and therefore do not threaten the use of local-loop unbundling (LLU—where entrants take control over the incumbent's access line to the customer) as a tool to promote competition;
- they may not lead directly to new services for consumers, but facilitate more efficient provision of existing services;
- decisions to invest in core networks are therefore mainly driven by the cost efficiencies that the operator could achieve through the simplification (or flattening) of the network structure that would be involved.

In contrast, access networks based on next generation technology would be fundamentally different from traditional networks (public switched telephony network, PSTN). The current local exchanges (the focal point for LLU as a competition-enabling policy) would be unlikely to exist, raising significant questions about how to promote competition in NGANs. Investment in these networks would enable significantly faster (or 'bandwidth-hungry') services (such as high definition IPTV) to be provided to consumers.<sup>1</sup> The incentives to invest therefore depend not on cost savings that can be achieved, but on the additional returns that could be generated compared with the status quo. Since regulation has a significant potential impact on those returns, the interaction between the nature of expected future regulation and investments in NGANs is a key influence on investment decisions.

This article focuses on certain key features relating to the regulatory implications of next generation investments at the core and access levels.<sup>2</sup> The particular challenge that regulators face is in ensuring that their actions do not prevent efficient investments from being made (as the innovation will benefit consumers) at the same time as working out how (or indeed whether) to promote competition (or maintain competition generated via LLU).

#### Next generation core and access investments

The appropriate regulatory approach depends on the level in the network at which the next generation technology will be deployed. Using the UK and Germany as comparators, it is helpful to highlight why the regulatory focus relates to access networks. A simple depiction of fixed telephony networks is provided in Figure 1, highlighting the local exchanges and the street



cabinets as key elements of the network, as well as the fact that voice and data are carried over different layers of the core network. The network to the right of the local exchanges is the access network, also referred to as the 'local loop' or the 'final mile'. That to the right of the street cabinets is the 'sub-loop'.

The figure also highlights which elements of the networks are the subject of current investments in the UK and in fibre-to-the-kerb (FTTK) models, as being implemented in Germany.

As can be seen in Figure 1, data and voice are currently transmitted via different core networks to the end-user. In the UK, elements of BT's core infrastructure will be replaced with fibre-based IP facilities.<sup>3</sup> This will make its 21st Century Network (21CN) simpler and flatter, as well as easier and less costly to maintain.<sup>4</sup> Such investment plans are likely to be driven more by operational and maintenance cost savings than innovation in the services that can be provided. Significantly, the relevance of the local exchanges is not affected by investments in the core. Thus, from a regulatory perspective, next generation investments in the core do not raise fundamental challenges to the current LLU policy and are therefore less likely to distort the competitive environment.

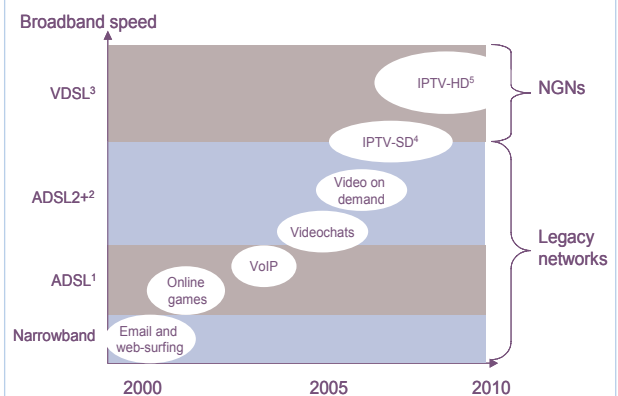
In addition to upgrading the core, fixed telephony network operators can also extend their investments to include new fibre lines from the main distribution frame (MDF) in the local exchanges to the street cabinets that represent the boundary between the local loop and the sub-loop access networks.<sup>5</sup> This is an FTTK model. Such a fibre-based access infrastructure will enable high-

speed broadband of up to 50Mbit/s.<sup>6</sup> An alternative approach would be to invest in fibre-to-the-home (FTTH).<sup>7</sup>

The impact of these approaches in terms of the services that can be provided is highlighted in Figure 2, which shows the range of services that can be delivered via next generation access and legacy networks. In particular, NGAN deployment will enable high definition television services. Other bandwidth-hungry services may also arise, but the key question is whether these services would justify a different regulatory treatment of next generation access services.

Of particular relevance to the regulatory debate is the fact that NGAN deployments have fundamentally different economic characteristics from deployments of next generation in the core. In particular, NGAN deployment is less likely than investments in the core to lead to significant cost savings for the operator. As discussed above, the driver for such investments is therefore the expected additional returns that could be achieved from the provisions of services over that network. Regulation of access to an NGAN, and the terms of such access, will influence those expected returns and thereby the incentives to invest in the new technology. Indeed, there are examples where the regulator's stated intention to continue to regulate for access (via policies such as LLU) appears to have been a factor in the withdrawal of investment plans.<sup>8</sup> Regulators therefore need to decide whether to regulate

**Figure 2 Potential new services enabled by high-speed broadband**



Notes:<sup>1</sup> Asymmetric digital subscriber line—the original DSL standard, capable of up to 6bit/s. <sup>2</sup> A refinement to ADSL, capable of between 8Mbit/s (UK) and 32Mbit/s (France). <sup>3</sup> Very high bit rate digital subscriber line—the most recent DSL refinement that requires additional investments in fibre, capable of up to 50Mbit/s. <sup>4</sup> Standard definition TV over IP—a television signal over a broadband line that has the standard resolution of a TV picture <sup>5</sup> High definition TV over IP is a TV signal over a broadband line that has a much higher resolution, which can only be displayed by televisions enabled for high definition services. Source: Oxera analysis of various sources.

to promote facilities-based competition, and consider the terms of such access, taking into account the benefits of promoting competition in broadband services, compared with the risk that the imposition of competition-enabling policies could threaten the deployment of NGANs.

## Challenging the pivotal role of LLU?

Regulatory policy for promoting broadband competition in many countries in Europe and elsewhere has focused on access obligations and LLU, enabling third-party competitors to invest in the local exchanges, and engagement in facilities-based competition with the incumbent operators. This policy has had a significant impact on the competitive landscape of current generation broadband services, with competitors not simply providing a choice of supplier for consumers, but also upgrading the quality of available broadband services. The European Commission recently concluded that:

There is a general consensus that competition is a major driver of broadband take-up ... Effective market regulation permitting access to the incumbent's infrastructure also stimulates competition, and decisive regulatory action in France and the United Kingdom, for example, has clearly been important.<sup>9</sup>

In Europe, where regulation of next generation access falls within the scope of the European Commission's regulatory framework for electronic communications markets,<sup>10</sup> the necessary condition for the imposition of access obligations is a finding of significant market power in the relevant market. An access obligation, which requires the incumbent to grant access to its network, is one of the more stringent remedies available. Yet is the continuation of LLU (or an equivalent) necessary in the next generation environment?

Regulators across the world have adopted different views. In Germany regulatory holidays have been proposed for Deutsche Telekom; in Australia, commitments to invest have been withdrawn by Telstra after the Australian regulator stated that it would regulate for access; but in the USA, all access obligations have been removed on the basis that the platform-based competition between cable and next generation fixed telephony networks is sufficient to ensure that consumers benefit from competition and innovation.<sup>11</sup> This range of approaches reflects the concerns that arise in relation to the provision of incentives to invest in NGANs and the risk that competition will be reduced in the future.

In the European regime, the current framework contains the principle that where markets are new and emerging, they should not be subject to ex ante regulation.

Furthermore, the framework adopts a technologically neutral approach, which implies that an NGAN would only comprise a new market if NGANs enable new services to be provided that are sufficiently distinct from existing services such that they would be included in a separate relevant market.

The fact that new technology is used is therefore not directly relevant to an assessment of market definition.<sup>12</sup> Instead, the question is whether new retail services will emerge as a result of high-speed broadband. While the forward-looking nature of such assessments makes undertaking a rigorous test of market definition difficult, the absence of a clear range of services (other than high definition IPTV) casts doubt on next generation access services leading to a revolution in services, rather than a gradual evolution. This would therefore imply that next generation access services would be unlikely to belong in a separate relevant market, and therefore may not merit exemption from ex ante regulation.

The German case provides a good example of the main concerns that have been raised in relation to NGANs under the regulatory framework. The European Commission opened an investigation into the German regulator's (BNetzA) notification of its proposals not to regulate for access to the NGAN, because the Commission considered the relevant product market definition, which excluded NGANs, as inappropriate.<sup>13</sup>

In the context of this debate, it is also necessary to consider whether there is merit in the argument that regulating for access undermines the incentives to invest in NGANs.

One relevant factor is the asymmetry of risk that regulating for access could introduce. The fact that new retail services enabled by next generation high-speed broadband are yet to be developed implies that the incumbents' investments are subject to significant commercial risk. In particular, demand for high-speed broadband will only be boosted if new services are introduced at the retail level; otherwise, customers will be less likely to be willing to pay a higher price to access broadband than under current technologies. Similarly, competitors will seek access only if there appears to be demand for higher-quality services. This introduces a potential asymmetry into the risk faced by incumbents since, in the presence of an access obligation, competitors may cap the positive returns of the investment, but leave the incumbent fully exposed to the risk in case the investments cannot be recouped.<sup>14</sup>

Such asymmetric risks could distort dynamic efficiency in the sense that incumbents may be less likely to induce efficient investments in NGANs. This threat to dynamic

efficiency would be greater if the regulated price for access does not take proper account of the risks that operators face prior to making those investments. However, in principle, this asymmetry can be overcome through regulating access prices to reflect the risks.

## Concluding remarks

It is important to note the distinction between next generation investments being made in core networks and those being made in NGANs. The economics and regulatory implications of these different investments are fundamentally different, and it is only investments in NGANs that raise complex regulatory questions.

This article has focused on the debate surrounding obligated access for third parties, and has highlighted the

difficult balance that regulators need to strike between promoting short-term competition and innovation. The central question for regulators in Europe, given the regulatory framework, is whether next generation access services should belong in a relevant market separate from existing services, and therefore be exempt from ex ante regulation. In advance of new services being developed that take full advantage of the improved underlying technology, the case for exemption is not obvious, and, as can be seen in the context of 2G and 3G mobile services, simply because a higher-quality technology is available, it does not lead automatically to a distinct demand for new services over that technology.

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<sup>1</sup> See, for example, Deutsche Telekom (2007), 'Deutsche Telekom: Focus, Fix and Grow', press release, March 1st.  
<sup>2</sup> There are other regulatory challenges that arise in this debate—for example, the issues that are being examined in the Netherlands relating to transitional arrangements in the period of migration to an all-IP network. See OPTA (2006), 'KPN's Next Generation Network: All-IP', position paper, OPTA/BO/2006/202771, October.  
<sup>3</sup> wik-Consult (2006), 'Framework for Interconnect of IP-based Networks: Accounting Systems and Interconnection Regimes in the USA and in the UK', study for the Federal Network Agency (BnetzA), March 27th.  
<sup>4</sup> BT estimates an annual reduction in operating expenses at £1 billion per year by 2008/09 as a result of its next generation network deployment. See BT website, '21CN is Coming to Everyone in the UK', <http://www.btplc.com/21CN/TheRoadto21CN/UKRollout/UKrollout.htm>.  
<sup>5</sup> In this regard, new fibre lines will be deployed from the MDF to Deutsche Telekom's street cabinets, where new equipment will be installed to serve customers with faster broadband connections.  
<sup>6</sup> Deutsche Telekom (2007), op. cit.  
<sup>7</sup> One of the factors that determines whether the access networks will be FTTK or FTTH is the dispersion of the street cabinets in the current network. If these cabinets are widely dispersed, the sub-loops will be relatively long, and in some cases too long to enable the high-quality services to be provided, since the quality deteriorates over longer connections. In such circumstances, FTTH would be more likely.  
<sup>8</sup> See, for example, Australian Competition and Consumer Commission (2006), 'ACCC "Perplexed" by Telstra Decision on Fibre-to-the-node Investment', press release, August 7th.  
<sup>9</sup> European Commission (2007), 'European Electronic Communications Regulation and Markets 2006 (12th Report)', March, p. 12.  
<sup>10</sup> European Commission (2005), 'Electronic Communication: Principles', fact sheet 13, DG Information Society, September, [http://ec.europa.eu/information\\_society/doc/factsheets/013-regulatory\\_framework.pdf](http://ec.europa.eu/information_society/doc/factsheets/013-regulatory_framework.pdf).  
<sup>11</sup> European Commission (2007), 'Commission Launches "Fast Track" Infringement Proceedings against Germany for "Regulatory Holidays" for Deutsche Telekom', press release IP/07/237, February 26th; and OPTA (2005), 'Regulating Emerging Markets? Economic Policy Note', April, noted that, in 2003, the US Federal Communications Commission ruled that fibre deployments should be relieved from the obligation to provide unbundling to competitors in the USA.  
<sup>12</sup> European Commission (undated), 'Commission Recommendation on Relevant Product and Service Markets within the Electronic Communications Sector Susceptible to Ex ante Regulation', Explanatory Memorandum.  
<sup>13</sup> European Commission, Decision, Case DE/2005/0262: Wholesale Broadband Access in Germany Withdrawal of Serious Doubts, 23.12.2005.  
<sup>14</sup> Ofcom (2006), 'Regulatory Challenges Posed by Next Generation Access Networks', public discussion document, November 23rd, p. 22.

If you have any questions regarding the issues raised in this article, please contact the editor, Derek Holt: tel +44 (0) 1865 253 000 or email [d\\_holt@oxera.com](mailto:d_holt@oxera.com)

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