

Unbundling local loops: global experiences

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Introduction

One of the policy instruments developed to facilitate the supply of telecommunications has been Local Loop Unbundling (LLU). Initially for voice telephony, it quickly became the centre of service-based competition in broadband Internet access and the heart of a range of bundled services for the consumer market.

LLU was introduced as a way to overcome the bottleneck control over the last (or first) mile of copper cable owned by incumbent operators which had proved very hard and very expensive to replicate.¹ An alternative approach, discussed by a few countries, would have been structural separation, putting the ownership of the local loops into a different company.² Given the costs and risks of that approach, countries preferred to rely on behavioral remedies until the introduction of an intermediate option of operational or functional separation, though without, as yet, any clear results.

The initially relatively simple model of unbundling has been developed into a range of increasingly complex regulatory “products”, including shared access, Bit Stream Access (BSA), Wholesale Line Rental (WLR) and naked DSL. Further complexities are being introduced in order to adjust to the deployment by incumbent operators of Next Generation Networks (NGNs). It is further complicated by moves towards the greater supply of Fibre To The Node (FTTN) and Fibre To The Premises (FTTP) for both businesses and residences.

Such models are in stark contrast to the story of telecommunications in Africa where the success has come from infrastructure-based competition, primarily wireless network operators. With few local loops to unbundle and a substantial access deficit, policy efforts have been directed at encouraging operators to construct cellular networks.

This discussion paper describes the cutting and sometimes bleeding edge of broadband deployment, then it examines models of ladders of investment on fixed networks. It looks in turn at case studies: Japan, United States of America, New Zealand, Morocco and the European Union, including the United Kingdom (UK). Conclusions are then drawn for policy makers.

¹ OECD (2003) Developments in local loop unbundling. DSTI/ICCP/TISP(2002)5/FINAL (Paris, Organisation for Economic Co-operation and Development).

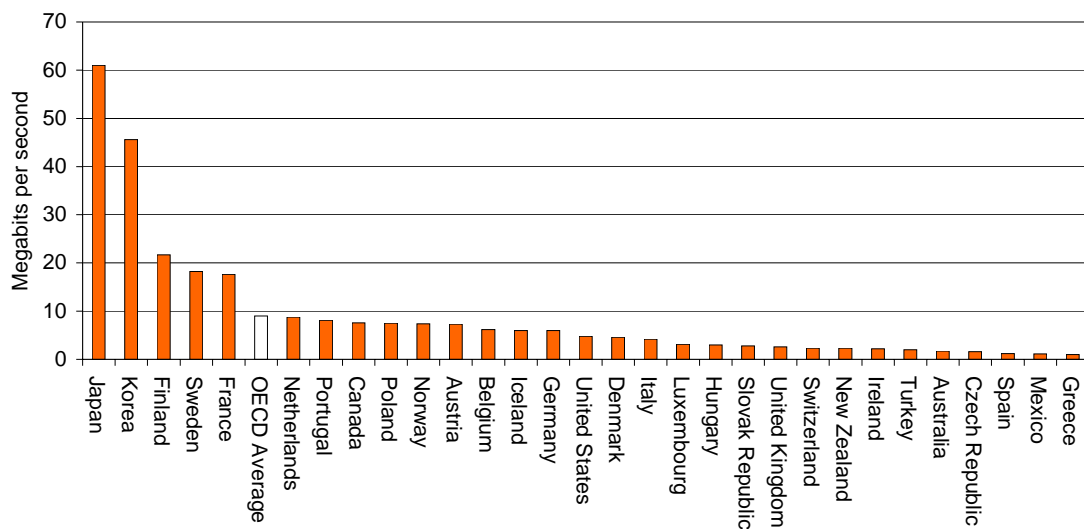
² OECD (2003) The benefits and costs of structural separation of the local loop DSTI/ICCP/TISP(2002)13/FINAL (Paris, Organisation for Economic Co-operation and Development).

The state of the art

Broadband Internet was initially a substitute for dial-up access, with the added advantages of higher speeds and being always-on, greatly facilitating its use. Where there was competition, the speeds available to consumers rose rapidly. Access has been further improved by the installation of Wi-Fi routers in homes, allowing multiple devices and thus multiple individuals to be connected to the Internet as and when they want.

Bandwidth available to consumers has continued to rise, though experiences vary greatly (see figure 1). In an extreme case, in June 2005, HKBN, an Internet Service Provider (ISP) in Hong Kong, launched a 1 Gbps service for HK\$1,680 (ZAR 1,490) per month.³ For less demanding customers it offers a Fibre To The Home (FTTH) service of 200 Mbps (symmetric) for local traffic and 20 Mbps for international traffic for HK\$ 688 (ZAR 610).⁴

Figure 1 Average broadband speeds⁵



There is increasing deployment of a range of new technologies including ADSL 2+ and VDSL offering higher speeds, both upload and download. To support these, operators are deploying more fibre in their networks, often to the street cabinet. Beyond that there is Fibre To The Home (FTTH).

Operators in some countries, generally in remoter locations, have retained the use of “caps”, limiting the volumes of data a customer can download. They claim this is because of the high costs of international connectivity, though there is little evidence to support this. In Australia and New Zealand the caps continue to hamper the use of broadband and in many ways to negate the always-on and high bandwidth features.

In developed countries, operators gradually reduced prices to a level at which a large part of the population was comfortable to pay. Thereafter, they have preferred to compete by improving and expanding the bundle of services to achieve triple play, comprising:⁶

³ <http://www.hkbn.net/bb1000/>

⁴ http://www.hkbn.net/bb1000/offer_ftth_bb200.html

⁵ Daniel K. Correa (2007) Assessing broadband in America: OECD and ITIF Broadband Rankings. (Washington DC, Information Technology and Innovation Foundation)

⁶ OECD (2006) Multiple play: pricing and policy trends DSTI/ICCP/TISP(2005)12/FINAL (Paris, Organisation for Economic Co-operation and Development).

- voice calls to the fixed network
- Internet access
- television channels, video on demand and IPTV

In some cases they go beyond this to quadruple play⁷ by the addition of mobile voice and data.⁸

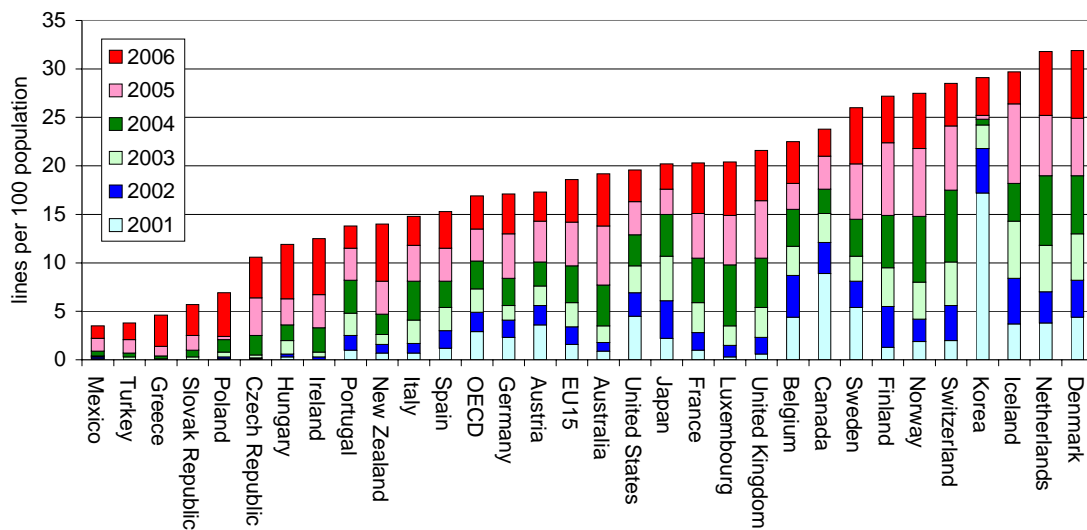
For example, in France Free.fr offers a bundle for €29.99 (ZAR 300) per month:⁹

- unlimited calls to fixed networks in France and 69 other countries
- 100 television channels
- ADSL2+ (up to 24 Mbps)

Free.fr, together with a few other French ISPs, uses unbundled local loops obtained from the incumbent operator. However, they are now installing their own fibre access networks. Additionally, some municipalities are laying optical fibre cables, in compliance with the European Union state aid rules that require open access to service providers in order to ensure a neutral effect on competition.

The implementation of broadband policies has been very varied across the developed world (see figure 2). The wide diversity of performance of countries and individual operators will continue for years as policies are refined and as competition is gradually raised to effective levels.

Figure 2 *Broadband in the OECD*¹⁰



There are several explanations for the poorer performances:

- the presence of a strong incumbent operator and a weak regulatory regime
- a history of inadequate investment in infrastructure
- low levels of PC ownership and computer literacy

⁷ See, for example, Analysys (2007) Quadruple-Play Bundling Strategies.

<http://research.analysys.com/default.asp?Mode=article&iLeftArticle=2481&m=&n=>

⁸ Sir Richard Branson prefers to call this four-play.

⁹ <http://www.free.fr/>

¹⁰ <http://www.oecd.org/sti/ict/broadband>

However, it is policy bottlenecks that result in slow, capped or just expensive broadband Internet access.

Ladders of investment

The ladder of investment is a metaphor, rather than an economic model. It was intended to convey the idea of a new entrant making staged investments while also being able to generate revenues. It was an alternative to forcing a potential entrant to build a complete national network before starting to earn any revenues.

The original rungs of the ladder were for voice telephony:

- International Simple Resale (ISR)
- Carrier Selection (CS) and Carrier Pre-Selection (CPS)
- unbundled local loops

The new entrant would begin at the international gateway and gradually build out to exchanges and then to the individual locations of customers.

Later, the ladder metaphor was extended to Internet access. Initially, through dial-up models, including Flat Rate Internet Access Origination (FRIACO), that allowed an always-on narrowband service. Then it was applied to broadband Internet through shared access and unbundling of local loops.

It had been assumed that it would be ISPs and Alternative Network Operators (ANOs) that would enter the market using the ladder. Increasingly it has been GSM and UMTS operators wanting to add home voice and broadband services to their retail bundle.

For example, the Vodafone Group was originally a non-copper operator, at least as far as customers were concerned, though behind the scenes it was heavily reliant on leased lines usually supplied by incumbent operators. Then in 2006 it moved to offer bundles of residential services using unbundled local loops from incumbent operators. To aid this, the Vodafone Group has bought:

- Ya.com, an ISP in Spain
- The Network Factory, a service provider in the Netherlands
- Tele2, an alternative telephone operator in Italy and Spain
- iHug, an ISP in New Zealand

In Africa, it has preferred to combine GSM and UMTS with Fixed Wireless Access (FWA), for example, Vodafone Congo.¹¹

Many developed countries chose service-based competition over infrastructure-based competition for fixed networks. Having done so, they have had to expand the initially simple unbundling regulations to include:

- shared access
- unbundling
- line sharing
- Wholesale Line Rental (WLR)
- Bitstream Access (BSA)

¹¹ http://www.vodacom.cd/vodanet_fixe.htm

- naked DSL
- duct sharing

The deployment of NGN and NGA has the potential to undermine or even invalidate such a policy by introducing yet more ladders. By extending fibre from exchanges to street cabinets, it becomes necessary for alternative operators to connect at considerably more locations. Some operators have also used the large investments in such networks to call for regulatory forbearance or holidays, though with little success.

There are important differences between access on fixed and mobile networks. While regulated access has generally been provided on copper loops it is rare for similar terms to be provided on GSM or UMTS networks. The mobile network operators argue that they are in a competitive market, usually with three to five infrastructure-based players, so that any access should be negotiated by the access seekers.

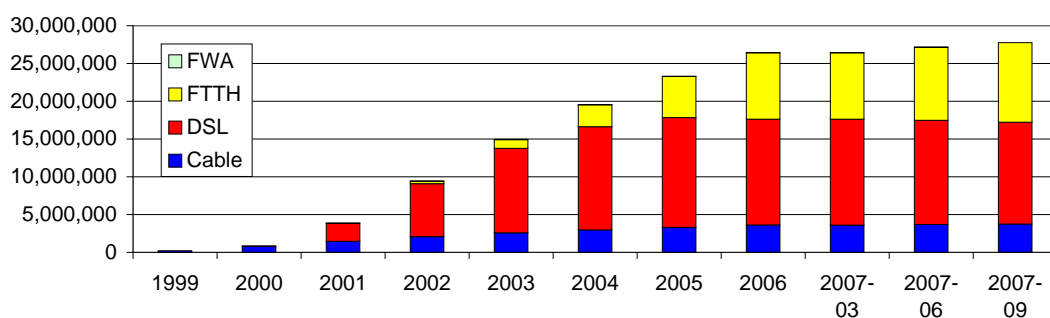
In Africa, the copper lines may not be there to unbundle or they may address only a fraction of the market already using GSM. Given that mobile network operators have backhaul networks and masts in place, the addition of FWA may be a simpler and more cost effective solution than seeking to regulate access to copper loops. However, this presumes that they have access to spectrum in bands for which there is affordable customer equipment.

For African ISPs there seem to be few routes forward. It is extraordinarily unlikely they can persuade GSM and UMTS operators to allow them wholesale access to their networks. Local loop unbundling is taking so long and networks are so incomplete, that ADSL is a very unsatisfactory and only partial solution. With the demise of dial-up the role of the ISP seems uncertain, unless they can find the capital to build their own networks.

Japan

Following the very early success of South Korea, Japan saw itself as a late starter but fast follower in broadband. It has been relentless in pursuing global leadership in broadband (see figures 2 and 3). Japan is also a leader in 3G, with half of its population having switched by March 2006.

Figure 3 *Japan – broadband statistics*¹²



There was rapid adoption by operators of shared access to local loops on the network of NTT, provided at comparatively low prices as was the wholesale backhaul. There was one extremely disruptive market entrant Yahoo! BB, led by Son-san, the CEO of Softbank.

¹² Source: Ministry of Internal affairs and Communications, Tokyo.

In 2004 there was a speed war, with DSL offers jumping from 8 to 45 Mbps. Currently, Yahoo! BB has an offer of ADSL 50/12.5 Mbps (down/upstream) for ¥3,480 (ZAR 224) per month.¹³

ADSL subscriber numbers in Japan are now declining. The growth has shifted to FTTH and this is now the main focus of operators, with both the incumbent (NTT) and alternative operators building their own networks. FTTH is offered at 100 Mbps down/upstream with relatively low prices: ¥4,000 to ¥6,000 per month (ZAR 260 to 390).¹⁴

By February 2005, 5% of users were already “heavy-hitters” up-loading more than 2.5 Gigabytes per day and downloading considerably more. Given the bandwidth, a growing number of customers will make use of it.

United States of America

At times there has been an acrimonious debate about the standing of the USA in the OECD broadband statistics. It has been claimed that the numbers are incorrect, that they are not meaningful and doubt has been expressed that Japan, China, France and Iceland are really doing better than the original home of the Internet. Nonetheless, there have been serious concerns that consumers in the USA are not getting the same offers as in leading countries and that this affects national competitiveness.¹⁵

Domestic statistics have been criticized for the use of a single customer in zip code to designate availability. Equally, the use of the very low threshold of only 200 kbps has been criticised, though it allows inclusion of satellite and wireless connections that are not especially fast.

Up to mid-2006, the most recent FCC statistics, there has been deployment of some FTTH services (see figure 4), though not on the scale of Japan. There has been pressure from the FTTH Council for action to encourage more rapid deployment.¹⁶

¹³ Such promotions change regularly.

<http://bbpromo.yahoo.co.jp/promotion/adsl/regular/>

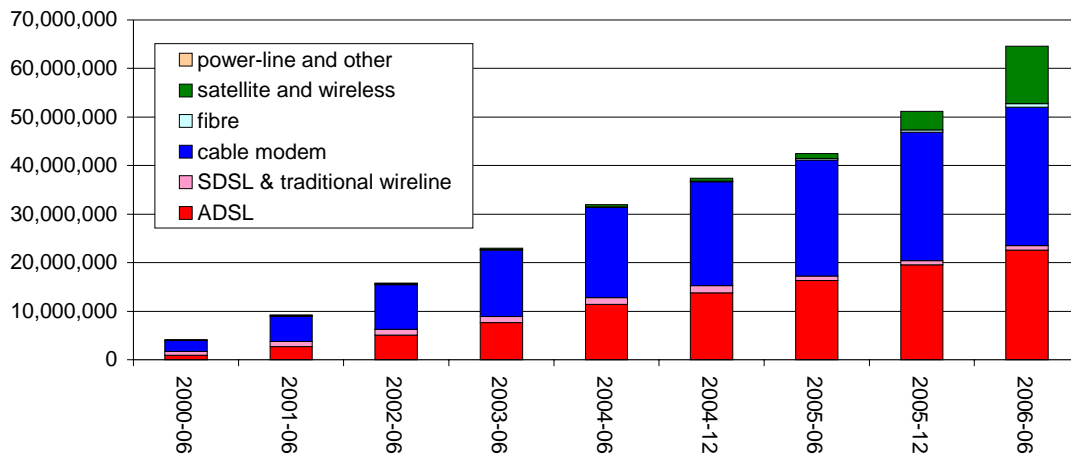
<http://bbpromo.yahoo.co.jp/promotion/campaign/discount1000/index.html>

¹⁴ See NTT B-Flets hikari prices at <http://www.ocn.ne.jp/english/personal/broadband/hikari/>

¹⁵ See, for example, the House Sub-Committee on Telecommunications and the Internet.

<http://energycommerce.house.gov/Subcommittees/telint.shtml>

¹⁶ <http://www.ftthcouncil.org/>

Figure 4 *Broadband in the USA*¹⁷

Unbundling was implemented by statute – the Telecommunications Act 1996 – with the details left to the Federal Communications Commission (FCC). After several attempts, implementation was abandoned, because of disagreements amongst the five Commissioners and a series of reversals in the courts. Unbundling is now available only on commercial terms to those operators willing to take it.

Consequently the USA is almost entirely reliant on duopoly competition between cable operators and the few remaining former Baby Bells. The latter are constructing new networks and both groups are offering customers triple play. The FCC applied “regulatory forbearance” to new constructions of fibre networks. In addition to any existing commercial rationale, this created a regulatory incentive to build new networks.

There are two approaches being taken by Telcos, Fibre To The Node (FTTN) and Fibre To The Home (FTTH), with no clear indication yet as to the more successful model.

AT&T U-verse:¹⁸

- FTTN and FTTP
- Up to 6 Mbps downstream and 1 Mbps upstream
- triple play

Verizon FIOS:¹⁹

- FTTH
- up to 50 or 30 Mbps downstream and 4 Mbps upstream
- triple play

There has been a complex and still unsettled debate on “network neutrality”.²⁰ Network owners have claimed that investments in the network cannot be recovered from customer revenues alone and that they should be allowed to charge content providers for delivery, in a two-sided market.

¹⁷ Federal Communications Commission (2007) High-Speed Services for Internet Access: Status as of June 30, 2006. Industry Analysis and Technology Division. Wireline Competition Bureau. (Washington, FCC).

¹⁸ <https://uverse1.att.com/launchAMSS.do>

¹⁹ <http://www22.verizon.com/content/consumerfios/>

²⁰ Tim Wu & Christopher S. Yoo (2007) Keeping the Internet Neutral? *Federal Communications Law Journal* 59 (3) pp. 575-592.

Municipalities have been engaged where Telcos have sought to install fibre networks. They have required that the networks be approved as television franchises, causing considerable delays, not least because of the scale of the regulatory work involved.

New Zealand

There have been repeated complaints about the poor rankings of New Zealand in its broadband performance. It is argued that Internet access would help to reduce its considerable geographical isolation.

A vertically integrated and entrenched incumbent operator, Telecom New Zealand, extends from the undersea cables linking to Australia and the USA all the way to the farmstead. There are a handful of small to medium-sized ISPs, which have little capital and less experience of network construction. Thus competition has become almost entirely reliant on:

- TelstraClear (the Australian incumbent operator)
- Vodafone Group (a GSM and UMTS operator)

A third mobile network has not been an active player, facing substantial difficulties.²¹

There is little hope of further competitive entrants, given the small and widely dispersed population, combined with relatively saturated markets for fixed and mobile telephony that ensures an uphill fight to achieve economies of scale. The remoteness and the lack of neighbours also makes the market less attractive and lacking in the natural entrants from contiguous countries found in Latin America, Europe and Africa.

There is now an established pattern of policy swings and reversals every few years:

- no regulation
- some regulation but not unbundling
- more regulation with unbundling

Telecom NZ was successful in having unbundling omitted from the Telecommunications Act (2001), leaving the regulator to evaluate its appropriateness after a cooling off period. By then, it had to be implemented by regulation which proved impossible, causing the issue to revert to the political level. In 2007, following a public consultation the minister decided to copy the former colonial power in adopting operational separation of the incumbent operator.²² The minister did not provide an impact assessment for the policy nor were different scenarios explored. The effectiveness of this approach will take many months to evaluate, after it become operational.

The overall effect of policy shifts has been to destabilise conditions for market entry, because of the very real fear of future policy changes. The government has failed to create competitive market structures for the provision of broadband, while local actors have fixated on the introduction of unbundling as a policy instrument, without ensuring the conditions are there to see the loops put to use.

Morocco

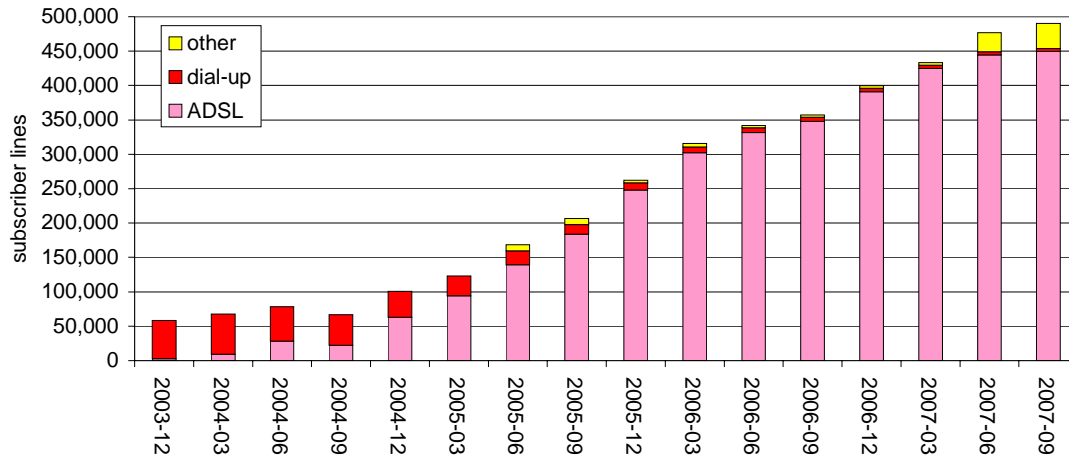
One of the telecommunications successes of Africa has been Morocco, especially in the adoption of GSM. Maroc Telecom has been able to build up a substantial customer base

²¹ This was originally controlled by Econet of Zimbabwe, but has recently been restructured.

²² Operational separation of telecom. Press release by the Hon. David Cunliffe 26 September 2007. <http://www.beehive.govt.nz/ViewDocument.aspx?DocumentID=30768>

for broadband (see figure 5). Under the Menara brand it offers an uncapped ADSL service at a range of speeds.²³ The prices are 256 kbps for MAD 149 (ZAR 135), 512 kbps for MAD 199 (ZAR 180), 2 Mbps for MAD 399 (ZAR 360), 4 Mbps for MAD 699 (ZAR 630) and 20 Mbps for MAD 999 (ZAR 900).

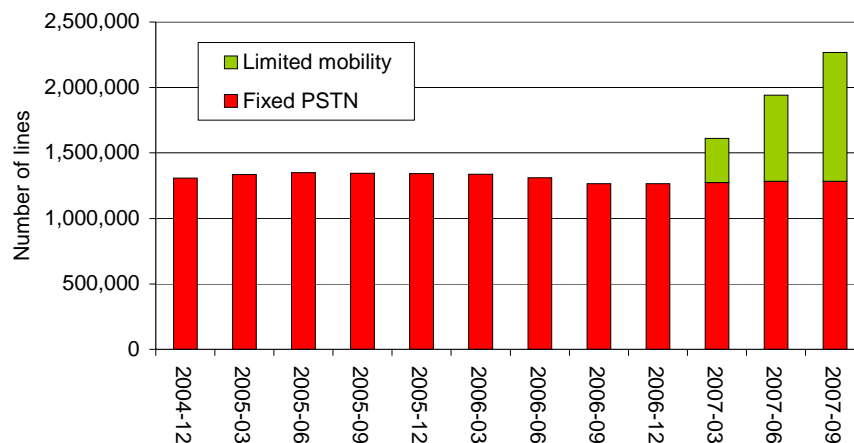
Figure 5 *Internet access in Morocco*²⁴



There is limited service-based competition, though there is some resale of ADSL by a few ISPs. A more significant and quite rapid development has been in FWA, with one operator, Bayn, taking a market share of over 5 per cent, included in “other” in figure 5.²⁵

In contrast to the success of mobile networks, the PSTN had not grown and fixed teledensity had been lagging its economic rivals. The government hesitated to introduce competition in fixed networks, despite its success in mobile. However, since the recent introduction of operators offering limited mobility and broadband services, this part of the market is once again growing (see figure 6).

Figure 6 *Growth of the fixed network in Morocco*²⁶



²³ <http://www.menara.ma/abonne/adsl.asp>

²⁴ “Other” includes about 1,000 leased lines. See <http://www.anrt.ma/fr/>

²⁵ <http://www.bayn.ma/accueil/accueil.php>

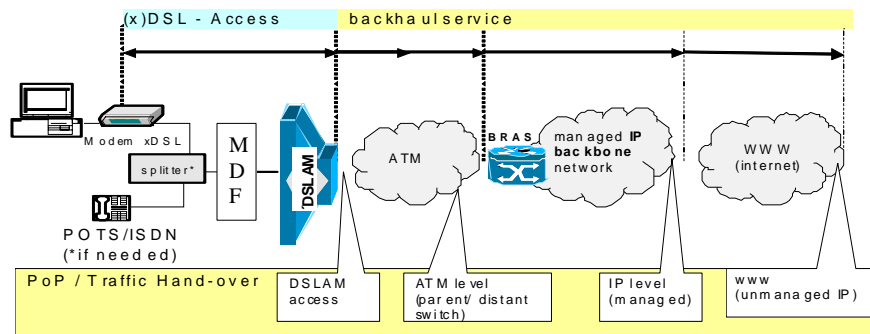
²⁶ Agence National de Réglementation des Télécommunications (2007) Tableau de bord : Marché du fixed au Maroc.

One policy initiative that was thought would help ISPs was local loop unbundling to allow them to expand their offers.²⁷ After some years of debate, unbundling was finally introduced in stages, *dégroupage partiel* from January 2007 and *dégroupage total* from July 2008.²⁸ However, whether there are sufficient traditional fixed lines and whether the ISPs will be able to compete with the rapidly growing FWA operators remains to be seen.

European Union

A single European Union Regulation unbundled all local loops on 2 January 2001.²⁹ This legal form was chosen in the belief that there would be no need for transposition by member states, avoiding many months of delay. In the event, it proved to require enormous efforts by National Regulatory (NRAs) and the addition of several complex variants to simple unbundling (see figure 7).

Figure 7 Handover points between the incumbent and alternative operators



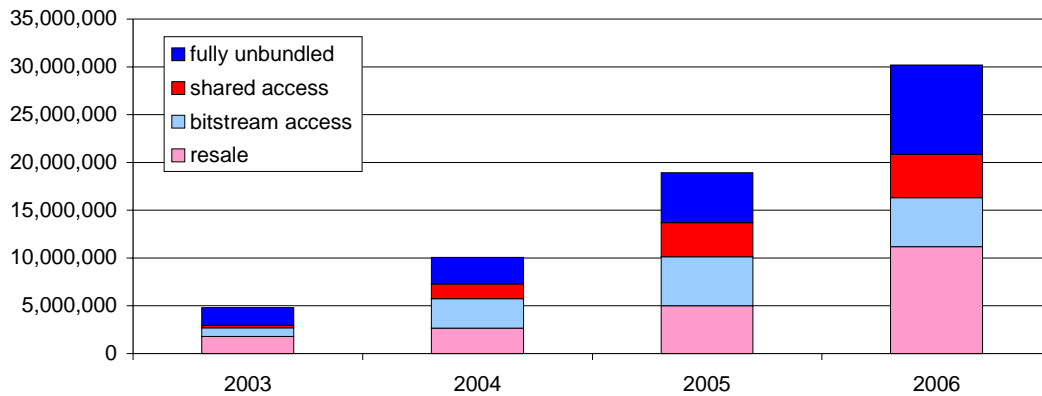
By October 2006, there were only 30 million unbundled lines, out of a total of 184 million lines in the European Union, about 16 per cent (see figure 8).

²⁷ Global Information and Communication Technologies Department (2004) Morocco: Developing Competition in Telecommunications (Washington DC, World Bank).

²⁸ Arrêté du Premier Ministre n°3-3-06 du 8 moharrem 1427 fixant les dates de mise en oeuvre de la présélection du transporteur et du dégroupage de la boucle locale. (07/02/2006). http://www.anrt.ma/fr/admin/download/upload/file_fr678.pdf

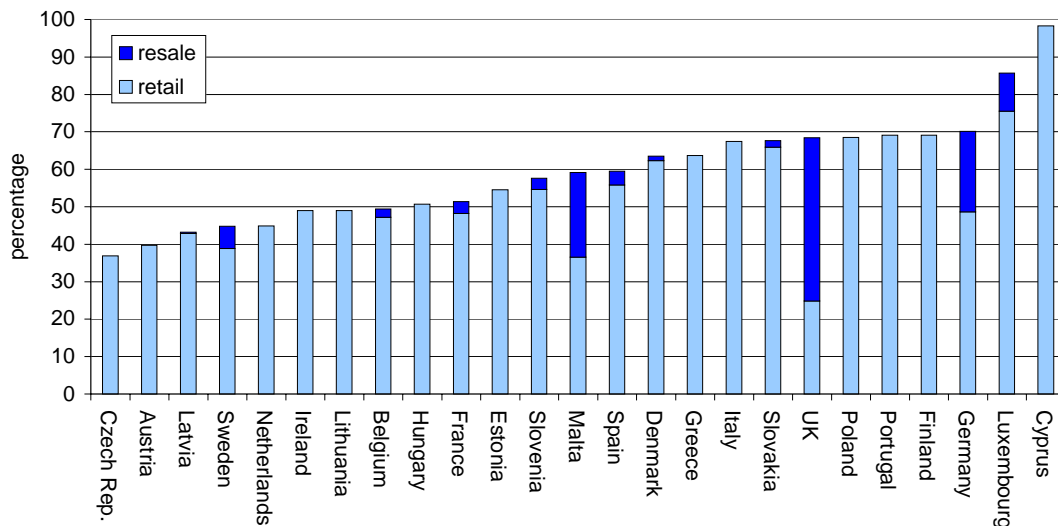
²⁹ Regulation (2887/2000/EC) on unbundled access to the local loop. *Official Journal* L 336 pp 4-8 (30 December 2000).

Figure 8 Wholesale access in the European Union³⁰



There are wildly varying performances across the member states (see figures 2 and 9). The poorer results, where incumbent operators remain dominant, generally arise from the imbalance of a strong incumbent operator and a weak regulator.

Figure 9 Broadband market share held by the incumbent operators in the EU³¹



The purpose of the Unbundling Regulation has largely been absorbed into the cyclical broadband market analysis procedure, with a range of “remedies” being imposed on dominant operators.³² The European Commission intends to repeal the Unbundling Regulation once all 27 NRAs have completed their first analysis of the relevant market.

NRAs have introduced complex accounting separation rules and economic cost models in order to determine the wholesale prices to be paid for the various forms of local loop. The result is a wide variation in prices (see figure 10). While some of these differences

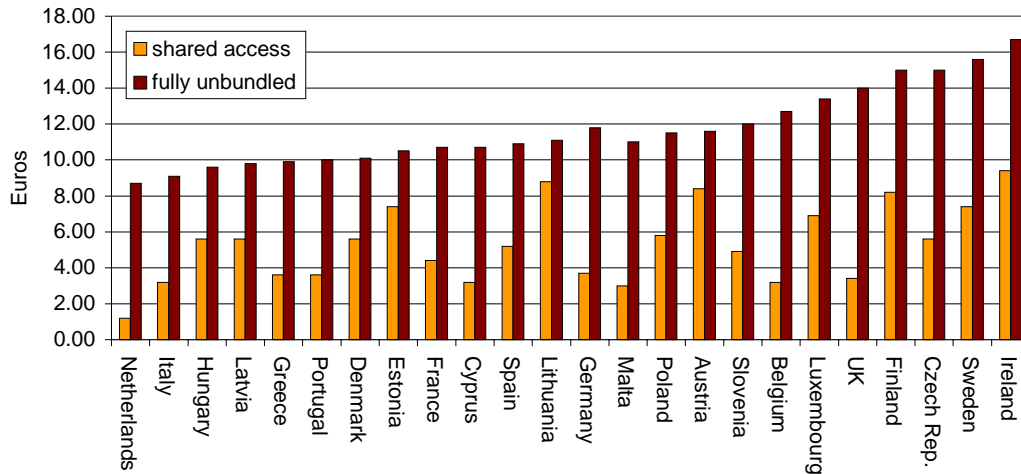
³⁰ EC (2007) 12th Implementation Report (Brussels, European Commission).

³¹ EC (2007) 12th Implementation Report (Brussels, European Commission).

³² European Regulators Group (2006) Common position on best practice in bitstream access remedies imposed as a consequence of a position of significant market power in the market for wholesale broadband access. ERG (06) 69 Rev1. (Brussels, ERG).

may arise from underlying costs, much is due to the national approaches to accounting practices, cost models and the differing negotiating powers of the various parties.

Figure 10 *Prices of local loops in the European Union*³³



The different prices create a range of incentives and profit margins which affect the business models used by operators in the member states. In several instances the practices of operators have given rise to price squeeze complaints against incumbent operators.

In Eastern and South-Eastern Europe there are fewer loops to unbundle and consequently much greater reliance on FWA and the licensing of spectrum.

While the EU can claim some success it has proved to be a much tougher regulatory war than was expected at the outset. It has generated many highly complex documents, required discussions at innumerable meetings and even then produced a mixed bag of results, from world class to something close to the inert.

United Kingdom

A new regulatory body taking office in 2004 initiated a “strategic review” that led to a rejection of the 20-year history of highly detailed and intrusive regulation in the UK.³⁴ Instead it set “equivalence of input” as the new “gold standard”, with BT Retail and its commercial rivals to be equal in every way. Under the Enterprise Act, not the Communications Act, OFCOM negotiated a “functional separation” agreement with BT, leading to the creation of Openreach – a separate and distinct entity within the BT Group – that was to provide equivalent inputs to all retail operators.³⁵

BT Openreach publishes a report of 40 indicators for LLU each week (see Annex 1).³⁶ Additionally, there are quarterly reports from the Office of Communications (OFCOM).³⁷ A less well-known body, the Office of the Telecommunications Adjudicator (OTA), provides detailed analysis and enforcement.³⁸ In a recent quarterly report noted that

³³ EC (2007) 12th Implementation Report (Brussels, European Commission).

³⁴ http://www.ofcom.org.uk/static/telecoms_review/index.htm

³⁵ <http://www.openreach.co.uk/>

³⁶ <http://www.openreach.co.uk/orpg/products/llu/kpi/kpi.do>

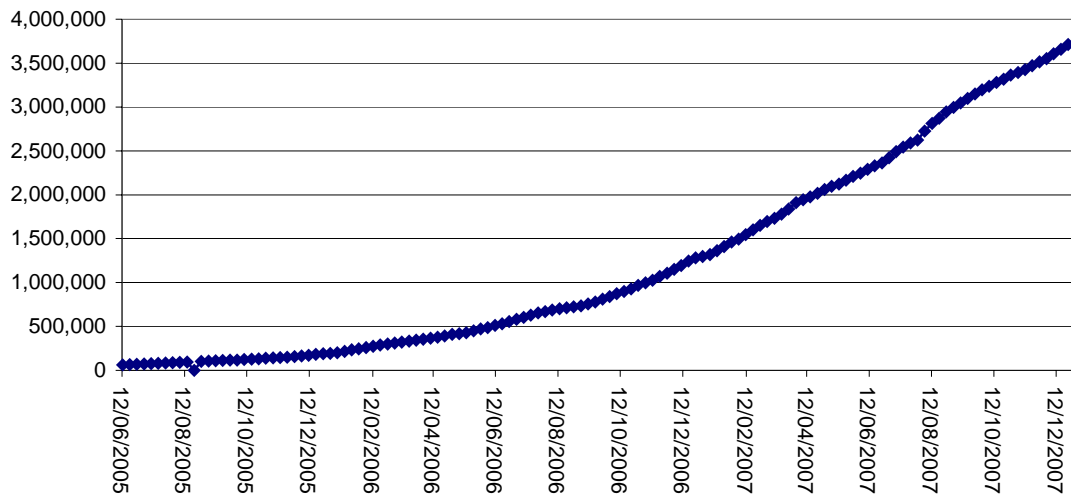
³⁷ <http://www.ofcom.org.uk/telecoms/btundertakings/implementation/>

³⁸ <http://www.offta.org.uk/>

quality had “shown little improvement” and that the underlying failure rate for mainstream repair performance was at an unacceptably high level. At the end of November 2007, there were:

- 3.55 million unbundled LLU lines (see figure 11)
- 4.48 million WLR lines
- 5.82 million telephone numbers using CPS

Figure 11 *UK unbundled loops*³⁹



The UK has created a complex set of interlocking structures in order to unbundle local loops. Yet there are no clear results to show that it has proved more successful than other countries (see figure 2). Moreover, there is a significant fear is that there is a lack of incentives to improve the services; all that is required is that they be equivalent for all players.

In September 2007, OFCOM launched a consultation on the possible migration from copper to optical fibre local loops. There was concern at the lack of progress towards the multi-Megabit speeds found in economic rivals and the possible effects this was having on national competitiveness. The questions raised were:

- When do you consider it would be timely and efficient for next generation access investment to take place in the UK?
- Do you agree with the principles outlined for regulating next generation access?
- How should Ofcom reflect risk in regulated access terms?
- Do you agree with the need for both passive and active access remedies to promote competition?
- Do you consider there to be a role of direct regulatory or public policy intervention to create artificial incentives for earlier investment in next generation access?

³⁹ <http://www.openreach.co.uk/orpg/products/llu/kpi/kpi.do>

Given the radical nature of the Openreach reforms and their incomplete implementation, it was surprising to find Steve Robertson, CEO of BT Openreach, arguing that: “Now is probably the time to say we need to rip up the rulebook”.⁴⁰

Duct sharing

The sharing of passive infrastructure, such as masts, poles and ducts, will usually have a neutral effect on competition. In many countries, GSM and 3G operators have been permitted and encouraged to share masts, to minimize environmental concerns, to accelerate network deployment and to save costs.

Similarly, for operators installing fixed local access networks, the ability to share poles and ducts can allow considerable savings in money and time. It reduces the costs of acquiring rights of ways and in the construction of infrastructure.

The rapid deployment by Fastweb of fibre to Italian apartment buildings was made possible by the use of the ducts of Telecom Italia. The Italian competition authority had forced Telecom Italia to open access in the course of a merger control case.

ARCEP, the French regulator, has taken a lead in duct sharing in Europe.⁴¹ It sees the way forward in terms of moving towards infrastructure competition, aided by sharing of passive elements.

Incumbent operators usually claim “our ducts are full”, requiring the introduction of procedures to check whether such claims are true. It also requires dispute resolution when complaints are made about access or damage to the cables of other operators.

In multi-tenant buildings the owners sometimes allow one operator to install a single network on terms that block other operators from obtaining access. A French consumer group has recently campaigned against exclusive deals because of their anti-competitive effects.⁴² In the USA, some operators are contesting a ruling by the FCC that ended exclusive internal cabling in multi-tenant buildings.

In the case of new constructions of homes, whether estates or high-rise buildings, developed countries have shown it is useful to ensure a provision for future cabling with ducts open to more than one operator.

In comparison to crafting rules for access over NGN and FTTH, it is comparatively easy to set rules for the sharing of ducts, masts and poles. Such rules save money and avoid distorting competition.

Conclusion

Unbundling has been made to work in a number of countries with relatively dense and well developed traditional copper networks. However, the conditions have been exacting, requiring:

- customisation for the national market
- alternative operators to enter the market

⁴⁰ Richard Wray. The bill looms for Broadband Britain. *The Guardian* 25 September 2007.

The regulator must soon decide who will pay to keep the internet up to speed

⁴¹ ARCEP (2007) La situation concurrentielle des fourreaux de communications électroniques et leur régulation éventuelle (Paris, Autorité de Régulation des Communications électroniques et des Postes).

⁴² L'UFC-Que Choisir mobilise les syndicats contre le déploiement de la fibre optique
<http://www.zdnet.fr/actualites/telecoms/0,39040748,39374254,00.htm>

- medium-term legal certainty for those operators
- the incumbent operator to be sufficiently restrained
- a powerful regulator to monitor progress and publish statistics
- a rapid appeals process to avoid lengthy delays
- a continuing refinement of the regulations

The greatest risk has been in the nightmare of regulatory gamesmanship played by certain incumbent operators.

The initial hopes for unbundling were misplaced. Interest has shifted from voice telephony to broadband, then NGNs and fibre access networks began to be deployed. The levels of change are not adequately represented by the static image of a single ladder of investment.

In the USA, the Telcos and cable operators are left as a duopoly to fight it out. In Europe, a mix of very complex regulation is added to continuously in an effort to sustain service-based competition.

In Africa, unbundling the local loop may not be the answer or not a very significant answer. With the exception of a few countries, there are insufficient local loops for the enormous regulatory effort to be worthwhile. There are few potential entrants and almost all of those are already GSM operators for whom FWA appears to offer a more attractive model than leasing copper local loops. Moreover, it continues the successful pattern of infrastructure competition, rather than service-based competition and helps to close the digital divide.

Acknowledgements

To colleagues at the LINK Centre for comments on drafts of this document. All errors are mine alone.

Abbreviations

ADSL	Asymmetric Digital Subscriber Line
ARCEP	Autorité de Régulation des Communications électroniques et des Postes
ATM	Asynchronous Transfer Mode
bps	bits per second
BRAS	Broadband Remote Access Server
BSA	Bit Stream Access
CEO	Chief Executive Officer
CPS	Carrier Pre-Selection
DSL	Digital Subscriber Line
DSLAM	DSL Access Multiplexer
EC	Europe Commission
EU	European Union
GSM	Global System for Mobile
FCC	Federal Communications Commission (USA)
FRIACO	Flat Rate Internet Access Origination
FTTx	Fibre To The home, premises, node, etc.
FTTH	Fibre To The Home
FTTN	Fibre To The Node
FTTP	Fibre To The Premises
FWA	Fixed Wireless Access
ISDN	Integrated Services Digital Network
ISP	Internet Service Provider
ISR	International Simple Resale
LER	Local Exchange Router
LLU	Local Loop Unbundling
MDF	Main Distribution Frame
MIC	Ministry of Internal affairs and Communications (Japan)
MNO	Mobile Network Operator
MVNO	Mobile Virtual Network Operator
NGA	Next Generation Access
NGN	Next Generation Network
NRA	National Regulatory Authority
NTT	Nippon Telephone & Telegraph
ODF	Optical Distribution Frame
OECD	Organisation for Economic Cooperation and Development
OFCOM	Office of Communications (UK)
OLT	Optical Line Terminal
OTA	Office of the Telecommunications Adjudicator (UK)
POTS	Plain Old-fashioned Telephone Service
SDSL	Symmetric Digital Subscriber Line
UK	United Kingdom
UMTS	Universal Mobile Telecommunications System
UNE	Unbundled Network Elements
VDSL	Video Digital Subscriber Line
WLR	Wholesale Line Rental
xDSL	any type of Digital Subscriber Line
ZAR	South African Rand

Annex 1 BT Openreach Key Performance Indicators⁴³

Working system size - Aggregate
 Volume of orders completed - Aggregate
 % of POE's accepted, completed within target - Shared MPF
 % of POE's accepted, completed within target - MPF
 % of pre order enquiries non-fatally rejected - Shared MPF
 % of pre order enquiries non-fatally rejected - MPF
 % of pre order enquiries fatally rejected - Shared MPF
 % of pre order enquiries fatally rejected - MPF
 Average lapse time from order receipt to CAD - Shared MPF (Overall) Tactical
 Average lapse time from order receipt to CAD - MPF (Overall) Tactical
 % of successful delivery of the 730 code by 23:59 on the day of CAD (SMPF)
 % of successful delivery of the 730 code by 23:59 on the day of CAD (Provision & Transfer for MPF)
 % of successful delivery of the 730 code by 23:59 on the day of CAD (Provision for MPF)
 % of successful delivery of the 730 code by 23:59 on the day of CAD (Transfer for MPF)
 ELF's - fault reported within 28 calendar days of installation - Shared MPF
 ELF's - fault reported within 28 calendar days of installation - MPF
 DOA's - fault reported within 4 calendar days of installation - Shared MPF
 DOA's - fault reported within 4 calendar days of installation - MPF
 SMPF 8 Day DOA - Closed faults reported within 8 days of installation (Overall)
 SMPF 8 Day DOA - Closed faults reported within 8 days of installation (Tactical Overall)
 SMPF 8 Day DOA - Closed faults reported within 8 days of installation (Tactical LLU)
 SMPF 8 Day DOA - Closed faults reported within 8 days of installation (Tactical PSTN)
 SMPF 8 Day DOA - Closed faults reported within 8 days of installation (EMP Overall)
 SMPF 8 Day DOA - Closed faults reported within 8 days of installation (EMP LLU)
 SMPF 8 Day DOA - Closed faults reported within 8 days of installation (EMP PSTN)
 MPF 8 Day DOA - Closed fault reported within 8 days of installation (Overall)
 MPF 8 Day DOA - Closed fault reported within 8 days of installation (Tactical)
 MPF 8 Day DOA - Closed fault reported within 8 days of installation (EMP)
 % of Shared faults cleared - 40 clock hours - excludes park time
 % of MPF faults cleared - 40 clock hours - excludes park time
 % of Shared faults cleared - Enhanced Care - 20 clock hours - excludes park time
 % of MPF faults cleared - Enhanced Care - 20 clock hours - excludes park time
 LLU Plan & Build Orders Success Rate - (4 week Rolling Average)
 First Touch Last Touch (FTLT) Including 4 Day DOA - Bulk SMPF Migration
 First Touch Last Touch (FTLT) Including 4 Day DOA - LLU - Line Share MPF
 First Touch Last Touch (FTLT) Including 4 Day DOA - Local Loop - MPF Pair (New)
 First Touch Last Touch (FTLT) Including 4 Day DOA - Local Loop - MPF Pair (Trans)
 First Touch Last Touch (FTLT) Including 8 Day DOA - Bulk SMPF Migration
 First Touch Last Touch (FTLT) Including 8 Day DOA - LLU - Line Share MPF
 First Touch Last Touch (FTLT) Including 8 Day DOA - Local Loop - MPF Pair (New)
 First Touch Last Touch (FTLT) Including 8 Day DOA - Local Loop - MPF Pair (Trans)

Abbreviations

CAD	Customer Agreed Date
DOA	Dead On Arrival
ELF	Early Life Failure
MPF	Metallic Path Facility
POE	Pre-Order Enquiry
PSTN	Public Switched Telephone Network
SMPF	Shared Metallic Path Facility

⁴³ <http://www.openreach.co.uk/orpg/products/llu/kpi/kpi.do>