

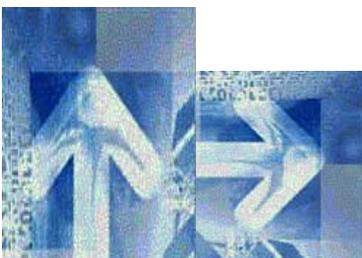
# **Competition in broadband provision and its implications for regulatory policy**

*A report for the Brussels Round Table*

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DotEcon and Criterion Economics

**Report Summary  
October 2003**



**This report was prepared by**  
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**and**  
**Criterion Economics, L.L.C.**  
**for the**  
**Brussels Round Table**

This report was researched and authored by DotEcon and Criterion Economics, two independent consultancy firms that are specialists in applying economics to telecommunications and other network industries. The project was commissioned by the Brussels Round Table, a forum for leading European telecommunication operators and equipment manufacturers. The members of the BRT are: Alcatel, BT, Deutsche Telekom, Ericsson, France Telecom, Siemens, Telefónica de España and Telecom Italia.

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DotEcon is an economic consultancy, advising private companies and the public sector on regulation, competition policy, public policy issues, licensing, auctions and business strategy. DotEcon focuses on network industries and applies leading edge economics to the challenges faced by firms and policymakers.

**Criterion  
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Criterion Economics is a Washington, D.C.-based consulting firm that provides advice on strategic, economic and business transformation matters to a diverse group of domestic and international clients. Criterion provides expert analysis for clients who face complex economic litigation or regulatory proceedings.

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## Key implications for public policy

### *Broadband brings substantial benefits for the European economy*

1. Unlike traditional narrowband connections, broadband provides high speed, always-on connections to the Internet and supports innovative content and services. Direct consumer welfare gains from mass market adoption of broadband across the EU could easily reach 50 billion euros or more per annum. As an input into many other sectors of the economy, broadband is an enabler of the information society, increasing productivity and competitiveness. Getting public policy for broadband correct could bring large benefits for consumers, firms and the economy at large; getting policy wrong risks stifling both the rollout of broadband and new innovative services, and thus the realisation of the EU's e-Europe vision.

### *Facilities-based competition is preferable to access-based competition*

2. Facilities-based competition brings many benefits for society, especially where there are competing platforms. It leads to competition over more aspects of providers' activities, bringing real choice for customers, downward pressure on costs and prices, and incentives for service innovation. Cross-country evidence shows that it is platform competition that drives broadband penetration, not access-based entry. Competition based on bitstream access and/or resale cannot bring about all of these benefits, and risks crowding out facilities-based competition.

### *Facilities-based competition is feasible*

3. Competition between broadband delivery platforms is already a reality. Cable and DSL compete head-to-head in countries with significant cable networks. New platforms using fibre-to-the-home have been built in Sweden and Italy. 3G licensees are set to deliver mass-market mobile data services across Europe. At the same time, there are new wireless technologies that could dramatically change the marketplace. Broadband infrastructure is not a natural monopoly and effective platform competition is possible. Growing demand for broadband will increase the number of competing platforms that can be sustained.

### *Current policy is not supporting these positive developments*

4. Whilst platform competition is emerging, investment incentives are currently weak. The majority of new entry in the EU is currently access-based, and this is skewed towards bitstream access and simple resale. Current regulatory policy has tended to carry over the approach of traditional voice telephony regulation, and in most cases provides excessively attractive terms to those who use regulated access services. Contrary to the claims of many NRAs, bitstream access and resale are not proven to be complements

to investment in infrastructure in that there is no evidence that providers using these strategies subsequently switch over to facilities-based provision.

## *Current investment incentives are inadequate*

5. Appropriate public policy should reflect the social benefits of facilities-based competition relative to access-based competition. This could be achieved by providing proper incentives for investment and innovation by:
  - rolling back access regulation where facilities-based competition is effective;
  - avoiding unnecessary parallel tiers of access regulation;
  - taking a more dynamic and longer-run view of access pricing by considering flexibility and risk in cost-based regulation;
  - making forward looking regulatory commitments not to subject new services and networks to access obligations; and
  - ensuring that subsidies, where applied, are transparent and competitively neutral.

## *The European Commission could encourage facilities-based competition*

6. The Commission has a pivotal role in determining incentives for innovation and investment through:
  - resisting NRAs' attempts to increase the scope of regulation through use of the Article 7 procedures in the new framework;
  - when reviewing the Recommendation on relevant markets, considering again the question of whether parallel tiers of access regulation add significant benefit compared with the risks of such an approach given current deficiencies in access pricing methodologies;
  - monitoring the proportionality of remedies proposed by NRAs, issuing guidance on appropriate remedies for broadband (including where remedies are not likely to be required given the existence of facilities-based competition) and thereby fostering a consistent, rules-based policy friendly to investment; and
  - looking again at what cost-based access means, as the costs of commercial flexibility currently given to access-based entrants for free should be incorporated into access prices to avoid distortions.

These are all actions that the Commission could take without modification of the new regulatory framework.

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## Our findings in brief

### *Broadband is different to plain old telephony services*

7. As well as high-speed data connectivity, broadband can also provide services such as voice telephony, broadcast television and video on demand; further new and innovative applications are likely to emerge. Broadband provides significant additional functionality compared with narrowband dial-up connections. There is consensus amongst NRAs and competition authorities that broadband lies in a distinct relevant market to narrowband (although there is some substitution from flat rate narrowband products). It is a new market and there is little that traditional approaches to the regulation of voice telephony services can tell us about the right public policy approach.

### *Broadband is of key importance to the EU economy*

8. Data communications is a key input into virtually every sector of the economy and has become an intrinsic part of our daily lives. Academic studies have estimated very large welfare gains from the introduction of new communications services, including significant benefits for the manufacturing industry. Although these estimates are speculative, the consumer welfare generated by mass market broadband deployment in the EU can be expected to be in the order of tens of billions of euros per annum. Given largely universal agreement on the importance of broadband, getting public policy correct is critical.

### *There are many possible platforms for delivering broadband*

9. There are many possible broadband delivery technologies, all providing high bandwidth, always-on data connections. The nature of the delivery platform makes little difference to customers' experience of services. Therefore, different technologies provide closely substitutable services that compete head-to-head and so lie in the same relevant retail market.
10. Where there is cable build-out, competition between **DSL** and **cable** platforms is intense and has driven penetration. Even where there is little cable build-out there are a variety of other methods of delivering broadband:
  - **fibre to the home** (FTTH) provides high bandwidth and is the technology of choice in green-field sites with a sufficient density of high-use customers. FTTH is currently being deployed by innovative entrants in Sweden and Italy;
  - **fixed wireless access** (FWA) can provide a wireless alternative to the final drop to the customer provided by local loops or cable networks;
  - **satellite** services are currently offered as a means of obtaining broadband service in rural areas where DSL provision is impractical;

- **powerline communication** (PLC) over electrical distribution networks is currently being deployed in regional trials across Europe;
- **free space optics** is an emerging technology with potential for establishing flexible low-cost networks in urban areas with massive bandwidth and without need for any backhaul network;
- **WiFi** (wireless LAN) technology currently provides hotspot internet access services, and is starting to be used to provide broad coverage public access networks in both urban and rural areas. This is a mature, cost effective and low risk technology. Many laptop computers are sold with wireless LAN functionality already built in;
- **3G mobile** is being deployed by mobile network operators (MNOs) across Europe. This will ultimately give the mobile telephone customer base an alternative means of broadband access;
- **'new mobile'** technologies can provide mobile broadband services, for example, bringing cell structure and cell handover to wireless LANs that currently permit only nomadic use. They can use a variety of different radio spectrum, including unused spectrum that many European 3G licensees hold. Commercial services are already being rolled out (e.g. in Australia) with bandwidth and pricing comparable to DSL services.

*Dislocating change is to be expected as part of competition*

11. At present it is unclear which technologies will ultimately succeed and there is a possibility of sudden dislocating change in the marketplace. Once adoption of a technology in sufficient volume is anticipated, equipment costs fall as manufacturers compete for the new market created; on-going learning-by-doing reduces both equipment manufacturing and deployment costs, further accelerating take-up. This is already happening with 3G as rollout starts. Other technologies (especially FWA, FTTH and 'new mobile') are at a cusp, where a favourable shock could lead to broad adoption alongside other platforms. Innovation is a key component of competition in broadband, reducing cost and providing enhanced functionality.
12. Although DSL and cable provision have benefited from being able to use networks originally rolled out for other purposes, wireless technologies have great potential, not just for fully mobile access, but also for nomadic and fixed access. Existing wireless LAN standards are already being used for wide-area broadband provision. There are developments of this technology that have the potential to provide a cost-effective high-bandwidth mobile service within existing spectrum allocations. There are many potential providers of such services, including fixed line telcos, MNOs, equipment manufacturers and entirely new entrants.

## *Facilities-based vs. access-based competition*

13. We can distinguish two modes of providing broadband retail services:
- **facilities-based** provision, in which an entrant makes investments in network infrastructure;
  - **access-based** provision, in which an entrant makes use of various wholesale services available from the incumbent PSTN operator at regulated terms.

There is not a bright line distinction between these two modes, rather a hierarchy of possibilities:

- End-to-end **platform competition**, where an alternative provider has complete control of all aspects of its network and the services it delivers (as for example with a cable network). This provides control over all service characteristics and costs.
- Use of **unbundled local loops**, which involves taking the copper pair between a local exchange and an end customer and passing use over from the incumbent to an alternative operator, is an intermediate case. Although an entrant is not building an entire alternative network, it is making investments in infrastructure such as DSLAMs. This gives it the ability to control a substantial part of the overall value chain and to control many aspects of its service. Unbundled local loops have been used to increase the reach of infrastructure-based competitors deploying their own platforms (e.g. alongside FTTH by FastWeb in Italy and Bredbandsbolaget in Sweden).
- **Bitstream access**, a wholesale service providing connectivity between the end-customer and handover point on the incumbent operator's infrastructure. The entrant could offer a retail service with a combination of bitstream access and either its own backhaul network or equivalent network services bought in from other operators (for which there is a largely competitive market). This allows some control of the value chain; for example, Tiscali offers a limited range of services in the UK market differentiated by price and available bandwidth, which affects the amount of backhaul capacity that they use. Bitstream access may be used to extend the reach of a facilities-based operator. Typically the benefits of increased coverage will be modest (limited to scale economies in marketing), but certain customer segments may be difficult for even an infrastructure-based entrant to serve without bitstream access, such as corporate customers with many small branch offices (e.g. banking networks). Whilst bitstream access allows some differentiation of services and control over some key costs, this is more limited than with unbundled loops.
- **Resale**, where an entrant purchases a wholesale equivalent of the incumbent's DSL offer, and resells a retail service with its own customer support and (in some cases) billing, but which is functionally identical to the incumbent's.

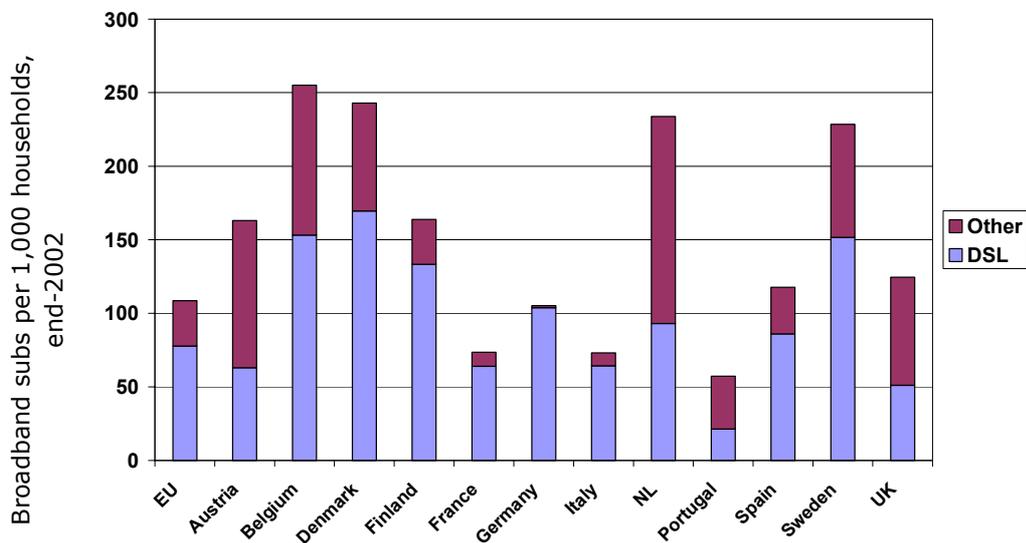
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- The defining characteristic of facilities-based provision is that it allows the entrant to control the characteristics of the service it offers and how it is provided. This gives additional dimensions over which competition can operate in that services can be fine-tuned to match customers' needs and costs controlled along most of the value chain.

## Competition between platforms already exists

- There is already competition between DSL and cable in many EU countries. In some cases, cable leads DSL in subscriber numbers (e.g. Austria, the Netherlands, Portugal and the United Kingdom) and, in other cases, DSL leads cable (e.g. Belgium, Denmark, Finland, France, Germany, Italy, Spain and Sweden).

**Competition between different platforms already exists**



- There is clear evidence that DSL and cable compete strongly. They offer similar services to the end user. In the United Kingdom, the prices of DSL and cable offers have converged; price changes by one platform lead to strategic pricing responses by the other. Econometric evidence for the United States clearly demonstrates that cable and DSL belong to the same relevant market. Competition between cable and DSL has led to a proliferation of service offers differentiated by speed and aimed at meeting the various needs of customers.
- There is considerable scope for cable to extend its broadband footprint to compete with DSL. European cable companies had ambitious upgrading and new build programs in the late 1990s but in many countries these have been stalled as a result of financial problems. However, substantial new cable build has taken place and continues in Spain and Portugal. Meanwhile, in countries such as Germany and France where DSL currently serves the large majority of broadband customers, cable operators have expressed their intention to press on with upgrades of existing networks for broadband.

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18. Platform competition is not limited to cable and DSL. New platforms are developing and have significant potential. Fibre networks have made significant inroads in the Swedish and Italian markets. For example, FastWeb had 127,000 FTTH subscribers in Italy by mid-2003. Between three and six 3G licences have been awarded in each Member State, with 3G services already available from some licensees. There is considerable potential for wireless broadband solutions to develop in the near term. In addition, there are many niche technology players, including (amongst others) satellite providers targeting rural areas in the United Kingdom, Germany and Spain, FWA in Denmark, Ireland and Norway, and wide area public WLAN in the United Kingdom.
19. Even given the current size of the retail market, broadband infrastructure is clearly not a natural monopoly; it can support multiple players competing effectively. As demonstrated by cable and DSL, competition can be vigorous with just two platforms, as there are strong incentives to win and retain customers. As broadband demand grows, the number of sustainable competing infrastructures will increase. Effective competition has developed despite capital scarcity following the bursting of the telecoms and technology bubble. Therefore, renewed emphasis on access regulation by NRAs cannot be justified simply on the grounds that short-term capital market conditions have limited infrastructure-based entry. Broadband provision has much more in common with mobile telephony, where platform competition has worked, than with narrowband voice telephony. Moreover, in those countries with little facilities-based entry, although there may be transitional concerns about competition, properly priced local loop unbundling should be a sufficient regulatory instrument to address this.

### *Facilities-based competition has many benefits*

20. Facilities-based competition leads to competition over more aspects of a service than access-based competition, and is self-sustaining. Where broadband provision depends on regulated access services, it is the regulator and the incumbent who ultimately determine the characteristics of the service provided to customers, including its pricing, rather than these characteristics emerging through the process of competition. In contrast, facilities-based competition brings real choice to customers. Much greater differentiation of services is possible through infrastructure competition (shown by the variety of different speeds of broadband service now available) and can drive penetration, meeting the various needs of different customer groups.
21. Competition between platforms produces many benefits that even the most enlightened and optimally designed regulation cannot, including:
  - pressure to minimise costs applying to a larger part of the value chain;
  - increased diversity of choice for customers;
  - enhanced pricing and service innovation, as platform operators compete to attract customers to fill network capacity already in place;

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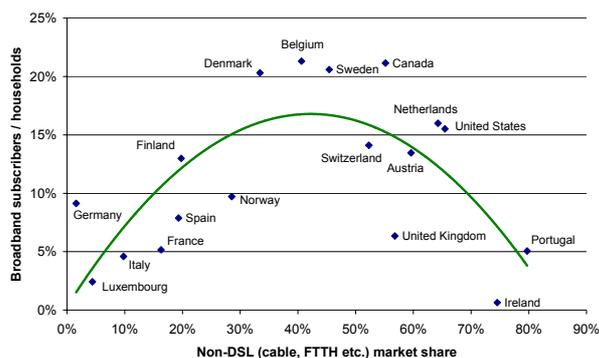
- Darwinian selection of efficient technologies and techniques; and
- economy-wide knowledge spillovers.

*Platform competition, not access-based entry, delivers broadband take-up*

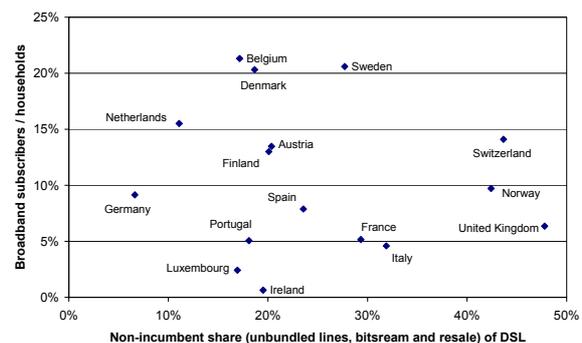
22. Looking across OECD countries, our analysis of current data shows evidence that it is competition between platforms, rather than access-based entry, that speeds up the take-up of broadband:

- Where the broadband market is served by competing platforms, penetration tends to be higher where DSL and non-DSL platforms have more similar shares. Where market shares are skewed towards one particular platform, penetration tends to be lower.
- In contrast, there is no such relationship between the take-up of access services by entrants and greater broadband penetration.

**There is strong evidence that platform competition drives broadband take-up...**



**... but no corresponding evidence that access or resale drives penetration**



23. It has been argued (for example, by some NRAs) that access-based entry can be complementary to facilities-based entry, either because access-based entrants will ultimately build their own facilities or because such provision can be used as an adjunct to extend the coverage of an infrastructure-based entry strategy. There is little reason to expect this to be the case, as cheap access reduces the relative benefit of infrastructure investment compared with access-based entry and maintains this differential incentive.

24. A facilities-based provider serving the residential mass market is unlikely to gain significant benefit from extending the reach of such services using regulated bitstream access or resale, other than modest scale economies in marketing. Provision based on regulated bitstream access or resale is easily replicable by competitors and so margins on such business will be thin. In addition, such a facilities-based provider would have the problem of undermining the distinctiveness of its mass market retail offer by providing access-based services (which would be largely undifferentiated from those of its competitors) alongside services based on its own infrastructure. These conclusions may not apply universally to the business market; it may be difficult for a facilities-based entrant to compete for corporate entities with

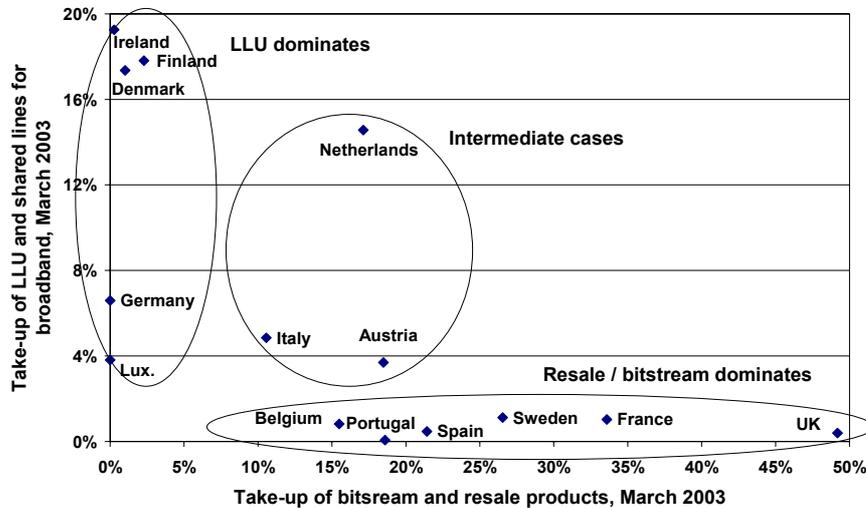
geographically fragmented demand without access to bitstream services outside main urban areas.

25. The use of LLU may in some cases be complementary to infrastructure-based provision strategies. For example, FTTH players may use LLU to extend the reach of their fibre network. However, there are no examples of a provider initially using LLU and then migrating to a platform-based strategy. Even if LLU is used to extend the reach of other platforms, it is still important that access prices are set appropriately.
26. US experience demonstrates that very cheap access to local loops largely eliminates incentives to build alternative platforms. Entrants using cheap unbundled local loops have no reason to switch to a platform-based strategy. Although cheap access has encouraged many entrants into the US market, it has not delivered sustainable competition. Rather, by eroding margins and raising customer acquisition costs, cheap access has led to entrants' business cases being highly leveraged and fragile.
27. There are interactions between different forms of access. The availability of regulated bitstream and, in particular, resale access has the potential to undermine incentives to use local loops, especially given the deficiencies of currently used access pricing methods. Rather than deploying LLU, entrants have the option of using other forms of access requiring less investment, which may be attractive as they require no commitment to a particular scale of operation or technology. Thus, depending on their relative terms and conditions, the availability of parallel tiers of access services can crowd out entry based on unbundled local loops or competing platforms.

*Entrants have strong incentives to use access*

28. There is evidence that regulated end-to-end access crowds out both the use of unbundled local loops and building alternative infrastructure. Pure access-based entry is much more prevalent across the EU than either infrastructure based entry or take-up of unbundled local loops. At March 2003, the ECTA estimated that there were 1.6 million incumbent lines being resold by other operators or ISPs compared with only 0.5 million unbundled lines in use for broadband. Only six Member States had significant (>5% of all DSL lines) take-up of unbundled lines.
29. Where bitstream access or resale are regulated and available at attractive terms (e.g. France, Spain, Sweden and the United Kingdom), there is high and growing demand for such access, whereas entrant use of LLU is negligible. By contrast, in countries where bitstream or resale access is unavailable or harder to obtain (e.g. Germany and Denmark), LLU take-up is significantly higher.

## Bitstream and resale access crowds out LLU and line sharing



(Take-up numbers expressed as proportion of total national DSL subscribers)

30. It is unsurprising that most entry into broadband provision has been access-based rather than facilities-based. Access-based entry provides many advantages at current regulated terms. It provides great commercial flexibility and eliminates many risks by:
- not committing an entrant to remain in the market, as there are few sunk investment costs;
  - allowing entrants to scale up or down their operations rapidly in response to changing demand from customers;
  - not tying the entrant to any particular technology or standard; and
  - giving the entrant the option to make an infrastructure investment once technology choices are mature and likely consumer demands known.

In contrast, all the risks associated with stranded assets (which arise from many sources, including both demand shocks and technology changes) fall entirely on the access provider.

31. These flexibility options are valuable to the entrant. Although providing them is costly to the incumbent, regulation grants them free of charge to the entrant. In other industries, contractual arrangements that provide enhanced commercial flexibility and reduce risk are of greater value to the user, cost more to provide and are priced to reflect this. For example, a short-term lease on a commercial property trades at a large premium over a long term lease, despite the commercial property rental market being highly competitive; this reflects the additional costs that the landlord faces from providing flexibility to the tenant. Mandating that short-term leases trade at the same price as long-term leases would grossly distort competition, yet, by analogy, this is largely what current telecoms regulation does.

## *Access-based entry can lead to fragile business cases*

32. Broadband provision based on bitstream access offers little opportunity for substantial differentiation of services and resale offers virtually none. They are easily replicable, and, therefore, can be easily contested. By themselves, they deliver limited benefits to customers in terms of true choice, service innovation or significant reduction in costs, as providers are largely unable to differentiate the characteristics or to control the majority of costs of their services.
33. Moreover, access-based entrants are often highly leveraged or under-financed. Even small adverse shocks can make players unviable given the high level of customer acquisition costs. Cheap access can lead to inefficient 'froth', with much entry and exit. The unsustainability of access-based entry creates regulatory inertia. Once access is granted, especially if access charges are inefficiently low, regulators naturally find it difficult to remove such concessions, owing to the adverse impact on entrants whose business cases may depend on inefficiently low access prices.

## *Infrastructure competition is a generally agreed objective of public policy*

34. Many NRAs and the European Commission itself are on record as claiming the development of infrastructure competition as an objective of public policy. However, there is an inconsistency between these policy objectives and current practice, especially in terms of the setting of access prices. Access regulation is more interventionist than necessary to level any advantage that incumbent PSTN operators might have from control of the local loop.

## *Access regulation fails to consider all the benefits of platform competition*

35. There is a considerable danger from access regulation being applied uncritically to broadband. Access pricing methodologies developed for narrowband voice telephony have focussed almost exclusively on efficient bypass (i.e. providing an incentive for an alternative provider to use its own facilities *only* where it is cheaper than using the incumbent's facilities). The objective of this policy has been largely to minimise end-to-end costs in an entirely static sense and to prevent duplication of network assets that would otherwise lead to loss of economies of scale.
36. In the case of broadband it is the wrong objective. It is mistaken to disregard the importance of innovation, which both delivers new services and leads to existing services being provided more cheaply. Broadband is an emerging service with a substantial impact on the productivity and organisation of the whole European economy; there is no justification for ignoring the dynamic benefits of competition when designing policy.

## *LLU should be a sufficient remedy for concerns about incumbent market power*

37. Although some EU countries have well-developed cable networks, others do not. However, even without significant existing cable infrastructure, there may be rollout of new cable networks (e.g. ONO and Auna in Spain) or other platforms (e.g. Italy and Sweden). In all EU states, multiple 3G licences have been awarded and services are expected to be generally available in the near future; WiFi and 'new mobile' initiatives are also being launched. This generates both actual and potential competition for DSL providers. Nevertheless, concerns may remain about incumbent control of local loops in cases where platform competition is still in its infancy.
38. In such cases, regulation can be targeted at those activities that entrants cannot replicate, namely access to local loops. In those countries where facilities-based competition is thought not currently effective, properly priced regulated access to local loops should be a sufficient remedy to restrict any market power resulting from incumbent control of local loops.
39. Bitstream access provides regulated access to incumbent operators' activities that are largely replicable by entrants. Given effectively regulated and properly priced access to a local loop and sufficient retail demand, there is no reason why the incumbent should have any significant advantage in the provision of DSLAMs and DSL modems to enable DSL service over that local loop; this activity is not subject to strong scale economies and is demonstrably not a natural monopoly, else we would not observe small-scale providers using unbundled local loops. The incumbent may be more efficient in delivering broadband over the local loop than an entrant or the reverse may be the case; it should be for competition to reward the more efficient operator and incentivise the less efficient one to improve.
40. Fears of incumbent control of local loops undisciplined by alternative platforms may provide a rationale for LLU. However, it is important that access to unbundled local loops not be priced too low, else it will crowd out investment in competing platforms, including both the development of cable and new delivery platforms. Cheap access can create a vicious circle, preventing the emergence of platform competition that would remove the need for regulation in the first place.

## *Regulation should be competitively neutral*

41. At present, PSTN operators are distinguished by platform-specific regulations on unbundling. However, given actual and emerging competition between platforms, this asymmetric approach is increasingly distorting. Where effective competition between platforms exists, access regulation should be rolled back for all platforms, rather than extended to new ones. Harmonisation should lead to less regulation, not more.

## *Distortions due to subsidies and threats of service obligations*

42. Some recent initiatives in EU countries on state provision of infrastructure (especially by local and regional government) have not been competitively neutral. If subsidies are required to incentivise broadband roll-out to high cost customers for social or other policy reasons, then these should be implemented in a competitively neutral manner, for example by allowing various providers to compete to offer the service with minimum subsidy (thereby determining whether a subsidy is even necessary). Subsidies should not be applied in a way that distorts competition, such as by picking a particular technology or delivery platform. Uncertainty about possible subsidies and obligations disincentivises investment, because investing now risks both losing out on future subsidies and being subject to future service obligations should they be imposed on facilities-based operators.

## *Ways forward for policy*

43. We have identified a set of measures that could deliver appropriate investment and innovation incentives and deliver more facilities-based competition. At present, public policy does not fully reflect the social benefits of facilities-based competition relative to access-based competition, especially in regard to access pricing. Five general measures could reduce the potential for access regulation to crowd out facilities-based competition:
- rolling back access regulation where platform competition is effective;
  - avoiding unnecessary parallel tiers of access regulation;
  - taking a more dynamic and longer-run view of access pricing by considering flexibility and risk in cost-based regulation;
  - committing not to regulate new services and networks; and
  - ensuring that any subsidies are transparent and competitively neutral.

## *The European Commission has instruments available to implement these measures*

44. The Commission has instruments available by which it could implement these measures. It could:
- resist any attempts by NRAs to increase the scope of regulation by applying the Article 7 procedures in the new framework;
  - when reviewing the Recommendation on relevant markets, consider whether parallel tiers of access regulation generate significant benefits compared with the risks given current (and potential) deficiencies in access pricing methodologies;
  - monitor the proportionality of remedies proposed by NRAs, issuing guidance on appropriate remedies for broadband and encouraging a consistent, rules-based policy; and
  - issue guidance on the incorporation of the costs of risk and flexibility into regulated access prices.