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*Enabling the Information
Society by Stimulating
the Creation of a Broadband
Environment in Europe*

*Analyses of Evolution Scenarios
for Future Networking Technologies
and Networks in Europe*

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Executive summary

How can Europe become, *"the most competitive and dynamic knowledge-based economy in the world, capable of sustainable economic growth with more and better jobs and greater social cohesion"*?

Central to this goal are networks and networking: not only telecommunications but also information technology writ large. Their capability and performance are crucial for creating a globally competitive environment. Accordingly, the European Commission's eEurope Action Plan focuses on investing in a cheaper, faster, and more secure Internet. Increased competition is seen as a crucial step in the way forward to achieve cheaper Internet access and higher bandwidth capacity.

This report is the result of a study commissioned by the Directorate General Information Society of the European Commission to create a better understanding of the pace and direction of developments in this area, mapped against an uncertain future, and to recommend policy options for government intervention as a background against which political decision making can take place.

The study provides an analysis of the development of electronic networks in Europe and North America and its technical, economic and political drivers. It includes four scenarios depicting possible futures of electronic networks in Europe, a framework for policy formulation, analyses of selected current policies and observations regarding possible policy measures and the input of experts and stakeholders in the field during a workshop in Brussels, and concludes with a series of observations and recommendations for policy action and further research.

Networks in general, and broadband networks in particular, present a unique opportunity to public authorities. Because they are open, common resources where market and regulatory decisions are likely to affect a wide range of participants, they challenge existing conceptions of governance. In the wake of recent (positive and negative) developments in the unfolding of the 'New Economy,' expectations are heightened and volatile. Novel technological possibilities combined with European leadership in 2G mobile telephony put European government institutions squarely on the 'hot spot' - there is abundant evidence that private (and civil society) entities are looking to public bodies to provide leadership in shaping the unfolding of the network and realising its enormous potential social and economic benefits.

Starting from the analysis of historical development and identification of drivers for the evolution of broadband the experts that gathered for the workshop agreed on the following observations and recommendations:

1. The primary carrier for broadband in the EU will be fibre optic cable to businesses, institutions and homes (bridging the years to come in combination with copper etc, and also in the future with satellite as back-up option for remote areas).
 2. Broadband, ubiquitous networking infrastructures should be based on open, non-proprietary standards. Governments should be active stakeholders in the development of these standards, but not assume sole responsibility.
 3. Public sector bodies can act as 'launching customers', using procurement to encourage and support appropriate and sustainable broadband development.
 4. Municipalities should have a primary role in creating environments that use and nurture the deployment of fibre optics. Their actions should include the development of plans for establishing a network of conduits and points of aggregation to complete existing networks and, crucially, to allow multiple service providers easy access to a common infrastructure.
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5. Further research is needed regarding the appropriate role of competition and economic stimulus in providing the necessary conduits, fibre and services.
 - a. Study is needed on appropriate models for investment and operation.
 - b. The principle is to use competition wherever appropriate. However, for some aspects of these networks, unfettered or ill-regulated competition may lead to redundancy, lack of investment money, prices that inhibit uptake, gaps in network coverage or structural changes in the industry that destroy co-ordination advantages or create too much market power. To prevent this, additional measures may be needed.
 - c. Allocation of public resources should be co-ordinated at the right level of authority. For example, allocation of scarce electromagnetic spectrum should be harmonised at a European level, while siting of local conduits and poles and allocation of scarce Point-of-Presence space (i.e. servers etc.) should be undertaken at a municipal level.
6. IPv6 is necessary for effective broadband scaling and security and is a precondition for effective 3G mobile access to broadband networks. For that reason government should consider facilitating this transition. Research topics requiring attention include:
 - a. Policy and technology solutions to overcome gaps with trading partners that lead or lag in the migration towards an IPv6 environment.
 - b. Analyses of financial impacts on European businesses and institutions that must convert extensive private IPv4 networks to IPv6.
 - c. Policy incentives and technology solutions to reduce transition costs and stimulate migration towards IPv6.
7. Co-ordination of research and technology development among trading blocks is crucial in the area of global technologies.
8. Security is vital for trust and confidence within the emerging broadband network and must be considered at all layers.
 - a. Identification of online individuals and institutions should be the norm, but with anonymity an available option. For security purposes, and with appropriate legal authorisation, tracing should be possible under all circumstances.
 - b. Individuals should have access to and control over information gathered about them.
9. It is vital for broadband services to provide access to increasing amounts and types of content, including public information. Limiting copyright to a period comparable to patent protection should be strongly considered.
10. Universal Service entitlements should be upgraded to include a minimum level of broadband access.
 - a. Completion of the network, including assuring that broadband is available in rural areas, may require government subsidies.
 - b. For some rural or remote regions, satellite-based access to broadband services may be the most effective means of providing universal service.
11. To ensure that 3G networks develop in a way that provides an appropriate complement to fixed broadband networks, research is needed to identify policies that address dangers to competition and innovation arising from fragmented spectrum allocation and licensing procedures.
12. While it seems inappropriate to forgive or buy back debts incurred as a result of 3G licence allocation procedures, consideration should be given to measures designed to minimise their impact on equitable, efficient and rapid development of wireless broadband.

Although the *areas* of necessary policy activity were well established by overwhelming consensus of the workshop participants, it is clear that in many areas more socio economic research and policy analyses are needed to pin down *what* can be done and how to ensure its (cost) effectiveness. This includes *mapping* of the current state-of-the-art, *benchmarking* and “*best practice*” research at strategic and more practical levels. For new approaches and new technologies for which such experience does not exist, facilitating *pilots* of interest complements this.

The policy recommendations of the workshop emphasised the following need for action:

- Getting the right infrastructure in place:
 - o Open, non-proprietary and user-led standards;
 - o Standards co-ordination across trading blocks;
 - o A dependable information infrastructure built for massive participation, mobile access and built-in security (NB: IPv6 is an important step in this direction!); and
 - o Reaching out to “everybody” through ubiquity and inclusiveness.
- Support by the right regulation:
 - o Appropriate use of competition and economic stimuli in providing infrastructure and services (including revision of licensing regimes);
 - o “Upgraded” universal service bundles, obligations and payment mechanisms; and
 - o Identity, privacy and security protection in context.
- The role of government as actor in the market:
 - o Establishment of network of conduits and poles (or even fibre) in the local community;
 - o Leading by example; and
 - o Supporting the standardisation process in order to protect the interests of society at large.
- Research and development:
 - o R&D collaboration across trading blocks;
 - o Technologies for cheaper and faster access to information and communications
 - o Technologies to enable “remote regions” to participate in the broadband network against affordable costs

Most cost effective would be an approach in which a balance of regulatory reform and development assistance creates the right environment for a self-sustaining state-of-the-art network environment in Europe, based on the considerations presented. Public networks and research networks can play a distinguished role in ensuring the long-term success of European telecommunication networks in two ways: acting as leading customer, or temporary assistance to overcome barriers to commercial sustainable network development stemming from (perceived) financial risks or excessive short-sightedness on the part of investors.

It is important to recognise that broadband is useless without content and services. In this the public sector can play two vital roles: (1) as a provider of –more– information and services and (2) as a stimulus to increased availability of cultural and artistic content through subsidies for creation and dissemination and –possibly– by reconsidering the appropriate scope and extent of intellectual property rights protection to balance availability and incentives.

Competition is one of the key drivers to the development of broadband. However, there are limits to the extent to which competition can be relied upon, particularly in areas in which investments or other scarcities tend to inhibit entry, or where economies of scale would lead to economic inefficiency associated with an excess of competition. The guiding principle is to recognise the advantages (diversity, efficiency, transparency) associated with competition in traditional markets, and to adjust public policies in such a way as to reap those advantages in the broadband networked environment.

Direct involvement of public actors in the *provision of infrastructure* is considered. In particular, in areas where the market may not be able to develop inclusive information infrastructures, government may consider playing a more direct role. Public funds to help matching investments in (broadband) infrastructure for remote areas are already available under the European Structural Funds.

This public leadership must recognise both the need to act in certain areas and the equally pressing need to refrain from acting in areas where self-governance will be sufficient or where critical technological and market uncertainties must be resolved before appropriate policies can be identified.

The upheavals of the past few years, from widely-varying costs associated with 3G licence allocation to 'corrections' in overheated new technology company stock markets predictably lead to calls for support, if not outright subsidy. Many of these have merit, and clear identification of the appropriate roles of government, market and civil society forces is an essential prerequisite to sorting out, those areas where intervention is warranted, from those areas best left to market forces or other forms of self-regulation. This is not a call for laissez-faire inaction: government cannot avoid its responsibilities in this area without missing vital opportunities and taking on unnecessary risk. Rather, it is a clear recommendation for a transparent, unbiased and determined policy response to this challenge. It is patently obvious that government will make a difference in the evolution of this vital underpinning of the Information Society evolving. The framework developed in this study and the perspectives and recommendations developed in the study and the workshop represent a sound basis for facing up to this challenge, and act in a cost effective way.