



## **Promoting Broadband as an economic enabler in Europe using Structural Funds**

### **- A position paper of the eMobility, ISI and NEM Technology Platforms -**

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### **The opportunity for Member States to use Structural Funds to promote Broadband skills and infrastructure**

This year, the European Union has promoted the use of Structural Funds for Innovation. In fact, National Plans due to be submitted in November 2006 must now show that at least 20 % of the funds will be devoted to innovation.

In previous budget periods in the 1980's and 1990's, there are several examples of countries (c.f. next Section) having used Structural Funds to deploy leading edge telecommunications networks and to develop human skills on broadband issues as well as to directly fund research programmes, which made a strong contribution to rapid economic growth in those countries in the following decade.

The opportunity is now offered to all Member States to consider using their structural funds to promote the development of human skills, test-beds, and leading edge infrastructure, which will provide them with an excellent basis for future economic development. Such an investment would also provide an advanced infrastructure on which research projects funded under programmes such as the seventh Framework Programme, the Eureka Programme and National Programmes, could be based.

This paper intends to offer Member States and Regions background information that they can consider when planning their use of Structural Funds.

### ***Advanced telecommunications as an enabling sector for economic growth***

Several New Member States are already known to be proposing the use of Structural Funds to fund telecommunications infrastructure improvements in their countries. History shows that this investment is likely to pay off in future years. For example:

In Ireland, during the 1980's, structural funds were used to upgrade the largely electro-mechanical telephone exchange network to a completely digitalized network, which was one of Europe's most modern networks at the time it was completed. The result was that Ireland had a fully digitalized fixed network infrastructure many years before many other larger European countries and was able to offer its citizens and businesses a communications infrastructure of the same quality. The availability of a high quality and futuristic telecommunications infrastructure attracted many foreign companies to set up operations in Ireland, often in areas outside the major cities, resulting in much needed employment in the remoter parts of the country and compensating for the lack, at the time, of a mature transport infrastructure. This investment of structural funds, in addition to changes made to the national financing of second and then third level education bringing it within the reach of a much bigger sector of the young population, made a strong contribution to an economic growth of approximately 10 % a year in the late 1990's and transformation of Ireland from one of Europe's poorest countries to one of the world's richest countries at present.

In Portugal, during the 1990's, structural funds were used to provide advanced education, to doctorate level, for thousands of engineers, in newly built research laboratories, equipped with broadband communications test beds. Using the asset of this highly skilled telecommunications workforce, Portugal attracted Siemens and other telecommunications companies to establish major R & D facilities providing much needed employment and bringing new knowledge into Portugal. Portugal's indigenous industry became a world leader in the provision of pre-paid charging systems to operators of fixed and mobile networks and forming the basis for the growth of many young companies founded by Portuguese entrepreneurs.

After the unification of Germany in 1990 Structural Funds were also used in the Dresden area for the establishment of the biggest semiconductor industry in Europe including AMD and Infineon based on available former industry and workforce and the Technical University. In addition to these big companies many SMEs were established, which cooperate with the big industry. This part of Germany was entitled to receive funding from Structural Funds. About 2 billion € subsidies also from Structural Funds were provided during the ninetieth and the total payback in terms of tax and social security over the years was in the order of 13 billion €. This investment created an important innovative industry and supported significantly employment.

What is striking about these examples of the successful use of Structural Funds is that the investment was made in advanced technologies, infrastructure, test-beds and research, which provided a long term strategic advantage to entrepreneurs within the country and those making inward investment in the countries.

### ***Leveraging Structural funds to achieve critical mass in market scale and international impact***

Member States have a timely opportunity to use, follow and update the proven strategy of using structural funds to intercept infrastructure technology development by

- investing in advanced fixed and wireless test-beds and infrastructures (e.g., optical, cellular, satellite),
- combining this investment with an investment in the use of the advanced test-beds to train engineers to doctorate level on emerging technologies,
- providing a highly skilled workforce and
- enabling high speed economic growth.

### ***Infrastructure deployment in low density areas***

Terrestrial broadband technologies like ADSL, cable modem, optical fibres, enable to serve at very competitive prices most of European citizens. Covered zones represent 90 to 98% of geographical areas in most of countries located in Western part of Europe. This coverage density is lower when considering the Central and Eastern part of Europe. As an example, market analyses forecasts a coverage in 2010 not exceeding 50 to 60% in countries like Turkey, Romania, and between 70 and 90% for countries like Greece Poland, Czech Republic<sup>1</sup>.

A significant part of these underserved regions can be covered in the next few years if hybrid solutions made of terrestrial (fixed and wireless/cellular) systems and satellite-based technologies are deployed at a wide scale, and if the demand is properly aggregated to make it more visible and concrete for investors:

- For the hybrid terrestrial/satellite solutions, satellites deliver uniform coverage over vast regions with low capacity requirements per area unit and can be deployed without pre-existing terrestrial infrastructures. They are well suited to complement terrestrial network solutions to deliver equal access to broadband services, everywhere and for everyone, particularly in those regions which until now have been disadvantaged like islands, rural and mountainous areas.  
Several successful study cases demonstrate the performance and added-value of these hybrid solutions, which today are used only by a small portion of the uncovered market.
- In areas with high capacity requirements terrestrial fixed and wireless/cellular systems provide high capacity per area unit under economic viable conditions.
- For demand aggregation, political measures should be taken to identify and prospect public bodies and public-private-partnerships that may use Structural Funds. Such measures will enable the improvement of the perception of hybrid terrestrial-satellite service by decision makers, and to make local user demand more visible to broadband service providers, which will then be able:
  - To integrate in their product portfolio these hybrid solutions;
  - To negotiate lower prices, comparable to ADSL ones in cities, for the benefits of end-users through bulk orders or frame contracts.

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<sup>1</sup> Ref. : « DDSO - Digital Divide : the Satellite Offer » ; ESA study led by Astrium, Final Report Dec. 2005

## ***Fragmented broadband market***

Potential fragmentation is a crucial barrier in Europe for large-scale take-up of new systems and services that applies at all levels of service distribution: customers, public users, service providers, regulators, and public funds.

The origin of potential market fragmentation is related to conditions on national or even local level coming from the historical, linguistic and cultural differences within Europe. On one hand the European Commission is supporting a common European market with intentions to establish a regulator on European level, on the other hand technology independent frequency allocation and competition between technologies are supported, e.g. in the WAPECS concept. One of the consequences of this potential fragmentation for underserved areas may be more expensive systems and a lack of interoperability and roaming capabilities.

A suitable use of Structural funds and pre-commercial procurement strategies may reduce fragmentation for system deployment across Europe for public and private users and public funding agencies in order to overcome the Digital Divide.

## ***Regulatory environment***

In the past significant efforts have been made for the harmonisation of telecommunication services such as for mobile communication systems (e.g. GSM, UMTS) via the cooperation of European regulators in CEPT. The current trend of regulation in some European Member States and in the European Commission is towards more lightweight regulation with increased competition of technologies, services and operators. This trend makes the deployment of pan-European services by hybrid terrestrial / satellite solutions more difficult or requires reconfigurable equipment to mitigate the fragmentation of technology. A service provider that would like to open its service in a new region, and/or use in its product-portfolio the hybrid terrestrial / satellite based broadband solutions has to adapt to the regulatory environment, which applies in the respective country. Depending on that certain technology choices and economic models may be possible. A more harmonised regulation across the European Member States, which supports harmonised systems, will enable a faster widespread deployment of new broadband technologies at reasonable cost and user and terminal roaming.

## **Using Structural Funds in the coming budget period**

The uses to which Structural Funds could be put are many and varied. Some examples are elaborated in this section. In the following examples as proof points and a proposal for further actions are described.

### ***Deployment of optical fibre networks (example as proof point)***

Optical fibre is now a standard component of backbone networks and it is quickly becoming established as one of the infrastructure of choice for leading edge broadband backhaul to the home networks.

Widespread deployment of fibre has been part of the National Plan in Japan and in Korea for many years and now Korea has one of the world's highest penetrations to the home of

broadband networks. This has fuelled the growth of on-line business in Korea and has led to the development of a large pool of young people who have grown up in a broadband home, providing a pool of innovation for the future. These developments in Korea are now complemented by the deployment of broadband wireless and cellular systems.

In Europe, Scandinavian countries such as Sweden and Finland have actively promoted the deployment of fibre in new housing initiatives. (Commission of the European Communities: European Electronic Communications Regulation and Markets 2005 (11th Report). COM(2006)68 final, Brussels, 20.2.2006.) The Netherlands has defined a plan to deploy fibre widely in Amsterdam. According to the above mentioned report the Netherlands has the highest broadband penetration in Europe, which is nearly the same as in Korea. In Germany a VDSL system is currently being deployed in major cities to improve the broadband penetration.

### ***Deployment of broadband to rural areas uneconomic for commercial providers (example as proof point)***

Ireland offers communities of less than 1500 people, a subsidy of up to 55% of the cost of broadband network deployment to their area. The scheme, called the Group Broadband Scheme, has been very successful and is in its second phase of operation. Details are available on the public web site of the Department of Communications in Ireland:

<http://www.dcmnr.gov.ie/Communications/Communications+Development/Group+Broadband+Scheme/>

Another example is the Cyberloire initiative, in Loire (France). Indeed, in this French region the Digital Divide remains a significant political issue and a hybrid satellite/wireless technologies have been chosen as a response to provide ubiquitous coverage and hence equitable access to broadband services for population, administration and education. The first results of this experience have been:

- The creation of new content and an increased motivation of the population to use e-services;
- The improvement of inter-institutional collaboration and a wider scale of e-applications opportunities.

From the perspective of this initiative the satellite plus wireless architecture must confirm its potential and that the sector demand aggregation should be encouraged to facilitate wider broadband coverage. The regulation authorities have a key role in addressing this issue.

### ***Deployment of broadband mobile and wireless networks (example as proof point)***

In international standards bodies broadband technologies are currently being developed, which will provide in the near future (around 2010) a significant improvement in user experience compared to the today's available systems. These systems will provide higher throughput for users and higher capacity per area unit. Especially in areas with low penetration of fixed networks wireless and cellular based solutions enable a fast and

economic provision of broadband services. Such systems will provide a smooth migration path from existing 3<sup>rd</sup> generation mobile communication systems to even more broadband systems beyond 3G. Examples are in the UMTS family HSDPA, HSUPA, 3GPP LTE/SAE, IMT-Advanced and different technologies for Broadband Wireless Access.

### ***Deployment of test-beds and prototype networks (proposal)***

Structural funds could be used to fund the development of test-bed facilities for converged broadband (both wired, wireless and satellite) networks. The purpose of such test facilities is to be a breadboard of new technologies such as wired, wireless, satellite and media networking space – convergence and interoperability are the key words in this context. Furthermore these network facilities will be the ideal test-beds for developing new applications agnostic from the underlying network layer. This on its turn will fuel new applications and services development.

Test-facilities could be coordinated with those of other countries through the Celtic Eureka PANLAB project, for example, giving more leverage to the investment and providing access to pan-European test-beds.

Such advanced test-beds provide an environment for training students to Doctorate level on futuristic technology. Students could be funded through the Marie-Curie, the Erasmus and other Human Capital Programmes within the seventh Framework Programme.

As an example a broadband wireless test-bed facility is being planned and developed in Dresden in Germany using German National Funding. Such projects could also be funded through Structural Funds in regions, where such funding is available.

### ***Development and deployment of integrated networks for security, public protection, emergency response (proposal)***

Structural funds could be used to fund the development and subsequent initial deployment of an integrated network, comprising both terrestrial and satellite-based infrastructures, to provide broadband communications in critical conditions. Such a network would fulfil multiple requirements in terms of security, public protection, relief from disasters and response to emergency situations in general. Indeed, broadband communications will become a necessity in the near future, and will have to be provided (e.g. to rescue teams and to the population) even under disaster conditions. Also, security at European level will require broadband equipment, to perform in real time intensive data processing with access to European information bases. The satellite-based infrastructure in combination with terrestrial systems could bring together a communications component, a navigation component (Galileo), and an Earth observation component (GMES).

## ***Development of applications and services on broadband infrastructure (proposal)***

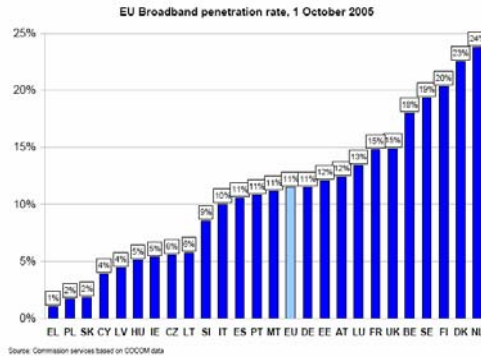
Structural Funds could be used to promote the development of services and applications on the broadband infrastructure. In this area SMEs would benefit and will create jobs in the respective regions. The focus of such applications should be related to major societal challenges that Europe is facing but for which Europe is at the forefront worldwide. Examples include health (Europe has very well established social security system), education (Europe is recognized for its excellent education system) and logistics (Europe is at the crossroads of world trade). Europe can bank on a huge expertise as well as on a widely deployed infrastructure in most of these domains. Moving these systems and related infrastructures in the e-era (e-infrastructures) will result in a wealth of new applications in the eHealth, eGovernment, eEducation and logistics domains. These basic societal needs will trigger further application development in these domains but also other domains such as eGovernment. Successful services could be exported from the region or individual Member States to other European countries and other continents as their market share developed.

In addition, Structural Funds can be used to realise in different parts of Europe conditions similar to the Spanish network of broadband internet access via a hybrid combination of satellite and terrestrial wireless networks. This network is serving more than 400 small villages and is equipped with a satellite gateway. It further expands the broadband access via a wireless terrestrial network. In this way, services like:

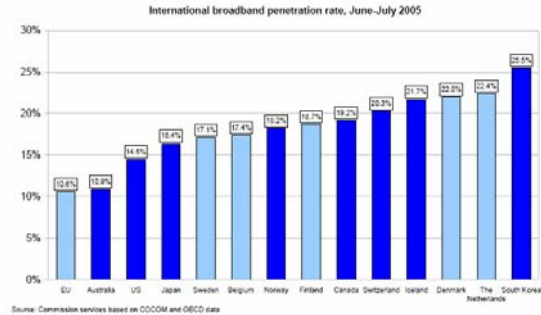
- access to broadband Internet and
  - distance learning applications
- have been implemented.

## **Conclusion**

Broadband communication technologies offers a multitude of opportunities to Member States to improve their economic performance and increase their supply of human skills. Currently, the broadband penetration in Europe is less than 50 % of that in Korea. Only The Netherlands and Scandinavian countries are in the order to the broadband penetration rate in South Korea (Figure 1 and 2 – Commission of the European Communities: European Electronic Communications Regulation and Markets 2005 (11th Report). COM(2006)68 final, Brussels, 20.2.2006).



**Figure 1** EU broadband penetration rate, 1 October 2005



**Figure 2** International broadband penetration rate, June – July 2005

Investing in broadband is essential for Europe to achieve at first a par of European infrastructure with that of other continents in order to contribute to achieve the goals of the Lisbon agenda to become the most competitive region in the world. Broadband communications is a key technology for all sectors of the economy, which is creating about 50 % of economic growth in Europe compared to 80 % in North America. The impact of ICT on direct and induced employment is an additional driver for investment in broadband communications to enable further development of European economy and to keep pace with other regions by maintaining and improving the economy and employment in Europe.

## Appendix – Platforms Descriptions

**eMobility** ([www.emobility.eu.org](http://www.emobility.eu.org)) aims at reinforcing Europe's leadership in *mobile and wireless communications and services*, which have created unprecedented possibilities for people to communicate and have become a key driver of economic growth. eMobility shall master the future development of this technology, so that it best serves Europe's citizens and the European economy.

The *Integral Satcom Initiative - ISI* ([www.isi-initiative.eu.org](http://www.isi-initiative.eu.org)) brings together all aspects related to satellite communications, including mobile, broadband, and broadcasting applications, security systems and applications, and the integration of data communications with navigation, Earth observation and Air Traffic Management systems, both for commercial and institutional/governmental applications. ISI is determined to contribute to several EU and ESA policies, in sectors such as ICT, Space, Security, Transport, Development, and Environment.

The *Networked and Electronic Media - NEM* ([www.nem-initiative.org](http://www.nem-initiative.org)) initiative addresses the digital convergence of broadband telecommunications, broadcast, media and content industry, consumer electronics and information technologies that will give birth to a new and exciting sector and provide advanced personalised services, delivered seamlessly over technologically transparent networks, to improve the quality, enjoyment and value of life.