Study on Availability of Access to Computer Networks in Rural Areas

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Authors/Contractors: The National Microelectronics Applications Centre Ltd (Ireland)
Czech Centrum for Science and Society (Czech Republic)
CyberMoor Ltd (United Kingdom)
Institute of Communication and Information Technologies Ltd.(Poland)
Mainstrat (Spain)
Power Lake AB (Sweden)

Abstract

This is the Draft Final Report of the DG AGRI "Study on Availability of Access to Computer Networks in Rural Areas". It provides policy makers, stakeholders and others, with concrete guidance on how to maximise the benefits of Information & Communications Technology (ICT) for growth and jobs in all rural areas of Europe, using the support of rural development programmes. The study includes a Guide and database of best practices (in Part I) and a Review of existing policies and literature (in Part II). These were developed using two methodologies that formed the main research strands of the study (a) The establishment and analysis of a database of 67 best practice cases studies and (b) A review of existing data, literature, policy and research illustrating ICT take-up

The Review concludes that rural ICT policies need to balance top-down and bottom-up approaches. This entails the European Commission articulating bottom-up recommendations coherently and centrally in strategy plans and development programmes – and individual Directorate Generals (DGs) making their own grant mechanisms more accessible to 'home-spun' initiatives that have local potential for solving local access and take-up.

The Review's recommendations acknowledge the complementary roles of LEADER and the national rural development planning process in promoting 'bottom-up' approaches to development. Specifically, it recommends a coherent eRural strategy as an integral part of sustainable rural development policy, focusing on building capacity, even though this often produces "softer" outputs. The eRural strategy should include improved control and monitoring of ICT indicators, policies and initiatives including the collection of coherent statistical data, and measures which stimulate business and technical competition at different levels of scope and sophistication within the rural broadband market. The strategy needs to focus on developing sustainable connected rural eCommunities to stimulate demand and ICT take-up – particularly by enhancing Regional Leadership and Local Champions to ensure that 'bottom up' projects flourish. Support is required for Awareness ("know what"), Training ("know how"), and providing services and content that rural users feel are pertinent to them, especially entertainment and local content, in addition to policy priorities such as eBusiness, eLearning, eHealth and eGovernment services. There needs to be coherent joined-up policies that ensure best practice at the interface between LEADER and those seeking access to funding, extending investment in broadband infrastructure to all local public sector agencies and schools and the introduction of an eProcurement process with appropriate safeguards and innovative proactive online support, to fast-track ICT projects in rural areas.

Finally, the Review adds the factors which influence the choice among rural populations to use ICT and experience the benefits of the Information Society. The study believes that it is through interventions which trigger such responses that the benefits of ICT will reach more rural communities. The route to wider ICT take-up, and to competition in its supply, lies through any small initiative provided mixed, untidy and even unorthodox means of accessing broadband can simultaneously be supported.

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Executive Summary

The European Strategic Guidelines for Rural Development[1] increase the focus on Information and Communication Technologies (ICT) take-up and use in rural areas in line with EU priorities for the Information Society. In particular, "there is a need to accompany changes in rural areas by helping them to diversify farming activities towards non-agricultural activities and develop non-agricultural sectors, promote employment, improve basic services, including local access to Information and Communication Technologies".

This study aims to provide all actors and stakeholders, from policy makers and investors to local government and community groups, with clear, cross-cutting guidance. The study shows how to maximise the benefits of ICT for growth and jobs, in all rural areas of Europe, using the support of rural development programmes. It synthesises existing literature, policies, research and best practices in a comprehensive analysis of ICT take-up in fields relevant to rural development. It reviews critically the impact of ICT and related practices and experience, in order to better focus and improve the effectiveness of rural development policy and better contribute to the European Union's growth and employment priorities.

The study includes: Part I - a Guide and database of best practice case studies and Part II - a Review of existing policies and literature.

Guide Methodology

For the first strand of the research, a number of projects were examined involving a selection of typical, local, small, rural-based businesses, organisations and farms across Europe. This determined the impacts of ICT usage and the factors influencing usage. Sixty-seven case-studies were chosen to ensure a representative coverage based on geography, sector and users. This database was achieved in two steps. First, the Research Team identified cases of best practice by consulting their extensive networks of rural broadband contacts. Second, further information on each best practice example was then collected, mainly by desk research and phone interviews with the key people directly involved.[2]

Each case was analysed in order to expose trends and identify lessons that could be learned. The aim was to isolate the factors that made projects successful or, alternatively, the problems that had reduced their effectiveness. The study took a practical approach and steered away from theoretical and policy reference documents.

Categorisation of Projects

The Guide categorises projects: (i) Access –focused on equipment to access the Internet; (ii) Content – what people use and the services which encourage them to go on line; and (iii) Capacity – developing new skills to make the most of ICT. ICT projects which combine all three make the greatest impact.

[1] Council Decision 2006/144/EC, 20 Feb 2006, Official Journal of the European Union, I.55/20.

[2] The Team's past experience in this area has found that such interviews can be extremely effective in exploring issues which may not appear in official reports. They also expose more qualitative and sometimes intangible effects of ICT upon organisations and communities.

The most important target areas for access projects were found to be eCommunities, SMEs and eBusiness/eCommerce practices. For content projects the primary and secondary sectors are Agrifood and SMEs, ICT and eBusiness practices, respectively. Tourism is also an important area in this group targeted through website projects. Capacity projects tend to address eLearning and eSkills for populations targeted located in predominantly rural and in remote/isolated areas.

Success Factors

The analysis of the case studies defined the actions or conditions which have allowed the achievement of each project's goals. Six major contributing success factors were discovered: (i) financial support from the EU, (ii) support from national/regional authorities (political, financial and legal), (iii) involvement and co-operation of local businesses and organizations, (iv) understanding and reacting to new business opportunities created by ICT, (v) strong involvement of local communities and (vi) understanding the need to promote the Information Society.

The use of EU funds regardless of the scale of funding can introduce vital support in rural areas. The cost of infrastructure, delivering training and adapting services is higher in rural areas. Many commercial providers focus on densely populated urban areas, where they can maximize take-up and return on their investments. To encourage operators to move into rural areas, funding is required to fill the gap and reduce the risk in the investment.

National/regional support was found to be a key success factor for the development of ICT projects. In some, it played an important role from a financial perspective and often they were the only source of funding. Particularly for SMEs using ICT it was a necessity that regional/national authorities provided support to enable the necessary infrastructure to be built.

The engagement of local companies and organizations can have a dramatic impact on a project if they develop their own interest in deploying the new technology. This success factor comprises any form of involvement of local companies and organizations willing to take part in improving the ICT take-up in the area.

Projects which have a wider appreciation of the benefits of ICT and can relate this to a positive set of values (access to information, social inclusion etc.) can create greater buy-in from the community. This leads to better take-up of services and can differentiate projects from purely commercial offerings.

Ownership of publicly funded assets can be transferred to co-operatives and social enterprises when the project is up and running. Broadband networks, websites and training can all be passed into the local community so they benefit from the future success. This generates greater take-up than schemes which are delivered in partnership with the private sector.

Drivers and Enablers of ICT take-up in rural areas

A project must inspire the desire to take-up ICT. Community enterprises are built upon a communal vision or desire, whereas top-down initiatives may not be.

The research found that several prerequisites affect decision-making and projects' implementation. Among these are legal requirements, business plan development, understanding the target group and project management skills.

Projects driven by the public sector for economic development purposes or connecting public buildings tend to use more expensive equipment, sometimes laying fibre and providing a more resilient service. They have sometimes been hampered by state aid regulations.

eProcurement or the fast-tracking of rural ICT infrastructure projects could facilitate the roll-out of broadband. Web-based systematic guidance would bring consistency and clarification to complicated information. Targeting groups who want to achieve a particular outcome can inspire ICT take-up. Conversely, simply telling them to take up ICT is unlikely to work.

There are three key ways that the private sector can be involved in a project: (i) as initiators (coordinators)/partners in projects; (ii) as suppliers (subcontractors) to projects; and (iii) as beneficiaries of a project. As suppliers of services to rural ICT projects, the private companies can deliver training, technology, websites according to the brief set out. As beneficiaries, SMEs generally receive support to access a service such as broadband when they would not normally be able to afford it.

The entrepreneurial spirit is a very determined ‘driver’ behind the take-up and development of ICT in rural areas. Technology champions are important, but wide representation in the community is essential to make the project sustainable.

Benefits and Impact

Benefits that ICT projects can create are not always directly linked to ICT. Project impacts include increased awareness; increased information and implementation of ICT; promotions of sustainable farming, better access to training opportunities (for farm activity and enterprise diversification) which brings greater representation, return to work and business start-ups by women; development of employment guidance by eLearning; effective delivery of public services, etc.

While some projects demonstrate the ability for knowledge based businesses to provide employment by relocating to rural areas which have broadband access, most of the case-studies did not show a big contribution to job creation. However there is still a significant impact on companies' performance and growth, population skills and social inclusion, as well as indirect impacts on the creation and maintenance of jobs. Based on the evidence from the cases, it is reasonable to suggest that targeting funding on improving the quality of life will trigger greater ICT take-up.

Problems and Barriers

Active inclusion of local organisations and people can make project development and management much more difficult. More views need to be taken into account and objections can slow down a project's implementation. However, this generates greater ownership and take-up within a community.

Problems could occur when public funding for broadband projects conflicts with the State Aid rules. Key issues that need to be bourn in mind are the transparency of the procurement process, the current level of competition, the justification and the focus of the project's objectives on social and economic cohesion, and the positive impact on welfare and competition.

Barriers to projects transferability exist. Tiers of government and their respective responsibilities vary enormously from State to State. Where the public sector works closely in partnership with the private sector, intellectual property rights can prevent the sharing of best practice through confidentiality agreements.

Common consistent reasons for projects to fail were not found. However, several factors could lead to failure, including overestimation of demand, underestimation of the required revenue funding, over selling of the service and lack of focus on the end user.

Review Methodology

The Part I Guide is complemented and enhanced by the Part II Review analysis of existing institutional policy and research in conjunctions with lessons from the database of case studies. This second strand of the study work focused on 'contextualising' the existing situation. It recognised that a variety of other conditions and factors existed, which could not be captured by statistical data alone.

ICT take-up is affected by a variety of different policy decisions at local, national and European levels. There are a number of sources and material relevant to this study. However, the diverse nature of the bodies and their objectives means that neither the level of information nor the cross-comparability of data was always available or reconcilable. The objective, in the review of existing data, literature, research and illustrations on ICT take-up, was to (a) draw a comprehensive picture of the situation regarding ICT take-up in rural areas of Europe based on available sources, and (b) isolate gaps in the data and literature available.

Recommendations

The Review's conclusions are based on the Research Team's preparedness to step outside conventional thinking about the roll-out of broadband technology and its take-up beyond the Digital Divide. Its recommendations acknowledge the contribution of Rural development programmes to ICT deployment, and the complementary roles of LEADER and the national rural development planning process in promoting 'bottom-up' approaches to development. But they also break new ground by identifying factors which reliably extend the benefits of ICT to those rural populations that current interventions have not reached.

The Review is concerned that:

- EU funding programmes are overly complex and those seeking support may be deterred and even abandon an idea;
- The national rural development planning process tends to marginalise ICT – the process may be further impeded by the non-participation of those with appropriate ICT expertise;
- Acceptance that funds are being spent in the best way may have become an institutional convenience – as the unchallenged marginalisation of ICT would suggest;
- Vigorous engagement with successful projects, as well as with failures, may have become an operational inconvenience – as the omission of failed projects from analyses linking ICT with rural development would suggest;
- An ingrained deference to the LEADER brand and to the hierarchical authority of the rural development planning process, may have blunted the impact of current public interventions.

The Review concludes that rural ICT policies need to balance top-down and bottom-up approaches. This entails the European Commission engaging with national and regional governments in articulating bottom-up recommendations coherently and centrally in strategy plans and development programmes – and individual Directorate Generals (DGs) making their own grant mechanisms more accessible to 'home-spun' initiatives that have local potential for solving local access and take-up. *Concerted* action is necessary, then, within and between the Commission and Member States.

Specifically, the Review and Guide recommend:

- A coherent eRural strategy as an integral part of sustainable rural development policy, focusing on building capacity, even though this often produces "softer" outputs;
- Improvement within the eRural strategy of control and monitoring of ICT indicators, policies and initiatives including the collection of coherent statistical data;
- Measures which stimulate business and technical competition at different levels of scope and sophistication within the rural broadband market;
- Developing sustainable connected rural eCommunities to stimulate demand and ICT take-up – particularly by enhancing Regional Leadership and Local Champions to ensure that 'bottom up' projects flourish, and by supporting Awareness ("know what") and Training ("know how");
- Providing services and content that rural users feel are pertinent to them, especially Entertainment and local content, as well as policy priorities such as eBusiness, eLearning, eHealth and eGovernment services;
- Encouraging initiatives which promote the theme of eCommunity, particularly by way of a common eRural agenda;
- Adopting a rubric of best practice at the interface between LEADER and those seeking access to funding, comprising measures which offer:
    - Self-evaluation by communities against an identified envelope of best practice;
    - A route map incorporating an initial action plan;

  - Published criteria for key stages of the initial action plan;
  - Unconditional release of stage funding provided published criteria are met;
  - A prioritising of content and originality over form and consistency when deciding whether criteria are met;
  - Training and practical advice and support for local attempts to reach the next stage;
  - Decision points concerning options delegated to community projects and the authority retained over the use of public money – specifically, 'choice' or 'control', 'public' or 'private';
  - Assisted decision-making to community-led projects (to cover technical, financial and contractual options);
  - Ethical assessments of the consequences of decisions;
  - Structured 'third partnership' where public private partnerships (PPPs) are implemented – specifically, the inclusion of target communities as 'third partners' with their own contributions to make within the governance of PPPs; and
  - Protected dialogue where interventions may be controversial – that is, impact assessments which are sensitive to the needs and expectations of affected communities and which include them appropriately in the options available.
- Extending investment in broadband infrastructure to all local public sector agencies and schools in order to provide:
  - Channels by which eGovernment, eHealth and eLearning can be presented and extended;
  - Physical 'building blocks' for local imagination and knowledge to adapt and develop.
- Investing and developing the content of local networks;
- Raising the digital e-skills of local businesses and citizens.
- Introduction of an eProcurement process with appropriate safeguards and innovative proactive online support, to fast-track ICT projects in rural areas.
- Explicitly encourage the role of local authorities in laying ducts and then renting them to operators on an open and non-discriminatory basis, and promoting indoor pre-cabling for all new buildings in their regions.

Finally, the Review adds new factors to those identified in previous research, which influence the choice among rural populations to use ICT and experience the benefits of the Information Society. These are:

- A shared sense of lagging behind, which can be stimulated constructively by a local 'champion';
- Being spurred on as a consequence of a successful local enterprise;
- Being encouraged by the experience or ICT familiarity of others;
- Following a targeted intervention which demonstrably has improved the local quality of life;
- Emotional responses for local, personal reasons;
- Local resistance to an imposed agenda;

- Defence or protection of local values or traditions;
- Being offered control or ownership of a project which will enhance local life;
- Being part of a meaningful partnership arrangement, rather than one which pays only lip service to 'stakeholders'.

This study believes that it is through interventions which trigger such responses, even where responses might initially appear negative or inconsistent with policy or programmes that the benefits of the Information Society will reach more rural communities. The route to wider ICT take-up and use, and to competition in its supply, lies through *any* small initiative *provided* mixed, untidy and even unorthodox means of accessing broadband can simultaneously be supported.

Introduction

The European Strategic Guidelines for Rural Development 2007-2013 [3] increase the focus on ICT take-up in rural areas in line with EU priorities in the field of the Information Society. In particular, "there is a need to accompany changes in rural areas by helping them to diversify farming activities towards non-agricultural activities and develop non-agricultural sectors, promote employment, improve basic services, including local access to Information and Communication Technologies (ICTs)".

ICT can improve the development opportunities of rural areas by reducing the relevance of constraining factors such as distance, isolation and low density. It can also impact advantageously upon the ageing population – albeit, for the most part, indirectly (for example, through richer associational activity and through reversal of a dwindling rural society). For a long time, distance, isolation, low density and even decline have negatively influenced rural competitiveness. The provision of broadband access to rural areas has shown a marked dynamism, although uneven across Member States but well monitored in its progress. On the other hand, understanding of the factors determining the take-up and use of ICT services, specifically amongst rural populations, their impact on development opportunities and the role of local authorities and stakeholders in facilitating such use has been patchy and unsystematic.

The objective of this study is to provide a comprehensive analysis and a critical review of existing literature on ICT take-up and use in fields relevant to rural development, its impact and practices, in order to better focus and improve the effectiveness of rural development policy and better contribute to the European Union's growth and employment priorities. The study assesses the character and relevance of the digital divide between urban and rural areas in terms of take-up. The study is focused on areas of take-up and use defined in the European Strategic Guidelines for Rural Development:

– Guideline 1. …*"Encouraging the take-up and diffusion of ICT. The agrifood sector as a whole has been identified as lagging behind in the take-up of ICT technologies. This is particularly the case for smaller businesses. Adoption of e-business applications is still on a low level outside of large multinationals and their larger suppliers. Rural development funds should complement future Commission initiatives such as i2010 in the fields of e-business (particularly in relation to SME's),e-skills and e-learning"* (Strategic Guidelines, example of key action iv).

– Guideline 3. … *"Encouraging the take-up and diffusion of ICT. …essential in rural areas for diversification, as well as for local development, the provision of local services and the promotion of e-inclusion. Economies of scale can be achieved through village ICT initiatives combining IT equipment, networking and e-skills training through community structures. Such initiatives can greatly facilitate IT take-up by local farms and rural businesses and the adoption of e-business and e-commerce. Full advantage needs to be taken of the possibilities afforded by the internet and broadband communications, supported for example by regional*

[3] Council Decision 2006/144/EC, 20 Feb 2006, Official Journal of the European Union L 55/20

programmes under the Structural Funds, to overcome the disadvantages of location." (Strategic Guidelines, example of key action vi).

– Guideline 3….. "*Encouraging the development of Tourism. … is a major growth sector in many rural areas…. Increased use of ICT in tourism for bookings, promotion, marketing, service design and recreational activities can help improve visitor numbers and length of stays, particularly where this provides links to smaller facilities and encourages agri-tourism*".
(Strategic Guidelines, example of key action viii).

The overall aim of this study is to provide concrete guidance on how to maximise the benefits of ICT for growth and jobs in rural areas through support under rural development programmes, through the provision of a guide on best practices (shown in Part I) and a review of existing literature (shown in Part II).

The study is geographically focused on European rural areas. In drawing on examples of good practice, the focus was on EU-27. However, other good practice examples from third countries were used where examples were not available within EU-27. The review of existing literature focuses on issues relevant to EU-27, and covering relevant research in third countries. As regards thematic focus, the study concentrates on those activities identified within the Strategic Guidelines. It looks at factors influencing take-up and use by different types of users in rural areas, rather than on infrastructure coverage.

The study includes (i) a Guide and database of best practice case studies (Part I) and (ii) a Review of existing policies and literature (Part II). These were developed using two methodologies that formed the main research strands of the study. First, a database of 67 best practices/cases studies was established and analysed, followed by a review of existing data, literature, policy and research illustrating ICT take-up with special focus on rural areas.

For the first strand of the research, a number of projects were examined involving a selection of typical, local, small, rural-based businesses, organisations and farms across Europe. This determined the impacts of ICT usage and the factors influencing usage. The final database of case studies was chosen to ensure a representative coverage based on geography, sector and users. This database was achieved in two steps. First, the Research Team identified cases of best practice by consulting their extensive networks of rural broadband contacts. Second, further information on each best practice example was then collected, mainly by desk research and phone interviews with the key people directly involved.[4]

Following the initial inquiry, the Research Team identified gaps where further investigation was required by sector and by theme. The representation across Member States was balanced to the extent possible. The resulting projects were then refined to a shortlist. Further analysis identified where additional projects could fill the gaps in countries not represented. The final list was then collated in 'fiche' form. Examples were included from outside the EU when these added insight to the constraints upon projects inside Europe.

Each case was analysed in order to expose trends and identify lessons that could be learned. The aim was to isolate the factors that made projects successful or, alternatively, the problems

[4] The Team's past experience in this area has found that such interviews can be extremely effective in exploring issues which may not appear in official reports. They also expose more qualitative and sometimes intangible effects of ICT upon organisations and communities.

that had reduced their effectiveness. The study took a practical approach and steered away from theoretical and policy reference documents.

The Part I Guide is complemented and enhanced by the Part II Review analysis of existing institutional policy and research and of lessons from the database of case studies. This second strand of the study work focused on 'contextualising' the existing situation. It recognises that a variety of other conditions and factors exist, which cannot be captured by statistical data alone.

ICT take-up is affected by a variety of different policy decisions at local, national and European levels. There are a number of sources and material relevant to this study. However, the diverse nature of the bodies and their objectives means that neither the level of information nor the cross-comparability of data was always available or reconcilable. The objective, in the review of existing data, literature, research and illustrations on ICT take-up, was to

(a) draw a comprehensive picture of the situation regarding ICT take-up in rural areas of Europe based on available sources, and
(b) isolate gaps in the data and literature available.

Again, the review methodology was built on the previous experiences of the pan-European Research Team and took into consideration current developments in ICT deployment in rural regions. Previous analysis demonstrated that both qualitative assessment and quantitative indicators are required. Such evaluation frameworks offer a clearer vision of the ICT challenges and benefits for development projects in communities. For this reason, it was necessary to consider integrating rich descriptions of situations on the ground, with statistical analyses of socio-economic indicators. Another issue concerned the inter-relationship between EU policies and programmes encouraging the adoption of ICT, and the way in which communities respond. Equally, the evaluation approach sought to contrast the pace at which ICT is diffused among communities and the possible, direct or indirect, social and economic impacts for users of those technologies.

Part I:

Guide to Implementing ICT in Rural Areas

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1. Introduction

This guide explains the role that ICT policies can play in rural development strategies and programmes in the regions of Europe. It is intended primarily for policy-makers in the EU and in Member States/Regions, but should also be useful to wider audiences.

The guide takes a practical view and steers away from theoretical and policy reference documents. The guide can be used in one of two ways:

- Identify the impact required from an ICT project.
- Identify the group / sector benefiting from an ICT project.

Based on the case-studies, the guide identifies success factors and shows which of them will be important for an ICT project. The recommendations in the study are based on the analysis of all 67 case-studies projects. Though the sample of case-studies is relatively small, it was well chosen and gives options for highlighting trends, showing of **best practice**, identifying **impacts**, deriving **lessons**, as well as the factors that have made projects **successful** and **problems** faced.

Lessons from previous work indicate that guidelines with practical examples of applications carry more weight than professional advice in convincing individuals of the benefits of adopting ICT.

2. Success Factors – What makes a great rural ICT project?

Analysis of information gathered in the case studies defines the actions or conditions which have allowed the achievement of each project's goals.

2.1 Financial Support from EU

The use of EU funds, including funds from the EAFRD, regardless of the scale of funding can introduce vital support in rural areas. The cost of infrastructure, delivering training and adapting services is higher in rural areas. Many commercial providers focus on densely populated urban areas, where they can maximize take-up and return on their investments. To encourage operators to move into rural areas, funding is required to fill the gap and reduce the risk in the investment.

EU funds with their reporting requirements can also support good project management. The rigorous assessment procedures associated with EU funding means that financial, organizational and legal issues have to be taken into account. It also follows that the timing of funding is important. As a general principle, pre-start funding (both capital and revenue) will ensure that projects are properly set-up. Mid-project applications for funding to rectify a failing situation should be discouraged if the failure is the consequence of a poor plan. However, mid-project applications should not be discouraged if funding will deliver discrete aspects that have proved additional. The approach we would encourage is flexibility rather than rigidity – perhaps in the form of 'Is this application reasonable in the circumstances of this particular rural area?'.

Revenue support to allow the project to bed in

EU funds can provide revenue assistance to projects during initial stages as the take-up of the technology builds up. In many cases there is slow initial take-up in rural areas as there is more reluctance to adopt new technologies than in urban areas. Projects aiming for sustainability can experience cash flow problems as revenues do not meet expectations and EU funding can help to bridge the gap.

One of them is the **Limousin Regional Network**. This project was mainly aimed at installing a fibre-optic network along with other facilities like WiMAX. It was a costly investment therefore financial support from different parties was substantial. Most of the funding was provided from a private company – Axione, responsible for implementation of the project. Their share amounted to €30 million. But the second biggest contribution was from EU funds (ERDF) with its share of more than €13 million. Without this support, there would have been a significant lack of funds.

Most of the projects determined by this success factor aimed at providing access to the Internet and introducing new technologies in deeply rural or isolated regions.

Support from Regional /National Authorities

This kind of assistance (provided in different forms – financial, organizational, legal, etc.) has been a key success factor for the development of projects in 31 of the case studies (45 % of all case studies). In some, it played an important role from the financial perspective: here, different governments (local, regional and national) provided significant support and often

they were the only source of funding. Moreover governments often initiated implementation of the projects, which makes it an even more important factor.

For the SMEs using ICT – for example, **Fjällhästen** (ADSL), **Impecta** (website design and IT business skills) – it was a necessity that regional/national authorities gave support to the necessary infrastructure to be built. Without good infrastructure, the web site these companies have developed would not reach out on the Internet. So although none are direct beneficiaries of any funding (EU or national/regional etc) they are directly benefiting from the infrastructure that was built with Governmental or EU support.

The partnership of organizations that benefit from the project can include financial, legal and political support.

Political support

Projects which fail to win high level political support can struggle to win over public sector partners that can make good use of the project. For example, promoters of a rural broadband network may find that partners prefer to make their own costly arrangements or continue to use dial-up rather than use the new network. Here, an e-procurement[5] system could accelerate infrastructure development if there was support across the public sector for it. In the same way, for example, that national procedures can 'fast-track' infrastructure procurement by characterising it 'strategic' (as happens in Ireland), so an 'e-procurement' label could be designed which would reposition projects or applications within a supportive, specialised approval process. This could have wider advantages: in winning high level political support, a project can become embedded in public sector strategies and, if successful, can bring kudos for public sector partners. In addition, Local Authorities could facilitate the roll-out of broadband in a very direct way by laying ducts and then renting them to operators on an open and non-discriminatory basis and imposing open access obligations, and promoting indoor precabling for all new buildings in their region.[6]

Funding

Match funding from regional partners demonstrates buy-in to a project and is often necessary to draw down EU funds. A great example is the **eLearning Centre in Livani** (multi-level training and video-conferencing). The whole project was initiated by local authorities in response to unemployment and economic problems. They started initiatives to build an information society and introduce their region into modern economy. Apart from that kind of involvement, the financial side was also covered by public investment. The whole project was financed with national development funds.

[5] e-Procurement - electronic integration and management of operations related to the procurement process including request for proposal, authorisation, order, deliverable and payment between purchaser and supplier, see the Glossary of Terms for more detail.

[6] as recommended in "Bridging the Broadband Gap Brussels 14_15 May 2007, Conference Conclusions", DG INFSO, http://ec.europa.eu/information_society/events/broadband_gap_2007/docs/conclusions.pdf

Legal support

Advice on state aid issues and procurement can support a project and make sure that it does not break any rules.

Involvement and cooperation of local businesses and organizations

The engagement of local companies and organizations can have a dramatic effect on a project if they develop their own interested in deploying the new technology. Local housing associations were a key promoter of the **Nuenen** project (high speed broadband via fibre optic cable) where it was recognised that broadband could facilitate remote telecare for elderly residents e.g. panic buttons and door entry systems.

This success factor comprises any form of involvement of local companies and organizations willing to take part in improving the ICT take-up in the region. Important issues here are good communication, assistance and exchanging support at different stages of realization of the project. Equally, the financial and organizational involvement of local entities interested in the development of new technologies is highly advantageous.

In almost half of the cases studies (31, or 46%) this factor was crucial in the development of the projects, as these companies provided necessary funds as well as expertise to explore the technical side.

An example lies in the **Look@World** project in Estonia (a free ICT training network for the adult population), where all funds came from private entities. Moreover, the whole project was an initiative of several companies that created a foundation to take necessary action and provide funds (almost €3 million). Partners realised that the adult population was hindered by a lack of skills connected with Internet-based services – skills that could be a source of revenue. Their response was to organise a sequence of training, from the level of no knowledge of ICT at all through to being a regular user of the internet. Look@World is an especially revealing project. Conventional measurements like the time needed for training are replaced by user demand and desire to be trained – in other words, the emphasis is switched from those who provide ICT skills to those want them. It then follows that evaluation becomes a more intelligible and meaningful task than reckoning the effectiveness of over- or under-capacity and the value gained by participants during the allocated provision. In the Look@World example, the project could persuasively argue that their initiative was successful: 500 calls from prospective applicants were received a day; capacity was filled in two weeks; 10% of the Estonian adult population was trained (15% of the rural population); and 73% of course participants now regularly use the internet (much above the target of 50%).

Good communication between partners is essential in the delivery of a project. Typically partnerships are multi-disciplinary with technical, public sector, community and business representatives. Each partner has their own objectives and plays a crucial role during different parts of a project. Technical issues can be important at the start of the project but failure to involve end users at this stage can leave a project which will not meet users' requirements and expectations when it is delivered.

2.4 Understanding and reacting to new business opportunities created by ICT

The skills required for citizens in the 21st century are changing as the Internet and technology transforms the way we do business. Big companies like Paypal, eBay and Google are opening up new business opportunities for businesses in rural areas to sell their goods to new markets and generate new revenue streams. The opposite effect is also draining resources from rural areas as local shops are in competition with on-line retailers offering products at lower costs. Rural businesses cannot afford to ignore these shifts or they will lose business to those companies that are successfully trading on line. Projects need to raise awareness amongst organizations and citizens. Ignoring ICT is not an option, it will impact on the livelihood.

This is a very important factor for all projects that were created for economic reasons. All kinds of activities focused on making a new platform for running businesses deriving from awareness of the necessity to exist in the Information Society. This was the key factor affecting the development of 24 (36%) of the case-studies. The growth of local economy and opportunities requiring implementation of new technologies, stimulated implementation of new solutions.

An example of a project that benefited from these reasons is **Organic Denmark** (a web portal with links to participating businesses). It uses an Internet platform to connect Danish organic producers with international buyers. Without such a solution it was much more complicated. The awareness of new possibilities for running a business in the modern economy helped to create an easy-to-use tool for business persons. A significant number of about 3,000 Danish farmers benefited already from this project.

Another example is **Impecta Frö AB** (website design and IT business skills). Impecta is an SME in the seed business which, in just 10 years, transformed from being a "catalogue mail order business" to being an e-Business with up to 70% of the trade on the Internet.

Up to three success factors were identified for each case study and the most important ones were:

- Involving local businesses and organizations
- Support from regional /national authorities,
- Understanding and reacting to new business opportunities created by ICT.

Involvement of local companies appears to be the most essential factor among the analysed case studies. Less importance was assigned to support from regional or national authorities. This is connected with their financial contribution to the projects themselves rather than reflecting political or technical support.

It is also clear that the changing economy pushes new solutions onto businesses. This is clear from the type of case studies that we analyse. Many of them concentrate on exploring modern ways of running a business and using new technologies, thus delivering innovation in rural areas.

2.5 Strong involvement of local communities

Involvement and cooperation of the communities that will benefit from introducing the project is essential. In some countries large amounts of money have been wasted on projects which have not generated sufficient interest and take-up amongst their target communities.

Poor communication and a lack of focus have led to projects disappearing after initial funding has finished.

We offer no prescription for involvement and co-operation recognising that different countries have their own traditions of communal enterprise and that the traditions themselves are often changing as a consequence of globalisation. However, two elements can be recognised:

Co-operatives / Ownership of a project [7]

Ownership of publicly funded assets can be transferred to co-operatives and social enterprises when the project is up and running. Broadband networks, websites and training can all be passed into the local community[8] so they benefit from the future success. This generates greater take-up than schemes which are delivered in partnership with the private sector.

Ownership of the development and management of the project

Including local organisations and people can make project development and management much more difficult. More views need to be taken into account and objections can slow down a project's implementation. However, this generates greater ownership within a community.

Ownership often appears as different kinds of actions taken by the communities to improve their environment and life in their region. For 19% of the cases (13 in number) this was one of the identified success factors.

One notable project that benefited from such action was **Nuenen** project (high speed broadband via fibre optic cable) where the project was realized thanks to cooperation of a local organisation Kees Rovers and the residents of the town. Their involvement in finance and marketing helped build a network and connect residents to Internet, as well as other services like cable TV, phone. A great majority of residents signed up for these services (85%) which definitely improved implementation of the solution. The word of mouth marketing by community members generated phenomenally high take up.

2.6 Understanding the need to promote an Information Society

Projects which have the benefits of ICT derived directly from the needs of society and can relate this to a positive set of values (access to information, social inclusion, etc.) can create greater buy-in from the community. While most projects pay lip service to these objectives in order to obtain funding, those which actively pursue them create a "feel-good factor" amongst users and partners. This leads to better take-up of services and can differentiate projects from purely commercial offerings.

[7] Social or co-operative ownership means horizontally owned and operated communal enterprise which trades, or aspires to trade, on behalf of its partners. By extension, social or community governance means a horizontal partnership between members connected by social interest and seeking to introduce and manage new practices and resources having communal relevance. The criteria, then, are horizontality, partnership, connection and an appropriate legal personality – each a target towards which local actors can be supported and encouraged.

[8] No special meaning or criteria to community is attached to this report. In this guide, community means no more than people whom EU, national or regional governments perceive to be connected with each other by special interest or by place (typically, the rural area with its individual activities and local significance).

This factor identifies all actions taken by any kind of entity that were mainly aimed at building and exploring the Information Society. Understanding the necessity of providing the means (for example, access to the Internet, knowledge and skills, etc.) of developing its own Information Society for the future was the main substance of this factor.

Under this group come 14 projects (21%) that were focused on the rural communities as the main beneficiaries. Usually this factor arose from the problems of unemployment, low Internet usage, and problems with access to knowledge for people from rural areas.

One of the cases for which this was a key issue was **Ikonk@** in Poland (public Internet access points in public libraries). The main objective was to provide access to the Polish Internet Library for the residents of small towns and rural areas so they could have access to more publications while providing them also with access to the Internet. The success of the project was mainly due to understanding that access to the Internet and the possibilities that derive from it are the future for communities in all types of areas, as they give more opportunities of acquiring new skills and knowledge.

2.7 Success Factors summary

The key success factors discovered from the case studies, in their generic abstracted groups, are:

- *Management*: Good co-operation between members
- *Economic*: Support from regional / national authorities (economic support)
- *Political*: Determination in creating / spreading Information Society. Support from regional / national authorities (political and legal support)
- *Social / Community*: Strong involvement of communities

The following conclusions were drawn from analysis of the case studies:

1. ***Management factors***

   The leading management factor was 'good co-operation between members' (19 case-studies, 28% of all), followed by 'strong leadership' (5, 7%) and 'the ability of the participants' (3, 4%). Arguably, these categories of management overlap. Their greater value may lie, however, in reproducing the defining strengths of management as they were perceived by managers (interlocutors) and presented to the researchers of rural broadband projects. A strong leader, for example, would be unlikely to identify his/her own qualities first, as **eTeams** demonstrates (a global translation service based on a cottage industry in the west of Ireland). Such distinctions seem acceptable in the terms they were offered, for two reasons. In virtually all case studies, either the interlocutor was the authorised spokesperson (for example, **eTeams**), or the interlocutor was speaking with the authority of past evaluation reports (for example, **CRISP** – a top-down area initiative, also in Ireland, creating local web sites encouraging the development of individual skills and local content).

2. ***Economic factors***

   The leading economic factor was 'support from regional / national authorities – economic support' (31 case-studies, or 45% of all projects), followed by 'understanding of growing competition and the functioning of modern markets' (23, or

34%), 'local economy growth' (12, or 18%) and 'financial support from the EU' (10, or 15%). There were no instances reported of an entrepreneur being a sole success factor, although the presence of an entrepreneur could be detected and is carried forward in section 3 of the Part II Review.

3. ***Political factors***

   The leading political factor was 'determination in creating / spreading the information society' (16 case-studies, 24%). This factor affecting the take-up of ICT in projects which were run with strong political support for its goals. The second political factor was 'support from regional / national authorities – political and legal support' which was identified in 10 case-studies (15% of all projects).

4. ***Social / Community factors***

   The leading social / community factor was the 'strong involvement of communities' (17 instances, 25%), closely followed by the 'engagement of local companies' (16, 24%)

While the predominance of Economic Factors as key success factors was found, the fact of broad-based combinations is more significant. A number of case studies (56, 86% of all) showed combinations of 'economic' with any one of the other three categories. Often there were two 'economic' factors coupled with one other category.

2.8 Prerequisites

1. **Legal**
   In most Member States, licences to use wireless technologies are not freely available. Operators wishing to obtain a licence must normally contact the national regulator. The application process varies from State to State depending on the spectrum required. However, licences for spectrum, which WiMAX technology operates in, are generally quite valuable and may lead to an auction.
   Installing equipment on masts normally requires permission from local planning authorities. Again this varies from State to State.
   Identifying all legal requirements for access to the airwaves resources and infrastructures during a project's preparation is key to avoiding problems during its implementation.

2. **Business Plan / Project Plan**
   Clear objectives and an understanding of what the project aims to achieve will help to guide the project as it develops. Projects with a clear focus stand a better chance of not being side-tracked.

3. **Understanding target group / beneficiaries**
   Identifying and researching who will use the service and how it will benefit them is an important early step. Without a good awareness of the market for the project, it will struggle to find beneficiaries and reach sustainability.

4. **Project management skills.**
   Expertise in the particular areas which the projects cover are vital. They can generally be split into the following areas:
   - Local knowledge – tailoring a project to the local community and ensuring take-up

- Finance / legal – ensuring the project is well resourced
- Marketing – communicating the services
- Technology – ensuring that providers deliver what they have promised
- Support – help and advice to hesitant users

Many of these skills overlap and good communication between members of the project team is essential.

2.9 How would this Guide have changed an existing project?

While this guide features various factors that influence new projects, key questions are:

"How would this impact on an existing project?"
"What would they have done differently?"

Looking at the example of the **Cybermoor** Project in the North of England (a remote community broad band project, linked to a local WiFi network and providing PCs in almost every home), the key success factors which were not implemented were:

Financial Support from EU

The project did not focus on obtaining financial support from the EU – although a contribution was received of 0.7% of the total project cost. More support would have been useful in the beginning of the project and in later years the project did obtain more significant funding from the EU. However, the project's focus on community activities did not fit with the Local Action Plan which was targeted at economic outputs. The guide could have led to increased usage of EU funding in such projects.

Understanding increased competition and new opportunities

While the project was able to promote the benefits of websites and eCommerce, sufficient resource was not focused on explaining threats to residents and businesses. The project did not give businesses the support to compete against on-line retailers which now had access to local residents. Supermarket chain Tesco began deliveries to Alston and this was perceived to damage local businesses. Use of the guide would have led to more activities to promote the new challenges that the project would bring to businesses not involved. It also address threats to residents and businesses which could be the subsidiary effect to development of ICT.

Involving local communities

The example of **Nuenen** and its "7 pillars" approach to community engagement would have been a very useful tool to use as the project was trying to sign up residents for the broadband service. More details are in the case study. The **Cybermoor** case is just one example among the 67 to highlight the approach.

This Guide presents also information about the most common problems faced by ICT projects to avoid them in the future. Details about those problems are described in section 9 of this Guide.

3. Project Types

This guide categorises projects in the following three categories.

- **Access** – projects which focus on equipment to access the Internet such as broadband networks and PCs.
- **Content** – what people look at and use on the Internet, including the services which encourage them to go on line.
- **Capacity** – developing new skills to access the Internet and make the most of ICT.

Each of these constitutes a pillar for successful ICT projects. Those which combine all three make the greatest impact. Providing broadband and PCs without appropriate training is less likely to generate take-up. Without compelling content and services, people are less likely to use ICT and broadband.

In the database of case studies only one project combined all three categories – **eTowns**. We identified also 6 other projects which combine two of presented categories. Those projects are:

- **Ammarnäs**, and the **Hungarian Innovation Center of Agricultural Informatics** – access and content categories;
- Carlow Rural Information Services Project (**CRISP**), and **Passerelle ECO** – content and capacity categories;
- **I-Centre**, and the Internet for the rural areas of Cyprus (**DIADIGITE**) – access and content categories.

It was recognised that there is a split between the numbers of users and the types of project:

- **Access** – the number of users depends on the location where the project is undertaken and sometimes covers all of the population from selected regions (even 40,000 people).
- **Capacity** – these projects address specific groups of users which can be as few as a hundred users.
- **Content** – projects targeted at groups of a few dozen, especially those linked to business. Solutions for these projects are very specific so the number of people in the groups of users can be quite small.

3.1 Access – how users connect to the Internet

This covers the technology – upgrades to telephone networks, laying fibre optic cable and the "hard" elements of technology projects. It also covers PCs in community buildings or projects which provide PCs to people in their homes.

Half of the projects identified in the case studies focused on access. It suggests the scale of the problem of insufficient access for rural communities and regions.

Projects under this subgroup of methods are the most expensive and therefore the support from authorities at different levels was crucial. It is also visible in the success factors identified for this group:

- Support from regional /national authorities – the most often discovered factor, which shows the role and involvement of governments and authorities in implementation of such projects
- Involving local businesses and organisations
- Responding to local communities and businesses

The most important target area for access projects is eCommunities. This was identified as the main primary sector of applications. One more important target area is SMEs and eBusiness/ eCommerce practices.

The aim of the access projects surveyed was similar – improving quality of life in rural areas and diversification of the rural economy. It is clear that lack of Internet access harms mainly the rural communities and their chances compared with urban areas.

All kinds of authorities supported these projects with different funds, but there was no dominance of any type of public funding. These projects were usually more expensive than those focusing on capacity and content, but some smaller projects were also identified. Private funds played an important role in this subgroup – they were used for 55% of all identified projects. They were the most important source of funding in projects where they were used. This is interesting because projects providing broadband and other Internet access initiatives are usually the most costly. It suggests that private organisations understand that this problem affects their own their effectiveness as well as the costs of running their business. This is probably the main reason why they decide to invest money in such projects. The best example here is the **Limousin Regional Network** (a public private partnership providing an open access, regional IP network in France). This was the most costly project among all taken into consideration under this study. Its budget was €85 million. And 55% of this amount came from private organisations although this is over 20 years.

The approach taken was either bottom-up or top-down without either being predominant. Almost 80% of the projects in this group were innovative and almost all were sustainable.

3.2 Content – activities founded on information resources

Content projects relate to the provision of information (for example, websites and portals). Projects which encourage blogging, developing eCommerce sites and supply chain systems all rely on content.

For 40% of projects, the method chosen was different ways of providing content. These include websites, portals and other means of providing information, creating sales platforms for agriculture goods or developing other tools consisting of databases. So emerging Web 2.0 applications and approaches are becoming very important.

The success achieved relied mainly on:

- Understanding and reacting to new business opportunities created by ICT
- Support from regional /national authorities
- Involving local businesses and organisations

The primary and secondary sectors for these applications were Agrifood and SMEs, ICT and eBusiness practices, respectively, as their share in this group amounted to more than 80%. Tourism was also an important area in this group with website projects like **Dolina Czarnej**

in Poland (a public, regional, promotional website) or **The Cumberland Hotel** in UK (an innovative use of parallel internet services and connections for business development and customer satisfaction).

SME/Business/Agrifood/Private Sector is the most important target group for these projects with examples like **Food and Drink from Greece** or **Organic Denmark** (both portals with links to member businesses).

Financial support was mainly from private institutions or granted from the EU. Local and regional governments contributed to almost 30% of projects interviewed. The most expensive project cost more than €4 million (**Promotion of Bio-Energy** by Marketing, Implementation & Trading in the North Sea Region, Germany) while the least expensive one was realized for only €580 (**Zamas, a** small local massage school in Slovakia). For the most expensive one, half was funded by EU.

For 75% of the case-studies the approach taken was bottom-up, while it was innovative for just 60%, which is still a significant number. All projects were sustainable, except one.

Under this group the projects generate just a few new jobs as they are usually small businesses employing no more than 10 people. However such small companies are crucial to rural communities by enabling the workers and their families to remain in rural areas.

3.3 Capacity – the ability to satisfy particular needs

Capacity relates to training and developing skills so that people can use the Internet to their benefit. This includes meeting goals such as spreading the information society, learning new skills, reducing unemployment, etc. This element is often the hardest to resolve as it faces cultural and social barriers.

Only 15 of the 67 projects were identified in this group, which makes up 19% of total number of projects. They were mainly eLearning activities, training and workshops for communities to acquire new ICT skills (e.g. **Workplace Guidance, Look@World**).

The success of this group is beneficial to:

- Understanding the need to promote an information society
- Involving local businesses and organisations
- Financial support from EU

Involvement of communities and good cooperation were also significant factors in building capacity.

The most important target area was eLearning and eSkills, which covered just over half of the case studies. Another significant area, but as a secondary sector, was eCommunities.

The population targeted was predominantly rural and in remote/isolated areas. These communities are the ones suffering the most from lack of ICT skills. This derives partly from a lack of Internet access but also the distances they need to cover to attend courses.

The main target group was workers in the community or home, but it was also very important for conventional employment in the SME/Business/Agrifood/Private Sector. New skills there improve the knowledge of employers and their workplace productivity.

The most important aim (for 12 out of the 13 case studies, or 92%) was improving quality of life in rural areas and diversification of the rural economy.

Almost half of the projects received financial support from the EU. It suggests how important EU funds are in spreading ICT skills to promote the Information Society in remote/isolated areas – for example, **Workplace Guidance in Finland** with a funding of €250,000 in total. It is important to notice that for these projects the scale of EU funding was still rather small compared to access projects, which drew millions of Euros from European funding. The same situation in funding access and content projects concern private funding - private contribution was recognized only in 40% of projects. In the **Look@World** project, all funds came from private organizations amounting to almost €3 million.

In the projects identified, 10 out of 13 (77%) were sustainable. It is important to see that sustainability is at the lowest level for this subgroup because training was the most widely displayed. The cost of training is higher in rural areas, but in many cases incomes are lower so it is hard to make courses run profitably without funding support.

There were two projects worth mentioning as they differ from the average in this study. They are **Look@World** (a free ICT training network for the adult population in Estonia) and **eTeams International** (a global translation service based on a cottage industry in the west of Ireland). They are two different types of projects but their contribution in unemployment actions is significant.

3.4 Summary

As described at the beginning of this section there is a correlation between the type of project and number of users. It was noticed also that this correlation influences the level of regional and national support both economic and political.

The national and regional authorities are more interested in the types of projects which bring the benefits of ICT for more people in the region. This situation means that access and capacity projects are more attractive politically for national and regional authorities. So they attract bigger funds for those types of projects.

The content projects are mostly bottom-up projects, and attract relatively little regional and national level financial support. The main reason for this is the narrow scope of such projects which include mostly local business improvement.

4. Impacts

This section discusses the reported impacts of the case study projects. In the Part II Review, the question of the impact of ICT upon rural economies and the quality of life is treated at length. As with all action research projects, one has to be careful to consider how objective project sponsors and managers can be about their work.

We consider whether these results can be provided as consistent web-based systematic guidance, and entered with the assistance of perhaps LEADER personnel to demonstrate at a very earlier stage what ICT can deliver for those who require results.

4.1 Improved performance of Agrifood & Forestry Businesses

Projects aiming to improve the performance in this sector generally focus on adding value to local products or improving supply chains systems with ICT.

Realizing this aim was crucial for 17 of the cases (25%). Of these, four were also aimed at Improving Environment and Countryside and five at Quality of Life in Rural Areas and Diversification of the Rural Economy.

The most important success factors for this group of projects were:

- Understanding and reacting to new business opportunities created by ICT
- Financial support from EU
- Support from regional /national authorities

Case studies such as **Organic Denmark** (a web portal) and **S'Atra** (an organic production, sales and marketing co-operative in Sardinia) demonstrate that ICT can be used to add value to local products.

Employment – Jobs Created

These projects created a total of 70 jobs and safeguarded 110. As a proportion of the total jobs created in the case studies, this was in the region of 6%. However, many of the projects could not produce accurate figures about the jobs created so this should be treated with some caution.

Geographical information systems such as **Prefarm** allow precision farming to improve agricultural productivity. Each farmer can reduce expenditure on fertilisers making their business more competitive. These incremental improvements seldom amount to completely new jobs in the case studies which were examined, however they help to safeguard employment.

Projects such as **Food & Drink Greece** similarly benefit a wide range of businesses, but it was not possible to establish the link to new employment. The situation is similar with **NetBrokers** in Poland. Here 3,000 companies were able to increase their sales but it was not possible to identify the employment impacts.

4.2 Improving the Environment

Projects using ICT to protect the environment focus on eLearning and mapping[9]. Only 12% of all case studies belong to this group and this aim was only one of all for half of the projects that had other aims.

The most important success factors are the following:

- Financial support from EU.
- Support from regional /national authorities.
- Responding to local communities and businesses

Promotion of Bio-Energy in the North Sea Region is a project which relied on support from the EU and responded to local communities. The project was successful because of the EU intervention and used ICT innovatively to support its environmental objectives.

Another example is **Les plus beaux villages de Wallonie** which aims to preserve cultural heritage.

Employment

63 jobs were created and 23 safeguarded by the 8 projects that included this aim. The employment creation from these measures was also low in comparison to quality of life measures.

These projects facilitate access to information in new ways which indirectly supports businesses. Geographical Information Systems show data from a number of public sector organisations in one place, saving time for individuals who can quickly see planning documents relating to their farm or business. The **Naturnet Redime** project provides a wide range of data to individuals for educational purposes, enabling them to interpret their environment more easily. By sharing environmental information more effectively, users have a greater awareness of their local environment.

4.3 Improving Quality of Life in Communities / Development of SMEs

These projects cover new systems in SMEs, community broadband projects and are the widest range of projects. Most of the projects belong to this group (51, or 76%).

Identifying success factors for this group is very important due to its size. The main factors that made the projects successful are:

- Support from regional /national authorities
- Responding to an identified need within local communities and businesses
- Understanding and reacting to new business opportunities created by ICT

For this group target areas are different than in the previous ones. Most important sectors of applications were eCommunities, eLearning and SMEs.

It was noticed in the analysis that the numbers of users where divided into two groups.

[9] For instance www.our-data.lu

- The first relates to improving competitiveness of agriculture and forestry sector, where there are only a few dozen users. This situation is the consequence of the specific business it covers.
- In the second group, there are a few thousand users. These relate to the two remaining factors, improving the environment and quality of life in rural areas.

It is reasonable to suggest, therefore, that targeting funding on the latter group will trigger greater ICT take-up.

A consequence of this could be low take up in Axis 1 projects as they will reach lower numbers of beneficiaries. Most major funding programmes attach a price to outputs e.g. ESF has a maximum hourly rate for training in some Member States. In most cases, specific training to benefit from ICT in rural areas is more expensive to deliver due to low, sparsely populated areas. High value training is virtually impossible to deliver in these conditions as there are not enough beneficiaries to justify running courses – some projects were able to overcome this obstacle (e.g IT competence in **Ballyhoura Country** using a mixture of funding).

The number of jobs created and safeguarded were dependent on the size and length of projects. Long term projects safeguarded more jobs as the projects had a longer lead time, were better planned and implemented than some of the short term projects.

Improving Skills – building capacity in rural areas

Three projects in the case studies focus on eLearning and eSkills as a primary activity. This is only 7% of the total case studies but reflects projects which have wider impacts. In these cases, where learning and skills are the primary objective, projects also contain other components around broadband access.

The low figure of 7% seems in contrast to pervasive policy emphasis on learning and skills – and also cuts across such business truths as the necessity of up-skilling the workforce. We are able to account for this by turning again to the example of **Look@World** in Estonia. That project succeeded because it took people who *wanted* to learn, rather than people who were pushed into learning. The lesson is not new. It is familiar to every child and adult who is or has been fortunate to be inspired by gifted teachers.

Our first conclusion is, therefore, that a project must inspire the desire to take-up ICT – unless the circumstances of the community in question are in the depressed state such as the one that Estonia's population endured in 2002, in which case the desire for improvement is already there. Clearly, community enterprises are built upon a communal vision or desire, whereas top-down initiatives may not be. Our second conclusion is that the positioning of learning and skills within a project's definition is a marketing challenge: if the message is not inspiring, the desired consequence may not ensure. As part of **Project Access** in the UK, farmers were attracted to courses because it offered them the chance to find and compare prices of agricultural equipment on the Internet. They were not attracted by the thought of acquiring keyboard skills, how to use a mouse and basic understanding of Microsoft Windows. However all these were outcomes of the course. Our third conclusion, therefore, is that terminology such as eLearning and eSkills may themselves constitute barriers to ICT take-up.

Increasing Tourism through ICT

The projects which focused on tourism made up 14% of the sample, focusing on marketing and on-line booking systems. Typically the businesses set up a basic website to promote their accommodation and/or services **(Hotel Martinské Hole** and **Fjällhästen**). This generated additional trade in the early days, however, as more businesses set up websites it becomes harder to differentiate. The next phase of services includes on-line booking systems which allow customers to make reservations on line (**The Cumberland Hotel**). The impact was dramatic in each instance – increased bookings and turnover for the businesses involved.

In other projects, portals have been set up to promote the wider region to visitors (**Ammarnäs** and **Les plus beaux villages de Wallonie**), although most tourism areas now possess a portal. There can be a competitive advantage if the portal is accessible and has an on-line booking system.

Employment – Jobs Created

Activities under this measure created the largest number of jobs - 1000, with 289 maintained. However, this is the measure which covered the largest number of projects and is a general 'catch all'. This covers job creation in expanding knowledge-based industries such as **eTeams International** in Ireland.[10] For example, **eTowns**, also in the rural west of Ireland, seeks to attract existing knowledge-based industries away from urban settings by offering a better quality of life to young families. It does this by providing, within attractive homes-with-workshops, the essential broadband access by which knowledge-based entrepreneurs can operate. Impacts will include the cross-pollination of ideas with existing local industry, the stimulation of local society, and the attraction of other potential employers. The various **Living Lab** projects offer other examples, as does **Relocating Knowledge Based SMEs – UK**.

Indirect employment comes as a result of new ICT based jobs in these communities. New ICT based SMEs create ancillary work in rural communities for shops, schools, builders, etc. The **Relocating Knowledge Based SMEs project** generated local building work as the business moved to an old farm which needed redeveloping. Using traditional construction techniques, local builders worked on the property and modernised it – training young people in new skills.

Beneficiaries and users of these services tend to be SMEs, citizens and public authorities.

[10] By 'knowledge-based', we mean the supply of information with know-how and expertise, a market in which the intellect and its education and training are the means of production.

5. Benefits

Some of the main benefits of the projects are not directly linked to ICT. These included:

- Increased use of **Bio-energy in the North Sea Region** by a German bio-energy project. Project impacts include increased awareness, increased information and implementation of ICT. The **ProBioEnergy** virtual trading web portal is a ready developed infrastructure for trade in bio-energy.
- Better access to training opportunities. The **Ballyhoura** project has improved farm compliance with new regulations and also farm management efficiency. It has enhanced the skills and competence needed for farm activity and enterprise diversification. It has brought about greater representation, return to work and business start-ups by women. It has delivered a culture of enterprise and confidence spreading beyond perceived sectoral boundaries and transcending imagined personal barriers.
- Development of employment guidance by eLearning (**Workplace Guidance**).
- More effective delivery of public services e.g. using broadband for carrying CCTV images (**Zielonka** and **Brescia**).
- **Organic Denmark** promotes sustainable farming. The web portal is good for information. The next step is eBusiness – most beneficiaries have not taken this up, partly because farming is a conservative sector.

6. Inputs versus Benefits

From analysis of all case studies, there could not always be shown a strong correlation between the budgets spent and outputs measured with number of jobs created and maintained. The funds used reflect more the number of users of the project.

This usually happens for broadband projects, for example **Rural Area Interconnection to the Educational Broadband IT Network (RAIN), Project Access**, **Broadband Communication Network of Kuyavia and Pomerania Region (K-PSI)**, **Basque Country - KZ@BZ** or **Limousin Regional Network**. These are all large scale projects regarding the duration and costs. Most of these projects were subsidised by EU funds and by national or regional governments. They are implemented as part of European and national strategies of development. There is however no correlation in the number of jobs created as these projects were targeted more at large numbers of business and residential users (the whole population of a region is the beneficiary and user of such an initiative). Having that in mind the number of users can be expressed in even hundreds of thousands of people.

The second group of projects regarding the scale of inputs and outputs can be different knowledge initiatives. Projects that exemplify this case are **Carlow Rural Information Services Project (CRISP)** (a training initiative), **eFarmer** (to provide information on the usage of EU funds for farmers), **Look@World** and **Workplace Guidance**. They are of a different scale, but the more parts of the region they cover, the more they cost. There is strong evidence that these kinds of initiatives are supported with EU funds.

The last group consists of small projects made by a few or single companies, organisations, schools or town communities. These projects are usually funded with private funds. An example can be **Ammarnäs** (community portal), **Dolina Czarnej** (5 agro-tourist households), **Organic Denmark**, the **Cumberland Hotel** or **Impecta Frö AB**. They are all small business initiatives, funded with private funds. They employ around ten people each operating in local markets, through improved web presence they have managed to attract customers from more distant regions.

One SME project deserves special attention, and is an exception in this analysis. It is **eTeams international**. It did not require heavy funding, but connects translators from different countries. Now it employs more than 750 eWorkers without large scale support from the authorities. This impressive number of users mainly derives from the international character of this SME and the particular type of service which enables growth of such employment.

For all of these projects the area of coverage is linked to the budget, as in broadband projects or large scale training initiatives. In the biggest projects, like **Limousin Regional Network**, the duration (20 years) also influenced the scale of the budget. In some cases, the territory did not determine high cost of implementation. An example is the **Netbrokers portal** - a trading platform for agricultural goods. It operates nationally, but is a small company, employing 10 people.

7. Projects defined by Sector

This section looks at 3 broad sectors – (a) Community / Home, (b) SMEs/Agrifood and (c) Public sector. For organisations wishing to target a particular sector, this section identifies success factors and outputs for projects in these sectors.

7.1 Community/Home

These projects cover broadband schemes targeted at end users, training and e-inclusion projects.

Almost half of the case-studies are dedicated to communities and home target groups. It shows the importance of putting most emphasis on projects ‘for people’. They are often the most important and have fewer opportunities to access ICT.

It is important to note that among these particular case studies aimed at community / home users, more than a half had more than one target group. Almost half of the projects are also dedicated to SMEs, Business, Agrifood and Private Sectors.

The success of these projects is mainly due to the following aspects:

- Support from regional /national authorities
- Responding to local communities and businesses
- Understanding the need to promote an information society

The most important target area for this group is eCommunities but it is important to notice that also other areas play a very important role (mainly eLearning and eSkills)

Community projects often address gaps that regional / national projects are unable to fill. EU regional policy focuses on economic development which, in turn, focuses domestic regional policy on economic development also. Regional authorities need match-funding to draw down ERDF funding with the consequence that domestic funding is unlikely to be focused on community projects with little economic output. The case of **DurhamNet** in the North East of England[11] is illustrative. There, the Regional Development Agency had a strong drive to connect businesses to broadband in order to develop the local economy. Connections to businesses were funded but DurhamNet did not have the funding to connect individual households and provide them with support. This gap was filled by area-based community projects which took broadband connections from DurhamNet and distributed them to local households. They took on the "last mile" and filled the gap left by the regional project. The community projects were funded by social enterprise development projects, charitable trusts and local councils.

Projects like **Cybermoor** managed to get local government to intervene in ICT projects by demonstrating that they could find external funding from central government and charities. There, local government saw that its money would go much further with a social enterprise which could attract funding from a variety of sources.

Pressure from businesses on local politicians also helped to focus the minds of local authorities on broadband issues in rural areas. Businesses which could not access broadband lobbied local authorities such as **Katrineholm** in Sweden. Officers were warned that businesses would leave the area. As a consequence, the local municipality developed a project to provide broadband. In this way, economic pressure, with its real threat of job losses, can help constructively to engage rural politicians.

At higher governing levels, Regional and National Agencies are interested in high impact "transformational" projects, such as reforming public services to make them geared more to the way people live their lives and less based on traditional departmental boundaries, using ICT to do so. ICT has been shown to increase GVA (gross value added). In the North West of England, the Regional Development Agency recognised that optimised ICT use by businesses drive significant growth. Its ICT strategy was an important element of its Regional Economic Strategy. Optimising use of ICT includes provision of broadband, support to end users and training.

7.2 SME/Business/Agrifood/Private Sector

These organisations benefit from eCommerce projects, supply chain systems and training.

This target group is the most important with 42 of the 67 projects (63%). Among these, one third were assigned to Communities / Home target group, and about one quarter to the Public Sector /Government Agencies/Schools.

[11] http://ec.europa.eu/information_society/istevent/broadband_gap_2007/cf/exhib-detail.cfm?id=1164

Why does the private sector get involved?

Knowledge based businesses such as **Dipsticks Research** and International **Dry Bulk Terminals** could not carry out their business without a good ICT infrastructure. Without broadband, they would have to relocate their business and potentially lose staff as they commute to an urban area which does have connectivity.

The importance of ICT can act as a catalyst for small businesses to work together (such as **Cahersiveen**, **Ammarnäs** and **Les plus beaux villages de Wallonie**). The threat of increased competition from businesses using ICT can also act as a motivator – the **Ballyhoura** project developed skills for farmers. Without these skills they would not have been able to process their farming records as effectively.

Types of Private Sector Involvement

There are 3 key ways that the private sector can be involved in a project:

i) as initiators (coordinators) / partners in projects
ii) as suppliers (subcontractors) to projects
iii) as beneficiaries of a project

The private sector supplies expertise, such as membership of steering groups, and is in some ways the easiest way to obtain involvement. **eTowns** in Ireland is an example. Advice from small businesses helped the project to tailor its training more towards skills gaps in the local economy.

As suppliers of services to rural ICT projects, the sector works with public sector or community partners to deliver training, technology, websites according to the brief set out. 'Your Communications' played this role in **Project Access**.

As beneficiaries, SMEs generally receive support to access a service such as broadband (**Cumberland Hotel**) when they would not normally be able to afford it. This also covers websites (**Organic Denmark** and **Les plus beaux villages de Wallonie**) and training (**Information Village**).

The key success factors, that determines achieving the goals set, are:

- Support from regional /national authorities
- Understanding and reacting to new business opportunities created by ICT
- Involving local businesses and organizations

For projects from this subgroup, all success factors played their role, but the above were identified in most cases.

The most important target area, both for primary and secondary sectors of ICT applications is Agrifood sector, SMEs and eBusiness practices. Also tourism plays an important role.

7.3 Public Sector/Government Agencies/Schools

Public sector projects typically have been used for training and broadband networks linking public sector offices and schools.

One third of all projects taken into consideration in this study were assigned to this group and concentrated on public sector (20 projects, or 30%).

Their success was found to be due to the following factors:

- Support from regional /national authorities – this is a crucial factor for this group, which results from the correlation between the target group and governments
- Financial support from EU
- Responding to local communities and businesses

7.4 Summary

The target areas were mainly connected with eCommunities and eLearning/ eSkills (25%). Agrifood sector and SMEs ICT and eBusiness practices were also important but mainly in secondary sector of applications.

The number of users is small for projects targeting the SME/Business/Agrifood/Private Sector. This number grows significantly for projects which are focused on communities, public sector and schools due to their targeting of bigger populations than those of business projects.

Correlation between the numbers of users and numbers of jobs (created and maintained) with target groups varies a lot. However, large projects targeting thousands of people made a bigger impact than some of the smaller targeted projects.

There is no specific correlation between the target groups and numbers of jobs. The number of jobs is more dependent on the size and duration of projects. Large projects which were well supported ran over long periods, creating more confidence and building more links with stakeholders. In contrast smaller projects found it harder to make a similar impact as they found it difficult to establish themselves.

8. Projects defined by target group

The research did not cover specific target groups, although some groups did benefit and were explicitly mentioned in project aims. However, we cannot offer any statistical analysis from this and can only rely on case study summarised evidence. The majority of community projects focused on ‘all’ local beneficiaries. The flexibility afforded by a PC and broadband connection meant that projects providing these services chose not to exclude any uses for their projects. Website projects, by comparison, tended to target groups as they aimed to create online communities of interest (**eFarmer**).

ICT competence in **Ballyhoura County** (Ireland) partly focused on women. The key success factors here were support from the EU and spreading the information society. This was

similar for the Bulgarian **i-Centres** project which focused on skills development and benefited women learners.

More projects focused on SMEs and business support as that complemented economic development objectives. The key success factor here was the understanding of the new business opportunities raised by ICT.

eCommunities projects tended to focus on wider groups of citizens (elderly people and young people). The major success factor here was developing an understanding of the need to promote an information society. Good examples are the Korea **Information Village Programme** and **Ikonk@**.

So what can we conclude? It is both unsafe and unsatisfactory to believe that there is no discrimination in the targeting of projects. It is safer to conclude that successful projects are successful because they target groups who want to participate. This is the same line of reasoning that began with Estonia's **Look@World** and was subsequently refined as a marketing problem with its central issue of 'positioning'. In the context of ICT in rural areas, positioning is an essential exercise if the desire to take up ICT is to be inspired by factors affecting target group sensitivities. Take-up is unlikely to follow a project which does not define the group at the centre of its concentration. In this respect, 'community' is an inadequate definition and may mask incomplete concentration. 'Community' tends to import the expectations of those who are not the target group. Only cautious differentiation of the factors which bring that target group together will lay the foundations of a successful bottom-up approach. Similarly, 'stakeholders' is best reserved for general description unless those identified as 'stakeholders' are told what their stake consists of and, most importantly, how they can use it. Without more, 'stakeholding' will tend to rest upon inappropriate assumptions which could act as barriers to ICT take-up.

9. Common problems

9.1 State Aid

Public funding for broadband projects can conflict with EC State Aid rules. Nevertheless, 20 of the broadband projects (30%) were successfully funded. Key issues to bear in mind are:

- The transparency of the procurement process
- Current level of competition – how many alternative suppliers are available?
- Justification and focus of the project's objectives on social and economic cohesion
- Positive effect on welfare and competition

What is a State Aid?

State aid is funding from any level of Government or a public body, including Regional Development Agencies and Regional Aggregation Bodies, which meets all four of the following tests[12]:

- by with or from state resources
- favouring a particular undertaking or the production of certain goods
- distorting or threatening to distort competition

[12] http://ec.europa.eu/comm/competition/state_aid/overview/index_en.cfm

- affecting intra-community trade.

Appingedam

In Appingedam, Netherlands, the local municipality aimed to lay a fibre optic network to provide fast data services to business and residents. They would own the network and provide a wholesale service to operators who would sell to residents. The local cable TV company objected to this as it directly affected their business.

The municipality argued that this was a Service of General Economic Interest[13] but the Commission decided that it would confer a specific advantage to certain operators and would have an effect on trade (distorting competition).

"Did this pursue a competition objective?" In the case of the Netherlands, which had a competitive broadband market with high take-up, the answer was a resounding "No." There was a feeling that existing networks could deliver the services which were anticipated for the fibre project.

Does this contribute towards cohesion?" The project was in a peripheral area of the Netherlands, but there were several providers and prices were comparable with the rest of the country.

Result - The project did not proceed.

9.2 Reasons for failure

This element of the study looks at common reasons for projects to fail. There are no named examples in this section.

Over estimating demand

It is easy to overestimate levels of demand for broadband and ICT services. Enthusiasts will tend to project their own feelings onto other potential service users. The rest of the target population will take more convincing and the decision making process tends to be slow. Customers may wait several months before signing up as they wait to see what experiences the early adopters have.

Underestimate Revenue Funding Required

Over ambitious income projections can lead to a cash flow problem as anticipated revenue does not appear. In cases where grant funding tapers off to reflect increasing income, the project can be left with a financial "black hole" which means staff cuts. In many cases it is naive to think that rural ICT projects will reach full sustainability – if the business case was there then mainstream businesses would make the investments in infrastructure and services.

[13] http://ec.europa.eu/dgs/competition/sgei.pdf

Over selling the service

Over selling the benefits of technology solutions to users inevitably leads to disappointment when the project launches and not all of the features promised are available. A far better approach is to offer the bare minimum and provide users with a better than expected service. This include over selling a technology that is not mature enough for deployment.

Failure to focus on the end user

Many projects funded by public money focus on 2 sets of stakeholders – funders and users of the service they provide. In many cases the main objective of the project is to safeguard the funding and the secondary objective is to support the user. This has implications for the long term sustainability of a project when the funding ends.

9.3 Lessons Learned from the Case Studies

This section outlines some of the lessons already learned from assembling the database of case studies.

The case studies which try to solve the problem of broadband access in rural areas seem to fall into the following categories:

1. Community driven projects, using off-the-shelf wireless technology are categorised by high take-up. The community is involved in the implementation and marketing and this fills gaps where there is no supply from a commercial broadband provider (**Watzelsdorf**, **Cybermoor**).
2. Projects driven by the public sector for economic development purposes or connecting public buildings tend to use more expensive equipment, sometimes laying fibre and provide a more resilient service (**Lenowisco, RAIN, Katrineholm**). They have sometimes been hampered by state aid regulations.
3. Projects where the incumbent telecommunications operator is subsidised to upgrade telephone exchanges to provide broadband. This service is sometimes commissioned by regional authorities and local partnerships and again is difficult to manage with state aid (**Project Access**).
4. Local ICT centres – based in libraries and post offices which provide basic broadband Internet access (**Rude project**). Some have provided a more holistic approach by developing village web pages (**I-Centres**) and eCommerce (**Korea Information Village Programme**).

The case studies which try to solve the problem of ICT take-up in rural areas appear to fall into the following categories:

1. The biggest advances occur when the services and interaction made possible by ICT move people to start using the Internet for business to business services (**NetBrokers** and **Organic Denmark**). Likewise, tourism projects which promote services to consumers via websites encourage the take-up of ICT (**Dolina Czarnej, Fjällhästen,Ammarnäs, Cumberland Hotel, Hotel Martinské Hole, Les plus beaux villages de Wallonie**).

2. Exceptions to this are regulations which force farmers to use ICT - "you *will* do it this way" – when farmers are brought to the computer to log animal movements. Some projects have engaged farmers to make this process easier (**Ballyhoura, eFarmer**). Farmers get frustrated by poor Internet connections as they fill out complex on-line forms and this creates pressure on them to adopt broadband (**Cybermoor**).
3. The entrepreneurial spirit is one very determined 'driver' behind the take-up and development of ICT in rural areas (such as **eTeams**). Technology champions are important, but wide representation in the community is essential to make the project sustainable (e.g. **Nuenen** with its cooperative ownership).
4. The availability of public funds and public expertise encourages take-up and development of ICT in rural areas. Partnerships have come up with some good quality projects (**Limousin Regional Network, Allconet, Katrineholm**). While part of this support is financial, it can also be mentoring and support for local champions (**I-Centres**).
5. Integration of public sector projects can catalyse broadband take up by getting a number of organisations to aggregate their demand and work together. This is often driven by personal relationships between key stakeholders. (**RAIN, Project Access**).
6. Several projects demonstrate the ability for knowledge based businesses to provide employment by relocating to rural areas which have broadband access (**eTeams, Dipsticks Research**)

10. Conclusions

This closing chapter of the Guide addresses the question of transferability and includes recommendations on the appropriate role that ICT policies can play in rural development strategies and programs.

10.1 Transferability

Nearly all of the case studies could be transferred to other EU countries in one form or another.

Key opportunities – Access to ICT, Content & Services, Capacity

- The ADSL enablement schemes such as **Project Access** and **ACT Now** in Cornwall[14] can be replicated in other Member States without contravening state aid rules.
- The cost of delivering broadband is falling as equipment becomes cheaper.
- eProcurement or the fast-tracking of rural ICT infrastructure projects could facilitate the roll-out of broadband.
- Local Authorities could facilitate the roll-out of broadband by laying ducts and then renting them to operators on an open and non-discriminatory basis and imposing open access obligations, and promoting indoor pre-cabling for all new buildings in their region.
- Targeting groups who want to achieve a particular outcome can inspire ICT take-up. Conversely, telling them to take up ICT is unlikely to work.
- Web-based systematic guidance, with the assistance of LEADER, could expose community groups to the benefits of ICT while they learn about the impacts, experiences and further effects of preceding projects. Similarly, web-based guidance would bring consistency, clarification and consistency to complicated information.
- One practitioner said that "Technology only makes up 10% of the project". Transferring knowledge about new ways of working and how to influence politicians to support a project are often more difficult and can only be learned from other projects.
- Visits to successful projects in other Member States can raise awareness of services and applications available. Discussing issues face-to-face, identifying problems and benefits can improve the likelihood that a project will be transferred successfully. The **Cybermoor** project team visited the Ennis Information Town in Ireland before implementing their project. Apart from the valuable lessons learnt, the visit enthused several local stakeholders to develop and progress their own project.
- Events such as the recent "Bridging the Broadband Gap" conference in Brussels[15] raise awareness and allow networking on best practice between projects. There is added value in bringing together projects which focus on access (such as **Dorsal**).

[14] http://www.actnowcornwall.co.uk/home.asp

[15] See http://ec.europa.eu/information_society/events/broadband_gap_2007/index_en.htm

Barriers

- Tiers of government and their respective responsibilities vary enormously from State to State. An e-Health project which works well in Italy may not transfer easily to England as the NHS does not commission many services at a local level.
- Where the public sector works closely in partnership with the private sector, intellectual property rights can prevent the sharing of best practice through confidentiality agreements.
- Importing inappropriate assumptions – either by imprecise terminology or by failure to put the target group at the centre of concentration.

10.2 Measuring the impact of ICT Policies

The effectiveness of take up can only be successfully measured if a set of key performance indicators are selected and required for all EU funded rural ICT projects.

Suggestions for these indicators include percentage of households which use ICT for:

- the Internet (websites, email, chat, etc.)
- typing, word processing, spreadsheets, presentations, etc.
- design, digital photography, video, audio

Percentage of businesses which use ICT for:

- research and competitive analysis
- word processing
- accounts
- email
- management and planning
- marketing and customer management
- e-business (buying and selling online)
- special business applications
- teleworking (e.g. working at home, when travelling)

Baseline figures could be obtained at the outset of the project, with a follow up survey after the project's end. Additional impacts such as jobs created could also be included and an index of these statistics could be recorded for each Member State, so projects could measure, for example, success against national or regional averages.

10.3 Recommendations on Role of ICT Policies

Depending on the definition of what a rural area is, it can be stated that over 60 % of the population in the EU27 Member States live in rural areas which cover 90 % of the territory.[16] New technologies and infrastructures for advanced **communications are being introduced in towns, cities, and industrial areas and in certain more fortunate** rural areas. All rural areas need comparable information technology, telecommunications and broadcasting infrastructures to urban centres if they are to compete for jobs and develop a more balanced economic activity with diversity of employment.

[16] EU Rural Development Policy 2007-2013, http://ec.europa.eu/agriculture/rurdev/index_en.htm

The real danger is that rural areas will increasingly lag behind urban areas. If corrective steps are not taken, enabling ICT systems will tend to concentrate in cities and core regions and opportunities for rural revitalisation through the use of these technologies will continue at a slow pace.

Broadband deployment reduces the isolation of rural areas. Use of ICT applications facilitates communication and the economic constraints associated with geographical isolation can become less significant. The cycle of economic decline in many rural areas can be broken. Opportunities for diversification of employment can revitalise economic activity and lead to more stable and balanced communities, more demand for and better health services, education facilities, social services and more varied cultural activities.

ICT take-up and use will impact on all aspects of rural life, whether in farming, food processing, tourism, the delivery of "quality of life" services, tourism. local government etc. Not all of these impacts will be of benefit to rural areas, nevertheless the opportunities outweigh the threats. This is a core challenge for rural areas: how to recognise, manage and optimise the power of broadband ICT to drive change for the betterment of Europe's rural areas.

From analysis of the 67 case studies, it is recommended that Rural ICT policies should focus on four distinct areas:

- Policy aspects
- Strategic actions
- Standalone initiatives
- Further research & Innovation

These need to balance top-down and bottom-up approaches, and the following specific Rural ICT actions are recommended:

1. **Define an eRural Strategy as an integral part of Sustainable Rural Development Policy across Europe**
   - Allocate public funding where there is “market failure”
   - Focus on building capacity, even though this often produces “softer” outputs
   - Implement an eProcurement process to fast-track rural ICT projects
   - Place systematic guidance, in line with the recommendations in Part II, on the Internet, to be accessed by aspiring community groups with the guidance of LEADER

2. **Stimulate business and technical competition in the European Rural Broadband Market**
   - Every user should have a choice of 2 or more broadband access options
   - Stimulate Public Sector Demand aggregation in rural and remote areas

3. **Develop sustainable connected rural eCommunities to stimulate demand and broadband take up**
    - Enhance Regional Leadership and Local Champions to ensure that "bottom up" projects can flourish.
    - Promote and support Awareness ("know what") and Training ("know how")

4. **Provide services and content that rural users want.**
    - Local content
    - Entertainment
    - As well as eBusiness, eLearning, eHealth, eGovernment

Part II:

Review of existing policies and literature

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1. Structure and Evolution of Rural Demand for ICT

1.1 Introduction

Rural areas have a relatively low residential density where people live in many small and dispersed settlements. Among the problems arising from their situation is the lack of high-speed Internet access and consequent development of an Information Society[17]. The First Annual Report on the European Information Society (i2010)[18] elaborates that concern and articulates the European Commission's resolve to support Information & Communication Technologies (ICT) and to target high-speed Internet access. Access and ICT together influence the use of Internet and stimulate the development of new and advanced on-line services (e.g. sending voice over the internet or video conferencing). They are also a key factor in the development of eCommerce.

The significance of high-speed access to rural development is identified in the Prague Declaration[19], adopted by the European conference "Information Systems in Agriculture and Forestry" (Prague, May 2006). In the related Riga Declaration[20], Member States agreed to significantly reduce regional disparities in Internet access. The commitment is to increase broadband to at least 90% of the population by 2010. In January 2006, DSL reached 87% of EU25 population[21] - although rural coverage still lagged behind at 65.9%. Furthermore, rural areas enjoyed lower download speeds than urban areas. Rural citizens also had fewer Internet operators and options to choose from.[22] For example in some areas only DSL was available.

[17] See for example the European Federation for Information Technologies in Agriculture, Food and the Environment, EFITA, www.efita.net

[18] European Commission, 2007a, i2010 - Annual Information Society Report 2007, COM(2007)146, European Commission, Brussels, available at http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=CELEX:52007DC0146:EN:NOT

[19] Prague Declaration, from the European Conference Information System in Agriculture and Forestry in Praha, on the 15th - 17th May, 2006, www.praguedeclaration.eu

[20] European Commission 2006h, ICT Riga, the first ICT for an Inclusive Society Conference, 11-13 June 2006, Riga, Latvia, http://ec.europa.eu/information_society/events/ict_riga_2006/doc/declaration_riga.pdf

[21] Coverage measurements do not include those consumers that cannot benefit from DSL access because of the long distance between their residence and the switch.

[22] European Commission, 2007a, i2010 - Annual Information Society Report 2007, COM(2007)146, Commission Staff Working Document - i2010 Annual Information Society Report 2007, Volume 3, European Commission, Brussels, available at http://ec.europa.eu/information_society/eeurope/i2010/docs/annual_report/2007/sec_2007_395_en_documentdetravail3_p.pdf

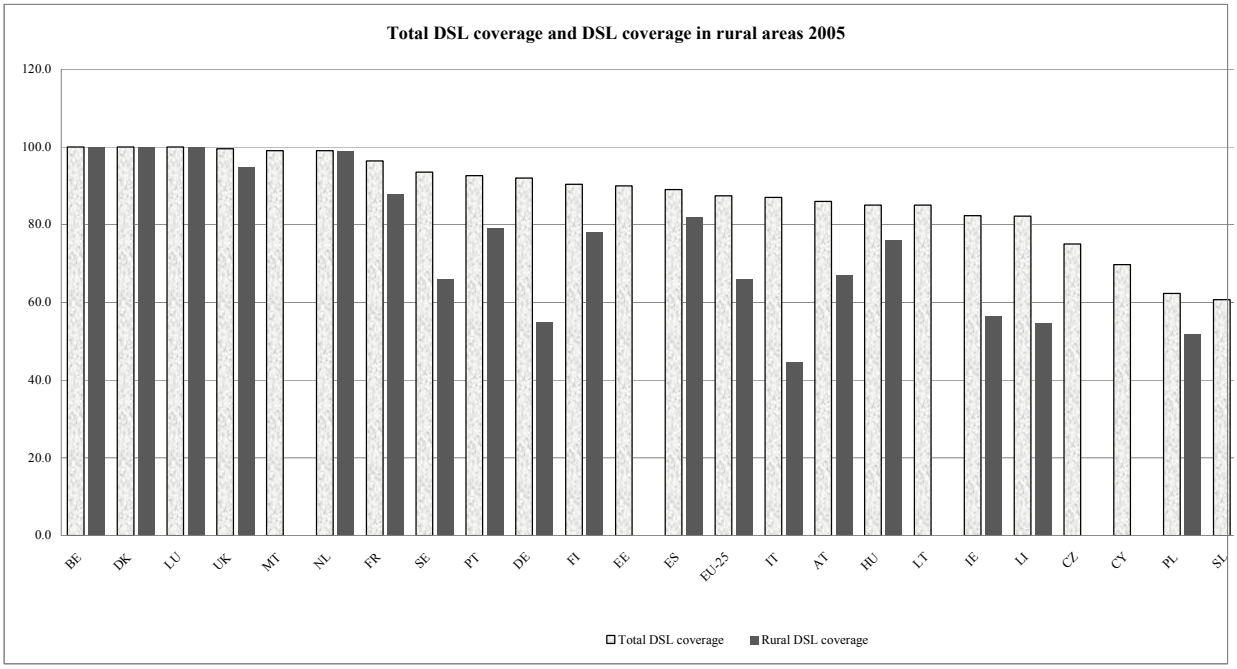

Figure 1 Total DSL coverage and DSL coverage in rural areas 2005[23]

Source: European Commission, 2007a
Note: Data for some MSs is not available

In countries with the highest broadband penetration level, therefore, already 90-100% of the population have access reaching the Riga target levels. In countries where the penetration level is lower, however, the picture is more diverse, with some of them enjoying a coverage of around 80%. In the less developed countries, penetration falls to 60-70%[24]. It should be noted, too, that coverage measurements do not include those consumers who cannot benefit from DSL access because of the physical distances to their homes. Due to this it has to be assumed that the access situation is less favourable still for rural populations.

DSL coverage varies between 100% in countries like Belgium, Denmark, Luxemburg, Malta, the Netherlands and UK. In Greece, it is 12%. Some new Member States have not presented any figures[25] either because no statistical data is available or because the figures are zero.

[23] In Figures 1 to 3 the following definitions are used:

- Total DSL coverage: the percentage of the total population depending on a Local Exchange equipped with a DSLAM (Digital Subscriber Line Access Multiplexer).
- DSL coverage in rural areas: in those areas with a population density lower than 100 inhabitants/km², and with access to a DSLAM-equipped Exchange.
- Broadband penetration: the total number of broadband subscriptions on 1 October 2006 divided by the number of inhabitants. All subscriptions are counted (except 3G subscriptions, explained below) whether to households, enterprises or public sector agencies.
- Number of 3G subscribers per 100 inhabitants.

[24] European Commission, 2006f, i2010 - First Annual Report on the European Information Society, COM(2006)215, European Commission, Brussels, available at http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=CELEX:52006DC0215:EN:NOT

[25] European Commission, 2007a, i2010 - Annual Information Society Report 2007, COM(2007)146, Commission Staff Working Document - i2010 Annual Information Society Report 2007, Volume 3, European

Good coverage is mostly achieved in countries with high population density, which is a geographical prerequisite for developing the infrastructure for DSL. Coverage in rural areas is lower in all countries except Belgium, Denmark, Luxembourg and the Netherlands. In large isolated rural areas – as found in Sweden and Finland, for example – coverage is also lower. It can be noted also that even in countries where DSL coverage is high, rural areas lag considerably behind the average levels, respectively urban areas (e.g. Italy, Ireland, etc.)

DSL is only one way of providing access however. It follows that such DSL figures are only representative, not comprehensive. Some countries, like the Czech Republic and Sweden, have invested in other technological solutions (in mobile telephony and in 'dark fibre', respectively). The total broadband penetration figures below show how other technological solutions have extended the levels achieved by DSL alone.

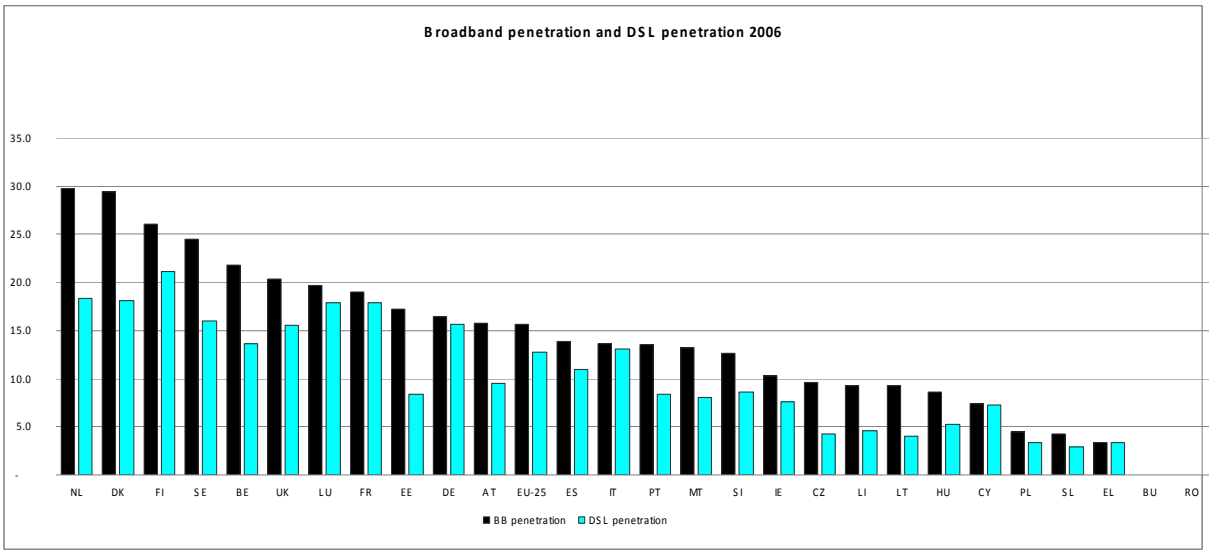

Figure 2 Broadband and DSL penetration 2006

Source: European Commission, 2007a
Note: Data for some MSs is not available.

We do still identify 3G as having a potentially major impact upon rural connectivity wherever mobile communication is widespread and popularly used. As prices drop, this impact will be realised. However, which additional technologies are extending broadband penetration, and where, is not perfectly clear. In some rural areas, 3G is a preferred alternative to DSL and other solutions. Only in Denmark and Italy, however, has 3G take-up been substantial. And yet these figures are almost three years old and much has happened since. We are confident, from patterns of known deployment, that take-up of such technology will still come first in cities and last in rural areas. In some rural areas, the necessary 3G-masts have not even been built yet in some cases due to appeals to court in building process.

Commission, Brussels, available at http://ec.europa.eu/information_society/eeurope/i2010/docs/annual_report/2007/sec_2007_395_en_documentdetravail3_p.pdf

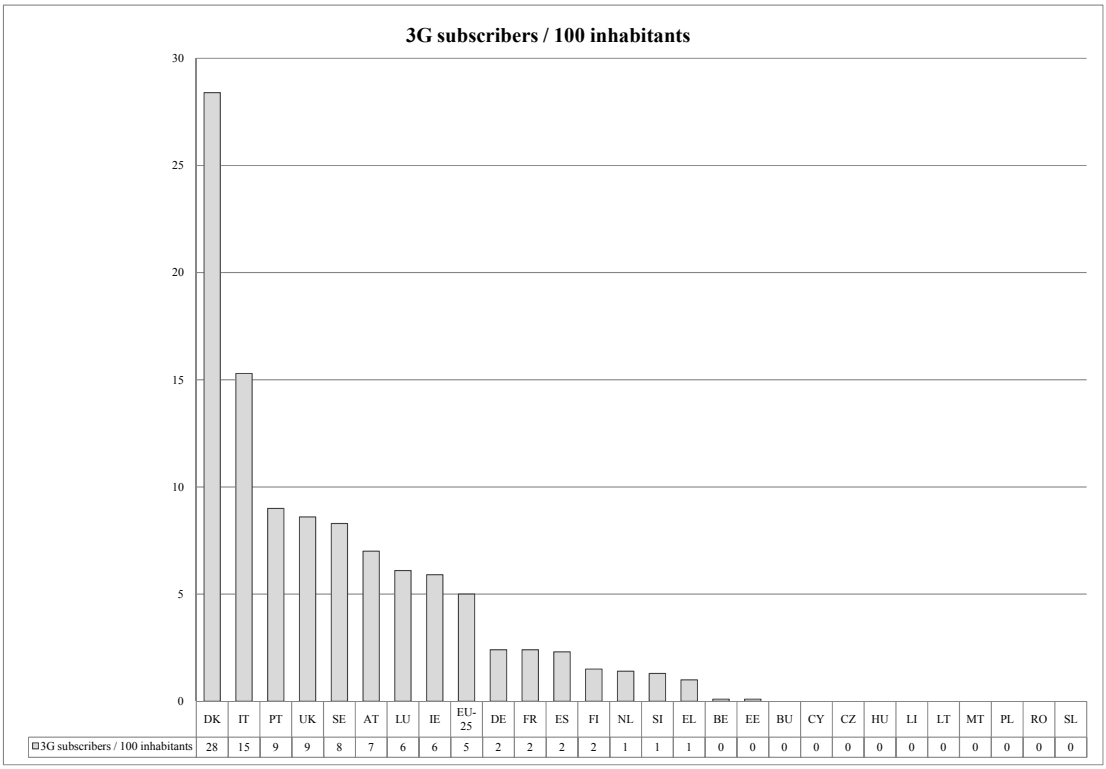

Figure 3 3G subscribers / 100 inhabitants January 2006

Source: European Commission, 2007a
Note: Data for some MSs is not available.

In Skerratt's view (2005 and 2007), an *urban-rural* digital divide persists primarily in terms of limited and/or expensive access to high-speed broadband (rather than low-speed 'broadband'); ability and confidence in using computer-based applications and the internet itself, and associated training provision; and variance in the relevance of content to rural settings.

We contend additionally that *intra-rural* digital divides continue to exist, and in some instances are being exacerbated by default, due to the ubiquity of internet-based provision in many areas of working, social and personal life. Funding arrangements, in turn, have some influence on the longevity of such ICT provision.

It has been argued (e.g. Skerratt, 2007) that elements, which relate to the socio-cultural processes and siting of shared ICT facilities within rural communities, are a key component of any analysis of rural digital divides.

1.2 Roll-out (coverage) versus Take-up

Five billion people, the absolute majority of the world's population, do not have access to broadband connections and the Internet. Compared to deployment in most 3rd countries the situation in Europe is much better but still needs improvement. Data on roll-out and take-up is sparse. We estimate that in Scandinavian countries, where the European citizens who suffer least from lack of access, roll-out (coverage) has reached 85-90%. This means that 10-15% of the population is left behind without any reliable broadband connections.[26] No usable data is available on coverage but it seems that in many rural areas not even mobile coverage (2.5 and 3rd generation) is available (the **Dolina Czarnej** case study project in Poland describes a typical situation). For people living in the "not covered areas", trials are now being conducted for testing different solutions from those available in the "most" populated areas.[27]

The benchmarking analysis provided by IDATE[28] in 2006 supported two important conclusions.

1. First, between 2004 and 2006, the roll-out of broadband grew rapidly but irregularly in all EU countries. Growth was mainly in DSL technologies with coverage driven mainly by market forces. However, other technologies were also developed. It is important to note that, in some countries, DSL technologies now cover 100 % of citizens. The rapid growth in the last three or four years could demonstrate the fact that operators are starting to provide wide scale coverage across all areas: this dynamism will lead to an improving situation. Conversely, it needs to be understood that the coverage does not extend uniformly to 100% of all citizens and that part of the population is still excluded from services. There is no representative comparison with those technologies which could increase coverage in the outpost of the union where NMT technology was used before that system was closed down[29]. It is also necessary to take into account, that the IDATE benchmarking study does not include connections such as CDMA, which some countries treat as 'broadband technology'. Any attempt to pin down ICT roll-out and ICT take-up, therefore, must take into consideration diverse states-of-the-art and the ability of each to guarantee basic access by citizens and businesses to a low but common level of ICT services.
2. Second, in terms of the 'divide' itself, take-up grows much faster in urban areas then in rural areas. This means that the gap between take-up in rural areas and urban areas is actually increasing despite the fact, that rural take-up is growing. There are two possible explanations for this: (i) the faster growth in urban take-up may follow a delay after the

[26] Deploying broadband to the last 10-15 % of the population, scattered in the county is a difficult business. The Katrineholm case shows that deploying broadband to the 85% of the population was feasible (economic) but the WiMAX solution for the last 15 % is delayed and not in use one year after actual start date. The strategy for the last 15% of the population has both financial and technological problems.

[27] This conclusion can be drawn from ICT Strategy Plans produced by the most northern municipalities in Sweden and from the deployment plans in the northern counties in Sweden (the Norrbotten and Västerbotten counties). The ICT Strategy Plans are being produced by the municipalities in northern Sweden before they got access to governmental and EC (structural funds) funding for their broadband deployment http://www.itvasterbotten.org/map_default.asp, http://www.itnorrbotten.se/Information_presentationer.aspx?menuID=196

[28] "Benchmarking Broadband Europe", European Commission, May 2007 http://ec.europa.eu/information_society/events/broadband_gap_2007/index_en.htm .

[29] Mainly New Member States, where fixed wireless and mobile technologies play very important roles.

roll-out of technologies (analysis of user cases suggests that the availability of applications has not been the limiting factor); or (ii) there exist other factors, such as age of population or education, which are limitations upon a better utilisation of technology.[30]

The mere existence of a gap between ICT roll-out and take-up fuels the need for European citizens to have access to broadband. It is clear that strong support for the take-up of broadband is necessary to be provided. Both processes are interlinked. Without good infrastructure most applications cannot be demanded. The effective use of e-mail today, using yesterday's dial-up connection, is one such example. Normally, the demand for applications pushes the demand for broadband infrastructure. Similarly, in the absence of relevant applications, ICT infrastructure looks like an empty box.

Roll-out may continuously grow but there still exist regions in Europe where the costs for providing coverage are substantial. High density of population and an advantageous dispersal of population are prerequisites that can ensure the cut in these costs and the realisation of economies of scale delivered via a wide coverage.

In areas with no permanent population, no figures are available for coverage. Such areas can be found, for example, in northern Scandinavia, in isolated communities located in the Slovenian and Romanian mountains, in the Massif Central of France, the Asturias or Galician regions of Spain. Such areas have a distinguishable problem originating from their remoteness: the technologies in common use are simply out of their reach (see, for example, the case of the **Isolated Community of Faeroe Island**). This is also evident in nature reservation areas at high latitudes. There, environmental considerations rule out the erection of the 3G-masts needed for conventional mobile telephony. As a result, satellite coverage is inadequate or economically unfeasible.

Notwithstanding their distinguishable difficulties, a range of activities of strategic, economic and social value takes place in such areas. Although settlements are relatively small, the number of people visiting or working there is known to be considerable. However, there are no reliable maps of ICT coverage in such areas, just as there are no reliable estimates of the number of people living and/or visiting them. In northern Sweden some promising trials have been made on Delayed Tolerant Network technology in that type of area.[31] Results are promising but it is yet too early to draw conclusions on its future operational deployment as more research is needed.

It may seem convenient to attribute lack of access to regional circumstances or economic difficulties. It is inescapable, however, that the lack of access is a reflection of the inability of current technical systems to offer adequate explanation and competitive solutions for a large majority of usage scenarios. This is not just an European problem although its impact is keenly felt in Europe. Progress in the EU most remote rural areas is severely impeded by the exclusion from the advantages created by the Information Society. The EC target for i2010 sheds some light on the issue. The provision of broadband and appropriate applications will give access to advanced public services and richer multimedia content for entertainment, training and work. With broadband connections, new forms of business innovation can

[30] Some statistics compare the number of connections with the number of citizens. But this may be unreliable because, usually, one line is frequently shared by more than one subscriber (for example, a family. From the numbers mentioned in the IDATE benchmarking process, it is unclear what methods were used.

[31] The trials run by the Sámi Network Connectivity Project was funded by the EUs Structural funds and the Swedish Governmental Agency for Innovation Systems and are documented in on http://www.snc.sapmi.net/

transform the lives of individuals, increase social inclusion and contribute to economic growth in remote rural areas. Broadband is also a necessity for getting access to health service in those areas. Without broadband, however, life in 'non-covered areas' becomes pegged at a level of development far below that elsewhere in European society. This is unacceptable for the exclusion it entails and the inconsistencies it enforces.

The plight of the Sámi people is a case that can be used to illustrate this (see the **Ammarnäs** case study and **Sámi Network Connectivity Project** in Sweden).[32] Sámis live in four EU countries and reindeer herding is considered a fundamental part of their culture, though no longer a main economic activity. There is no coverage of broadband and telecommunication in areas where Sámi people herd their reindeer. This is always the case in the summer months (and partly applies during the rest of the year as well). Broadband and other ICT communication is a necessity, however, if this population is not going to be excluded from the benefits of the Information Society. In addition to Internet, the most urgent need among the Sámi population is for ICT solutions like e-mail and web cache. The children are, particularly, the most affected group. In addition, no access is provided to applications such as systems for Cattle and Animal Tracking, eLearning and eHealth, which negatively impacts upon the Sámi populations across all four countries.

This is just one example of the impact caused by the lack of total broadband coverage. Indirectly, it has consequences for the European tourism industry, forest sector and transports.

A better work environment for outdoor-based personnel is one foreseen impact of rolling-out better coverage. There is a wide range of SMEs and micro enterprises, based in rural areas that are relying on outdoor activity. Their economic development depends to great extent on the (improved) access to affordable communications. Moreover, fast and reliable communication on local developments caused by different impacts such as climate change turn into a priority.

The database of case studies, in this examination of roll-out/take-up in rural areas has three useful back-bearings. These are the IDATE studies and the analyses of broadband development and best practices in the periods 2002-2003 (Rural Wins[33]) and 2005-2006 (A-BARD). However, these all worked more with regional analyses and pilot studies than with statistics. They compared situations in selected regions. Consequently, their conclusions were more qualitative than quantitative. Statistical analysis is difficult because available European data is not easily comparable. In many cases, returns and quantified assessments are missing. There also existed many free net activities in the New Member States (EU10) which were incompletely analysed. Lack of comparative broadband data in the development of a business model was found to be one of the main obstacles in the Rural Wins study. At that time (between 2002 and 2003) there was no data available on broadband connections for EU15 and EU10 that could differentiate between urban and rural communities. The data that has been developed reflected examples of remote rural areas that had built broadband networks (optic

[32] The Sámis are popularly described as 'one people in four countries' (Sweden, Norway, Finland and Russia). They live in the Nordic countries and the Kola Peninsula of Russia. It is estimated that the total number of Sámi is between 50,000 to 75,000. Of these, 15, 000 to 20,000 live in Sweden, 30,000 to 50,000 in Norway, 4,000 to 5,000 in Finland and around 2,000 in Russia. About 10% of the Sámi in Sweden make a living by reindeer herding (approximately 4,700 persons). According to Swedish law, reindeer herding can only be carried out by Sámi. Information about Sámi people from Sametinget (Sámi Parliament), http://www.eng.samer.se/servlet/GetDoc?meta_id=1002

[33] ROADMAP for Broadband Solutions for Rural areas (RuralWins), www.ruralwins.org

fibre and ADSL) with high coverage. Data for EU10 was completely missing. Consequently, the comparisons were only selective and incomplete. For example, the case of Sweden actually rested on the comparison between municipalities in two counties where different solutions had been implemented.

Problems of incomplete data are aggravated by different local conditions. If the preferred solutions in northern Europe were based on optic fibre and mixed solutions, southern Europe, in particular Spain, opted for a wireless one. In the Rural Wins study a trial is reported that used a satellite broadband service for rural farmers. This was developed by the Italian satellite company Tiscali and the Swedish Federation of Farmers. The trial and the business models in use received much good publicity at the time. However, the trial has since then been closed down and the Italian satellite provider is no longer trading, possibly due to lack of demand. One reson behind the close down was that the price to the final consumer (mostly farmers) was too high. In addition, the service did not allow for gaming due to lags in connection. This made the service less attractive to families with children. Similar trials were also presented for Ireland.

At this time, in the Czech Republic only simple discrete cases based on local activities were highlighted. Usually these involved some combination of terrestrial wireless technologies as 'back haul', and WiFi for local connectivity. DSL technology in rural areas was simply not available during this period and the only option for Internet connectivity was dial up, or eventually ISDN technology. It is important to understand, however, that more than 99% of the Czech population was also covered by GPRS technology at the time. This was later partly replaced by CDMA and EDGE technologies. The effects of competition between suppliers made such technology more affordable so that almost everyone started to use them to achieve connection. In contrast, ICT access in the EU10 was much more market-driven than cost-driven, as generally copper lines were not available which made the investment situation go from zero for both technologies. The telephone lines had not been laid in rural areas so now investors could go immediately for 3G. Such differences also affect comparisons between EU15 and EU10[34].

In an effort to overcome these analytical problems, A-BARD tried to link the broadband coverage to settlement patterns using the ESPON[35] and Digital Divide Forum Report[36] models. When their case studies were made (2005 - 2006) great emphasis and hopes were laid on WiMAX solutions. In Sweden, for example, WiMAX was thought to be capable of reaching the 10-15% of population which have been left aside in rural areas. If broadband could not be delivered to them using known wireless technology, what had been seen as a problem of technology and finance became vastly more complex.

The conclusion was actually inconclusive. If left to market forces, the roll-out of broadband communications to isolated rural areas with low population densities would lag behind that of more central and densely populated regions. It had to be noted too, however, that few

[34] This suggests that rather then just mapping DSL lines, a composite indicator that factors in the availability (and possibly the relative pricing) of existing telecommunications infrastructure technologies is required to better indicate the potential broadband take-up in rural areas.

[35] The European Spatial Planning Observation Network (ESPON), www.espon.eu

[36] "Digital Divide Forum Report: Broadband Access and Public Support in Under-Served Areas", http://eur-lex.europa.eu/Result.do?direct=yes&lang=en&where=GRP_CITATION:52006DC0129&whereihm=Rttsakter%20som%20det%20hnvisas%20till:52006DC0129

broadband providers in urban areas were as yet viable. In this context, it was not possible to conclude that market failure (to roll-out broadband) was purely a rural issue.

From the current and previous work, it is concluded that the options, issues and possible initiatives to be considered in the context of rural broadband delivery comprise:

(1) The predominance of DSL type services

DSL remains the main technology for delivery of broadband in rural areas. This will increasingly be used with wireless technologies (probably WiMAX as an infill to areas that are not covered. DSL exhibits particular problems such as trade-off between capacity and distance, and a high rate of unusable lines. This problem is not unique to rural areas. However, it is more acute in rural areas where perhaps 25% of lines may be affected due to their age and sharing of lines over long distances[37]. An alternative to DSL is needed in rural areas.

(2) Competitive supply

Irrespective of potential DSL delivery there is a need for a complementary or alternative broadband platform for all rural areas. This is already materialising in many parts of Europe especially in urban areas – for example, cable TV networks. Competition is necessary both to encourage speedy roll-out and competitive priced services. Delivery platforms should be in competition. Local incentives may be required to accelerate roll-out. Competitive backhaul facilities should also be available: lack of competition is resulting in high charges to backhaul to the Internet. These are distance-dependant, or based on minimum prices and quantities, which puts remote areas at a cost disadvantage as the costs have to be spread across fewer end-users than in areas with high population density.

(3) Wireless broadband

At this moment details on the possible cost of wireless infrastructure such as WiMAX remain sketchy. Typical costs of deploying this technology are unclear and it would appear that the economic case for providing this technology will be marginal for small local communities. Furthermore, local factors, such as opposition to wireless masts, will continue to be a major barrier to wireless deployment in rural areas.

Notwithstanding, there exist good examples of the use of wireless technologies – for example, the **Watzelsdorf Weinviertel** project in Austria, the **Kyrenia Mountains** in Cyprus, the **Baltic Rural Broadband Project** in Finland, the **Turku Archipelago Living Lab** also in Finland, the **Limousin Regional Network** in France, **Zielonka** in Poland, and **KZ@BZ-Spain** in the Basque Region.

[37] As estimated in A-BARD, www.a-bard.org

(4) Local community involvement

Rural broadband market development is complex and requires involvement of local actors and local competition (e.g., **Kuyavia & Pomerania,** Poland; **ALLCONET,** USA; **RAIN,** Lithuania). Establishing local, community or group broadband schemes is only one step in initiating local broadband provision.

More attention needs to be given to cross-collaboration within communities in the matter of broadband resources and facilities. For example, the local school or hospital *sharing* unused broadband capacity with the local community, *using* existing transmission masts and high buildings in public ownership, and *helping* with network maintenance could be a model for PPP (private public partnership) on micro level which could benefit all parties.

(5) Demand stimulation

In addition to competitive supply, demand needs to be stimulated. PC penetration appears to be a good indicator of local broadband demand. In this context, the stimulation of local ICT applications and uses will also make a difference.

Another important component of demand stimulation is the upgrade of e-skills through local educational courses and training on PC use. Training on broadband network development could also be necessary for some local communities. Additionally, many potential users of broadband need help in identifying appropriate applications and services.

(6) Applications and Services

From the perspective of broadband planning and market categorisation, it is unlikely that every local rural area will have the same requirements or that will need the same solutions. The objective of developing a typology as an aid to streamlining rural broadband planning may not be achievable or meaningful. On this basis, initiatives designed to support rural broadband roll-out may need to initially highlight options rather than propose bespoke solutions.

Meeting demand certainly calls for different solutions and often is better to run 'top down' projects. In places where high density of population exists private market forces provide effective solutions. The slow start for rural applications is thought to reflect something of a vicious circle: if there is no infrastructure, then there is no service.

It is not surprising, therefore, that the applications being mostly developed are those financed and demanded by the public sector (Content, eGovernment solutions, eLearning and improvements of service deliveries). Such services are being developed for whole populations but, if they could be delivered, they would benefit the rural community particularly.

Services for the Agrifood/SME/Business/Private Sector have exploded since the end of the 1990s in many countries. They are generally of two types. To the first group belong web portals for marketing of group activities. Typical examples of such services are displayed in the case studies in the area of marketing, regional tourism, products and organic food. The second group comprises web pages for marketing single enterprises, products or operational

techniques. Examples range from hotels to 'green' technologies. The recurring theme is marketing although some examples are found where sales and payments are made on line.

(7) Content and Entertainment

By 'content', we mean information. In 29 of our case-studies (43% of all), the aim was to provide information. The methods used included websites, portals and other devices, for example creating sales platforms for agricultural goods or developing databases. Services to rural communities are also conveyed as 'content' – a reproducible perspective which may serve to broaden a possibly limiting way of conveying the benefits of ICT.

Focusing on the development of appropriate content is central to driving demand and take-up of broadband in rural areas, as is evident in many of the best practice case studies.

- Understanding local requirement – the areas and issues underlying the content (for example, **Les Plus Belles Villages de Wallonie** in Belgium, and **DIADIGITE** in Cyprus)
- Using the local language (**CRISP** in Ireland)
- Establishing a mechanism to update content and to collect feedback (the **System for Managing Emergency Cars in Vysocina** , Czech Republic)
- Using alternative technologies to develop the content (**Prefarm**, the **System for Training on Sustainability Aspects in Vysocina, WIRELESSINFO Living Labs for Rural Development,** all three in the Czech Republic; **Watzelsdorf Weinviertel,** Austria and **Cahersiveen Satellite Broadband,** Ireland)
- Designing a convenient medium to deliver the content (**eFarmer,** Slovakia; **Elmpt,** Germany; **Rural Information System for GAL Platani Quisquina,** Italy)
- Developing a system to integrate diversified content or for bundling of content (**CRISP,** Ireland; **eFarmer,** Slovakia)
- Enhancing knowledge of operators at the field level so as to enable them to understand the value of content (**Technical Innovation in the Rotalde Irrigation Community,** Spain; the **System for Training on Sustainability Aspects in Vysocina,** Czech Republic; the **I-Centre,** Bulgaria; **DIADIGITE** in Cyprus)
- Focusing on providing a robust connectivity and infrastructure (the **Limousin Regional Network,** France; **Dipsticks Research,** Great Britain)

'Entertainment' may be a more familiar concept. But in a similar way to 'content', the development of new entertainment products and software will push the deployment of broadband in rural communities.

The effects of the new entertainment services and applications on life in rural communities are not yet fully analysed. However, with young people increasingly influencing investment in PC and other ICT solutions for the homes it is likely that having access to entertainment services (including online gaming) will dictate the type of broadband delivery to which families subscribe. As a purveyor of culture and entertainment, the broadband industry still needs to invest more in the production of (cultural) live performances on the Internet. We argue that doing so will open up new avenues for distribution. Without such investment and attention, however, the digital revolution could exacerbate the cultural divide sometimes associated with urban and rural areas. Motivation and motivating, then, are also important factors like demonstrated by the **SARAKIDE Exhibition of New Technologies** in Spain.

(8) eBusiness

In the Internet-driven global economy, market advantage lies with those who ensure that their businesses are more accessible than the one of their competitors. Some of the business services connected with broadband and Internet are relevant to agriculture: eCommerce, B2B (Business-to-Business), B2C (Business-to-Consumer), C2C (Consumer-to-Consumer) and CRM (Customer Relationship Management).

eCommerce consists primarily of the distributing, buying, selling, marketing, and servicing of products or services over Internet or extranet. Examples of eCommerce can be seen in the **Organic Denmark** project, **S'Atra Sardinia**, **eTeams** in Ireland and the **Martinus Bookshop** in Slovakia. In respect of agriculture, there are many companies around the world that sell goods or services through the Internet. This market and way of marketing are especially important for the sale of live and perishable products and equally for the growth in agri-tourism. There is much optimism about the potential success of eCommerce in agriculture. Common agribusiness B2B transactions – such as buying, selling, trading, delivering, and contracting – seem to be natural targets for conversion. The benefits would seem to include:

- the promotion of information flow, market transparency and price discovery,
- the facilitation of industry coordination,
- and the reduction or elimination of transaction costs.

Examples of such benefits can be seen in the **Prefarm** project in the Czech Republic, **NetBrokers** in Poland, and the **Introduction of ICT in the Milk Sheep Sector** in Spain.

This is reflected in the largest target group of case studies (43 projects, 64% of all) that fall under this option. The key success factors that were identified as factors supporting the achievement of the objectives were:

- Understanding and reacting to new business opportunities created by ICT– 53% of projects,
- Support from regional /national authorities – 48%
- Involving local businesses and organizations - 40%

The **Korean Information Village Programme** is an inspiring example.

The most important target area, both for primary and secondary application, comprises Agrifood and SMEs, and ICT and eBusiness practices.

(9) eHealth

eHealth type services are seen as important both in the context of rural healthcare delivery and in the justification for rural broadband. Normally people living in isolated rural areas or small rural villages do not have fast access to advanced medical assistance. The Commission has called on the private and public sectors to make a better use of ICT to improve healthcare and empower patients across Europe. The eHealth conclusions were:

1. There is an acceptance that "patient-centred care", care at home or within the community, is the approach that will be pursued in the future.

2. The topic/issue of rural eHealth (including eCare) in a European context is as yet poorly understood. There is a glaring lack of knowledge of developments, of what is possible and of accumulated experience in this area.
3. The local public sector needs to drive broadband availability and take-up. There is a need for a regional or local rural eHealth task force in the context of rural broadband.
4. It is apparent that eHealth will be a key driver of broadband services and use in rural areas.

Despite eHealth's flagship status under i2010, pilot cases show that eHealth services are till now only poorly used in rural areas. The importance of these services to rural communities is undoubted – for example, in giving patients in rural areas expert diagnoses by trauma centres expertise via links to local personnel. It is also important that future research includes specific aspects of eHealth's impact on rural communities.

(10) eLearning, eTraining, eSkills

Rural areas tend to lose those young people who are looking for well-paid employment or who would like to study in specific learning institutes. This drains the skills and the knowledge out of rural areas. If human capital is the main source of competitive advantage then learning is the key for developing skills and maintaining employment levels. The i2010 initiative highlights further the opportunities and challenges in eLearning.

From our cases, only 13 projects were identified in this group (19%). These are mainly eLearning activities, trainings and workshops (**Workplace Guidance** in Finland) for communities to acquire new ICT skills (**Look@World** in Estonia). Relevant related projects include also **eFarmer** in Slovakia, the **Media Event** in Latvia, **DIADIGITE** in Cyprus, and **RUDE – Associação de Desenvolvimento Rural** in Portugal.

The eLearning conclusions were:

1. Mediated learning is still very important for rural areas. Therefore rural eLearning still needs a physical Training Centre in the local area. ICT workers may not need this but the typical rural community does.
2. There is a continuous burden in encouraging ICT use. It may be a more efficient if focus is first on entertainment services and then followed by a shift to domains such as eLearning. **DIADIGITE** in Cyprus recognised that entertainment had a role to play. The triple approach of the **Ballyhoura IT Competence** in Ireland was also open to the value of entertainment for people who could not easily leave home.
3. In the view of entertainment as a stepping stone to service domains, eCulture is likely to prove a more acceptable package to the public sector and the EU rather than for example, commercial gaming.
4. The availability of broadband infrastructure makes life in rural areas a more acceptable prospect for young people.

(11) eGovernment

The European Commission has assigned a central role to the development of eGovernment solutions in the eEurope 2005 and i2010 initiatives. The characteristics of rural areas in terms of geographic isolation and settlement patterns make them one of the best environments for obtaining full advantage of the benefits of on-line services.

But this is not without challenging issues, that are being addressed at a local level as seen in a number of the case studies. For instance in **Zielonka** in Poland and the **Information Office for Citizens** in Romania.

Almost one third of all projects taken into consideration in this report were assigned to this group (19 projects). The eGovernment conclusions were:

1. Clearly rural broadband connectivity will have a bearing on the uptake of eGovernment services – particularly those such as webcasting council meetings.
2. What is unclear, however, is how far eGovernment will go in subsidising training, connectivity and equipment to deliver these services.
3. As use of new media and interactive websites grows, so will the pressure on Governments to become more responsive to citizens.

(12) eCommunities

Community applications require skilled and committed people to contribute locally relevant content and to make the applications work. As content becomes more interactive (in Web 2.0) and more people contribute and post (send) content, issues such as libel and quality control loom large. Ethics and protection are similar areas of sensitivity. Solutions that can be seen to be effective include:

- Rural community websites (for example, the **I-Centre** in Bulgaria)
- Rural Community Web Services (for example, PreFarm in the Czech Republic)
- Travel: roadside web cams, SMS alerts, lift share (to some extent the **CRISP** example in Ireland)
- Discussions, Directory, Pools, News, Events, Marketplace (for example, the I-Centre in Bulgaria again, **Dolina Czarnej** in Pland, and **Nuenen** in the Netherlands)

The potential and importance of communities is confirmed in other studies (e.g. Jarolímek et al., 2006; Heery and Fowler, 2007; Skerratt and Preece, 2007). The conclusions are:

1 There are several different models for rural communities to develop a web presence. Each has benefits and drawbacks. The key challenge is presenting content and data which rural residents find compelling (and "want to go online for ").

2 While establishing web-based services can be straightforward, the greater challenge is in maintaining them after initial interest has worn off. Updating directories, moderating discussions making sure that data is accurate can be a struggle. Web 2.0 approaches will have a major impact here. However, the possibility of finding very simple solutions (like that described in **CRISP**, where a local scouting group undertook the updating role) should never be overlooked either.

3 Greater distribution of the work to be undertaken can ease the load. But it can also create more difficulties if content needs to be moderated and even removed.

1.3 Wired versus Wireless Technologies

The preferred solution of telecommunications operators is to deliver broadband using DSL type technology over the existing copper wire connections to residential users. However there is a distance and speed trade-off associated with DSL provision. For example, although it is

now technically possible to deliver 34 megabits per second on a standard copper line, this can still only be achieved over a short distance.

In this context, a broadband transmission speed of 512 kbps could cover potentially 99% of all residents, whereas the broadband standard of 2 Mbps cannot raise coverage much above the 90 percentage.

Operators also point out a problem with failure rates in lines. This relates to quality of lines and connections and to problems with split lines (shared by more than one end-user). At best, this affects 10% of all lines, although some industry analysts suggest that the figure could be as high as 15%. Around 25% of all lines may not be suitable for broadband transmission if different technical reasons are aggregated. Importantly, the overriding majority of such lines are in rural areas. It cannot be assured, therefore, that a rural resident in a DSL-enabled exchange area will receive broadband services. This is not the case in urban areas where potential users often have a choice of broadband delivery platform.

In addition to the questions of line quality and transmission distance, there is an economic factor which needs to be considered. Most operators claim that is not always economically viable to enable remote rural exchanges with broadband. The number of potential users does not justify the installation and maintenance of a local broadband technology. The question of sustainability also affects the potential for unbundling local access lines to take broadband-type services.

Mobile, fixed, wireless and broadcast platforms are seen as competing platforms and, whilst they may complement each other, they do not converge. Where convergence does occur is at the end user level, at device level and through 'bundled service' offerings. All platforms are broadly dependant on fibre networks for backhaul to link to national networks. In many rural areas, lack of network competition results in a high backhaul charges, which are distance-dependant and based on minimum prices and quantities. This places rural areas at a cost disadvantage compared with urban areas.

Many traditional telecommunication operators see a place for wireless applications. For example, WiMAX is considered as a technology which delivers very good in-fill where the copper network cannot provide a service. The copper infrastructure goes into nearly every home and business. From the incumbent telecommunications perspective, therefore, copper wire is the most economy way to provide broadband for consumers and small businesses. Incumbent operators will not consider optic fibre to homes when they can use the existing copper wire alternative. Fixed wireless access, therefore, is perceived as expensive for broadband. As a result, it is difficult at this moment to be identified typical installation costs for technologies such as WiMAX. In areas where a fibre infrastructure is being rolled out, however, wireless is still an option for providing the last mile connection.

Wireless technologies include Fixed Wireless Access (FWA) or Wireless Local Loop (WLL), RLAN (Radio Local Area Network), UMTS and WiMAX. It was expected that these technologies would encourage Wireless Internet Wireless Service Providers (WISPs) to evolve to develop their own wireless network to compete with DSL and 3G services. The expectation was that service providers offering relatively inexpensive and high performance broadband access in rural areas will enter the market and develop the services.

This expectation still exists but how the market will be structured or how it will develop is still unclear. The question about the possible universal use of WiMAX to deliver broadband

into those rural areas that are not covered by DSL service remains open. This is mostly caused by equipment certification and spectrum allocation issues. Until now, certain WiMAX operators appear to focus on serving rural communities which are unable to get DSL and want high speed fixed access. In most cases, however, these communities do not need a fully developed network.

Pre-standardised WiMAX networks are now beginning to appear, for example, in Belgium, Denmark and Ireland. In the US, a portion of the 2.5GHz spectrum is set aside for WiMAX. The present lack of an uniform WiMAX spectrum across Europe, combined with a lack of standardized equipment, is delaying the roll-out. It should also be noted that the GSM Association is engaged in extensive lobbying activities to ensure that WiMAX is not an allocated spectrum. Intel is already developing dual-mode wi-fi/WiMAX chips and will incorporate WiMAX into its Centrino platform. For these to be of any use, however, there is a need of service providers to offer WiMAX wireless broadband.

Other transmission developments are taking place that compete with WiMAX. While WiMAX challengers offer an alternative to both fixed broadband and mobile broadband, those operators are facing the costs of building a total network infrastructure. This means that they have initially focused on a small number of rural communities which were unable to get DSL and have desired high speed fixed access.

The case studies have shown that many remote areas are often using wireless technology integrated with another broadband technology. There is a need to look more closely at technology convergence models for fixed and mobile solutions in rural areas. The sectors that typically demand high speed communications are:

- Outdoor workers, and rural and outdoor-based SMEs
- The tourist sector in natural reserve areas, or areas in remote or extremely remote locations where wireless telecommunication masts are not allowed to be set up. In some of them, satellites do not have any coverage. Such areas attract a large number of tourists (hikers, cross-country skiers etc). For example, in the Swedish county of Norrbotten it is estimated that around 250,000 person nights annually are spent there. Tourists coming to such areas have a total ‘mobile attitude’ which means they are used to broadband with 100% coverage. This mobile, modern tourist will not accept being ‘out of reach’. Another example could be based on a Swedish survey[38] showing that out of 1000 employees about 36% will open their e-mail during their holiday. Among “well educated” (employees with university or college education) 49% will open their email during their holiday. A conclusion that can be drawn is that tourist hotels/spots in rural areas with no broadband will not be attractive for large number of customers in near future. For security reasons, the ageing part of the rural society also needs solutions, for example in the field of health and wellness. Climate change reporting additionally increases the pressure on finding best possible solutions..

Despite a number of possible and available broadband technologies, solutions in rural areas are still more costly to roll-out and sustain. Clearly, they cost more for the rural users. There is a need, therefore, for research and development of cheaper broadband access technologies and infrastructures.

[38] SvD 9/07/2007 assigned the Sifo institute to interview 1000 employees about their “mail-usage” during their holiday, http://www.svd.se/dynamiskt/inrikes/did_16131981.asp

2. Factors influencing the demand for ICT in rural areas

Notwithstanding the evolution of the debate, certain questions remain unanswered. What is the dominant factor affecting the deployment of ICT in rural areas – roll-out or take-up? The relationship between roll-out and take-up was explored in the A-BARD project. There, it was stressed, that without appropriate infrastructure difficulties to provide real deployment of ICT in rural areas will be faced – but also that, in rural areas where roll-out is nearly 100%, take-up is *still* lower than in urban areas. Does this mean that the existing infrastructure is heavily used? Can prevailing usage rates be attributed to high costs, low skills, missing applications or to some other reasons? It also needs to be understood why infrastructure is simply not in place in some regions. Even within a single country there could be considerable diversity of coverage. Is this because of market failures or are there other reasons? Why is there no demand for ICT in some rural areas, whereas others do respond?

Who or what stimulates local demand? The empirical data suggests that the stimulation of local demand is an important part of ICT take-up. If quantitative indicators can be isolated, however, it needs to be asked what could limit or restrict them? And if qualitative stimuli can be interpreted, what in turn drives them? Clearly, competitive supply is a source of stimulation in all markets. However, PC penetration is also a good indicator of local broadband demand. If PCs are increasingly available, local ICT applications and uses also will have a part to play. Here, the question of 'killer applications' becomes important. Killer applications are those which have a high popular attraction. Official opinion (including i2010) favours eLearning, eHealth and eGovernment. However, research suggests that eBusiness is a more popular 'driver' of ICT take-up. Furthermore, and supported by analysis from different EC regions and EFITA (European Federation for Information Technology in Agriculture, Food and the Environment)[39], an even higher influence may be Entertainment and Local content. The two latter reflect particularly the big demand for ICT among young people. The relative influences of official preferences and local choices then, especially any synergies between them, need to be assessed.

Could demand aggregation promote a take-up response to the roll-out of infrastructure? The development of initiatives to aggregate demand for broadband communications and solutions within the public sector clearly benefit and increase broadband adoption. The adoption of broadband in rural schools, libraries and health dispensaries, therefore, should be considered an essential first step towards the introduction of eGovernment, eLearning and e-Health solutions in rural communities. But there are then further issues to be addressed. Aggregation has to be linked back to the main network and, for 'backhaul connectivity' to be affordable, must be realised at the level of optimum aggregation – in other words, at the lowest feasible level. Where demand aggregation occurs at higher levels (for example, national or European), it has to be economically demonstrated that connectivity cannot be achieved more advantageously. Furthermore, the selection of operator serving aggregated demand must be on a basis of technically neutral 'open' tenders: the operator has to guarantee equal conditions for all potential local sub-operators. This is an area where there is much to be learned from past experience.

The last important question is how the demand situation could be influenced by the relationship between wired and wireless technologies. Countries where roll-out started earlier

[39] www.efita.net

are covered mainly by wired technologies, but the countries with later deployment are mainly wireless. A key question is: can wireless technologies rapidly change the situation in rural areas, where monopolies are in place?

Currently used methods of analysis of rural development issues (Jarolímek et al., 2006) may have impeded our ability to articulate a clear understanding of the factors affecting the demand for ICT in rural areas. However, institutionalised barriers are coming down as we progress towards an Information Society for all.

The strongest impetus for a change is the EU funding which is enabling shared baseline perspectives of the various factors. The key studies have been Rural Wins and A-BARD, a pan-European investigation under IIASA[40] (European Rural Development), ESPON (Spatial effects of demographic trends and migration) and various studies on policy implications of demographic changes in national and community policies – for example, *The Demographic Change: Impacts of New Technologies and Information Society* (DG Employment and Social Affairs, European Commission). It has to be noted that the insights of these important studies are mostly based on statistical data collected until the year 2004, and the data is now dispersed and in many cases has "died" with the projects involved. Even where available, the results tend not to reflect the dynamism of developments during the last few years and there is still insufficient understanding on rural take-up of ICT.

A very recent survey of Swedish responses offers a clear set of responses on why people are not using broadband:

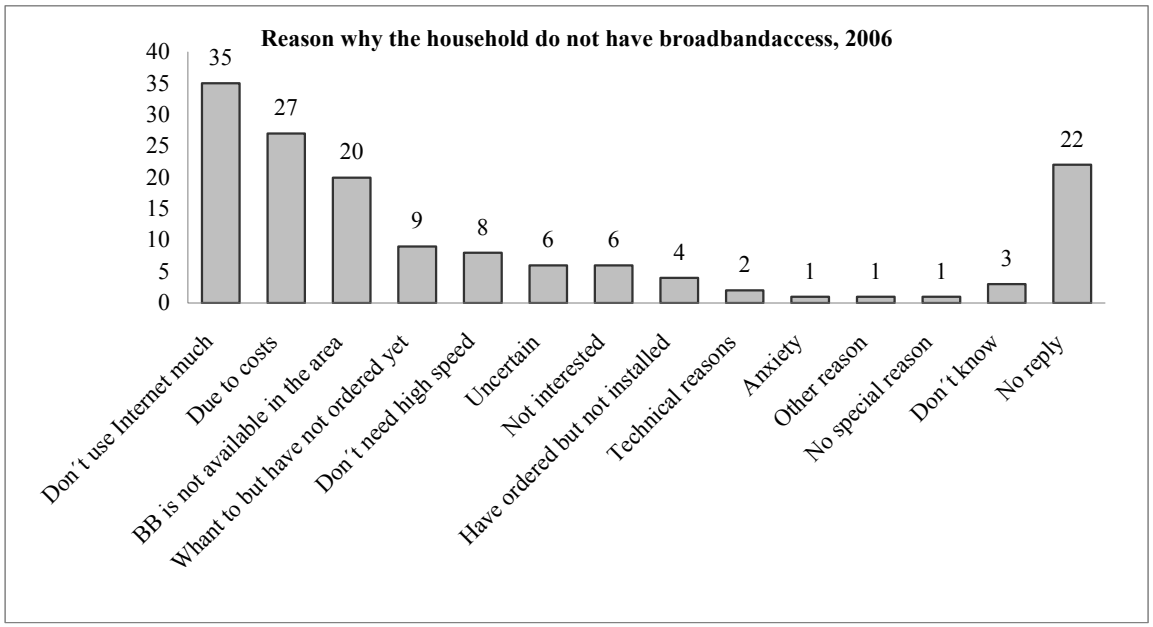

Figure 4 Reasons households not to have broadband in Sweden, 2006

Source: *"Broadband in Sweden 2007(Bredband i Sverige 2007") Post- och telestyrelsen (PTS-ER-2007:17),* Stockholm, ISSN 1650-9862, Diarienr 06-17136

Other similar surveys confirm no large differences between cities and rural areas, except that more people in smaller communities do not have access to broadband. Additional views

[40] International Institute for Applied Systems Analysis, www.iiasa.ac.at

express the ideas that people who live in detached houses have greater difficulties in getting broadband.

The studies found that the factors, which stimulate demand for ICT are:

- The social and economic composition of the population – rural regions near to large city have comparable demands as urban area.
- Transferred work habits – people who use PCs and Internet at work are motivated to subscribe to broadband at home (for both social and professional use).
- Age – it has been found that young people are a key driver of new technologies. Adoption in the residential sector is mainly driven by the age of the user. Families with children or grandchildren subscribe to broadband because young people demand Internet connectivity. They need it to study, to keep in touch with their friends, to play on-line games, to download music, etc.
- Business applications – these are a significant market driver for broadband deployment.
- Personalities – local champions are known to be effective stimulators of demand, just as active regional or local political leadership also plays a part.

Apart from inadequacy or absence of local infrastructure, the factors which impede demand for ICT are often interlinked and characterised by:

- Education – rural areas may have a higher proportion of ICT illiteracy.
- Absence of leadership – missing people respond to inspirational leadership.
- A lack of relevant applications – ICT applications need to focus on the specific needs of rural populations.
- Poor co-operation and absence of innovation – although most rural SMEs already use computers and have Internet connections, the potential of ICT for economic growth and competitiveness is used only at a very basic level.
- Low awareness – among individuals and businesses: advanced methods of cooperation and innovation in the usage of ICT are to large extent unused.
- The cost of ICT services in rural areas – the lack of flexible and creative sales packages inhibits profitable take-up by rural businesses.

The following sections take this baseline understanding forward.

2.1 Social and economic composition of population

The ESPON[41] studies from 2002 and 2004 concluded that the countries of Denmark, Sweden, Norway and Switzerland plus certain regions in the Netherlands, UK, Belgium and Finland enjoyed a clear leading position in ICT adoption. The main factor in this pattern was the strength of the Scandinavian countries, which led in almost all technologies. A number of other countries were also identified as leaders, but normally only within a particular technology. The moderately high scores for the Mediterranean countries are mainly related to mobile telephones. In that particular field, the Mediterranean countries outpaced the rest of Europe. By comparison, new Member States were, on average, running behind in ICT applications.

[41] ESPON (The European Spatial Planning Observation Network), www.espon.eu

The reasons for the differences can be understood from the distinguishable situations in various countries. For instance, Malta, Slovenia and Estonia were positioned ahead on leading edge technologies and applications such as broadband and eCommerce. Bulgaria and Romania, however, could be identified as lagging across all technologies and applications. A more specific finding from the data analysis was that at local and regional levels there were clear disparities between metropolitan, urban and rural areas regarding internet related technologies, and in particular broadband uptake.

This was, and remains an expected conclusion as currently the most commercially developed forms of broadband technologies are driven by demand and thus primarily serve areas of high population density. This might has partly changed since 2004 but without any significant differences in the countries' positions.

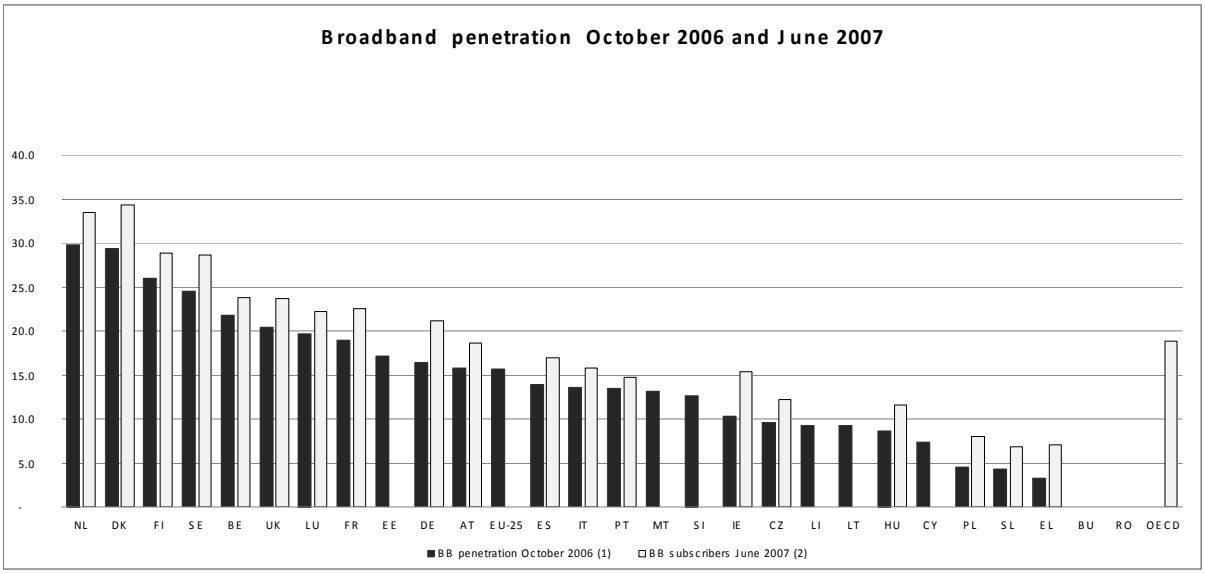

Figure 5 Broadband penetration October 2006 and June 2007

Source: European Commission, 2007a and OECD (2007)
Note: Data for some MSs is not available

Most recent data on penetration (subscribers) of broadband confims this. In all countries the number of subscribers have increased but the relative distribution between countries are almost the same (figure 5).

The regions covered by the ESPON research can be divided into: (i) regions, where the level of households with computers (including those with Internet access) is higher than the national average (Italy, Germany, Finland, Hungary), and (ii) regions, where the level is similar to the national average (Poland, Greece, Czech Republic). At the same time, distinct intra-regional disparities could be observed between towns and rural areas, mainly those which were peripherally located. This was primarily the case in the metropolitan Hungarian region. In the Finnish region, differences in both equipment and access were not as distinct and were mainly related to the use of the latest technical developments. These differences determine diverse diffusion of innovation in different regions. The determined factors could be different in different countries. Surveys conducted in the Finnish region have demonstrated that the factors which determine such disparities largely result from the socio-economic

structure of the population. New technologies are most frequently used by young professionals with tertiary education and higher than average incomes. Nevertheless, it can still also be observed that the lower degree of ICT use among the rural (peripheral) population can to some extent stem from a lower number of potential users.

The conclusion from this analysis could be that, at European level, the main factor for ICT deployment is the GDP of countries: eventually their national political priorities have greater influence than their population density. Consequently, differences arising from population density should be compared only within a single country, because comparison between regions in two or more different countries would be unreliable. The differences between countries are certainly much higher when we compare utilisation of ICT technologies in groups of householders with groups of businesses. EPSON studies demonstrate for example, that the Czech Republic is already identified with countries with a high penetration of ICT technologies in the commercial sector, but under-penetration in domestic use. The reason is that cost of ICT technologies and services are very similar in all countries but that there are big differences in household incomes. These differences could be reduced in the business sector but, for citizens, they would be more resistant.

If we take into account the growing gap in penetration of ICT technologies between rural and urban areas in the period 2004–2006, it seems that economic factors do influence the deployment of ICT in rural areas. Rural incomes are lower than urban incomes. This holds relatively inside of one country or neighbouring countries. A similar economic situation in two regions with different social, political or geographical conditions does not reveal the same level of ICT adoption. It is clear, then, that ICT adoption is influenced by the economic situation on the level of comparison of similar social, historical, political and geographical conditions. But also that it is difficult to directly compare the situation of two regions in two different countries with different social, historical, political and geographical conditions. Comparing for instance northern Italy with northern Scandinavian countries, it is clear that the "poorer" regions in the north of Scandinavia have a higher deployment rate of broadband.

Within a single country, two key parameters were perceived as remaining relevant:

- Settlement pattern, and
- Population in the context of numbers of potential local users.

These two factors directly affect the viability of the local solution and can be analysed at local or regional level without recourse to thematic mapping techniques. On this basis it was concluded that the original aim of using public sector data to perform broadband typology mapping of rural areas may not now be a meaningful activity. The quantitative analysis realised in all EU requires complicated multi-criteria analysis based on large scale data sets collected by harmonised methods. It was apparent that certain key statistical sources are, as yet, not universally available throughout the EU. This gives better possibilities to provide such analysis inside of single country, where methods of data analysis are unified. The analysis of situation and comparison of different EU regions has to be done more on the base of qualitative description, then simple usage of quantitative indicators.

If we look at demographical trends, there is one important aspect in recent years, which has to be taken into consideration. The 'urban sprawl' or spread of city areas into the surrounding countryside is generally called as 'sub-urbanisation'. It is caused by the desire of many citizens to live in their own home located in a healthy, 'green' and secure environment. Owing to financial restrictions, however, most households have to leave the city if they want

to realize their ideal living sphere. They settle down away from the city where property prices are low. Working in the city and living far outside has become compatible with reality. For example, in 1971 approximately 20% of the population of the Vienna region lived in the surrounding countryside and 80% in the city. By 2001, this changed to 30% in the urban fringe and 70% in the core of Vienna. Projections show future changes to 40% to 60%, respectively, in 2031.

These trends are visible in many European countries (for example Germany, Belgium, Italy, ect.), Last demographical survey realised in the Czech Republic demonstrates that on one side higher educated people from peripheral regions are moving to large cities (like Praha and Brno) and on the other hand, part of economically stronger population is moving outside these cities. With the sub-urbanisation of the urban population, there comes a strong market push to establish ICT infrastructure in the out-of-town areas. This is linked with the need of part of the suburbanised population to reduce their every day commuting. It translates in turn in a strong demand for infrastructure, which is usually met by market forces.

2.2 Age

Despite the fact that Internet usage among the older age groups has gradually increased during recent years, only a minority of older people actively engaged in the Information Society today. The ageing population is a big concern of many rural areas, with younger generation moving to cities (e.g. the central part of Sicily).

This age-divide should be a matter of real concern to policy makers. Older people do not get benefits from online services and applications which may could have potential utility for them. They are also facing new risks and exclusion because important services are increasingly growing and becoming available only online or are easier accessible online. This could bring exclusion of older people from part of services; the main age divides don't depend on access on broadband, but on accessibility to different services (banking, time tables, etc), which are more and more on line. The majority of old people are unlikely to go online on their own initiative within their lifetimes. As technology continues to evolve, new age-divides will emerge excluding additional groups of old people.

Because of this, it is important that reinforced policy attention is given to reducing the age divides affecting engagement in the Information Society – and also that much more attention is given to counteracting the potential negative impacts of such divides. It is neither appropriate nor realistic to try to push all older people online. Substantial efforts will be required to ensure that those who are not already online are not left behind in the mobilisation of ICT access to services and wider civil participation.

The related challenges and opportunities include:

- The impact of the age-divide on rural areas – exclusion from engagement in the Information Society is aggravated by lower incomes and lower education.
- The nature of barriers and constraints in rural areas – older people face additional barriers to engagement in the Information Society when compared with younger populations (for example, what may prove accessible for a younger rural dweller may be beyond the capabilities of a retired person).
- The emergence of new risks for older people – the on line accessibility of new services could exclude the older generation from this services (governmental, eDemocracy, banking, information)
- Linking older people with the benefits available through connectivity and the Information Society – the majority of older people are missing out.

Although ICT uptake among older citizens in Europe has steadily increased during recent years, the some positive movement seems more visible, particularly in cities. However, older citizens are still much less likely to have access to and use ICTs and online services than younger people, even in urban population. An age-divide will continue to exist in the near future. Just over one-in-four of those aged 55-64 and just under one-in-nine of those aged 65-74 use Internet, compared to almost two-thirds of those aged 25-34 and almost half of those aged 35-54.

Available evidence suggests[42], [43] that the current age-divide will not disappear in the near future without significant supply-side and demand-side initiatives. It is necessary to prepare specific actions mainly for rural populations, because access to ICT for elderly people is very limited there.

The main barrier for adoption of ICT by elderly rural population is lack of interest: many studies have confirmed that lack of interest and low motivation are key factors limiting the engagement of the older people in the Information Society. Computer anxiety and intimidation by technology also appear to be barriers, compounded by the fast pace of hardware and software development.

Another impeding factor is the lack of skills in how to access and use the Internet as well as the associated devices such as PCs. Many adults who are actually online report a lack of confidence in their skills. Most adults were never educated to use computers and Internet, for young generation it is part of basic education. If the adults don't use computer at their work, they have limited possibilities of training for ICT shills. This can limit their online actions and the benefits they can obtain. It can be mentioned also that minds trained by conventional methods do not readily think in the same way as minds training themselves. The training themselves never give chance to use all potential of information and communication technologies.

Not having had the opportunity to acquire ICT skills in working life is a major factor behind these age-divides in skills. Costs can also be an important barrier for older people with low

[42] The Digital Divide in 2025 An independent study conducted for 2025, http://www.btplc.com/Societyandenvironment/PDF/Digitaldivide2025.pdf

[43] Impact on Society and Culture, http://www.w3.org/2004/Talks/w3c10-SocietyAndCulture/

incomes, a factor that is especially relevant for the new Member States and some old Member States that are lagging behind in their development. More generally, the tendency towards greater cost-sensitivity amongst older people is also a factor. A large proportion of older adults have functional restrictions (e.g. visual, hearing and dexterity) that prevent or hinder their usage of ICTs as currently designed. Statistics[44] shows that whereas hearing problems occur among 13% of the population (16-84 years old) the same problem occurs for

- 25% of people between 65-74 years of age
- 34% of people 74-84 years of age

Visual problems occur for 1,6% of 16-84 years old

- 2.5 % of people between 65-74 years of age
- 10.4% of people 74-84 years of age

These studies were made before the Internet. No overall studies have been made on the number of people actually being e-excluded due to disabilities. Most of these factors are common for both urban and rural populations. But it must not be forgotten that, with the exception of suburbanised areas, the percentage of older people is higher in rural than in urban areas and that "help" is more easily found in densely populated areas.

2.3 Education

The deployment of broadband infrastructure covering the rural area is only the first step to overcome rural digital divide. The real challenge is to use the opportunities that broadband services and applications bring to increase the quality of life and to enable rural communities to join the information society in the same conditions as the urban population. Two good examples are provided by the **Korean Information Village Programme** and the **SARAKIDE Exhibition** in Spain.

Increasing awareness, ICT skills and motivation of the potential rural users appear crucial activities. In many rural areas where income levels are low this could be 'a killer factor' to increase demand and adoption by offering financial support to the end users so that they can buy PCs and get access to training and ICT support. To that end, local champions, mainly public authorities and community leaders, could play a key role in creating a minimum level of demand within the community to justify the public and private investments in broadband infrastructure and services. None of the activities stands alone as made clear by the approach adopted by **eLearning** in Latvia.

Outward migration of young people is a reality in rural areas mainly due to the lack of job opportunities, difficulties to access leisure and cultural entertainment in rural areas, and inadequate access to educational facilities. Taken with the inward migration of retirees in some regions, this contributes to the ageing of the population and to the general net depopulation of these areas. From the shifts of population that rural areas have been experiencing in the last decades it follows that changes in approaches to rural policies are needed to reverse this trend.

[44] Source: SCB Funktionshindrade 1988-1999 (Living Conditions, Report no 97, Disabled 1988-1999), Statistics Sweden, SCB (2003). www.scb.se

Regional communities are strongly differentiated in terms of their ability to absorb new technologies. Major barriers in ICT adoption exist, particularly in the less developed, agricultural regions, which hinder the application of ICT technologies.[45], [46] Another factor impeding their development is the smaller scope of potential applications. Generally speaking, the factors which determines to the absorption of state-of-the-art technological developments include young age, good education and high incomes. This poses a special challenge for educational systems, which should aim to equalise the opportunities of children and young people in this sphere.

An appropriate level of provision of ICTs in schools is a fundamental prerequisite for the development of a Knowledge Society. An equal distribution of ICT provision across all schools including the ones in rural areas is a necessary condition for getting people who come from smaller and peripheral locations to the same starting point as urban and suburban peers, i.e. for creating equal opportunities.

Awareness on the need of ICT should be promoted at the level of elementary education. Schools and their staff need to be able to keep up with developments in technology. There is no retreat from using ICT. It helps the teaching process. It enhances the administration and the running of schools (for example, the use of ICT in the recruitment process to secondary schools in **Poland**). ICT is not an educated choice but has become the means of exercising it.

2.4 Role of Businesses and Employment

It is important to record that there are noticeable differences in job creation rates among different rural regions. Some predominantly rural regions attain employment growth rates significantly higher than urban-classified areas. This means that 'rurality itself is not a handicap for job creation. Therefore, efforts to promote rural employment are worthy and justified. The reasons behind the important job creation rates in some areas are diverse. In some instances, this has to do with achieving intangible aims (entrepreneurship, cultural identity, participation and partnerships). In others, it has to do with amenity-based development schemes, and valorising public or quasi-public assets (clean environment, attractive landscapes, and cultural heritage). It is important to understand the differences and to foster those which meet the objective at hand.

Most rural areas have difficulties in establishing the necessary critical mass of facilities, producer services and infrastructures to support economic development. Remote areas may face problems reaching sufficient customer base. Consequently entrepreneurs face specific obstacles in starting up enterprises in rural regions. In this sense advances which integrate ICT in rural areas could dramatically increase the possibilities of development of new knowledge-based businesses. Furthermore, distributed workplaces substituting traditional ones will encourage entrepreneurship to develop in rural areas. This process will not be easy or familiar because, in most rural communities, there is no tradition of an indigenous entrepreneurial class. The **Korean Information Village Programme** reflects a number of these issues.

[45] ICT in England's Rural Economies, A Final Report to DEFRA Conclusions & implications for rural ICT policy

[46] ICT adoption, Conclusion from EFITA congress 2007, Glasgow

Though agriculture, fishery, cattle farming and forestry (the so-called 'traditional' activities in rural areas) have been the economic base of rural areas up to recent times, a set of important externally-oriented economic activities in rural regions is becoming more widely met. The restructuring of economic activities, with a transition to manufacturing and services related activities, is growing in importance. Those that are still depending primarily upon traditional activities are on average less well off in terms of a broad range of economic indicators. There exists products whose production can generate higher profits (such as high-quality products, organic products, etc.), but the total value of the European agriculture production except in 2004 is decreasing in the EU[47] Despite this, some rural areas may be constrained by lack of resources or assets and cannot attempt such a transition.

In general, rural businesses adopt ICT significantly more slowly than their urban peers. The average level of adoption is lower in businesses located in rural areas but this is not just due to different distributions of industries. The slower adoption is primarily attributed to a more limited range and intensity of 'influences' promoting the use of ICT, rather than 'barriers to adoption'. In particular, rural businesses are significantly less exposed to advertising, discussions with stakeholders and the influence of new recruits. Moreover, ICT decision-makers tend to be older in rural businesses (mainly in agriculture)[48], a factor which appears to be associated with lower ICT adoption rates. Micro-businesses are particularly disadvantaged. The 'ICT adoption gap' between rural and urban businesses is most pronounced for SMEs. This is also where disparities in the adoption levels of firms in different industry sectors.

There could be found few other important differences across the various conditions of 'rurality'. The distinctions between rural and urban businesses in terms of ICT adoption and impact are more marked than the mostly insignificant differences observed for businesses based in different types of rural location. Rural businesses are playing 'catch up' with broadband, now when it is (generally) available. The issues with respect to broadband seem to be more about constraints than about influences, whereas for ICT generally the opposite is the case. Generally ICT technologies except connectivity are not directly depending on the geographical conditions, and question of acceptance does not depend so much on external conditions, but more on usability for businesses. Whilst current overall broadband take-up is lower amongst rural businesses than urban businesses (c. 40% of rural Internet users, versus 60% of urban Internet users), this is due to broadband being made available later in rural areas. Penetration rates are very similar in urban and rural areas which have had broadband for more than a year. Higher levels of ICT adoption are associated with higher turnover per employee and higher growth expectations in rural firms. The more advanced ICT adopters consider that recent developments with the technology have made it easier to operate from a rural location. About 30% of urban businesses say that they may consider operating from a rural location now that broadband is available (**eTeams** is an example of an attempt to attract such businesses). The most important productivity advantages of ICT only start to be realised when businesses go beyond 'basic' adoption levels – that is, when adopting ICT applications beyond the simple use of email and access to the worldwide web.

[47] EFN Report Economic Outlook for the Euro Area In 2007 and 2008, http://www.efn.uni-bocconi.it/EFN2006_winter.pdf

[48] Defra - Economics and Statistics

2.5 Infrastructure

Current infrastructure guarantees lower levels of service in rural than in urban regions.

Infrastructure development has been analysed in detail earlier in section 1 and in the *Guide to Implementing ICT in Rural Areas*. In countries where all areas (100%) are covered by DSL technologies (or some wireless technologies like CDMA), the quality of service is generally lower than in urban areas. The speed of connectivity is usually lower than in urban areas and excludes services based on video and other high-bandwidth on-line interactions.

Areas, which until now have only had satellite coverage (satellite operators guarantee coverage almost in all Europe) are also excluded from such services as Voice over IP and interactive gaming.

Three potential development scenarios for the roll-out of broadband infrastructure are:

(a) **Rural digital communities**: This development scenario is characterized by a bottom-up approach to introduce broadband in rural areas. The model is based on the development of digital communities within the different villages of a rural area, with the support and direct involvement of the main public and private agents. Examples include the **I-Centre** in Bulgaria and the **System for Managing Emergency Cars in Vysocina** in the Czech Republic.

A fundamental principle in this approach is that each rural community is responsible for the definition of its own digital development model, and for the identification of the main drivers to justify the investments and the sustainability of the broadband system. There are many rural communities with a low economic and digital profile that will require a specific support programme sponsored by the public administration to promote the digital community concept and facilitate its development.

(b) **Public Private Partnerships**: This development scenario envisages the active participation of regional and local authorities in the deployment of broadband infrastructure and services through the creation of public private partnerships (PPP). Examples include the **Turku Archipelago Living Lab** in Finland, the **Brescia Broadband Technology Bridge** in Italy, and **KZ@BZ-Spain** in the Basque Region.

The creation of a PPP requires a clear vision in the public sector about the fundamental objectives and principles that will guide the relationship with the private sector. The main advantage of a PPP comes from the fact that risk is allocated to the party best equipped to manage it and at the least cost. Under PPP arrangements the private sector can become a long-term service provider, combining the responsibilities of designing, building, operating and possibly financing the broadband infrastructures in order to deliver the services required by the public administration.

Under our scenario, the public sector also needs to evaluate in which areas its own resources are able to add value to the private sector for the broadband deployment. A proper definition of roles and responsibilities will optimise the joint investment effort.

A key question is the ability of the regional and local administrations to facilitate and minimize the investment required to build the backhaul and ‘last mile’ infrastructure

needed to cover the rural area – for example, by making use of the existing public infrastructure assets such as radio towers, electricity clamps and public buildings.

(c) **Private operators with public support**: This scenario assumes that the private sector could eventually own the infrastructure and is responsible for the provision of the service to the end users. There are not many (if any) public companies constituted to design, build or operate civil (masts, towers, etc) and communication infrastructures (fibre, wireless networks, etc). Furthermore, this scenario does not envisage setting up PPPs to authorise them. Notwithstanding, some lessons can be learned from the **Turku Archipelago Living Lab** in Finland, the **Broadband Network of Kuyavia & Pomerania** in Poland, and **Project Access** in the UK.

The leading role of the private sector does not exclude the support of the public administrations. The public sector could provide or facilitate access to funding or other types of instruments designed to improve the commercial viability of the business cases of the network operators and service providers.

2.6 Cost of services

Looking at telecommunications costs in various European countries would seem to indicate that where rural connectivity is supplied commercially, there is a trend for the cost of services in rural and urban areas to be comparable. This is achieved by market influences, but is also a result of legislation preventing the differentiation of customers by location. The cost for rural and urban area is usually inside of one country the some. A particular problem arises in those areas where there is a strong national or regional monopoly due to the burdens created by them for other potential commercial competitors. Connectivity is then supplied by, for example, satellite technologies which are usually expensive.

Where this problem does arise, the cost for connectivity is compounded by the lower incomes of the rural population, which limits the utilisation of ICT technologies. This holds not only for rural areas, but also when countries' comparisons are done.

2.7 Stimulation of Local Demand

The analyses of selected best practice reveals a large diversity of applications, coverage, agriculture and food productions, entertainment, eBusiness, eWork. Both the previous ICT studies and our own examination indicate that it is difficult to identify clearly the ‘killer applications’ which can drive broadband take-up. From commercial point of view, it seems that the most promising application area is entertainment. The demand from the young generation usually ‘pushes’ the deployment of internet among their families. Other promising users are businesses, by comparison, in many EU countries, mainly in central Europe, the access of companies to internet (broadband) has reached100%. It demonstrates that young people and businesses mainly stimulate demand for broadband.

The various studies, set against IDATE benchmarking, indicate that:

- Owing to National and Regional Broadband strategies, roll-out is faster then take-up.
- There usually exists financial support for infrastructure building, but there did not exist in the past a clear policy supporting take-up.
- Despite the positive trends in roll-out, there exist areas in Europe, which do not have broadband access. To achieve the i2010 coverage goals, it is necessary to focus

financial support on those areas which will probably not be covered by market initiatives because of insufficient commercial returns.

- It is important to define a clear strategy to speed up the take-up in rural regions, because it is in this area that the gap is growing.

Recommendations for actions can be found in some previous European studies and supporting actions, such as Ami@Netfood[49], and CoreLabs[50].

AMI@Netfood directly contributed to the mission of the Framework Six IST programme. It sets out to support the development and adoption of novel ICT solutions and practices in different target sectors, in order to achieve the objectives of the Lisbon strategy – namely, the objective of the EU economy to become "the strongest knowledge-based economy in the world by 2010". The Commission's strategic framework, i2010, promotes an open and competitive digital economy and emphasises ICT as a driver of inclusion and quality of life. AMI@Netfood provides a set of means for supporting these objectives.

In order to address key technologies, the AmI@NetFood strategic research agenda proposed four Research and Technology Development domains, specifically:

- ICT applications for the complete traceability of products and services throughout a networked value chain. The objectives of this research domain are to develop world-class network management solutions that facilitate communication and cooperation between networks of SMEs and large enterprises in the agrifood and rural development domains.
- Collaborative environments in agri-food industry and rural areas. Here, the objectives are focused on solving specific requirements on working environments in terms of decentralisation, environmental conditions, user experience, collaboration patterns (e.g. frequency, timing), heterogeneity of CWE users (e.g. from farmers to large food industry) etc.
- ICT applications supporting the management of natural resources – and applications supporting rural development creating value for citizens and businesses. The objectives of this dual domain address the development of ICT for sector specific applications (tourism, marketing, eServices), specific applications to improve quality of life in rural areas, and ICT applications and tools to support detection, observation and management of natural resources.

The overall objective of the **CoreLabs Coordination Action** is to achieve a coordination of activities leading to the establishment of co-creative Living Labs. These would provide, on several levels, a foundation for a Common European Innovation System. The concept of Living Labs is relevant for rural areas where evaluating the mass deployment potential of ICT is concerned. Living Labs constitute regional innovation environmental focusing on user communities embedded in 'real life' situations. In addition to technological aspects, Living Labs offers an insight on the human dimension of technology. This is of paramount importance for successful societal deployment of new technologies. Living Labs are 'functional regions' where stakeholders have formed a public private partnership (PPP) of firms, public agencies, universities, institutes and people all collaborating for creation, prototyping, validating and testing of new services, products and systems in real-life contexts.

[49] Development of Long-term shared vision on AMI Technologies for a Networked Agri-food sector

[50] http://www.ami-communities.net/wiki/CORELABS

Such contexts are cities, villages and rural areas as well as industrial plants. This concept seems to be very promising for rural regions and for the support of ICT deployment and innovation in rural regions.

Recommendations from all projects confirmed the potential for future demand stimulation. The new model of Living Lab would provide good support for stimulating local champions. This model is now under wider evaluation in a number of European countries including Sweden, Finland, Italy, the Czech Republic and Hungary.

National responses and appropriate policy adjustments are an important but possibly could generate some risks. National strategy plans and Rural development programmes may risk being static descriptions where ICT is concerned, rather than presenting a dynamic frame of mind. For example, too many national rural development programs seem to prefer unspecific headline statements about the importance of ICT, to positive direction on the problem of connectivity. Finland is, for example, one exception where the availability of broadband, the adequacy of the network, the responsibilities of regional councils and targets for connection are among the issues elaborated. However, in many other draft programs[51] the broadband/ICT perspective is not included, which could also be driven by the demarcation with the ERDF.

In addition to the aforementioned findings, we would recommend:

- Continuing with existing actions for the development of applications such as eGovernment, eLearning, eBusiness and eHealth;
- Public demand aggregation;
- Targeted awareness and training in order to bridge social-demographic differences in ICT take-up.

We recognise the important role of local champions for stimulating local demand. The support and leadership of the regional and local champions is very important for raising awareness in rural communities and justifying the investments that have to be carried out. In many cases, however, such champions may not necessarily have the technical knowledge needed to make the decisions in terms of technology /provider choice and will need external support. Accordingly, we also recommend the promotion of community networks, and recognition and support wherever local champions can be identified.

2.8 Demand Aggregation

As discussed in previous sections, a territorial divide exists within the EU and, in the absence of policies and strategies to provide access to broadband in under-served rural and remote areas, this will continue to be the case. This report identifies a range of potential solutions that could be adopted by public authorities. Under-served areas are characterized by low density of population and a fragmentation of demand that deters private sector investment by operators. At present, solutions adopted in a few pilot schemes tend to employ a mix of satellite and local wireless networks but the costs of this are too high to attract sufficient levels of demand. It is suggested that if demand in such areas could be aggregated – at some level – economies of scale could lead to a significant reduction in costs of access and of user terminals. Where demand aggregation has been successful at sub-regional and regional levels,

[51] Some of the draft RDPs were revised and approved by the time of preparation of the final report of this study.

reductions of 20% in procurement costs are being achieved together with significant resultant increases in forecasts of both GDP growth and job creation[52].

An important issue is determining the level at which it is most useful to aggregate demand. The aggregation of demand on the level of large regions/areas could lead to distortion of markets. For this reason it is better to provide aggregation at the local level (for example, at the level of municipalities and micro-regions). Service providers and local authorities need to be aware of what works in rural areas. Choosing and deploying a broadband solution in rural areas involves risks for commercial parties which aggregation of demand could be minimised. The lack of a successful business case for the roll-out of broadband infrastructure in a certain rural area is the main obstacle to overcome. Generally, rural areas present a higher cost per line and the possibility of lower demand than in urban areas. Respectively, they are not usually included in the target list of private operators.

Often local public bodies involved in rural broadband provision have an incomplete understanding of the limitations of some of the available technologies, or of the specific requirements of their local communities and rural areas. It is necessary to offer to these local leaders relevant information supporting their decision. An "advisory web portal" could help regional, local administration and industry with advice and provide them with examples of best practice for procurement, deployment, ideas for interregional deployment (cross regional and national border deployment) and related broadband issues. A forum for local and regional representatives, stakeholders, industries and citizens where policy can be discussed and decisions on broadband promotion could also be of benefit.

2.9 Local Leaders (Champions)

Champions may be:

- Local actors who are not interested in technology but accept the leadership for the communities' benefit;
- Local business with clear innovative and knowledge-based growth strategy, which needs access and sharing of knowledge;
- People moving to live in rural areas and wishing to be e-enabled by broadband
- Younger and higher educated people moving to live in rural areas, who want to have the same services as in cities
- People who have holiday homes in rural areas and need similar broadband access to the one they have in the city

The role of local champions needs clarification because they (could) have a crucial influence on the adoption and take-up of ICT technologies by rural communities. How do we recognise these local champions? How do we understand what they can accomplish? How could they be supported in their task?

By their very nature, champions will tend to identify themselves and the cause they are representing. However, it is possible also to suggest that local champions:

[52] IANIS Feasibility Study for Developing an On-Line Tool, http://www.ianis.net/_layouts/loginErisa.aspx?ReturnUrl=%2f_layouts%2fAuthenticate.aspx%3fSource%3d%252f&Source=%2f

- may have not already identified themselves, but may be prepared to do so, if an appropriate and relevant offer of support is made available
- will be prepared to raise awareness if they have not already done so
- are able to change a prevailing situation – for example, by mobilising opinion or reaction
- are limited by the economic and social situation, by existing infrastructure, skills etc.
- could achieve more – that is, be less limited – if the support increases their influence
- may grow into the role from a very modest level of participation (the City of Limerick VEC, evaluated in the *Citizens First* project of INTERREG IIIb[53], provides an excellent example of unlikely champions emerging unexpectedly from within disadvantaged and marginalised communities)
- may be principally concerned with quite different issues from ICT and, therefore, recognise the value of ICT as a tool for achieving a different agenda (again, the City of Limerick VEC)
- may owe loyalty only to the situation they are representing (**eTowns**)
- have a knowledge of the problems and needs of the area – but also, most importantly, can potentially act as 'gate-keepers'[54]

It seems that local champions are immensely attractive catalysts for driving ICT take-up and yet also need to be treated cautiously and with respect. The **eTowns** project in Ireland demonstrates how a local *collective* champion constitutes a very powerful model for whatever project it chooses to adopt within the rural area it recognises as its own. Solutions which benefit from the direct involvement of a mobilised and motivated rural population in this way, in order to solve problems in a practical and locally rational way, have great potential to achieve wider coverage or impact than a purely commercial approach will. The examples of **Impecta Frő AB** in Sweden and **Watzelsdorf Weinviertel** in Austria cast further light on how local champions operate, what they can inspire and why it is important to respect their particular local rationality.

Exchanges of experience, of know-how and of best-practices where local champions are concerned should involve the rural communities concerned and be supported by public administrations at the EU, national and regional level. The lessons learned could inform the wider application of this model for local and regional development.

[53] www.citizen-first.net

[54] Gate-keepers control access to benefits they do not own, an exercise of power which has a value unfettered by production costs and can therefore be considerable (Corra, M., and D. Willer, 2002. "The Gatekeeper", Sociological Theory, 20(2), pp 180-207.

2.10 Local and Regional Political Leaders

Strategies for achieving the Information Society have been developed mainly at the European, national and regional level. The next natural step is to go down to the local, municipal or community level. This will add a more focused approach and identify the key drivers that will lead to high levels of adoption. It will help deliver a positive short-term return on investments. Pilot studies clearly documented the important role of local and regional politicians on the deployment of ICT technologies. The additional conditions identified in this study, which could lead to fast development, are:

- ICT and Broadband strategy – this has to be included in every regional development strategy and needs financial support
- Need for balance – there has to be support for the free market, but where market failure occurs, it should be supported by public funds[55]
- Support for both roll-out and take-up – this could be based, for example, on existing governmental applications which demonstrate the need for broadband
- Strong support for innovation – innovation usually brings requests for utilisation of ICT technologies and needs to be integrated within development strategies
- Support for citizens – a proactive, sensitive and appropriate focus on disadvantaged groups, particularly the elderly, in order to introduce the possibilities accessible through ICT services

Each of these is characterised by a need for leadership that only elected politicians can bring about. This raises in turn some fundamental questions about our ability to prioritise the allocation of local, regional, national and EU funding on rapidly extending broadband coverage and increasing take-up in rural areas. This applies to all rural areas that have not closed the development gap, regardless of stage of broadband development they have reached. Without such prioritisation, the sustainability of broadband initiatives will be placed at a very high risk. The future of our knowledge-based society will be weakened if not compromised and prejudiced.

[55] The public support can take many different forms within the framework defined by the EU. Measures for consideration could take the form of grants, low interest and alternative provision of capital on favourable terms, exemptions or reductions in taxes, social security or other compulsory charges, or the supply of land, goods or services at favourable prices, state guarantees, etc.

3. Impact of ICT on Rural Economies and the Quality of Life

The opportunities that the use of ICT can bring to rural economies and their quality of life cannot be considered in isolation from strategic policy for sustainable development in rural areas. Of all synergies, that deriving from coherence between the two is possibly the most fundamental to increasing roll-out and take-up.

This section is developed by considering ICT in the context of strategic policy for sustainable rural development – and rural development in the context of i2010. This establishes a baseline, while also revealing where barriers and inconsistencies in policy may persist. Such synthesis enables reliable comparisons to be made and conclusions to be drawn in the categories of economic, social, political, environmental and cultural opportunities.

The Sixth Framework A-BARD project[56] set out to research rural broadband from *both* the provision and the user perspectives. A-BARD insights are varied and valuable. For example, where communities share ownership of the infrastructure, the PPP tends to be successful. The public priorities of eLearning, eHealth and eGovernment are not the reasons why people take-up ICT – children and a need for entertainment are more likely to drive rural take-up. And applications themselves tend not to be tailored to rural solutions. The A-BARD recommendations based on its selected case studies can be summarised as a clear vision, a strategy and work plan, use of the PPP model, inclusion of even the most remote population, and tailoring the plan to the capacity and competence of the provider. These rested in turn upon networking business and 'rural knowledge societies' as the key issue for implementation of the Lisbon goals in rural regions – a human-centric and yet also competitive model that:

- Seeks new connections to better exploit existing strengths
- Outsources and e-Collaborates
- Is attentive to best practice and actively shares it
- Tries new ideas
- Links applications to its market-users
- Makes itself attractive to investors
- Privileges local values and local visions
- Adopts new business and social structures based on ICT
- Places ICT at the centre of education and youth development
- Sees rural development as being compatible with higher education and the knowledge economy
- Adopts plans and policies which enable stakeholders to have a meaningful stake and also to be able to exercise it

This model, linked with rural policy objectives and the role set out for ICT, describes an 'envelope of best practice'. The envelope is consistent with the EU's fundamental belief in the importance of ICT to local economic and social development. It is, furthermore, within the reach of rural communities, regardless of where they find themselves in relation to the Digital Divide and of the technology available to them. The envelope is, therefore, both an agenda for action and the means of self-evaluation. It applies as much to suppliers of ICT as to the communities they seek to encompass. The envelope also provides an approach to the database of case studies in Part I.

[56] Analysing Broadband Access for Rural Development (A-BARD), www.a-bard.org

In the following appraisals of 'opportunity', each case study of ours is benchmarked against this envelope. Patterns (recurring features) and themes (irreplaceable success factors) are explored. Only where new insight is apparent, however, are individual case studies elaborated and the envelope expanded.

3.1 Economic Opportunities

It is established that ICT enhances business efficiency and competitiveness. The Part I Guide reinforces clearly such management and marketing truths, making particular reference to the advantages for farming. These advantages include real-time information, online consultations, access to improved management techniques and the possibilities of eTrading. **Organic Denmark** and **eFarmer** in Slovakia are typical examples, while the case of the **Spanish sheep farmers** seems unusual and inspiring for its image of shepherds with laptops. These patterns of opportunity are reproduced reliably in tourism, hotel management and rural production, where time is optimised, costs are reduced, standards are raised and orders grow. **Hotel Martinské** in Slovakia and the **Cumberland Hotel** in the UK are examples of tourism and hotel management. The **Rural Information System for GAL Platani Quisquina** in Italy and the **Oxford Farm Shop** in UK provide examples of rural production. These all confirm, in turn, the underlying assumption that the more the Digital Divide is broken down, the better rural life will be – and that it does not matter particularly what technology is used to break the Digital Divide down.

Certain themes, however, run across the path of simply greater broadband access. They are characterised by phrases such as 'entrepreneur', 'champion', 'critical mass', 'linked with…' and 'unique feature'. These tend to suggest that more is needed to deliver reliably the full impact sought from ICT, than simply access alone.

In Ireland, for example, the **eTeams** project was initiated to create work where there was none but also where basic access was available. In other words, business acumen and the eye for a developing market started the process, not access. Entrepreneurship has grown that multi-lingual business since, with business demand driving and exploiting the technology available. Technical support and collaboration have certainly played a key role in supporting eTeams' growth therefore: ICT has provided solutions and enabled the business to be taken forward. However, it is actually a distinguishable human factor which has delivered eTeams' outstanding success. Similarly, in the **Kyrenia Mountains** of Cyprus, "two young entrepreneurs" saw a need and a market opportunity. They responded to it, overcoming successive limitations by bringing in progressively newer technology over time. The growth of the business is attributed to meeting customer need, not to the fact that it is a technology business.

The **Fjällhästen** project in Sweden, **Dipsticks Research Ltd** in UK, **New Zealand WiFi** and **S'Atra Sardegna** in Sardinia are among other examples of entrepreneurship. In parallel, the **Nuenen** project in the Netherlands, **Cybermoor Ltd** in UK and **Watzelsdorf, Weinviertel** in Austria all demonstrate how the commitment, drive and courage of 'a champion' can trigger ICT take-up across a rural community. The apparently straightforward case of **Technological Innovation in the Rotalde Irrigation Community** (Spain) may also rest as much upon a 'champion' as on the need to stay abreast of customers, although this is not made clear.

The potential of 'critical mass' is well demonstrated by the American example of **Allegany County** in Maryland, USA. Allegany is a deeply rural area where broadband provision was conspicuously poor and yet the proximity to Washington DC and its environs promised a

bright economic future if only new businesses could be attracted. The linking solution grew once again from local imagination and a willingness to think 'around' the problem. The root of this problem was that local schools and public agencies still needed connectivity. A local technician responded by creating a network of wireless links between buildings and water towers so as to share the few existing internet connections. He used his ingenuity. He worked with what he had at his disposal. Notwithstanding the shortcomings of a locally developed solution to connectivity need, a critical mass of users was eventually achieved sufficient to attract the participation of those who would invest and take the network forward.

The **Brescia** project in Italy is among other examples where critical mass can drive a solution. In Brescia's case, the solution was a PPP serving not only the industries demanding connection in the first place but also the communities dependent upon them. Critical mass also provided the stimulation for the entrepreneurs in **New Zealand WiFi**.

Linkages are a constant theme. In Greece, for example, the **Food and Drink** portal provides free connections to customers for rural produce and free access to business services. **NetBrokers** in Poland balances a database of customers with aggressive marketing on behalf of members. **CREPAC** in Corsica undertakes marketing for its rural suppliers while also delivering customers to their local fairs. And **IT Competence in Ballyhoura Country** is providing three interlinked activities – *IT for Farmers* and *IT for Women* through the linking medium of *Mobile IT*. Linkages, therefore, can overcome local skill deficiencies. Sometimes the linkages are unexpected. The 'Bridging the Broadband Gap' conference (Brussels, May 2007) reports that digging and ducting in a remote Swedish farming community provided the opportunity for extending the wire network. Similarly, linking the sewage system of three communities on the Czech/Austrian border served to extend connectivity there. So linkages can also overcome material deficiencies.

Linkages, entrepreneurship, champions and critical masses can reasonably be expected to remain factors affecting the successes sought from the Digital Dividend's release of new spectrum. But that suggests, in turn, that human skills like perseverance and thinking unconventionally will still be key features however advanced the technological context becomes. Therefore the economic impact of rural ICT will continue to be felt mainly in the opportunities provided by existing features – because existing features structure human agency. It can be argued, therefore, that it matters less whether a project is top-down or bottom-up, wireless or DSL, sophisticated or downright crude – and more that anyone who recognises what may be possible, however improbable it might seem at the time, should be listened to and encouraged. If there is an additional lesson, it is that even the most traditional of activities has the potential to generate economic opportunity. For example, broadband access has triggered eco-tourism and SME activity among the indigenous Sámi population of reindeer herders in **Ammarnäs** in Sweden. And the **Fjällhästen** project, also in Sweden and identified earlier as an example of entrepreneurship, has started another eco-tourism business based on tracking reindeer on Icelandic horseback rather than from the uncomfortable alternative of a bicycle saddle. Similarly, **Passerelle ECO** in France is stimulating an exchange trading system using ICT in the unlikely setting of mud huts and camp fires.

With especially good reason, then, it remains essential to take ICT demonstrations out to remote populations, as the **SAREKIDE exhibition** in Spain has done. It is within such communities that the real potential is thought to reside, and less so among the systems and connections which provide ICT. The Czech **PreFarm** project and the **Korean Information Village Programme** are striking examples. In PreFarm, the local value attached to a precision farming approach, based on identifying the effects of soil variation, fertility and elevation,

drove the need for and design of a wireless solution. In Korea, public concern, that remote villages should participate in ICT benefits, created a route map of ICT education and connection, tailored to local realities, which has unlocked an expanding value-added rural economy.

Projects which manage to link the community, with the entrepreneurial spirit, with critical mass and with unique features may, therefore, do best of all. The **eTowns** project in Ireland appears, at this early stage of its development, to integrate most of these features. The first of five planned eTowns is attracting existing information-based businesses by promising the 'work/life' ideal in a peaceful rural setting. In a courtyard development of ten homes-with-workshops (all equipped with broadband), migrating businesses will be welcomed by and sustained within a supportive local community – a community which has already grasped, by itself, the importance of critical mass to social and economic development. It is possible that the Lithuanian **RAIN** project could move in a similar direction although it is not yet clear that technological concerns have been sufficiently balanced by the community factor, in the same way that subsequent in-depth examination of eTowns has revealed.

3.2 Social Opportunities

It is axiomatic that social gains follow any sustained access to the internet. Education, information, self-improvement, participation, better health and better public services all characterise eInclusion. Improved 'quality of life' and 'ageing well in the information society' may be beguiling aims for tomorrow, however, but it is inescapable that ICT projects which proceed at the pace of life as it is lived today expose more reliably what ICT can achieve socially. Projects which allow people to present, transmit and share their local news are well-known – for example, the **Isolated Community of the Faeroe Islands**. Projects which recognise that the pace of life may be unsustainable are perhaps less well-known – for example, the **Watzelsdorf Weinviertel** project in Austria.

It is worth noting a project response to research underway among disadvantaged communities on the periphery of Limerick City in Ireland[57]. The research reveals that 55% of respondents from 400 households are 'late adopters' of ICT. However, 48.4% are "not interested in using e-mail or the internet" at all. They simply do not see the relevance of such technology to the way their lives are lived. (The equivalent figure for 'non-disadvantaged communities', nationally, is 15.4% – a surprising difference which illuminates some of the attitudes embedded on either side of the Digital Divide.) In response, the project partners whose remit is to extend the take-up of ICT among Limerick's peripheral communities have adopted, as their core strategy, a partnership with those active in the same disadvantaged communities whose objective is solely to educate. The privileging of the local challenge of how best to meet local educational need dictates how and at what pace the services available, including ICT, should be rolled out[58]. The partnership preceded the advent of broadband in those areas and is beneficial and capacity-building in itself. Related tactics include placing responsibility for benchmarking and evaluation among the communities, together with providing appropriate training – and consultation exercises, particularly aimed at younger people, on building up a vision of their society tomorrow. In other words, ICT is introduced where and when it is needed, not simply to break down the Digital Divide.

[57] Limerick City Community ICT Steering Group, "Citizen First Evaluation", Interreg IIIb, April 2007 www.citizen-first.net

[58] Limerick City Community ICT Steering Group,"Citizen First Evaluation", Interreg IIIb, April 2007. www.citizen-first.net

ICT should be seen as a catalyst, then, for strengthening the sinews of society as much as for triggering change within it. Examples of 'strengthening' include **CREPAC** in Corsica, where local ICT-based networks or *filières* encourage traditional activities and provide customers for local produce; and the **Ammarnäs project** in Sweden, where the heritage of the Sámi population of reindeer herders and the settlers with SMEs has been protected in parallel with generating related business activity. A similar example is Les plus beaux villages de Wallonie in Belgium. Examples of 'changing' include the social and cultural guidance offered by the **Diakonia project** in Finland and the **CRISP project** in Ireland aimed at enabling the local voice. Projects which do both include **Elmpt** in Germany, the **Sámi Network Connectivity project** and also related to Ammarnäs project in Sweden.

The **Elmpt** project in Germany addresses poor land-line contact between individuals at a particular military camp and their families left at home. The difficulty arose from the nature of the terrain around the camp, the limited numbers of land-lines and poor performance from those broadband solutions judged affordable. It was aggravated as much by the youth and relative isolation of the soldiers, as by their absence for long periods on training and operations and sometimes at short notice. The solution was to build a mesh network at the camp which can be accessed using laptops in accommodation, messes and identified 'hotspots'. Voluntary services are now also using the network to deal with welfare issues and the challenges in transition from service to civilian life. The local economy is benefiting, too, as soldiers adapt the network to obtaining local goods and services.

The **Sámi Network Connectivity project** set out initially to support communication, data compilation and reindeer herd tracking telemetry during the annual migration. A particular need was to keep Sámi children in contact with their teachers. It is becoming apparent, however, as the project unfolds, that here may be a model for socio-economic application to other communities with challenged network capabilities.

3.3 Political Opportunities

The possibilities presented by 'strengthening', 'changing' and 'wider application' were identified, in the previous section, as part of the social impact of extending broadband access. These are exciting ideas but they do also raise questions of ownership and ethics.

The **Watzelsdorf Weinviertel** project in Austria provides an example of the recognition of 'ownership' issues. Strong identity, support for local authority and a pooling of resources – as, for example, in **Allegany County** in Maryland, USA – also suggest why a community, which does not 'own', can nevertheless acquiesce in the lead being taken. In terms of 'ethics', the two **Sámi** projects in Sweden illuminate the need for care and caution whenever the introduction of ICT impinges upon the especially vulnerable.

From several perspectives, then, the case is easily made that special rules should apply beyond the Digital Divide. A parallel investigation[59] has approached the question of "Which rules?" by proposing a 'route map' approach to the introduction of ICT. The proposed route map distinguishes between the release of 'choice' to the citizen and the handing over of project 'control'. Public Internet Access Points, as in the Czech **IKONK@** project and the

[59]Limerick City Community ICT Steering Group, "Citizen First Evaluation", Interreg IIIb, April 2007, www.citizen-first.net

Latvian **Media Event**, are examples of 'choice'. The Irish **eTowns** initiative is an example of 'control'. The route map next asks:

> *Does this intervention, or that aspect of the plan, have an ethical consequence?*
> *If it does, what does the project have to do to address the embedded rights and expectations?*

A formal ethical challenge along these lines may usefully endorse and strengthen 'living lab' programmes – for example, the Czech **WIRELESSINFO** project, and outside the database in this study, the Italian **Frascaati** project and the **Madeira Living Lab**. The Madeira project particularly encompasses stark extremes of society. Indeed, but not in reference to those three projects, such extremes prompt the question whether the expression 'bottom up' has come to rest more upon a convenient assumption of local legitimacy than a positive check that at least some basic, but fundamental questions, have been addressed.

Route map approaches sit well beside the procurement of public infrastructure by PPP – and yet PPP has been identified earlier in this section as having raised doubts about the extent to which the societies to be served are actually included in both the procurement mechanism and the management of the infrastructure. It should be recognised, therefore, that the PPP approach, which is premised on using the private sector to provide what the public sector cannot or will not, has the potential to distort the passing of 'control' and the scope for participation. Research at the University of Limerick, associated with the Sixth Framework Programme and attentive to earlier French recommendations, has demonstrated that PPPs work best when the 'third partner' – that is, the community to be served – is included. In this sense, 'included' means much more than being labelled a 'stakeholder'. A systematic approach to inclusion also seems to be consistent with the proposed EU Constitutional Treaty[60]. The design and adoption of appropriate route maps, therefore, could serve to protect the crucial social interest and to strengthen civil society, while also liberating the local potential for innovation. Route maps would bring predictability and, therefore, greater confidence, too.

Releasing control and inviting participation may seem fundamental to a thriving civil society. However, a substantial literature, together with the history of the proposed EU Constitutional Treaty itself, reminds us what a troublesome concept 'civil society' is in practice. It is possible, therefore, that the bureaucracy associated with process, which must accompany any introduction of route maps and special rules, might not sit comfortably within the active, vibrant civil society that Europe seeks to enable. The direction of the argument here does suggest, moreover, that this is an area which may produce a further political impact as broadband access is made available in rural areas.

The thrust of this section is that local knowledge and local imagination will reliably innovate if given the advantage of broadband access. The concomitant must be, however, that local knowledge and local imagination can also lead to dissent and reliably spread resistance, if so enabled. This seems particularly likely in an age characterised by widespread change and major infrastructure procurement. The impact of widespread change and major infrastructure procurement tends to be felt more in rural areas and, therefore, may be a particular issue beyond the Digital Divide. It is evident that the European environmental protest movement has grown around such issues and that some of its protests are co-ordinated and can also be categorised as 'extreme'. Certain other protests, however, resist co-option into a greater movement and attract wide respect and interest for the coherent, principled stance which

[60] See, for example, Articles I- 32(3), I-47(1) and I-50(1) of the EU Constitutional Treaty

individuals adopt. A topical, Irish example of the latter is the case of the Co Mayo-based objection, called 'Shell to Sea'[61], which rejects the proposal to bring unprocessed gas ashore in a remote part of Ireland's west coast. 'Shell to Sea' and similar projects – for example, the protest against the building of a motorway across Ireland's ancient Hill of Tara[62] – are using the Internet to extremely good effect and yet also to considerable public cost.

The underlying frictions in those two cases are thought to be similar and also typical. They can be traced to a privileging of expert – that is, external – knowledge over local knowledge and to a bureaucratisation of resolution procedures[63]. Resolving such differences as Co Mayo and the Hill of Tara, however, is a political responsibility while, self-evidently, a bureaucratic approach to the adoption of ICT in rural areas would be disastrous. It is argued, therefore, that an *additional* political responsibility attaches to the introduction of ICT in rural areas, *beyond* the existing responsibility to engage with the civil society skills which are expected to develop within them. Sensitivity, support and sympathetic 'hands-off' handling would seem to characterise such additional responsibility. But it could also entail acute burdens where environmental issues, such as Local Agenda 21, are concerned. This is because the challenge of dealing successfully with climate change *must* respect local knowledge and not suppress or distort it.

3.4 Environmental Opportunities

New skills, resources and techniques for farming and forestry are straightforward consequences of broadband access in rural areas. They imply wider knowledge leading and informing a better local response. Training and investment are clearly well directed when used to support that flow of information. When local knowledge takes the lead, however, the results set new directions rather than simply reinforce best practice. The Czech **PreFarm** project and the **Korean Information Village Programme**, already identified in the context of economic opportunity, are good examples of many more. The Czech case introduces a multi-dimensional approach which may gain particular relevance as climate zones drift north from the Equator. The Korean project has generated 'green tours' – an exchange of understanding which must benefit city-dwellers as much as the 80 villages involved.

The Korean project is also an example of the route map approach. It is worth noting that "local autonomy" is one of the key steps – a point of resonance with the recommendation for 'third partnership' when implementing PPPs, explained above. But the additional impression in the Korean project is still that theirs is seen more as an economic opportunity than an impact upon the environment.

It is argued here that a local environmental 'stock-taking' is an essential part of the route map approach. Clearly, ICT will enhance its effectiveness and widen the scope of what can be attempted locally in the cause of the environment. But simply replicating what others do in the cause of economic advantage, when climate change will eventually accentuate the differences, may cause hidden opportunities and even essential initiatives to be missed. The **Buskerud fylkeskommune** project in Norway, which uses ICT to promote bio-energy, is an excellent example of turning local resources and realities to good effect.

[61] http://en.wikipedia.org/wiki/Shell_To_Sea

[62] www.themodernantiquarian.com/site/1117/hill_of_tara.html

[63] Garavan, M., 2006. "Seeking a real argument, in Uncertain Ireland: a Sociological Chronicle, 2003-2004", M. Corcoran and M. Peillon (eds), 73-90, Dublin: Institute of Public Administration.

Such environmental 'stock-taking' is not only intrinsic to Local Agenda 21 but must be addressed even before route map process and broadband access arrive[64]. The interest of young people in environmental issues is well-known and even appeared for a while in certain British initiatives[65] – although these seem to have petered out. In view of the A-BARD opinion that 'children' will be one of the key drivers in the take-up of ICT, there may be a missed opportunity here. For example, the European Youth Portal[66] does not mention 'environment'. Similarly, passing reference to 'sustainable development' in the Rome Youth Declaration, adopted on 25 March 2007, suggests a level of understanding among young people which does not match anecdotal evidence of related school activities and which could usefully be energised and extended. The key may lie in inspiring young people through different messages and different voices. **Passerelle ECO** in France, for example, attracts professionals as much as those who permanently opt out because its message about alternative life styles catches attention and stimulates interest. Indeed, the desire for 'entertainment', which A-BARD also identifies as a key driver, may provide the opportunity for a publicly-inspired intervention to link ICT with the environment in ways that market forces would not consider until a critical mass of interest was demonstrated.

3.5 Culture and Heritage

The need to recognise culture and heritage as an opportunity area was explained in the introduction to this section. Four particular projects stood out – the **Ammarnäs** and **Fjällhästen** reindeers and the **Sámi Network Connectivity project**, all in Sweden – although 'heritage' as a source of ideas, cultural enrichment, art and even business growth is already well known to those who study 'community'[67]. Les plus beaux villages de Wallonie is promoting tourism in "beautiful" villages in Belgium. Those who study the practice of environmental impact assessment understandably despair, therefore, when the modernisation imperative and quest for competitiveness 'scope out'[68] the building blocks of new opportunities despite local efforts to protect them. Those responsible for planning and preparing the physical aspects of laying new infrastructure might bear this in mind.

The solution appears to lie in the interconnection of legitimacy and accountability – specifically in ensuring that projects achieve local legitimacy by accounting for what local

[64] See, for example, www.brooksbulletin.com and www.sierralegal.org concerning the 23 May 2007 report of the steps being taken by local municipalities in Canada, and why they are being taken.

[65] www.la21.org.uk

[66] http://europa.eu/youth/

[67] Two recent and readable Irish contributions to the topic are: Corcoran, M., 2005. "The role of the village in creating a local structure of feeling: evidence from the suburban periphery," a paper presented to the Village Design Conference ('Who has designs on our villages?'), Heritage Castle, Castle Durrow, Laois, 28 June 2005; and Curtin, C., and A. Varley, "Community Action and the State, in Irish Society", Sociological Perspectives, P. Clancy, S. Drudy, K. Lynch and L. O'Dowd (eds), 379-409, Dublin: Institute of Public Administration.

[68] 'Scoping out' is the technique used to place certain features outside the protective envelope of the local environment where impact is to be assessed. The weakness of the process itself was reviewed by Hyder (Parr, S.), 1999. Study on the Assessment of Indirect and Cumulative Impacts as well as Impact Interactions, EC DGXI NE80328/D2/2, www.europa.eu.int

people say must be stewarded[69]. This has particular reference to the 'embeddedness' in the local context, needed by private partners in PPPs. Once again, then, measures which enable the local voice, even before broadband access liberates it, become important considerations.

3.6 Synergies and Interconnections

This section commenced by re-stating an envelope of best practice based upon policy understanding and practical investigation (in subsection 1). The envelope was characterised as "an agenda for action and the means of self-evaluation". It is argued that the impact of the envelope is only realised if it is treated as a complete package, as the patterns and themes in the case studies make clear.

The keys to success were seen, on the one hand, as the individual qualities of entrepreneurship and championing. And, on the other, were the collective qualities of critical mass and linkages. None achieves its full potential, however, if it does not put, at the centre of its attention, place, resources and people. It is on this foundation that powerful solutions are built. This is not a new message. It lies at the heart of LEADER+ good practice.

ICT should be seen as supporting such solutions. It should not lead them unless that is the project plan at that point in time. The Finnish **Diakonia** LdV project is a case in point. Broadband access can change, therefore, as well as strengthen a local context but if it sets out to accomplish its own agenda it might, at best, achieve only random success. Working successfully within a local context calls for different skills and obligations than simply 'rolling out' technical product. And yet the synergies will not be realised if these new functions are not reliably brought into play. 'Strategic assessment' may start with self-evaluation, therefore, but it must then move to a plan if its energy is not to be lost. 'Stakeholders' need a proper role within that plan or else their stake is meaningless. 'Partnership', too, is a myth if it privileges industry expectations over the capacity of the target population to absorb and make use of the technology on offer.

It is against a background of conflicting and possibly unhelpful terminology and assumptions, therefore, that the synergies and interconnections need to be understood. It should be stressed, too, that 'impact' as well as 'capacity' differ from place to place. An intervention or a step to be taken, at one location, may not be achievable without a form of mentoring. The **I-Centre** project in Bulgaria, for example, is dealing with a wholly different situation than **eTowns** in Ireland. The common and crucial understanding, however, is that both those projects should proceed at the pace of the respective communities concerned.

The benefits of broadband access in rural areas will be realised if linked with a systematic approach to rural development. Systematic approaches are, of themselves, transparent and build confidence. They are also consistent with the ethos of LEADER+. The main features that should characterise the systematic approach are:

- Self-evaluation against the envelope of best practice
- A route map incorporating an initial action plan
- Published criteria for key stages of the initial action plan
- Unconditional release of stage funding provided the criteria are met

[69] The Framework 6 NEWGOV project and its partner CONNEX are considering legitimacy and accountability in the context of new forms of governance. Stewardship was identified in NEWGOV Workpackage 24 where its link with PPP 'third partnership' is also under examination.

- A prioritising of content and originality over form and consistency when deciding whether criteria are met
- Training, practical advice and support for local attempts to reach the next stage
- Decision points – 'choice' or 'control', 'public' or 'private'
- Assisted decision-making – to cover technical, financial and contractual options
- Ethical assessments of the consequences of decisions
- Structured 'third partnership' where PPPs are implemented
- Protected dialogue where interventions may be controversial

3.7 Weaknesses and Omissions

The A-BARD final report identifies frustration arising from slow provision of broadband access, from late trials and from an absence of new approaches. The approach proposed above will bring predictability to an uncertain situation. The approach encourages people in rural situations without broadband to take action on their behalf. It sets them realistic, achievable tasks. It also challenges those who do have access, to assess what opportunities may have been missed. Most importantly, it privileges and protects the 'local' dimension so that the eventual impact of broadband access, or a new and innovative use of ICT, is neither deflected nor distorted.

It is appropriate to identify where things could be improved. Top-down approaches, in the form of interventions which change practices or local society, have ethical consequences. Such interventions may also not recognise what local stewardship values, which is a source of innovation in itself. Such interventions may even turn people away from eBusiness, eLearning and eGovernment, if their tone or emphasis is not sensitive and consistent. By their very name, 'Public Private Partnerships' do not place the third partner at the centre of their concentration. Young people are being neglected. The potential of climate change, to be a driver of ICT take-up, is also being neglected. Young people and climate change could be advantageously connected.

It has to be noted, too, that causes of 'failure' – at project level and in take-up response – are generally simple things which better training and supervision could prevent. For example, poor business planning, in the sense of over- and under-estimating, reportedly characterises a number of the projects we have examined. Similarly, a lack of genuine customer focus could inhibit even an interested target population if practical issues like access are neither recognised nor resolved sympathetically (see **Ballyhoura**, where an imaginative, value-adding solution was found during good management practices). Such difficulties are normal responsibilities but can be distorted or become disproportionate burdens if supply-side pre-occupations serve to shift attention from the end user. Where a project apparently focuses on the wrong outcomes (as could have happened in **CREPAC**), the end user may even become disaffected. But whether 'wrong focus' in examples of poor rural ICT take-up is a wider trend linked with internal management problems and even the consequence of skewed funding priorities, this investigation has not been able to establish. Clearly, local issues and difficulties with external funding could also be a cause of failure – just as participation and understanding may impact unhelpfully upon the content and direction of rural development planning.

4. Contribution of Rural Development Programmes

4.1 Policy Perspectives and Related Research

The strategic policy for sustainable rural development is characterised by "continuity and change"[70]. This translates into four thematic axes, supported by one statement of priorities and one statement of principles:

Axis 1	Improving the competitiveness of the agricultural and forestry sectors
Axis 2	Improving the environment and countryside
Axis 3	Improving the quality of life in rural areas and encouraging diversification
Axis 4	Building local capacity for employment and diversification through the horizontal governance
Priorities	Maximising synergies between and within the four axes by translating their objectives into programmes
Principles	Achieving complementarity and coherence between Community Instruments

The role of ICT in the context of this strategy for sustainable rural development is linked with competitiveness, job creation and innovation in rural areas, and with improved governance in the delivery of programmes. ICT has a positive impact to make upon the competence of rural dwellers, upon their skills and upon theirs and the countryside's capital. It provides new and innovative techniques which make it possible to offer new work opportunities, but more importantly, a better and more cost effective approach to deliver innovative services that can enhance the "quality of life" in rural areas. ICT makes those skills available to new actors and entrepreneurs.

The current context for i2010 is 'bridging the broadband gap'[71]. ICT is not only a driver of innovation and competitiveness but also changes the way people live and communicate. That a Digital Divide can be demonstrated, however, requires updating of the current implicit policy assumptions, from 'continuity and change' towards 'change and yet more change'. By way of confirmation that perceptions may not yet be as consistent or coherent as is assumed, the policy appreciation underpinning i2010 can be compared with the Second European Conference on Rural Development in Salzburg, 2003. The Salzburg conclusions encompassed agriculture and forestry, diversification, food quality and safety, access to services, commonality, cohesion, stakeholder participation, partnership and simplification. At Salzburg, ICT had only a supporting role, which i2010 would now reject:

> *The scepticism that held back ICT investments four or five years ago has been replaced by greater confidence in our ability to develop and deploy ICT applications to our economic and social advantage.*[72]

[70] Council Regulation (EC) No 1698/2005 of 20 September 2005 on support for rural development by the European Agricultural Fund for Rural Development (EAFRD), OJ L 277, 21.10.2005, p. 1–40 , http://eur-lex.europa.eu/LexUriServ/site/en/oj/2005/l_277/l_27720051021en00010040.pdf

[71] "Bridging the Broadband Gap: Benefits of broadband for rural areas and less developed regions": 14-15 May 2007, http://europa.eu.int/information_society/events/broadband_gap_2007/index_en.htm

[72] European Commission, 2007a, i2010 - Annual Information Society Report 2007, COM(2007)146, European Commission, Brussels, available at

http://eur-lex.europa.eu/LexUriServ/site/en/com/2007/com2007_0146en01.pdf

It is reasonable to suggest that concern to promote the benefits of ICT may convey a message which is antithetical to – or, at least, in tension with – the direction in which the rural way of life is being led. The European Council's statement in the strategic guidelines for rural development[73], and the European Economic and Social Committee's opinion in response to the Commission's explanation of how to bridge the broadband gap[74], may be a case in point, where the tempo of rural life differs from that apparently imagined by the drafters, who stress prioritisation and urgent action – which is not the way that rural life unfolds. A possibly reduced awareness of the needs of the rural sector in some ICT-sponsored documents, and *vice versa*, may be another. Such inconsistencies could lead to conflicting public interventions, with degraded synergies and lost opportunities.

At the level of implementation, there may be further difficulties. Public private partnerships (PPPs) are aggressively encouraged as means of complementing public intervention. It does not seem to be recognised, however, that the Sixth Framework research into new forms of governance, and academic opinion and ongoing research into the practice of environmental impact assessment and PPP procurement, raise questions about whether PPP interventions, as currently implemented, tend more to exclude than to include the societies they have to serve[75]. If accepted, it would mean that the reification of the Digital Divide by the relentless advances in ICT may cause further marginalisation, or even remove opportunities which rural entrepreneurs might subsequently have turned to good effect.

Other relevant issues are the potential problems of wrong interpretations of data. Broadly speaking, four categories of information are measured in annual broadband surveys – connections, penetration, coverage and eligibility. 'Connections' and 'coverage' are self-explanatory (although it is generally only the DSL standard which is quoted). 'Penetration' reflects coverage per head of population served by DSL-capable exchanges. And 'eligibility' refines 'penetration' to only those households or businesses actually capable of receiving broadband. However, neither 'penetration' nor 'eligibility' reflects take-up – and that 'connection' does not illuminate who is being connected, why and with what impact. Availability and cost clearly dictate the data that can be collected. But the first inevitable consequence is that current annual broadband surveys are tailored more to ICT provision than to its role in sustainable rural development. And the second is that 'quality of life' becomes erroneously identified with parity of broadband access. More in-depth and qualitative on-going investigations are required (perhaps based on the model of the interactions with the participants of the best practice cases in this study).

Rural development programmes in Europe have been critical to the development of community projects and the challenge of accessing ICT benefits. LEADER+ (now only Leader), particularly, has played a central part in local capacity building, in public-private partnerships and in multi-dimensional actions involving various different rural groups. Actions have ranged across the forestry and agrifood sectors and included small businesses and other local public and private agents. The capacity, the partnerships and the rural groups

[73] 2006/144/EC, Council Decision of 20 February2006 on Community Strategic Guidelines for Rural Development (programming period 2007 to 2013) , http://eur-lex.europa.eu/LexUriServ/site/en/oj/2006/l_055/l_05520060225en00200029.pdf

[74] 2006/C 318/36, Opinion of the European and Social Committee on the Communication from the Commission to the Council, the European Parliament, the European Economic and Social Committee and the Committee of the Regions – Bridging the Broadband Gap. http://eur-lex.europa.eu/LexUriServ/site/en/oj/2006/c_318/c_31820061223en02220228.pdf

[75] NEWGOV, www.eu-newgov.org

have all contributed in their way to achieving the roll-out and take-up of broadband as we have found it.

The strength of rural development projects has been their bottom-up approach. They are driven by local need rather than centralised intervention. However, the narrow focus of bottom-up projects complicates the extrapolation of sustainable business models or quantitative cost-benefits. While further funding may also be jeopardised, the greater problem may be the difficulty in learning lessons from what is already being done.

We now examine recent EU policies and programmes related to rural development and ICT. We seek to isolate those practices at the level of the rural development programmes themselves which appear to stimulate successful bottom-up approaches, and any factors which impede them.

4.2 Analysis of the current situation

Member States share a common vision of the key role that ICT can play as a driver for change in the rural areas. However, the wide range of policy initiatives and instruments designed to encourage its adoption raises questions of coherence and coordination at the level of implementation, and even of focus on the real problems that should be addressed.

ICT adoption is generally linked directly to the availability of broadband and access to PCs. For example, the development of faster and innovative broadband services is evidently accelerating the adoption of ICT in urban areas. But this leads also to bigger differences in development and some rural areas then lag even further behind. Broadband Internet availability in rural areas is a problem that has not been solved yet, although it is possible to observe that significant progress is being made in some parts. By such reasoning, connectivity itself is conveniently confirmed as one of the main obstacles to overcome.

There is a variety of funding instruments and programmes in place at European, national and regional levels all designed to support rural development actions linked with ICT and also reflecting the aforementioned linkages.

We suggest that, within the broad three-tier framework at Community level and reinforced by the connectivity argument, the idea has taken hold that solving ICT availability and take-up is essentially a technical challenge. For example, there is a general acceptance that ICT and rural development are linked – but no strategic targets to be achieved or measured within defined timeframes. Specifically, a key ICT policy document such as i2010 does not address explicitly the particular problems that the rural areas are suffering from the lack of broadband infrastructure in remote areas and lower ICT take-up rates are known to be barriers that must be overcome in order to guarantee the development of the rural areas and their inclusion in the Knowledge Society.

4.2.1 Summary of support initiatives – EU policy

This subsection summarises EU policy relating to ICT and Rural Development. This enables synergies and possible duplicated effort to be identified. In order to present the results in a way that can easily be assimilated, this subsection includes two tables.

The following table summarises kinds of instruments or funds accessible through each Commission DG.

Instruments / Funds \ DG	DG AGRI	DG INFSO	DG REGIO	DG Enterprise and Industry	DG Research	DG – Education & Culture	DG Environment	DG Competition	DG Communication	DG SANCO	DG Employment, Social Affairs & Equal Opportunities
ERDF			X								
EAFRD	X										
EAGGF	X										
ESF											X
Cohesion			X	X	X	X	X				
Life Long Learning	X	X	X			X[76]	X				X
Grants based on calls for proposal (e.g. RTD projects)		X		X	X		X	X[77]	X	X	
Contract based on Tenders	X	X	X	X	X		X			X	

Table 1 Funding Instruments applicable to ICT take-up in Rural Development per EC General Directorate.
Source: Authors' estimates

The funds included in Table 1's analysis fall into two groups. First, there is the group comprising the major funding instruments – the European Regional Development Fund (ERFD), European Agricultural Fund for Rural Development (EAFRD), European Agricultural Guidance and Guarantee Fund (EAGGF), European Social Fund (ESF) and Cohesion Funds. These funds are managed either by the DGs themselves or by National/Regional Governments through the Rural development programs and the Operational Programmes. The second group comprises funds directly managed at Community level and with a certain degree of autonomy. These include grants to EU public and private organisations based on calls for proposals, and contracts from EU organisations resulting from specific calls for tenders. We summarise the main features of each group below.

From the analysis could be seen that each group could be distinguished by the question of 'control'. By 'control' we mean the authority to determine what is implemented with European funding. From this perspective, 'control' is delegated by the first group.

We argue that by delegating control, the first group has allowed national and regional governments to reproduce the assumption that solving roll-out and take-up is a technical problem. And by retaining control, the second group has itself embedded this assumption. Our analysis will bring the approach of each group into a sufficient balance with the other to re-focus funding for breaking the Digital Divide upon real causes not specious reasoning.

[76] Lifelong Learning programme related to Education and Training in Rural Areas, http://ec.europa.eu/education/policies/lll/lll_en.html

[77] Market competition (e.g. ICT sector) and Stat Aid regulations

4.2.2 Summary presentation of the major EU funding instruments

The **ERDF** is a European fund which aims to strengthen economic and social cohesion in the European Union by correcting imbalances between its regions. In short, the ERDF finances:

- Direct aid to investments in companies (in particular SMEs) to create sustainable jobs
- Infrastructures linked notably to research and innovation, telecommunications, environment, energy and transport
- Financial instruments (capital risk funds, local development funds, etc.) to support regional and local development and to foster cooperation between towns and regions
- Technical assistance measures

The **EAFRD** is a single instrument to finance rural development policy. Its objectives are to improve the competitiveness of agriculture and forestry, the environment and rural land management, as well as to improve the quality of life and diversification of the rural economy. The EAFRD will also finance local development strategies and technical assistance.

The **Guidance section** of the European Agriculture Guidance and Guarantee Fund (EAGGF/Guidance) provides support for farmers and for rural development, primarily in regions whose development is lagging behind. Rural areas facing structural difficulties are also specifically targeted by the Structural Funds.

ESF sets out to improve employment and job opportunities in the European Union. It intervenes in the framework of the Convergence and Regional Competitiveness and Employment objectives. ESF supports actions in Member States in the following areas:

- adapting workers and enterprises – for example, lifelong learning schemes, designing and spreading innovative working organisations
- access to employment for job seekers, the unemployed, women and migrants
- social integration of disadvantaged people and combating discrimination in the job market
- strengthening human capital by reforming education systems and setting up a network of teaching establishments

The **Cohesion Fund** is aimed at Member States whose Gross National Income (GNI) per inhabitant is less than 90% of the Community average.[78] It serves to reduce their economic and social shortfall, as well as to stabilise their economy. It supports actions in the framework of the Convergence objective. It is now subject to the same rules of programming, management and monitoring as the ESF and the ERDF.

[78] For the period 2007-2013, the Cohesion Fund concerns Bulgaria, Cyprus, the Czech Republic, Estonia, Greece, Hungary, Latvia, Lithuania, Malta, Poland, Portugal, Romania, Slovakia and Slovenia. Spain is eligible to a phase-out fund only as its GNI per inhabitant is less than the average of the EU-15.

The Cohesion Fund finances activities under the following categories:

- Trans-European transport networks, notably priority projects of European interest as identified by the Union
- Environment (here, the Cohesion Fund can also support projects related to energy or transport, as long as they clearly present a benefit to the environment – for example, energy efficiency, use of renewable energy, developing rail transport, supporting intermodality, strengthening public transport, etc.)

The **Europe Aid Co-operation Office** (EUROPEAID) is the European Office responsible for implementing the external aid instruments of the European Commission funded by the European Community budget and the European Development Fund. It is an important actor in this area. In a number of cases, EUROPEAID is used to design and implement rural development policies into the new EU member states.

In respect of ICT take-up in rural areas as a measure intended to achieve rural development, EUROPEAID supports initiatives oriented to rural development, food and health – for example, access, quality care, security, education systems and access to school.

The following table identifies where resources are available to specifically support different initiatives with respect to relevant topics or domains related to ICT take-up and rural development.

Domains \ DG	DG AGRI	DG INFSO	DG REGIO	DG Enterprise and Industry	DG Research	DG – Education & Culture	DG Environment	DG SANCO	DG Employment, Social Affairs & Equal Opportunities	DG Enlargement
SMEs	X	X	X	X	X		X	X		X
Agrifood sector	X	X	X	X	X		X	X		X
eLearning/eSkills	X	X	X	X		X			X	
eTourism -ICT in Tourism	X	X	X							
eBusiness /eCommerce Practises	X	X	X	X						
Employment & creation Practices	X		X	X					X	X
Rural eCommunities		X	X							

Table 2 Availability of supporting initiatives or programmes per domain relevant to ICTs and Rural Development

Source: Authors' estimates

In line with the Strategic Guidelines for Rural Development, the domains addressed in this table refer to ICT take-up and ICT application in the following sectors: SMEs, Agrifood sector, eLearning/eSkills, eTourism - ICT in Tourism, eBusiness/eCommerce Practices, Employment Creation Practices, and eCommunities. It must be stressed that, only the major targeted sectoral domains are identified (marked with an X in table 2). In Table 1, only one DG has a focus on rural eCommunity. There is a scope for improving coherence,

complementarity and also the focus of funding through strengthened cooperation between different Community policies and financial instruments.

DG AGRI supports ICT initiatives based on the framework of the European rural development policy. It has three main axes as already discussed:

(a) improving competitiveness for farming, food industry and forestry;
(b) environment and land management; and
(c) improving quality of life and diversification of the rural economy.

The role of the private and national funding (co-financing) in this area is also relevant.

Under the Seventh Framework ICT work programme, DG INFSO defines key RTD challenges on which the European Commission should focus its efforts. Regarding ICT take-up for rural development, DG INFSO covers many topics or objectives which might be widely applied in rural areas. Examples include initiatives to promote innovative eHealth systems for the purpose of inclusion; enabling all EU citizens to have access to such services independently of where they are working and living; and breakthroughs in food manufacturing processes by which means ICT applications in small businesses might have a wider impact in rural areas. Even the concept of intra and inter-enterprise cooperation could have a strong impact on issues such as food traceability, by involving the whole supply chain from 'farm to fork'.

The Directorate General for Regional Policy supports initiatives which facilitate the development of less prosperous regions. Some of the activities funded are directly connected with rural development and the promotion of ICT take-up.

The Competitiveness and Innovation Programme (CIP), administered by DG Enterprise & Industry, pays particular attention to the needs of Small and Medium-sized Enterprises (SMEs). It facilitates the implementation of innovative technologies in SME processes – for example, those which change the business into an eEnterprise. Important conditions for this support are expected impact on employment, and impact on the real needs of SMEs.

The CIP programme includes:

- Entrepreneurship and Innovation Programme (EIP)[79]
- Information Communication Technologies Policy support Programme (ICT PSP) which will support the EU strategy for i2010[80].
- Intelligent Energy Europe(IEE) contains of Rational Use of Energy and Renewable Energy Sources i.e. RUE and RES. Under these heading programmes like ALTENER, SAVE, STEER, COOPENER and Horizontal[81] are financed.

Eco-innovation is a recurring theme of the whole CIP programme. It can be argued, therefore, that CIP will contribute partially to ICT development in rural areas.

DG Research also manages a large number of areas under the Seventh Framework Programme. In addition to research in domains ranging from Biotech to Food Safety or Energy and Environment, DG Research launches calls for Research among SME

[79] http://ec.europa.eu/energy/intelligent/projects/horizontal_en.htm

[80] http://ec.europa.eu/information_society/eeurope/i2010/index_en.htm

[81] http://ec.europa.eu/energy/intelligent/projects/horizontal_en.htm

Associations, and Research for the benefit of SMEs. In these Programmes, issues such as eCommunity, or ICT for innovation processes in SMEs, are specifically addressed.

In respect of ICT implementation and application by rural inhabitants, DG Education & Culture funds initiatives oriented to supporting lifelong learning – for example, eLearning, ICT adoption and collaboration. It support is specifically oriented to target groups such as: youth, ageing population and Citizens in Less Favoured Regions.

Topics like sustainable production or sustainable management of natural resources are addressed under the initiatives supported by DG Environment. Theses are closely related to both food and feed, to SMEs and also to forestry activities, all of which are very relevant in rural settings.

DG SANCO publishes calls for tenders, expression of interest and calls for proposals related to Public Health, Consumer Affairs, Food Safety, and Plant Heath. Take-up of ICT and its potential for rural development can be linked with consumer affairs and food safety issues.

The major part of the European Social Fund is managed by DG Employment, Social Affairs & Equal Opportunities. Training and learning activities (for example, tenders for Information and training measures for workers' organisations) are considered essential measures for achieving the Community's objectives.

Programmes developed under DG Enlargement are agreed between the European Commission and the authorities of the countries concerned. Some of those projects involve the adoption of new technologies in different environments, such as government, schools or other institutions. Some of these programmes are also managed under EUROPEAID.

Conclusion

We conclude from this analysis of the EU's supporting initiatives that several programmes designed to support rural development actions are directly or indirectly related with the promotion and use of ICT. Equally, there are programmes designed to promote the adoption of ICT that directly or indirectly have an impact on rural development. The coherence of this support may be evident to experts, but conveys complexity to those who are not, which is a barrier in itself. There is scope for further clarification and simplification of the access to the different European financial support instruments available for rural ICT projects within specific European, National and/or Regional programmes.

4.2.3 Empirical evidence on EU support for ICT development in rural areas

In this section, we link EU support with the database using the structure of sustainable rural development. In effect, we look back at funding policy from the perspective of this study's database of best practice cases themselves.

Improving the competitiveness of the agricultural and forestry sector

Pre-farm and **Wireless Info** are typical examples of support from DG INFSO. The research and innovation component of these projects is very relevant. It is probably at the same level as the innovation needs of the **Promotion of Bio-Energy in the North Sea Region** project in Germany that has received ERDF support.

The **ICT competence in Ballyhoura Country** and **S'Atra Sardigna** projects are typical examples of Leader support in which the use of ICT is born of a need to transform internal processes and knowledge.

Improving the environment and the country side

DG INFSO supporting initiatives and private investment play a significant role in projects that deal with the improvement of the environment and the country side. Such examples could be the **System for training about sustainability aspects in Vysocina region** and **Media Event** projects.

Improving the quality of life in rural areas and diversification of the rural economy

The role of the ERDF support is crucial in regional or national projects oriented to improve the quality of life in rural areas and diversification of the rural economy. The **Wireless Connections in the Archipelago**, the **Limousin Regional Network**, the **Rural Area Interconnection to the Educational Broadband IT Network (RAIN)**, the **Nuenen**, the **Broadband Communication Network of Kuyavia and Pomerania Region (K-PSI)**, the **Basque Country - KZ@BZ** and the **Sámi Network Connectivity Project** are typical examples of projects that use sound financial support. All these projects share a common factor that is the deployment of ICT infrastructure, mainly broadband communications to bridge the broadband gap.

The role of Leader+ support reaches also the deployment of broadband infrastructure but normally in projects that are implemented at the local level such as the **Cahersiveen Satellite Broadband** project.

The role of private investment is significant across these strategic areas. The commitment and leadership of private local and regional champions is also an important key. While we celebrate the variety of projects that results, we raise the question of what more could be achieved if the reach of European initiatives was less limited. There is some superficial evidence of a barrier here, as the previous section has suggested, against which local imagination struggles and to some extent succeeds. Making rural ICT development programmes more accessible to local initiatives with potential for solving local access and take-up seems to be one of the main barriers to overcome. This study concludes that rural ICT policies need to balance top-down and bottom-up approaches and proposes a set of recommendations (see Recommendations) for good practice and policy targeting.

4.3 Analysis of the Rural Development Support contribution to ICT adoption

The main aim of this section is to isolate elements which identify and explain how rural development support can promote ICT and support the goals of the rural development policy. The secondary aim is to attempt to explain where barriers may have been created in the implementation of the central vision of the role of ICT in rural development.

Rural areas have their own special characteristics, which complicate our analytical task. Nevertheless, it is possible to move beyond the reproduced assumption that the provision and adoption of ICT is the solution applicable to all of them and observing how ICT is treated by different rural development programmes.

4.3.1 Rural development programmes contribution to ICT

The information on ICT actions gathered from various Rural Development Programmes 2007-2013 is summarized according to the contribution of the ICT actions (competitiveness or diversification, respectively Axis 1 and Axis 3). Objectives to which each measure aims are also listed. This is not an exhaustive set of information as actions are sometimes broadly defined. Often programming authorities prefer to stay broad, and because of this vagueness in their description of the measures/actions thus giving freedom of the potential beneficiaries to choose what to provide. However, this does not confirm expectations that these programming authorities have a clear view on what is demanded in their rural areas and how it is to be achieved. Road maps defining particular steps to be undertaken by the rural communities in order to increase the roll-out or take-up of ICT are also not displayed, though such road maps could have a significant impact on streamlining the efforts of local authorities and potential beneficiaries.

The common vision of ICT as a driver for change in rural areas, with which this section began, is reproduced in a less than systematic way in the Rural Development Programmes (RDPs). Indirect linkages treat ICT in a patchy and inconsistent way. Direct linkages are vague and unspecific in most of the cases. The priorities of those to whom control is delegated sometimes replace the main concerns of the European programmes. The principles underpinning sustainable rural development are thereby diminished because the act of delegation has insufficiently placed the role of ICT among the central issues for collective concentration.

Several conclusions could be derived from the tables in this subsection.

First, ICT initiatives fall under only two of the four thematic axes of Rural Development Policy 2007-2013 reflect meaningfully the importance of ICT in the promotion of measures at national and regional level:

Axis 1. Improving the competitiveness of the agricultural and forestry sector.

Axis 3. Improving the quality of life in rural areas and encouraging diversification of the rural economy.

While often Axis 3 impacts are delivered through the Leader axis, it is obvious that the agri-environmental contribution of ICT is not yet fully developed, if developed at all.

To be sure, measures adopted by national and regional administrations can be linked with domains where we have identified successful projects. But this seems more a reflection of bottom-up approaches which happen to resonate with strategic policy for sustainable rural development, than the efficient operationalisation of strategic policy creating a climate which fosters innovation.

The screening of the rural development programmes (drafts and voted) showed that broadband initiatives are not taken on board by all programme authorities. One of the reasons for this lack of widespread action is that support for broadband development over the current programming period 2007-2013 will be provided not only by the EAFRD, but also by the ERDF. Demarcation lines drawn by the Member States/Regions have ensured that overlapping of financing will not occur, and often programming authorities have decided to opt for Structural Funds support. We should not neglect also the fact that sometimes ICT project implementers choose to run projects under the State aid rules. However, this does not

exclude other ICT actions under different rural development measures. The tables below summarize our main findings from the Programmes that were analysed.

Clearly, there is a significant variety of actions associated with many of the rural development measures (mostly the ones of investment type). Obviously, such actions will have direct or indirect impact, both on increasing access to internet and on improving ICT applications in the various businesses, or strengthening the eSkills of the population.[82]

Broadband infrastructure is developed mostly under measure 321 "Basic services for the economy and rural population". This covers various actions such as establishment of ICT centres for information, training and business support, ICT services such as health (advice) and local eGovernment, establishment of access to the latest information and communication technology, provision of infrastructure for prevention and screening, establishment of communication points through which care providers could be connected to external databases, branch pharmacy, etc.

It is interesting to notice that ICT has reserved a wide set of actions within the two diversification measures under Axis 3 (codes 311 and 312) as well as under the rural tourism measure. This covers mostly the development of web portals bringing consumers and producers closer to each other, creation of business infrastructure, applications of innovative services and development of mobile solutions, eToursim services (e.g. web portals for reservation and booking; information services or points) and so on.

Under Axis 1 ICT has remained a much narrower application. In many measures the focus is on the purchase of software, hardware and technologies, thus indirectly affecting the use of ICT and the take-up of ICT. However, when it comes to production processes, options taken on board represent a more colourful set of actions, though again limited to the aforementioned investments.

There is a glaring omission of actions on eCommunities in the analysed RDPs, though some of the ICT actions can support ICT initiatives within and among which the meaning of eCommunity could be addressed.

Domain	Rural Development Programmes contribution
Agrifood sector	Positive
SMEs	Positive
eBusiness /eCommerce Practices	Positive
eLearning/eSkills	Positive
Employment creation Practices	Positive
Ecommunities	**potential for improvement**
ICT in Tourism	Positive

Table 3 Contribution of Rural Development Programme by domain of application

Source: Authors' estimates

The reasons for seeking to develop eCommunities (or related ICT projects) are driven more by the need of the social groups concerned.[83] They are not driven by the funding structure or

[82] Demarcation with ESF should also be provided. In certain areas, training on ICT knowledge/technologies falling under Axis 3 is provided entirely through the ESF and hence missing from the Rural Development programmes.

[83] The TeleTech on the Faeroe Island and the Ikonk@ projects are good examples of private initiatives in the eCommunities domain. The reach of the ERDF support has also had a positive impact in eCommunities

the assumptions of the applicable schemes. Often funding becomes difficult to obtain for eCommunity initiatives, which leaves applicants to search for other routes, for example through their local and regional authorities.

While the presence of examples is encouraging, we can also see that there is scope for further initiatives and a renewed focus on this important domain. While the social groups and communities themselves are at the core of the eCommunities, we believe that the funding schemes should actively provide and support them.

In terms of objectives, RDPs are specific and clear, but again most are within a generally defined scope. Despite the fact that often objectives are common and too general (coinciding with the objectives of the axes), cases where a more straightforward, concrete and focused aims are presented exist. Among the general objectives we may include the increase of professional knowledge of ICT users, enterprise development through innovation, increase in competitiveness, development of alternative activities, promotion of products and industries/sectors, jobs creation, etc. However, notable exceptions are objectives such as promoting distance learning, teleworking and the use of new digital technology, ensuring access to ICT-related services, establishment of an IT background in supporting private forestry operations, and to maximise the tourism potential of rural areas. There is, however, a need for more targeted approaches which will be reflected in the actions specified or the priorities set by national/regional policy makers.

projects such as the Broadband Communication Network of Kuyavia and Pomerania Region (K-PSI) and the Sámi Network Connectivity Project.

Table 4 Group of objectives and actions affecting the application of ICT in rural areas, Axis 1, 2007 - 2013

Measures	Objectives	Actions
Axis 1 "Improving the competitiveness of the agricultural and forestry sectors"		
111 Vocational training and Information actions	Increase the professional knowledge of those working in the agricultural sector	Development of in-service training system; acquisition and improvement of training materials; eLearning; acquisition of information technology and software for adult education
	Provision of an innovative actions	Training on IT knowledge and technologies
		Training and information on the value of ICT in farm management
114 Advisory services for farmers and forest holders	Enterprise development through encouraging the development of existing and new products and activities	Application and use of ICT in business administration, marketing, knowledge transfer, funding applications, internet, etc.
121 Modernisation of agricultural holdings	Modernization of the agricultural production structure	Introduction of new technologies as well as information systems facilitating production and sale
	To improve the competitiveness and economic performance of agricultural holdings through improving the physical capital.	Introducing new technologies and innovation
	To increase the competitiveness of the agricultural sector	Purchase or installation of machines, devices, including computer equipment
122 Improving the economic value of forests	Establishment of an IT background in order to support private forestry operations	Purchase and development of forestry machinery and supplementary equipment, the establishment of the associated IT background and the generation of reproduction materials
123 Adding value to agricultural and non-wood forestry products	To promote the application and spread of information and communication technology	Implementation of information and communication technology in production and business activities (e-business applications, homepage creation, specific software and equipment
	To encourage innovation into forest related micro-enterprises	Improving the application of ICT within the supply chain
	To improve the economic performance and international competitiveness of the agri-food and forestry sectors	Purchase of software for managing the enterprise and controlling production and storage processes
124 Co-operation for development of new products, processes etc	To optimise the use of ICT	Purchase of software, hardware and technologies

Table 5 Group of objectives and actions affecting the application of ICT in rural areas, Axis 3, 2007 – 2013

Measures	Objectives	Actions
Axis 3 "Improving the competitiveness of the agricultural and forestry sectors"		
311 Diversification into non-agricultural activities	Improvement of the quality of life in rural areas and diversification of economic activities To encourage the development of basic services for farmers and other rural population To assist farm households to diversify into non-agricultural activities	Development of mobile solutions Implementation of information technology, incl. new technologies for bringing the producer and the consumer closer to each other Encouragement of all types of activities alternative to agriculture in rural areas through the use of ICT Creation of business infrastructure Innovative Services Accounting, consulting or IT services
312 Support for business creation and development	Development of innovative products and activities. Development of crafts	Utilisation of local ICT capacity Setting up of new, and for the development of existing non-agricultural micro-enterprises Development of traditional crafts and provision of conditions for representation of traditional crafts and marketing of crafts products
313 Encouragement of tourism activities	To maximise the sustainable, regionally balanced, tourism potential of the rural areas through provision of necessary infrastructure Encouragement of introduction of the IT developments To increase employment levels and to develop alternative activities in rural areas Promoting the tourist industry	Development of the use of internet and eCommerce facilities for the provision of booking and information services to tourists Construction, reconstruction or equipment of information points with public Internet access intended for public use Developing of the infrastructure facilities and services for sustainable village and agri-tourism as well as of the active tourism Development of ICT infrastructure for tourism activities such as marketing, distribution,

		communication and reservations
321 Basic Services for the Economy and Rural Population	To ensure access to ICT-related services	ICT services for the population and business knowledge and education centres and ICT based services (training, health advice, business support, municipal services etc.)
	Improvement and development of (missing) basic services	Establishing integrated information and training centres using ICT
	Promoting distance learning, teleworking and the use of new digital technology in both the private and public sectors	Utilisation of ICT initiatives for better availability of services and work
	Jobs creation	Building and renewal of local communications
	More communities with broadband connections	Establishment of access to the latest information and communication technology for enterprises in rural areas
	Improve the accessibility of the basic services in the settlements of the rural areas	Find new profitable solutions for the offer of services, utilising modern information technology (wider spread of Internet).
		Internet access
		(IP) telephone service
		Provision of infrastructure for prevention and screening
		Rehabilitation (remedial gymnastics)
		Communication points (IT by which the care providers can be connected to outside data bases)
		Branch pharmacy
331 A training and information measure for economic actors operating in the fields covered by axis 3	To equip rural dwellers and communities with the appropriate range of skills and training to derive maximum social and economic benefit from the initiatives available under Axis 3	Training and support to be provided for elements such as developing the capacity of rural dwellers to utilise ICT including Internet and broadband to access e-Services and other public/commercial electronic applications

4.3.3 Re-positioning ICT in rural development approaches

Engaging with the potential benefits of ICT investment in the context of rural development is intellectually demanding. Investing in other basic infrastructures such as roads, electricity and water supply, is still far simpler to understand and justify. The lack of broadband infrastructure in a rural area remains, however, is the main hurdle to be overcome, but we believe that by treating ICT as a road or utility, concentration upon tangibles can displace receptiveness to ideas which do not fit preconceived solutions. The infrastructure, the skills and the means of access are, of course, all important but we think that the problem has been addressed only partially.

The case studies show that motivating rural areas to take up broadband is a good practice and a useful starting point. Motivation has a positive impact both on ICT adoption and on the development of the rural area. In principle, this impact can be articulated persuasively and easily made relevant: the availability of broadband infrastructure enables the introduction of ICT in businesses, in the rural residential market and also in public administration; it is a primary driver for stimulating ICT take-up and the development of the Information Society in rural areas. In practice, however, the vision expressed may not be the vision that local people recognise. Even the terminology 'community', for example, makes assumptions that only external logic will reliably support.

Sometimes, the development of ICT infrastructure and its spreading are not enough to ensure ICT adoption. Much more is needed. Something must stimulate demand, in the sense of depicting ICT as such a flexible and valuable tool that local people will recognise that the gulf between external ideas and their own local vision is a distraction. The message that rural development programmes might wish to project is the immense power of ICT. In other words, 'choice' needs to be aligned in the rural public's mind with empowerment and not with selection. Similarly, 'control' is the reward for those who choose to step in the direction of empowerment.

We believe that upon this basic equation, the natural synergy between, for example, EAFRD (e.g. Leader) and ERDF can be realised. Realisation entails tightening up the links from European policy through to local initiative – and easing control over local initiative so as to sensitise policy directions to local needs.

However this is only part of 're-positioning' ICT in rural development programmes. Building blocks are needed – things to do which directly or indirectly facilitate roll-out and take-up by continuously exposing target areas to empowerment through ICT. These are all familiar steps to take but we believe that reflecting upon them, by using the 'choice or control' perspective, is useful:

- Modernizing the public sector, for example, putting Internet in schools, introducing eGovernment and eHealth, and promoting eLearning. It is especially important to obtain active public sector participation in the promotion and introduction of ICT in the rural area. The commitment of the rural public sector to develop a primary driver programme in the field of eGovernment, eHealth or eLearning represents a great opportunity, and constitutes a strong partnership, for stimulating ICT adoption within the community.

- Developing local content. By delivering content which is stimulating and relevant to a large proportion of the rural community, ICT penetration rates in the rural population will increase.
- Raising the digital e-skills of businesses and citizens. This is crucial for the development of the Information Society in rural areas. Most of the rural development initiatives underway are very active on this matter.

4.4 Recommendations

Our main recommendations for future programmes based on past experience and the foregoing research are:

- Encourage the development of projects in the rural eCommunities domain. eCommunity projects rely upon bringing the social community together. This community is then challenged, provoked, stimulated, assisted and even bullied by champions and leaders into identifying their own solutions and into using ICT for familiar domestic tasks. Activities could include web surfing, e-mail, downloads, homework and so on. But the activities matter less than the earlier act of capturing their attention and stimulating the self-belief of the social community concerned.
- Stronger coordination between DG AGRI, DG REGIO and DG INFSO to ensure a common vision for the use of ICT in support of Rural Development programmes. There is a need of reaching a common vision that could be called an 'eRural Agenda'.
- Greater sensitivity within the various funding mechanisms to local responses. The eRural Agenda could go out of track if it did not give as much control as possible to the target populations.
- Extending investment in broadband infrastructure to all local public sector agencies and schools. This would provide channels by which eGovernment, eHealth and eLearning can be presented and extended; and physical building blocks for local imagination and knowledge to adapt and develop.
- Investing in communal ICT infrastructure. Developing the content of local networks, and raising the digital e-skills of local businesses and citizens.

5. Synthesis

In drawing together the conclusions and recommendations of this Review, this synthesis seeks to step outside what is familiar and predictable about connectivity and the rural context, in order to raise new insights.

It views the combination of connectivity and the rural context from three perspectives – from the local or communal perspective, the business perspective and the public perspective. Next, it offers a systematic appraisal of the structural evidence of how and why ICT seems actually to be taken up in rural areas. By 'structural evidence' is meant the shape and recurring features. Finally, it considers measures which could increase the capacity of rural areas to streamline the desired connection between roll-out and take-up.

5.1 The Local Perspective

The central problem seems to be that people in rural areas, when they can access broadband, do not necessarily take it up for the reasons that the public sector imagines or seeks to bring about. Dutton and Helsper (2007) very recently have remarked:

> *The digital divide is now as much about choice as lack of access*

eGovernment, eLearning and eHealth certainly have a role in citizens' developing relationship with the services available over the internet but they are not the 'killer applications'. If families do turn to ICT on account of their children or in search of entertainment, as A-BARD insists, it is even more likely that emotional, rather than cognitive, reasons will drive connection. This could explain why take-up does not always follow roll-out.

Emotional reasons, like expressions of consciousness, are not easily shared – or at least will require more expert investigation than current surveys feel affordable or necessary to undertake. Certainly, current surveys do not seem to be targeted at the issues which would improve understanding of attitudes to connectivity in rural areas. Qualitative data could be, for the time being more valuable than more quantitative assessments. It may be more productive to investigate themes which resonate more communicably within families, especially families in remote locations, rather than pursue questions which are perhaps too wide for some to respond to easily. Such themes would certainly include ageing, for example. But *ageing well within the Information Society* could be accused of resting upon urban assumptions about income and circumstances which may not prevail rurally. A more productive approach, therefore, may be to investigate local issues, local interest and the local need for information. In other words, to understand *ageing well within a particular rural society*.

Local 'demand' evidently remains passive until an intervention causes it to seek external stimuli like broadband connection. Events generated solely within the local context are unlikely to have that effect unless they happen to provoke the right emotional response. Interventions which catalyse passive demand, therefore, could be the desired 'killer actions'. But such interventions will also provoke demands for accountability and stewardship, for ethical protection and political support. They need to be targeted carefully and are not without consequences.

If interventions are problematic and rural demand inclined to be passive, then making broadband available needs careful planning and management to realise the available opportunities. The solution lies in developing projects together *with* the people concerned, rather than doing it *for* them. Proceeding at the pace of the people being exposed to the opportunities of ICT can reliably lead to self-improvement, (communal) awareness, bright ideas, innovation, strengthened cultural identity, co-operative ventures and to environmentally helpful responses. These all have the potential to stimulate the development of the civil society and to initiate a desired relationship with broadband.

Choice and control are crucial to that development. Such distinctions need to be addressed and explained to the targeted populations. Roles have to be distinguished and clarified. Hybrid solutions, particularly unconventional or even ill-defined or "untidy" combinations of technology and local enterprises, are to be welcomed and commended – for ingenuity and knowledge will take the arrangement forward in time. Once again, however, the key lies in ensuring that broadband does not add to structural constraints or force the pace of projects underway, but releases the inherent dynamism of the local interest that has been touched. The way to accomplish that is to work within local realities while adding value and new options to what is locally prioritised.

5.2 The Business Perspective

There would seem to be three categories of business demand for access to broadband – the established sector, the diversifying sector and the niche market. The circumstances of each are different.

The established sector is likely to benefit from tailored interventions in the form of bespoke packages. These comprise demonstrations of best practice, acquisition of skills to achieve it, and provision of resources to accomplish it. Demand aggregation then becomes the foothold for broadband provision. Industry understanding provides the argument for connection. And structural adjustments become the tools of sectoral reform.

The diversifying sector needs markets, customers and general business support and training. These are characterised by 'new things to do' – a wholly different activity from the needs of the established sector which can be characterised as 'new ways of doing the same things'. And yet there is every reason to encourage both activities in the same enterprise or industry – in farming or forestry, for example – and at the same time.

The niche market differs yet again. It comes from thought, from observation, from innovation and from experience. It is characterised by 'what no-one else is doing but what everyone really needs'. Its need is for investment and highly specific business services.

This is a complex operational scenario for the rolling-out and taking-up of ICT. However, it is not difficult for a business person to identify to which category his/her business belong and what he/she needs in terms of support. To that extent, there is an absolute clarity in the business perspective. Arguably, therefore, supply-side confusion may primarily fix the Digital Divide, not technical ability to provide broadband or the availability of money to pay for it. Secondary influences may include problems of communication with and within the public and private sectors – problems of supply side 'penetrability' for the determined individuals who still manage to drive through innovation and market success.

Successful entrepreneurs identify a market need and have a customer focus. In most of the cases, these entrepreneurs have admitted ICT into their own business planning processes and seek good, responsive relations with those who can supply additional solutions. The entrepreneur may not signal his presence on the market until the correct time comes. Champions, in comparison, tend to be critical thinkers and have personal qualities of courage and persistence. Unlike entrepreneurs, they signal their presence because the market is not yet developed. It is important to understand, therefore, when a local driver for change presents itself, *what message* is being communicated and for *what reason*. The needs of entrepreneurs and champions differ but tend to lie within a common area marked by business services, technical support and barriers' removal. Most importantly, there needs are interlinked. Those whom they approach should be alert to opportunities of offering other linkages in return. Entrepreneurs and champions both seek an innovative, 'can-do' response from those who can supply solutions and an ongoing relationship built on trust and collaboration.

5.3 The Public Context

The purpose of the public sector is to build the quality of the society, whereas the local perspective, for example, is to protect the quality of life. Clearly, perceptions of 'quality' differ.

Improved public services may be the 'end' for the public sector, but those services are only a 'means' for the tax-paying public to access advantages which are relevant to them. 'Relevance' also differs across the urban/rural divide. Demonstrably in the case of ICT and broadband, a common response from citizens on each side of that divide is not assured. Citizens may not respond cognitively if a public service does not also offer advantages relevant to their quality of life – that is, emotional gains.

The case can be made that the Digital Divide may actually mark a different frontier than broadband access and take-up. Viewing the Divide solely in those terms may be frustrating the attempt to raise beyond 70% the numbers of rural dwellers people who do connect. It may even have a further adverse impact upon the legitimacy of cross-cutting EU initiatives. The Divide could possibly mark the limits of what is practicable and achievable without a new arrangement of public and citizen interests irrespective of ICT. Therapeutic language, such as 'partnership' and 'stakeholding', evidently hold out new possibilities where target populations are starting from a relatively low level. But equally clearly, they could serve to alienate more sophisticated rural communities if projects do not actually relinquish control and genuinely privilege an authentic local voice.

The public need for its interventions, then, is for legitimacy, relevance and respect, in the eyes of the target population. If those three elements are present, then community interests will be inclined to follow a public authority's lead. The concomitant is that the public sector cannot design such interventions in isolation. It has to graft them on to themes of relevance to the local imagination – and that means being prepared to accept untypical solutions.

Untypical solutions could embrace *the self-evaluation and action plan approach* described in chapter 3. This entails lowered tolerance, and increased sensitivity, thresholds on the part of

LEADER[84]. It should recognise *the potential of young people* to champion certain themes, particularly environment and responses to climate change. This entails a more imaginative approach to youth institutions than is evident on the European Youth Portal and possibly a concerted approach to climate change, as a potentially powerful energising theme, in schools. And it must recognise *the crucial role of local knowledge* in solutions affecting the local environment. This entails a willingness to listen to research and to respectable arguments that the PPP process has limitations that can be repaired and improved.

In respect of PPP, the phrase 'third partnership' has been offered. Third partnership is consistent with social democracy but, more particularly, releases the synergy between the legitimacy necessary to the public sector, the accountability needed by local communities and the embeddedness sought by market interests (Gidden, 2003; Kay, 2007). One early description of third partnership seems to encapsulate today's challenge in breaking down the Digital Divide:

> *The objective in public/private partnership is, by definition, to provide a service for the people. The user customer must therefore be at the heart of the concerns of the actors in the public/private partnership. Consequently, the setting up of PPP projects must take into account the requirements of the third partner …*[85]

A theoretical model of third partnership and a statement of its practical application have been researched in the context of the PPP programme in Ireland. Irish PPP practice is based upon the British model and is considered something of a benchmark in procuring infrastructure and services in developing situations.

5.4 Structural Aspects

The 'problem' of those rural dwellers who do not connect is not a problem of a transient population. This is a stable population. Those who have responded from a similar situation to the opportunity offered by ICT and broadband, whether or not it is actually available, have done so in ways that can be isolated. To the 'drivers' identified by A-BARD can be added:

- A communal sense of lagging behind, stimulated by a champion
- As a side-effect of a successful local enterprise
- Spurred by the experience or ICT familiarity of others – i.e. a hybrid champion-entrepreneur
- Following a targeted intervention to deliver local quality of life gains
- As an emotional response for local, personal reasons
- As local resistance to imposed agenda
- In defence or protection of local values or traditions
- When offered control or ownership of a project which will enhance local life
- As part of a meaningful partnership arrangement

It is suggested that the structural aspects of a positive response to broadband will not be reliably reproduced if:

[84] It is understood, from experience, that LEADER+ can attach conditions that are unrealistic and unaffordable – once again a possible example of supply-side detachment from what is locally realistic and achievable.

[85] France's Minister of Transport (M. Gaysott) speaking at the Second Global Summit on PPPs held in Dublin, 2001.

- Solutions are imposed and provision made in isolation from local needs or realities
- Interventions overlook the need for accountability and stewardship, do not proceed at the pace of the target communities, and do not add value to what is locally prioritised
- Supply-side confusion clouds user certainty and clarity of purpose
- Supply-side estimations are unrealistic
- If the 'partnership' arrangements do not offer linkages or meaningful roles for local people
- If critical masses are ignored
- If project outcomes are inappropriate, perhaps by being skewed by external funding priorities or failures

5.5 Enhancing Measures

Measures which could increase the capacity of rural areas to streamline the desired connection between roll-out and take-up include:

- A route map approach based on self evaluation and local action plans
- Financial inducements to self-help – with ICT and service inducements to stimulate take-up
- A systematic response to local plans, consistent with LEADER+ but based upon achievable criteria and staged release of funding, and characterised by lower tolerance and increased sensitivity thresholds
- Complementarity between funding regimes and a general 'spring-cleaning' of rural development programmes

6. Recommendations

On the basis of the analysis and assessment of the role of policies and programmes, and of the results of the synthesis in chapter 5, this section now sets out our recommendations for good practice and policy targeting. These recommendations focus on how to maximise the benefits of ICT for rural development – in other words, they treat the two challenges together and not as separate issues.

Underpinning our recommendations is the complementary role of LEADER+ and the rural development programme process. This nexus has played a central part in 'bottom-up' approaches. But it is not thought to have successfully delivered models which reliably reproduce innovation and projects which work.

The reason why is not easily isolated and could seem controversial. If complexity can be accepted (at least as it might appear to the inexperienced or uninitiated end-users), together with a certain lack of dynamism, imagination and representation at the national planning level, then the underlying problem may reflect the *institutionalised convenience* of accepting that funds are being properly allocated, rather than the *operational inconvenience* of vigorous engagement with successful outcomes and dismal failures. This is not a question of financial auditing which possibly gets in the way of vigorous engagement. It may be more a question of ingrained deference – to the LEADER brand and LEADER agencies, and to the hierarchical authority of the rural development planning process.

1 Our first recommendation, therefore, is for reflection upon priorities. LEADER comes into its own as a transparent 'umbrella' over a given rural society. Those crossing new ground within that society are properly protected by LEADER from the intrusion and disruption of external inspection over and above the existing burden of 'paper trails' and preparing accounts. But this does not mean that such successes and failures should not be scrutinised and learned from. Similarly, the rural development planning process might benefit from the participation of new voices trained in thinking laterally and imaginatively about ICT in the rural context.

Our principal concern reflects the possible loss of effectiveness that must follow overly complex rules and procedures between DG effort and the dispersal of European funds. Where funding for rural ICT initiatives is concerned, these can obscure the problem we are trying to solve. We do not know, for example, whether the theme of eCommunities is better off under one DG – or has its full effect as a stimulus for ICT take-up degraded by this solitary oversight. It only seems certain that funding for a key area is not being managed consistently with the funding arrangements for other key areas.

2 Our second and related recommendation, therefore, concerns an eRural Agenda. By this we mean improving the coherence, complementarity and focus of European funds and programmes in the area of using ICT for sustainable rural development, through strengthened cooperation between Directorates. In accomplishing this, the priority must be to remove barriers to obtaining funding. Anything which gets in the way of putting a bright idea to work will have the effect of privileging ingrained institutional sensitivities over innovation, champions and local entrepreneurs. In clarifying how funds and programmes are to work together, the suitability of ERDF/EAFRD to

infrastructure and EAFRD/LEADER to content, training, applications and services would seem still to be relevant building blocks.

3 Our third recommendation concerns the introduction of an eProcurement process. Just as certain infrastructure projects can be fast-tracked, with appropriate safeguards, in order to accelerate the delivery of strategic infrastructure (the example of Ireland was quoted), so ICT projects in the rural context would benefit from similar procedural mechanisms. The question of what safeguards should be attached to eProcurement has not been explored although the Research Team believes these are adequately outlined in the 'Beneficial Factors' of our next recommendation. We foresee that eProcurement could be usefully supported by such innovations as web site guidance on the steps to be followed and the impacts and consequences of different decisions.

4 Our fourth and related recommendation is directed at the interface between LEADER and those seeking access to funding. We have identified factors which diminish the prospect of a successful outcome (adverse factors) and the factors which enhance it (beneficial factors). These are repeated again below, with the observation that there is not simply one layer of barriers to be overcome. Where rural populations are concerned, we believe that barriers may attach to every good thing they might try to do on their own behalf. The beneficial factors below constitute one 'multiple' recommendation for supporting local projects and helping to overcome a multiplicity of the obstacles they face.

ADVERSE FACTORS	BENEFICIAL FACTORS
• Solutions are imposed and provision made in isolation from local needs or realities • Interventions overlook the need for accountability and stewardship, do not proceed at the pace of the target communities, and do not add value to what is locally prioritised • Supply-side confusion clouds user certainty and clarity of purpose • Supply-side estimations are unrealistic • 'Partnership' arrangements do not offer linkages or meaningful roles for local people • Critical masses are ignored • Project outcomes are inappropriate, perhaps by being skewed by external funding priorities or failures	• Self-evaluation against the envelope of best practice • A route map incorporating an initial action plan • Published criteria for key stages of the initial action plan • Unconditional release of stage funding provided the criteria are met • A prioritising of content and originality over form and consistency when deciding whether criteria are met • Training, practical advice and support for local attempts to reach the next stage • Decision points – 'choice' or 'control', 'public' or 'private' • Assisted decision-making – to cover technical, financial and contractual options • Ethical assessments of the consequences of decisions • Structured 'third partnership' where PPPs are implemented • Protected dialogue where interventions may be controversial

5 Our fifth recommendation is intended to lay the foundations for innovation and take-up where no champion or leader is apparent. It is possible that the following could even entice such personalities out into the open where they can be assisted and supported. We recommend the investment in broadband infrastructure in public sector agencies and schools. These become the channels by which eGovernment, eHealth and eLearning are presented and extended – but they also become physical building blocks for local imagination and knowledge to adapt and develop.

6 Our sixth recommendation concerns applications and skills – a 'soft' investment in parallel with the infrastructure above. 'Killer Applications' is, we think, a distracting, and possibly an unhelpful, term. There are no killer applications and we discourage use of the phrase. However, there are two areas for attention which will help stimulate local interest – and it is local interest which will in turn drive the take-up of broadband. These two areas are (a) developing local content, and (b) raising the digital e-skills of local businesses and citizens.

Our recommendations complement those of the Broadband Gap Conference in May 2007[86]. We agree that broadband is the enabling infrastructure of the Knowledge Economy and therefore a target of public policy in support of the diffusion of the Information Society in under-served rural areas. And in particular:

- *The EU rural development policy cannot cover every need related to ICT and broadband in rural areas. It has to act in synergy with other EU policies, national and regional policies. Rural and regional development strategies need to include ICT in a coherent way.*
- *Market forces are the main drivers of broadband deployment, but the remaining gaps in rural and remote areas may still require public intervention. Public intervention should increase incentives to invest and lower entry barriers.*
- *Direct public funding is not the only available tool to bringing broadband to under-served areas. Demand aggregation policies can create a critical mass of users, exploit economies of scale and facilitate commercial investment.*
- *ICT skills and digital literacy are critical to the effectiveness of any broadband strategy. Training should constitute an important chapter of all projects in support of the Information Society.*

We conclude by endorsing strongly the recent OxIS Report.[87] We agree that the digital divide is about choice. However, the factors which drive that choice are more than those identified by OxIS and previous studies. They rest also upon:

- A communal sense of lagging behind, which can be stimulated constructively by a champion
- Being driven as a side-effect of a successful local enterprise
- Being spurred by the experience or ICT familiarity of others
- Following a targeted intervention to deliver local quality of life gains

[86] DG INFSO: "Bridging the Broadband Gap Brussels 14_15 May 2007, Conference Conclusions", http://ec.europa.eu/information_society/events/broadband_gap_2007/docs/conclusions.pdf

[87] www.oii.ox.ac.uk/microsites/oxis

- Emotional responses for local, personal reasons
- Local resistance to imposed agenda
- Defence or protection of local values or traditions
- Being offered control or ownership of a project which will enhance local life
- Being part of a meaningful partnership arrangement

It is through actions which trigger such responses that the benefits of ICT will reach more rural communities – provided even mixed and untidy means of accessing them can be supported and put in place.

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Glossary of Terms

3G Third Generation Mobile Telephony; the network currently in the process of being introduced that will permit high data transfer speeds and advanced services.

ADSL Asymmetrical Digital Subscriber Line

Benchmarking This means measuring how well one country, business, industry, etc. is performing compared to other countries, businesses, industries, and so on. The 'benchmark' is the standard by which performance will be judged. Benchmarking is one of the techniques used in the 'Lisbon process'

Bluetooth Shortwave radio-based technology employing a new type of chip that enables wireless transfer of signals at short distances between telephones, computers and other equipment.

Broadband Transfer principle entailing greater bandwidth than that available for traditional transfer of voice. Transfer speeds of 2Mbit/s and higher are generally considered to be broadband.
To ensure a total focus on the objectives of the study and to avoid technical distractions and "re-inventing the wheel", the following definition of broadband was adopted from the A-BARD project[88] for this study:

> *Broadband is about Digital Inclusion for all rural areas – its an aspiration to accessible, affordable, convenient, always-on, fully-interactive connectivity and use of ICT to overcome the Digital Divide and achieve equality with all urban areas. Broadband is dynamic, relative and constantly changing - "faster than what I had before".*

Browser Client program used to navigate through the information resources of the Internet.

CDMA Code Division Multiple Access; technology for digital transfer of radio signals between, for example, a mobile phone and a base radio station.

Civil Society This is the collective name for all kinds of organizations and associations that are not part of government but that represent professions, interest groups or sections of society. It includes (for example) trade unions, employers' associations, environmental lobbies and groups representing women, farmers, people with disabilities and so on. Since these organizations have a lot of expertise in particular areas and are involved in implementing and monitoring European Union policies, the EU regularly consults civil society and wants it to become more involved in European policymaking.

Client A program on a networked computer that utilises the services of a server. May also refer collectively to both computers and programs.

Cohesion This means (literally) 'sticking together'. The jargon term 'promoting social cohesion' means the EU tries to make sure that everyone has a place in

[88] Analysing Broadband Access for Rural Development (A-BARD), www.a-bard.org

	society – for example by tackling poverty, unemployment and discrimination. The EU budget includes money known as the 'Cohesion Fund' which is used to finance projects that help the EU 'stick together'. For example, it finances new road and rail links that help disadvantaged regions take a full part in the EU economy.
Convention	This term has various meanings, including (in the EU context) a group of people representing the EU institutions, the national governments and parliaments, who come together to draw up an important document. Conventions of this sort met to draw up the Charter of Fundamental Rights of the European Union and the draft EU Constitution.
Council	There are three different European bodies with the word 'council' in their names: The European Council This is the meeting of heads of State and government (i.e. presidents and/or prime ministers) of all the EU countries, plus the President of the European Commission. The European Council meets, in principle, four times a year to agree overall EU policy and to review progress. It is the highest-level policy-making body in the European Union, which is why its meetings are often called "summits". The Council of the European Union Formerly known as the Council of Ministers**,** this institution consists of government ministers from all the EU countries. The Council meets regularly to take detailed decisions and to pass European laws. The Council of Europe This is not an EU institution. It is an intergovernmental organization based in Strasbourg and it aims (amongst other things) to protect human rights, to promote Europe's cultural diversity and to combat social problems such as xenophobia and intolerance. The Council of Europe was set up in 1949 and one of its early achievements was to draw up the European Convention on Human Rights. To enable citizens to exercise their rights under that Convention it set up the European Court of Human Rights.
CRM	Customer Relationship Management; program that helps a company handle customer relations in an organised way, by integrating sales, marketing, customer service, and support.
DDF	Digital Divide Forum
DECT	Digital Enhanced Cordless Telecommunications
Democratic deficit	It is often said that the EU's decision-making system is too remote from ordinary people, who cannot understand its complexities and its difficult legal texts. The EU is trying to overcome this "democratic deficit" through simpler legislation and better public information, and by giving civil society (see above) a greater say in European policymaking. Citizens are already represented in EU decision-making via the European Parliament.

DG	The staff of the main EU institutions (Commission, Council and Parliament) are organized into a number of distinct departments, known as "Directorates-General" (DGs), each of which is responsible for specific tasks or policy areas. The administrative head of a DG is known as the 'Director-General' (a term sometimes also abbreviated to 'DG').
Domain Name	Web address that can be obtained by registering with domain companies for a .com, .net, or .org domain
DSL	Digital Subscriber Line
EAFRD	European Agricultural Fund for Rural Development (EAFRD). The EAFRD shall finance, in a context of shared management between the Member States and the Community, the Community's financial contribution to rural development programmes implemented in accordance with the Community legislation on support for rural development by the EAFRD.
EAGGF	European Agricultural Guidance and Guarantee Fund. The European Agricultural Guidance and Guarantee Fund (EAGGF), set up by Regulation No 25 of 1962 on the financing of the common agricultural policy (as last amended by Regulation (EEC) No 728/70) consumes a large part of the general budget of the European Union. The Fund's Guarantee Section finances, in particular, expenditure on the agricultural market organisations, the rural development measures that accompany market support and rural measures outside of Objective 1 regions, certain veterinary expenditure and information measures relating to the CAP. The Guidance Section finances other rural development expenditure (not financed by the EAGGF Guarantee Section).
eBusiness	Electronic Business[89], or "e-Business", is defined broadly as any business process that relies on an automated information system. Today, this is mostly done with Web-based technologies. The term "e-Business" was coined by Lou Gerstner, CEO of IBM. Electronic business methods enable companies to link their internal and external data processing systems more efficiently and flexibly, to work more closely with suppliers and partners, and to better satisfy the needs and expectations of their customers. In practice, e-business is more than just eCommerce. While e-business refers to more strategic focus with an emphasis on the functions that occur using electronic capabilities, eCommerce is a subset of an overall e-business strategy. eCommerce seeks to add revenue streams using the World Wide Web or the Internet to build and enhance relationships with clients and partners and to improve efficiency using the Empty Vessel strategy. Often, eCommerce involves the application of knowledge management systems. E-business involves business processes spanning the entire value chain: electronic purchasing and supply chain management, processing orders

[89] http://en.wikipedia.org/wiki/E-business

	electronically, handling customer service, and cooperating with business partners. Special technical standards for e-business facilitate the exchange of data between companies. E-business software solutions allow the integration of intra and inter firm business processes. E-business can be conducted using the Web, the Internet, intranets, extranets, or some combination of these.
EC	This abbreviation refers either to the 'European Community' or to the 'European Commission'. The European Community Is the present name for what was originally called the 'European Economic Community' (EEC). The European Commission Is the politically independent institution that represents and upholds the interests of the European Union as a whole. It proposes legislation, policies and programmes of action and it is responsible for implementing the decisions of Parliament and the Council.
eCommunities	There is not one single definition of eCommunities[90]. eCommunities can include a group of people with a common interest, living in a region/municipality or defined by age, sex or other characteristics. They use Internet to communicate and to develop their interests. In this report we have used the term for people living in a certain region.
eDemocracy	eDemocracy is the use of ICT, such as the Internet, in enhancing democratic processes within a democratic republic or representative democracy. It is a political development still in its infancy, as well as the subject of much debate and activity within government, civic-oriented groups and societies around the world. The term is both descriptive and prescriptive. Typically, the kinds of enhancements sought by proponents of eDemocracy are framed in terms of making processes more accessible (particularly important for remote rural areas); making citizen participation in public policy decision-making more expansive and direct so as to enable broader influence in policy outcomes as more individuals involved could yield better policies; increasing transparency and accountability; and keeping the government closer to the consent of the governed.
EDGE	Enhanced Data rates for Global Evolution; enhancement technology for GSM or TDMA permitting Global Evolution (EDGE) data transfer speeds up to 384 kbit/s.
EDI	Electronic Data Interchange; a collection of standardised tools for the exchange of information computer-to-computer, specially adapted to electronic commerce.
EEA	This abbreviation refers to the European Economic Area – which consists of the European Union and all the EFTA countries except Switzerland. The EEA Agreement, which entered into force on 1 January 1994, enables Iceland, Liechtenstein and Norway to enjoy the benefits of the EU's single market without the full privileges and responsibilities of EU membership.

[90] Definition by Rural ICT Study Research Team

EEC This is the abbreviation for the European Economic Community – one of three European Communities set up in 1957 to bring about economic integration in Europe. There were originally six member countries: Belgium, France, Germany, Italy, Luxembourg and the Netherlands. In 1993, when the Treaty of Maastricht came into force, the EEC was re-named the European Community (EC) and it forms the basis of today's European Union.

EFTA This is the abbreviation for the European Free Trade Association – an organization founded in 1960 to promote free trade in goods amongst its member states. There were originally seven EFTA countries: Austria, Denmark, Norway, Portugal, Sweden, Switzerland, and the United Kingdom (UK). Finland joined in 1961, Iceland in 1970, and Liechtenstein in 1991. In 1973, Denmark and the UK left EFTA and joined the EEC (see above). They were followed by Portugal in 1986, and by Austria, Finland and Sweden in 1995. Today the EFTA members are Iceland, Liechtenstein, Norway and Switzerland**.**

eGovernment eGovernment[91] (from electronic government, also known as e-gov, digital government, online government or in a certain context transformational government) refers to government's use of information technology to exchange information and services with citizens, businesses, and other arms of government. eGovernment may be applied by the legislature, judiciary, or administration, in order to improve internal efficiency, the delivery of public services, or processes of democratic governance. The primary delivery models are Government-to-Citizen or Government-to-Customer (G2C), Government-to-Business (G2B) and Government-to-Government (G2G) & Government-to-Employees (G2E). The most important anticipated benefits of eGovernment include improved efficiency, convenience, and better accessibility of public services.
While eGovernment is often thought of as "online government" or "Internet-based government," many non-Internet "electronic government" technologies can be used in this context. Some non-internet forms include telephone, fax, PDA, SMS text messaging, MMS, wireless networks and services, Bluetooth, CCTV, tracking systems, RFID, biometric identification, road traffic management and regulatory enforcement, identity cards, smart cards and other applications; polling station technology (where non-online e-voting is being considered), TV and radio-based delivery of government services, email, online community facilities, newsgroups and electronic mailing lists, online chat, and instant messaging technologies. There are also some technology-specific sub-categories of eGovernment, such as m-government (mobile government), u-government (ubiquitous government), and g-government (GIS/GPS applications for eGovernment).

[91] http://en.wikipedia.org/wiki/E-Government

eHealth

eHealth[92] (or e-health) is a relatively recent term for healthcare practice which is supported by electronic processes and communication. The term is inconsistently used: some would argue it is interchangeable with health care informatics, while others use it in the narrower sense of healthcare practice using the Internet. The term can encompass a range of services that are at the edge of medicine/healthcare and information technology:

- Electronic Medical Records: enable easy communication of patient data between different healthcare professionals (GPs, specialists, care team, pharmacy)
- Telemedicine: includes all types of physical and psychological measurements that do not require a patient to travel to a specialist. When this service works, patients need to travel less to a specialist or conversely the specialist has a larger catchment area.
- Evidence Based Medicine: entails a system that provides information on appropriate treatment under certain patient conditions. A healthcare professional can look up whether his/her diagnosis is in line with scientific research. The advantage is that the data can be kept up-to-date.
- Consumer Health Informatics (or citizen-oriented information provision): both healthy individuals and patients want to be informed on medical topics.
- Health knowledge management (or specialist-oriented information provision): e.g. in an overview of latest medical journals, best practice guidelines or epidemiological tracking.
- Virtual healthcare teams: consist of healthcare professionals who collaborate and share information on patients through digital equipment.

eLearning

Electronic learning[93] or eLearning is a general term used to refer to computer-enhanced learning. It is used interchangeably in so many contexts that it is critical to be clear what one means when one speaks of 'eLearning'. In many respects, it is commonly associated with the field of advanced learning technology (ALT), which deals with both the technologies and associated methodologies in learning using networked and/or multimedia technologies.

Many technologies can be, and are, used in eLearning: such as screencasts , ePortfolios, electronic performance support system, PDA's, MP3 Players with multimedia capabilities, web-based teaching materials, hypermedia in general, multimedia CD-ROMs, web sites and Web 2.0 communities, discussion boards, collaborative software, e-mail, blogs, wiki, text chat, computer aided assessment, educational animation, simulations, games, learning management software, electronic voting systems and virtual classrooms

Most eLearning situations use combinations of the above techniques.

An example of this is *moodle* which use: discussion board threading, wiki

[92] http://en.wikipedia.org/wiki/EHealth

[93] http://en.wikipedia.org/wiki/E-learning

and real time textual chat. However, moodle is referred to a CMS, this is because course material if often video, mp3, text documents, scanned images or links to other web sites.
Along with the terms learning technology and Educational Technology, the term is generally used to refer to the use of technology in learning in a much broader sense than the computer-based training or Computer Aided Instruction of the 1980s. It is also broader than the terms On-line Learning or Online Education which generally refer to purely web-based learning. In cases where mobile technologies are used, the term M-learning has become more common.
eLearning is naturally suited to distance learning and flexible learning, but can also be used in conjunction with face-to-face teaching, in which case the term Blended learning is commonly used.
In higher education especially, the increasing tendency is to create a Virtual Learning Environment (VLE) (which is sometimes combined with a Management Information System (MIS) to create a Managed Learning Environment) in which all aspects of a course are handled through a consistent user interface standard throughout the institution. A growing number of physical universities, as well as newer online-only colleges, have begun to offer a select set of academic degree and certificate programs via the Internet at a wide range of levels and in a wide range of disciplines. While some programs require students to attend some campus classes or orientations, many are delivered completely online. In addition, several universities offer online student support services, such as online advising and registration, e-counselling, online textbook purchase, student governments and student newspapers.
eLearning can also refer to educational web sites such as those offering learning scenarios, worksheets and interactive exercises for children. The term is also used extensively in the business sector where it generally refers to cost-effective online training.

eProcurement

Electronic integration and management of operations related to the procurement process including request for proposal, authorisaion, order, deliverable and payment between purchaser and supplier. Electronic Procurement can be either the business-to-business or Business-to-Consumer purchase and sale of supplies and services through the Internet as well as other information and networking systems, such as electronic data interchange (EDI) and Enterprise Resource Planning (ERP).
The main types of e-procurement are[94]:

- Web-based ERP (Electronic Resource Planning): Creating and approving purchasing requisitions, placing purchase orders and receiving goods and services by using a software system based on Internet technology.
- e-MRO (Maintenance, Repair and Operating): The same as web-based ERP except that the goods and services ordered are non-product related MRO supplies.
- e-sourcing: Identifying new suppliers for a specific category of purchasing requirements using Internet technology.

[94] See http://en.wikipedia.org/wiki/E-procurement

- e-tendering: Sending requests for information and prices to suppliers and receiving the responses of suppliers using Internet technology.
- e-reverse auctioning: Using Internet technology to buy goods and services from a number of known or unknown suppliers.
- e-informing: Gathering and distributing purchasing information both from and to internal and external parties using Internet technology.

ERDF

European Regional Development Fund.
ERDF resources are mainly used to cofinance:

- productive investment leading to the creation or maintenance of jobs;
- infrastructure;
- local development initiatives and the business activities of small and medium-sized enterprises.

In practice, all development areas are covered: transport, communication technologies, energy, the environment, research and innovation, social infrastructure, training, urban redevelopment and the conversion of industrial sites, rural development, the fishing industry, tourism and culture.

ERP

Enterprise Resource Planning is an integrated business system that handles entire or large parts of a company's administration, planning and logistics. Payroll and human resources administration systems are included, business systems, production and inventory systems, as well as logistics systems, often combined and supplemented with EDI.

European Communities

In the 1950s, six European countries decided to pool their economic resources and set up a system of joint decision-making on economic issues. To do so, they formed three organizations:

- the European Coal and Steel Community (ECSC),
- the European Atomic Energy Community (Euratom),
- the European Economic Community (EEC).

These three communities – collectively known as the 'European communities' – formed the basis of what is today the European Union. The EEC soon became by far the most important of the three and was eventually renamed simply 'the European Community' (EC).
EC decisions are taken using the 'Community method' (see above), which involves the EU institutions. This covers everything the EU does except for those things that are decided purely by agreement between governments.

Extranet

Extension of a company's intranet onto the Internet, permitting selected customers, suppliers and colleagues working in the field to obtain exclusive access to information and services through the web.

Firewall

Software and hardware systems that protect an internal network from outside data that could be harmful to the network, such as a virus sent via the Internet.

Four freedoms One of the great achievements of the EU has been to create a frontier-free area within which (I) people, (2) goods, (3) services and (4) money can all move around freely. This four-fold freedom of movement is sometimes called "the four freedoms".

Free trade area This means a group of countries that have removed barriers to trade between them – barriers such as import tariffs and quotas. Several free trade areas have been established around the world: Mercosur in South America, Nafta in North America and EFTA in Europe, for example. The European Union is also a free trade area, but it is much more than that because it is built on a process of economic and political integration, with joint decision-taking in many policy areas.

FTP File Transfer Protocol

GSM Global System for Mobile Communications, the most prevalent standard today for digital mobile telephony. Used on the 900 MHz and 1,800 MHz frequencies in Europe, Asia and Australia, and 1,900 MHz in North America and Latin America.

HTML Hypertext Markup Language, code language for creating documents for use on the Web. HTML defines the structure and appearance of a Web document.

ICT Information and Communications Technology

Innovation As one of the purposes of this study is to assess what practices have been most successful in making ICT a strategic and innovative factor for growth and employment in rural areas, a definition of Innovation was required.
In this study we used the Commission's own definition of innovation which is briefly *"the successful production, assimilation and exploitation of novelty in the economic and social spheres"* (See COM(1995) 688). That COM also presents a more detailed definition that is relevant to this study and its case studies

> *"innovation is the renewal and enlargement of the range of products and services and the associated markets; the establishment of new methods of production, supply and distribution; the introduction of changes in management, work organization, and the working conditions and skills of the workforce."*

The Commission states[95] "*These definitions continue to be a valid basis for our approach to innovation policy, and are consistent with the Lisbon European Council's perception of the importance of innovation to competitiveness. Since it is through enterprises that the economic benefit of the successful exploitation of novelty is captured, the enterprise is at the heart of the innovation process.*"
Competition through innovation is probably as important as price competition for rural SMEs to react to market pressures. It is the new enterprises with growth potential that are often the most innovative,

[95] COM(2003) 112, "Innovation policy: updating the Union's approach in the context of the Lisbon strategy"

	forcing established enterprises to respond to the challenge by themselves becoming more innovative. Encouraging the emergence of new firms is a strong force for innovation in many sectors, but especially in rural areas. While research is a major contributor to innovation, for most rural SMEs, it is mainly entrepreneurial action that leads to value creation. The speed and efficiency of the diffusion of innovation through rural economies is critical to productivity and economic growth. Through the forces of competition, imitation and the use of ICT, an initial innovation can be developed and improved so that the impact on the economy is many times greater.
Intergovernmental	This literally means 'between governments'. In the EU, some matters – such as security and defence issues – are decided purely by intergovernmental agreement (i.e. agreement between the governments of the EU countries), and not by the 'Community method' (see above). These intergovernmental decisions are taken by ministers meeting in the Council of the European Union, or at the highest level by the prime ministers and/or presidents of the EU countries, meeting as the European Council.
Intranet	A network, based on IP, that belongs to an organisation, usually a company, and is only accessible to the organisation's members and employees or other authorised persons.
IP	Internet Protocol, protocol that constitutes the basis for all communication on the Internet. Defines how information is transferred between systems. Version 4 (IPv4) is most commonly used at present. The pending version 6 (IPv6) is also called IP next generation (IPng).
IP telephony	Technology for transfer of voice calls on the Internet. Also called Voice over IP, VoIP.
ISDN	Integrated Service Digital Network
LAN	Local Area Network, a basic component in a company's information management.
Lisbon strategy	To compete with other major world players, the EU needs a modern efficient economy. Meeting in Lisbon in March 2000, the EU's political leaders set it a new goal: to become, within a decade, "the most competitive and dynamic knowledge-based economy in the world, capable of sustainable growth with more and better jobs and greater social cohesion." The EU's leaders also agreed on a detailed strategy for achieving this goal. The 'Lisbon strategy' covers such matters as research, education, training, Internet access and on-line business. It also covers reform of Europe's social protection systems, which must be made sustainable so that their benefits can be enjoyed by future generations. Every spring the European Council meets to review progress in implementing the Lisbon strategy.
Market Failure	The concept that market does not reflect the full societal costs of all economic activity and, in particular, the economic costs imposed on third parties. Market failure occurs when markets do not bring about economic efficiency and do not allocate scarce resources efficiently in a way that achieves the highest total social welfare in a market/industry. Government

intervention may be required to address the situation in the public interest.

Member State The countries that belong to an international organisation are its 'member states'. The term is also often used to mean the governments of those countries.
From 1 May 2004, the member states of the European Union are Austria, Belgium, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Poland, Portugal, Slovakia, Slovenia, Spain, Sweden and the United Kingdom.

PDA Personal Digital Assistent, a small portable computer carried by the user, primarily used for notes, addresses and e-mail. Also called a hand-held computer.

R & D Research and Development

Router Packet switch for connecting local networks with traffic control and filtering capabilities when there are several routes for each information packet to be transported between two endpoints.

Rural Areas To ensure a total focus on the objectives of the study, and to avoid location identification complications and "re-inventing the wheel", the straight forward OECD definition of "rural" as used in the Strategic Guidelines for RDP 2007-2013 was used in this study.
In the Organisation for Economic Co-operation and Development (OECD) rural definition[96], a community is defined as "rural" if its population density is less than 150 people per square kilometre. This includes the individuals living in the countryside, towns and small cities (inside and outside the commuting zone of larger urban centres). Then a region is defined as:

- **Predominantly Urban (PU)** – if less than 15% of the population lives in rural communities. These urban regions contain the largest cities.
- **Intermediate Region (IR) -** if between 15% and 50% of its population lives in rural communities. Intermediate regions tend to contain small cities.
- **Predominantly Rural (PR) -** if more than 50% of its population lives in rural communities.

To tie in with the work of the Digital Divide Forum Report[97], its definition of "rural areas" for ICT access (which maps well – but not exactly to the OECD definition) was also used in this study, i.e.

- **Urban areas**: areas with population density > 500 inhabitants/km²
- **Suburban areas**: areas with population density > 100 and < 500 inhabitants/km²
- **Rural areas**: areas with population density < 100 inhabitants/km,

[96] OECD – Organisation for Economic Co-operation and Development "Creating rural indicators for shaping territorial policy", Paris 1994

[97] "Digital Divide Forum Report: Broadband Access and Public Support in Under-Served Areas", http://europa.eu.int/information_society/eeurope/i2010/docs/implementation/ddf_report_final.pdf

with 3 scenario's relevant to broadband provision:

1. **Small town scenario** is a clustered community in a rural area 10 km from a larger town, where 80 users take broadband services and a majority are within the near-reach distance of the point of presence
2. **Scattered scenario** is a more scattered community 27 km from a larger town, where 40 users take service. Some are within the near-reach distance of the point of presence.
3. **Isolated scenario** is a remote area with isolated dwellings whose centre is some 60 km from a large town. 20 users in this area take service. No (or hardly any) dwellings are within the near-reach distance of the point of presence, though most are within the middle-reach distance.

Scalability The possibility of increasing capacity in an existing system without significant costs, and without making changes in applications.

Server A program that provides services to other computers (clients) in a network and distributes shared resources such as data, programs and communications access. May refer collectively to both computers and programs.

SME Micro, small and medium sized enterprise within the meaning of Recommendation 2003/361/EC in the version of 6 May 2003[98] (see). An enterprise is considered as an SME, taking into account its partner enterprises and/or linked enterprises, if it (a) employs fewer than 250 persons, (b) has an annual turnover not exceeding EUR 50 million, and/or (c) an annual balance sheet total not exceeding EUR 43 million.

SMS Short Message Service, GSM function enabling messages up to 160 characters long to be sent and received by mobile terminals through a network operator's message centre.

Social dialogue This means discussion, negotiation and joint action between the European social partners and discussions between these social partners and the EU institutions.

Social partners This is jargon for the two sides of industry – i.e. employers and workers. At EU level they are represented by three main organisations:

- The European Trade Union Confederation (ETUC), representing workers;
- The Union of Industries of the European Community (UNICE), representing private sector employers;
- The European Centre for Public Enterprise (CEEP), representing public sector employers.

The European Commission consults them when drawing up proposals for social and employment legislation.

Stakeholder Any person or organisation with an interest in or affected by EU legislation and policymaking is a 'stakeholder' in that process. The European Commission makes a point of consulting as wide a range of stakeholders as

[98] http://ec.europa.eu/enterprise/enterprise_policy/sme_definition/index_en.htm

	possible before proposing new legislation or new policy initiatives.
State Aid Rules	The objective of State aid control is, as laid down in the EC Treaties, to ensure that government interventions do not distort competition and intra-community trade. In this respect, State aid is defined as an advantage in any form whatsoever conferred on a selective basis to undertakings by national public authorities[99]. The EC Treaty pronounces the general prohibition of State aid. However in some circumstances, government interventions are necessary for a well-functioning and equitable economy. Therefore, the Treaty leaves room for a number of policy objectives for which State aid can be considered compatible. By complementing the fundamental rules through a series of legislative acts that provide for a number of exemptions, the European Commission has established a system of rules under which State aid is monitored and assessed in the European Union. For more details see the Vademecum Community Rules On State Aid[100].
Subsidiarity	The "subsidiarity principle" means that EU decisions must be taken as closely as possible to the citizen. In other words, the Union does not take action (except on matters for which it alone is responsible) unless EU action is more effective than action taken at national, regional or local level.
TDMA	Time Division Multiple Access
Transnational	This word is often used to describe cooperation between businesses or organisations based in more than one EU country. Part of the EU's purpose is to encourage this cross-border or 'transnational' cooperation.
Transparency	The term 'transparency' is often used to mean openness in the way the EU institutions work. The EU institutions are committed to greater openness. They are taking steps to improve public access to information, and they are working to produce clearer and more readable documents. This includes better drafting of laws and, ultimately, a single, simplified EU Treaty.
URL	Uniform Resource Locator is a Web address, the first part of which states which protocol is used to transfer files.
VoIP	Voice over Internet Protocol, see IP telephony
W3C	World Wide Web Consortium, the international organisation that defines which functions will be included in Web languages
WAN	Wide Area Network
WAP	Wireless Application Protocol, a free, unlicensed protocol for wireless communication that makes it possible to create advanced telecommunications services and to access Internet pages to a mobile telephone. WAP is a de facto industry standard supported by a large number of suppliers.

[99] See http://ec.europa.eu/comm/competition/state_aid/overview/index_en.cfm

[100] Downloadable from http://ec.europa.eu/comm/competition/state_aid/studies_reports/vademecum_on_rules_2007_en.pdf

Web 2.0	A second generation of web-based communities and hosted services — such as social-networking sites, wikis, blogs etc which aim to facilitate collaboration and sharing between users on the Internet.[101]
WiMAX	Worldwide Interoperability for Microwave Access a telecom technology aimed at providing wireless data over long distances in a variety of ways, from point-to-point links to full mobile cellular type access. WiMAX is based on the IEEE 802.16 standard.
W-LAN	Wireless Local Area Network
XML	eXtensible Markup Language, a standard allowing documents to be defined and presentation of pages to be controlled uniformly on the web, regardless of the local computing environment. XML permits considerably greater specialised functionality than HTML for applications such as electronic commerce. Web designers can create their own tags, thus simplifying the definition, transfer, validation and interpretation of data between applications and organisations.

[101] See http://en.wikipedia.org/wiki/Web_2 for a more in-depth discussion.