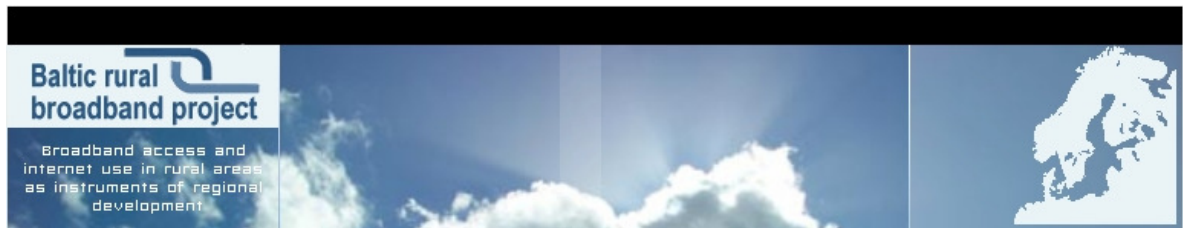
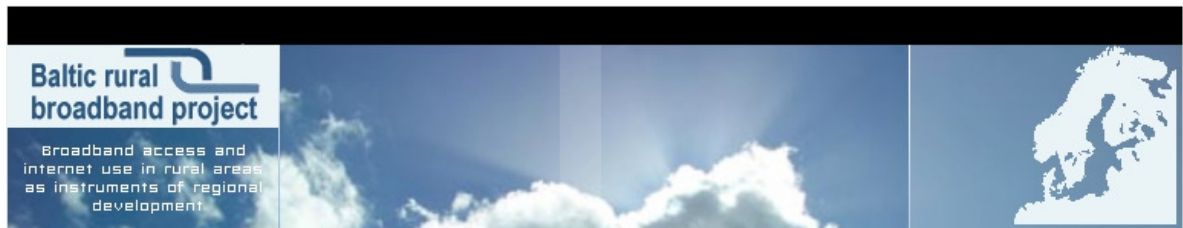


Local Strategy paper

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0. Introduction

The Institute of Mathematics and Computer Science of the University of Latvia (IMCS UL) started the work in the project BRB - Baltic Rural Broadband (Interreg III Neighbourhood program) with some delay, however the participation is considered as very fruitful and perspective for short time as well as long time period.

In this document the strategy of the IMCS UL is described for the broadband development in Latvia in general and for the successful participation in the Interreg project.

The first chapter deals with the action areas related with the BRB project, the second chapter describes the actual situation, and the third one analysis the risks for the project (SWOT analysis). The short and long term goals are discussed in the fourth and fifth chapters.

1. Action areas

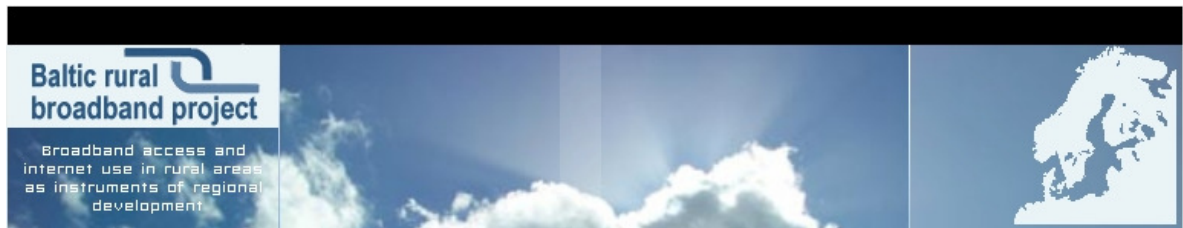
This chapter deals with the general action areas related to the Interreg III project.

1.1. Organisation

The Institute of Mathematics and Computer Science of the University of Latvia (IMCS UL) is the leading scientific institution of Latvia in the areas of mathematics, computer science and networking technology. The IMCS UL started Internet activities in Latvia in 1994 and at that time founded Academic network LATNET. Now LATNET continues to act as the National Research and Education Network (NREN) and in this capacity is taking part in various European projects. The academic network LATNET is a separate administrative unit of the IMCS UL and the staff of this unit is engaged in the BRB project.

Apart from providing Internet services to the academic users, the Academic network LATNET at the very beginning of its activities was the pioneer of wireless (radio) connections to the Internet, and as the result it has built radio networks in many urban and rural regions of Latvia and in the capital Riga. Later these activities were continued by a spin-off company "Latnet Serviss Ltd".

At this time the IMCS UL has created a team of specialists that studies the problems related to the Baltic Rural Broadband project, though the team (4-5 experts) does not operate as an administrative unit, and its members have also other duties. It would be strategically important to organise a separate unit of full



time researchers that could concentrate efforts on the broadband installation, user and maintainer education etc.

1.1.1. Strategic principles for broadband networking

The strategy understanding of IMCS UL for broadband networking in rural areas is the following - the delivering of broadband connections to rural areas consists of two levels: 1) the optical fibre connections are installed to the local (regional) centres; 2) the local broadband connections that are mainly based on wireless technology.

1.1.2. Participation of IMCS UL in the broadband networking

The strategic goal of the IMCS UL is to participate in the development of the rural broadband access in the country with a special stress to the educational and information needs in rural areas. The Institute also plans to take part in the education of people in rural areas in the usage of Internet and other networking facilities.

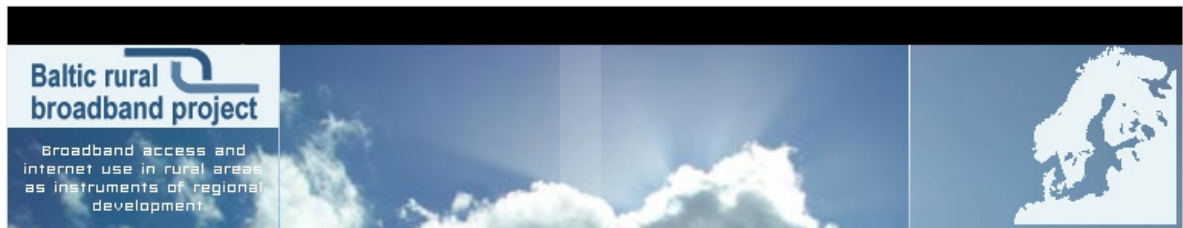
The participation of IMCS UL will be based on the results and tasks of other EU and local projects the Institute is taking part in.

1.1.3. Other EU projects important for broadband networking

The main project is the GN-2 project that deals with creating and maintenance of the European academic gigabyte network GÉANT-2 and IMCS UL is providing the services of this network to the academic community of Latvia. The GÉANT-2 network is the main component for the e-infrastructure of European Research Area currently being built by European scientists. In Latvia the access to this network is offered to all universities, schools, school's libraries, hospitals etc., if only they have the necessity and appropriate capacities for using the wide opportunities of the network. It should be stressed that the work in GÉANT-2 implies good broadband connections of optical fibres.

Another project is Porta Optica Study (POS) that is closely related with the installing of the broadband connections to the regional centres with the goal to deploy broadband access further to remote places. The POS investigates the possibility and the ways to cover Latvia (and the whole Eastern Europe) with dark optical fibres exclusively used for educational and scientific needs.

1.1.4. The co-operation with other partners



To be successful in the broadband networking, the experience of all other partners will be very helpful; especially the research of the University of Applied Sciences Stralsund and the Djurslands International Institute of Rural Wireless Broadband in the technical organisation of wireless networks of high capacity will be useful. The neighbouring partners from Estonia and Lithuania are considered as future partners in fostering cross border co-operation of rural education institutions.

1.2. Overview of action areas

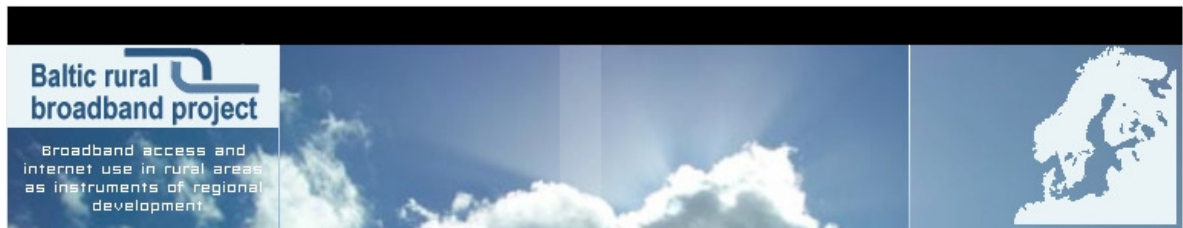
The IMCS UL will act in accordance with the European Communication Policy, and will base its activities on the decision of Latvia's government. The most important of them is the National Programme of broadband network development that specifies the following presumed achievements:

- formation of information society in rural regions;
- development of commercial activities and new services in remote regions;
- growth of investment amount in remote regions;
- creation of new working places;
- improvement of education and health care systems;
- rise in living standards of rural inhabitants;
- people migration back to rural regions;
- better co-operation between inhabitants and local governments;
- etc.

Broadband access availability and affordability in the rural areas, as well as the growth of number of people educated to use it, would directly contribute to the fastest development of those regions and to the reduction of the number of unemployed. The unemployment issue would be addressed by increasing the e-literacy of the inhabitants, thus maximising their competitiveness in the labour market. It should be added also that the developing of modern education methodology in the rural areas would liquidate the educational gap between industrial centres and rural regions.

To implement the tasks of the National Programme, several other projects are announced. The programme of informatisation of the education system „Technology of information and communication for the education quality” was adopted by the government at October 17, 2006 for the next seven years. The total investment amount is planned to be 130 million LVL. The program proposes the creation of the effective education information and control system, the developing of the electronic teaching materials, the training of teachers etc.

Latvia also uses European Structural funds to create better Internet connection in rural areas. One project of this kind is the programme “Development of



information and communication networks in the remote regions by installing broadband access". This program is financed by European Regional Development Fund (ERDF) (75%) and the state budget (25%). The program was accepted in June 2006, a call for proposals was announced in October, 2006. The results of the call were published in December 18, 2006, and the winner was the company Triatel. Actually this company was the only participant in this call. Now till 2012 it should create infrastructure for broadband access in regions of Latvia investing for this goal about 11 millions Euro and getting additional 6 millions from the program financing. It should be mentioned, however, that some companies and public organisations protest against the way the call was organised.

2. Stocktaking – present situation

At this moment the project GÉANT-2 is running in Latvia and practically all higher education institutions are connected to this gigabyte network. In many towns the metropolitan area networks are established that allow connecting of most (or all) education institutions to this network. These networks are mainly organised on the basis of wireless connections of various technologies. However many rural education institutions also have interest in connecting to the GÉANT-2 due to provision of secure and fast communication, which is needed for many modern educational projects.

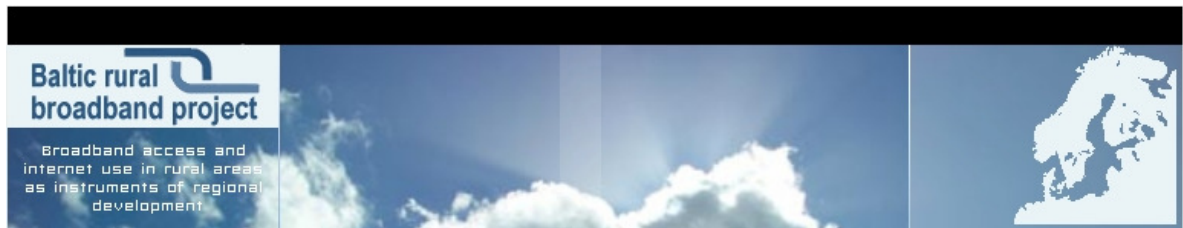
Currently the following education institutions are connected to the network in rural regions of Latvia:

- 24 secondary and elementary schools;
- 7 libraries.

The connections are established mainly by wireless connections, and only two schools use ADSL connections. Approximately half of the above mentioned 31 institutions – 16 institutions have bandwidth 256 Kbps or more, that may be considered as broadband connection according to the definition of broadband connections adopted by Latvian officials.

Most of these connections were established already 2-3 years ago using CISCO Aeronet wireless technology in the frequency ranges about 5 MHz (protocol 802.11b). For some recent projects also Motorola Canopy technology (protocol 802.16) is used.

3. SWOT analyses



Considering possible threats and weaknesses of the BRB project and the broadband technology in general one may discuss the following problems.

3.1. Legal aspects of the network usage

Baltic Rural Broadband project aims to provide means required by people from less developed areas to help them to gain access to the Internet. However, some precautions should be taken.

The rapid and in most cases uncontrolled development of the Internet has raised many legal issues that have to be taken into account when speaking of new users. In our days the Internet encounters many millions of users that represent the variety of the real life. Which means that not all people are 'good' and use the means of the global network in *bona fide*.

Considering users in rural areas it is important to stress the following aspects:

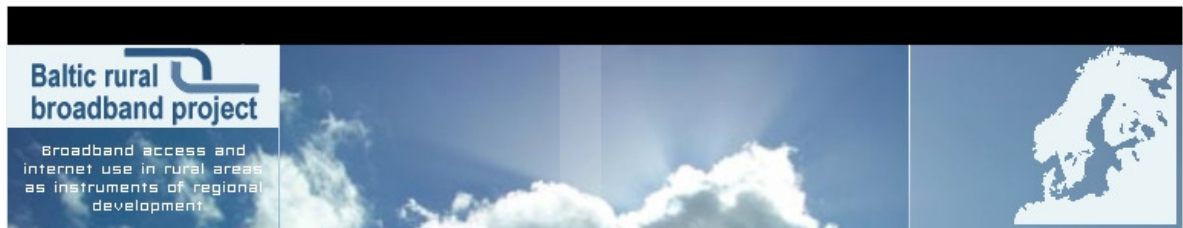
- personal security – this aspect includes security of the computer in use, as well as the safety of person and property. Internet users should be aware of the necessity to use all means of precaution, such as firewalls and anti-virus – both needing experience and knowledge to be handled properly. On the other hand the security of computer is not enough as the users themselves should behave properly in order not to become victims of criminal activities;
- acceptable use policy – users have to be aware of the netiquette and acceptable patterns of the behaviour on the Internet in order not to destroy usage experience for other Internet users.

Thus, most attention should be paid to the training of the users in areas that are getting connected to the Internet. Current strategy does not stress the importance of user education that might cause many problems in the near future.

3.2. Diversity of the technical solutions as a threat for the broadband technology

At this moment a widely accepted cheap solution for wireless connection in rural areas is not proposed and the common standards are not accepted. This is the reason why several partners of the BRB project (UASS, DIIRWB) are studying the technical solutions available in the market. The success in this research is rather important for the broadband technology solutions acceptable for less developed regions. IMCS UL will test the most perspective technical solutions in the pilot project of Ugale school.

3.3. Administrative division changes



One of the most urgent problem for Latvian politics is the administrative reform. At this moment there are about 500 administrative units (civil parishes) of lowest level. In couple of years many of these units should be consolidated to the final number of about 150 ones. It is clear that this consolidation will cause changes in the Internet access infrastructure that quite possibly will be restructured.

3.4. Problems with educated staff

Two kinds of educated specialists are needed for best usage of broadband technology. First, the technical experts capable to establish connections and make the system running. Second, the educated users – teachers, librarians etc, who would be willing to work in the global information society and who would have the necessary skills. The shortage of these specialists may destroy the best plans for the building of the networks, therefore the necessity of well-organised life long learning is obvious.

4. Short term goals

As the short-term goals IMCS UL considers the work in the proposed two pilot projects:

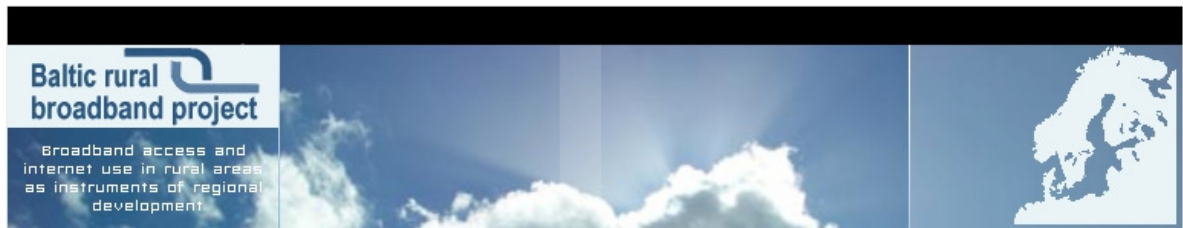
- Analysis of the rural component of the European academic network GÉANT-2 in Latvia;
- Setting up of the WiFi network in the Ugale's secondary school.

The content of these projects is discussed in some details in their descriptions.

Additional information about the technical goals is the following:

There are three main short-term goals for the IMCS UL regarding the technical solutions for the broadband connections. The first one is to try out and test several wireless broadband connection solutions for both long distance and last mile connectivity. Since the only free of charge frequencies in Latvia are 2.4 GHz and 5.2 GHz, most wireless connections have to be based on these frequencies to keep the connections financially feasible. Thus the aim is to try out and identify the best available solutions that are most appropriate and suitable for conditions of Latvia landscape, frequency restrictions, user requirements and other factors.

The second goal is to analyse and experiment with wireless infrastructure related software – Captive Portals, data encryption, authorisation protocols, load balancing, traffic shaping, etc. Since the wireless connections and all the involved hardware is only the lowest level of the whole wireless broadband infrastructure, it is very important to use appropriate software as the next step to



make this infrastructure available for the users, meeting the necessary functionality, security and usability requirements.

The last but not the least short-term goal is to combine the results of both previous activity groups and create several WLAN-covered areas in schools or campuses. Such creation of wireless access areas would not only improve educational process and Internet availability to users, but would also provide a good experience and “know-how” for the IMCS UL in deploying, configuring and running previously mentioned wireless broadband infrastructure solutions and various software.

5. Vision

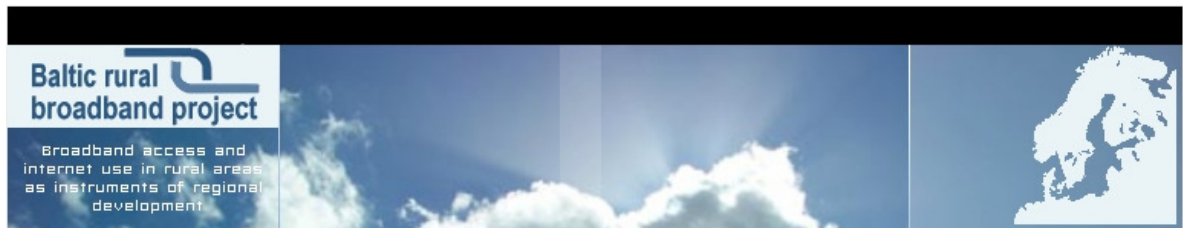
The vision of IMCS UL for the future research in the Institute can be considered as consisting of three parts – technical development, education and legal studies. In all these three directions the research efforts of the Institute will be focused.

5.1. Technical development

Vision for the development of rural broadband for IMCS UL involves long term development of dark fiber network for educational and research institutions, tracking state-of-the-art technologies in last mile solutions for wireless connections – mainly WLANs and WiMAX; and evaluating the possibility to create cellular phone network based connections that may become popular in next several years. Also the vision is to start the trend and initiate process of deploying WLANs in schools and other educational organisations.

Since the demand for high bandwidth network access is continuously increasing for educational institutions, it is important to provide backbone and last mile infrastructure that is capable to provide increasing network throughput during long term periods and would not saturate its capacity within a few years. Wireless solutions are good for initial connection deployment, since they cost much less and can be installed much faster, but the available bandwidth is also more restricted and can not be upgraded easily. Thus it is important to deploy dark fibre in areas that are prognosticated to require soon more bandwidth than the current wireless solutions are capable of providing.

The next long term goal is to keep track of current state-of-the-art technologies in last mile solutions, particularly WLAN and WiMAX based ones. Once the WiMAX standard is completed and compatible devices are being produced from various manufacturers, it would be feasible to create medium-scale WiMAX covered areas. Also the release of 3.5 GHz frequency into free use would provide possibility to create more versatile WiMAX covered areas than with 2.4 GHz based WiMAX solutions, but such release of this frequency is yet unsure.



Another technology that could become very popular and feasible in the next several years could be cellular phone network based access. Such technology would use existing cellular network infrastructure that already covers most of Latvia territory thus would require low deployment and running costs for users.

The last long term goal is to start the trend of WLAN deployment in educational organisations so that students, teachers and other users would be capable of using broadband connections without any restrictions anywhere in the schools or campuses, thus minimising the need for large computer classes with many computers. Students would no longer be forced to share available computer time among them and instead have network access from their laptops and wireless network card equipped PCs at any time.

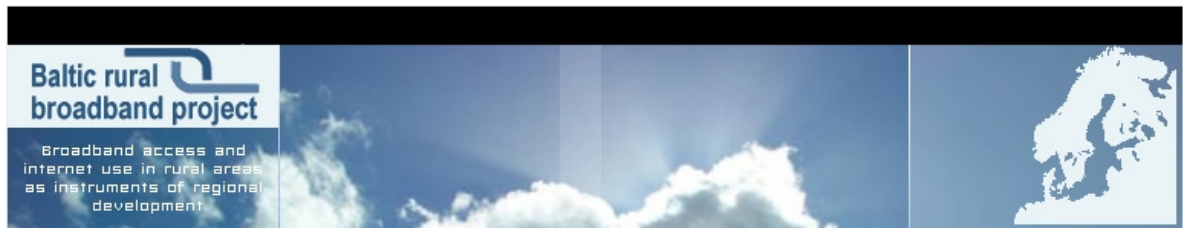
5.2. Education in the usage and in the maintenance of the broadband connections

The instalment of new and fast connections in rural regions provides new tasks for education because it is very important to inform the teachers, technical staff, students and, generally speaking, all local community about the new possibilities of the broadband connection as well as to teach them how to use new technologies.

Fast broadband connections make it possible to use audio conferencing and videoconferencing, fast data sharing, multimedia applications and content, on-line participation in discussion groups, banking, etc. These applications are new to the majority of the schools staff. Therefore it would be vital to demonstrate and to explain briefly the new applications before or after installing broadband connection, to organise seminars, workshops or courses for educators.

For using of some new applications more serious training might be needed and more experience might be highly desirable. It is very important also to create possibilities for creative thinking, because it is clear that not all possible and most effective ways for using of new possibilities are already discovered.

IMCS UL suppose that the most effective way for wide spreading of the appropriate knowledge is to organise the education in several levels, teaching first the persons that will be capable to teach later the next generation of users. For example, it would be reasonable, to educate one teacher or staff member in the school or in the area. Ideally if a specialised „train the trainers” programme would be available about the particular subject or application. Of course, „train the trainers” approach should be used to educate students and pupils about the new applications, vulnerabilities and security threats if the network is misused.



It is quite clear also that there are not so many specialists in rural areas who could install broadband hardware and applications. Even much more important is the lack of qualified experts in the maintenance of the computers and operational systems. Therefore it is crucial to educate properly the people that will be responsible for the installation, maintenance and upgrades of the network devices and components. Sometimes those are network and system administrators, but it is known that in small schools or communities it is very common to have outsourced administrator or a person in the region taking care of the IT of several institutions. Whatever the scheme is, these people should be identified and their qualification should be checked and raised if necessary to make them aware of the new network configuration, possibilities and threats.

As one of the best ways for education and maintaining of broadband connections IMCS UL considers the creating of country wide network of small enterprises that would operate in local regions and could offer support to all educational and other institutions.

5.3. Legal aspects of the network usage

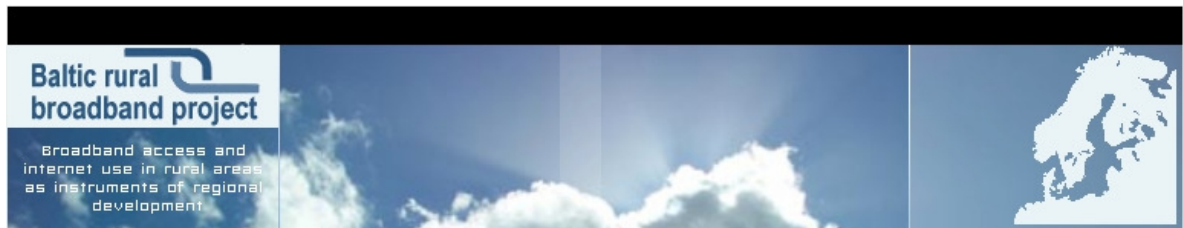
It is not possible to consider legal aspects of the network usage in a particular region or even in a separately taken country. The Internet – being global formation without a single owner – can be maintained and co-ordinated in close co-operation between governmental institutions, regulatory bodies, and society in large.

However, when speaking of required regulation for users in rural areas it is necessary to focus on applications they will use. Applications available on-line are the key factor for successful Internet penetration. Applications users benefit from most are related to Internet banking, e-commerce, and e-government.

In Latvia Internet banking has become very popular for daily operations like assets management, payments for gas, electricity, telephone, etc. Although security issues are crucial in this case, those issues are solved and no additional regulations are needed.

As for e-commerce, there are several laws implementing EU Directives. Unfortunately consumers are not well aware of their rights, but this issue can be solved by well-targeted awareness campaigns.

E-government services are not broadly used in Latvia at the moment. It is possible to get information on regulatory acts, official news from the websites of ministries and other state institutions, submit statistical data, etc. Those applications would help people from rural areas access information of a great value for them. Some other applications like e-health, tax declarations, e-voting are still on a way. Regulatory framework for these applications will be necessary.



For less developed regions with relatively high unemployment rate, teleworking could be a solution. Some changes in Labour law and Civil code would build the trust for this way of work.

Yet another aspect of the Internet is related to copyrighted materials made available via the network. Again, regulatory framework is in place, but more proactive control is required.