Latvia − RTD Technological Audit

Imants Freibergs, Ph.D. Past President of the *Latvian Communications and Information Technology Association – LIKTA*

A partial summary of the report "D9 Latvia - ICT RTD technological audit: a simplified report", prepared for the European Commission, Directorate General Information Society and Media, submitted March 2011 (to be distributed shortly).

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INTRODUCTION

In order to realise the full potential of the European Research Area (ERA), all available technological resources of the EU have to be fully integrated and utilised. However, for the newer Member States (EU12), and for Latvia in particular, this does not appear to be the case, as witnessed by the participation record in the Framework Programs: FP6 – IST Priority and FP7 – ICT Theme.

DG INFSO hascarried out a Technological Audit on information and communication technologies (ICT) research capabilities in each of the EU 12 states, in order to identify:

(a) The ICT RTDpolicy environment, and the opportunities and barriers it presents;

(b) The status of the ICT RTD activities, identifying the centres of excellence and centres with development potential, as per FP7 – ICT Theme Challenges and Objectives;

(c) The actions that need to be taken at national and European levels to increase the participation of organisations carrying out ICT RTD in both the private and public sectors.

In the case of Latvia, the tasks of the Technological Audit have been entrusted to the *Latvian Communications and Information Technology Association − LIKTA*.

The Study Experts team of LIKTA have carried out all tasks of the Audit, which have been presented in nine reports to the EC. The task 9 of the Audit was to present a simplified report of the conclusions and findings of the previous tasks, namely "*D9 Latvia - ICT RTD technological audit: a simplified report*". This is the most comprehensive study to date about the ICT RTD situation in Latvia, seen through the prism of the Latvian participation capability in the FP7 – ICT Theme challenges.

One of the most important goals of the study was to identify the barriers and obstacles to successful participation of Latvian ICT organizations in EU research programs.

ICT SECTOR STAKEHOLDERS IN LATVIA

In Latvia there are threemain groups of the ICT sector stakeholders: the governmental sector, the academic sector and the private sector (which includes a few large corporations, SME's and associations representing the ICT industry).

- Among the **governmental institutions** two Ministries have a strong influence on Research and Development policy and its supporting instruments in Latvia: **The Ministry of Education and Science** and **the Ministry of Economics** (including the Investment and Development Agency of Latvia - LIAA).Other Ministrieshave also ICT components as part of their strategies and policy papers, but they do not focus on research.
- Among the **academic stakeholders** the two major players are **The Latvian Academy of Sciences** and **The Latvian Council of Science,** plus **Research institutes** and**Universities**. ICT research is one of the priority sectors in the academic research programmes and strategies.
- **The ICT business sector** is an important part of the national economy (in 2007, the percentage of ICT generated gross value in the country was 4.2%) , however most of the turnover is generated by the ICT service sector (9.3%), electronic communications (21.9%) and wholesale(65.4%), the contribution of the manufacturing sector (including software development) being much smaller (3.4%).

  The number of ICT related companies, employees and turnover was steadily growing until 2007, when a dramatic decline in the development occurred because of the economic crisis. The statistics for 2009 show that the number of ICT enterprises and the number of employees decreased significantly, especially in the wholesale sector. The telecommunications enterprises did not suffer as much – the number of them even increased, as well as the number of their employees, nonetheless the annual turnover decreased. The overall ICT annual turnover declined by 66.7% between 2007 and 2009.

The *Latvian IT Cluster,*is an export oriented group of companies (1900 employees) of ICTE products and services. Their turnover for 2009 was 76.6 MEUR, of which 40% was export.

Regarding ICT education, there are 13 institutions of higher education and 10 professional high schools preparing ICT specialists, graduating around 1300 ICT professionals annually (20% with higher degrees). Research is mostly established in those university institutes/structural units, which have the capacity and which participate in FP and other RTD projects.

The ICT industry is represented by several **NGOs**, notably the Latvian Information and Communication Technology Association (LIKTA), and the Latvian Electrical Engineering and Electronics Industry Association (LEtERA).

NATIONAL LEVEL POLICIES AND STRATEGY DOCUMENTS FOR ICT RTD

Many **strategy documents** have been elaborated in Latvia during recent years at the national level and at the level of individual ministries. All of them insist on the importance of research and development for reaching the strategic goals of Latvia, but no specific strategy for ICT RTD has been developed. Most of them are lacking a European dimension. At the highest level in the hierarchy of long-term planning, the ***Strategy of the Sustainable Development of Latvia***is defined. The main medium-term strategic planning document is the ***National Development Plan*.**

The Parliament has adopted several **laws** having a serious impact on the strategy, development and functioning of the ICT sector. The ***Law on Electronic Communications*** (2004), the ***Law on Scientific Activity*** (2005) and the ***Law on the Services of the Information Society*** (2004) are the most important of those. The **financial support** for scientific activity has increased since joining the EU in 2004, because European funds have become fully available. The programmes supporting ICT RTD are managed by the Ministry of Education and Science, the LatvianAcademy of Sciences, and the Ministry of Economics (for private business research and innovations).

So far, Latvia has one of the lowest percentages of GDP spent on R&D (**GERD**) among the European countries. In 2008 the Latvian GERD was only 0.61% of the national GDP, but as a result of the economic crisis, it was reduced to 0.45% in 2009, and in 2010 it is estimated to be 0.54%.

Due to the current economic crisis in Latvia and subsequent budget constraints, the support programmes are severely curtailed and/or postponed for the near future. In many cases, the required co-financing is no longer available due to budget cuts and/or credit restrictions by the banks, so that the previously available financing is lost and reallocated to other programmes.

CURRENT PLANS OF SUPPORT OF ICT RESEARCH IN 2010-11

Currently (in 2010-11), the development of science in general and of ICT research in particular should be carried out according to the *Plan of the activities for necessary reforms in the higher education and science 2010-2012*.

This plan specifies that the financing of science in 2011 and 2012 should remain at the level of 2010 financing, but starting from 2013 it should gradually increase, reaching 1.5% of the GDP by 2015. At the same time, the model of the financing should be improved, focusing the efforts on the practical results. The research infrastructure should be developed based on the resources provided by the EU Structural funds.

The actual resources allocated for ICT research by the national budget comprise 1.5 M Euros allocated yearly for the National Research programme *"Development of novel multifunctional materials, signal processing and information technologies for competitive knowledge-based products"* in 2010 and 2011. The Latvian Council of Science in 2010 and 2011 allocates

approximately185 000 Euros per year for six individual projects, i.e. in average about 31 000 Euros for each project. Additionally, nearly 80 000 Euros are allocated for a single collaborative project carried out by four groups of researchers. In total, the support for IT research in Latvia in 2010, as well as in 2011, is about 1.85 MEuros per year.

The contribution of the EU Structural funds to the development of science in Latvia is much more significant.

- The programme of ERDF *Entrepreneurship and Innovations,* within its activity *Support to science and research,* has allocated (July 2010) about 5 MEuros for 11 projects related to the ICT area. These projects are planned for differing time spans over 4 years. The average resources for a project are about 155 000 Euros per year.
- The activity of ERDF programme *Support to the collaborative projects in science and technologies* has allocated (May 2010) about 3.5 Meuros for 11 research institutions related to the ICT area. These projects are planned for different time spans over 3 years. The average resources for a single institution are about 167 000 Euros per year. The institutions should develop collaboration with researchers of other Member States, organize scientific conferences and workshops and prepare proposals for FP7 Themes.
- The ERDF programme has allocated significant resources for the development of research infrastructure. In the framework of its activity *Improvement of information technology infrastructure and information systems for research activity* about 14 MEuros were allocated (September 2010) for the development of the next generation Academic network. The Ministry of Education and Science is the responsible organisation for this project.
- Another activity of the ERDF programme for the development of the research infrastructure is the subprogram for the creation of national research centres. The programme has envisaged what kind of centres should be developed, and two of these planned centres are related to ICT. One of them is the State research centre for information, communication and signal processing technologies, and another one is the State research centre for nanostructured and multifunctional materials, constructions and technologies. The available resources that can be allocated to create one of these centres are up to 24 MEuros.

Table 1. Summary of support programmes

Name of the programme	Source of funds	Time frame	Budget MEuros
Operational Programme: Infrastructure and Services Priority 1 – Infrastructure for strengthening human capital (IT infrastructure of schools, research institutions, etc.) Priority 2 - ICT Infrastructure and Services (electronic services, Internet)	ERDF, National ERDF National	2013 2013	512 90 511 90
Operational Programme: Human Resources and Employment Priority 1 - Higher education and Science Priority 2 – Education and skills Priority 3 - Promotion of employment and health at work Priority 4 – Promotion of social inclusion Priority 5 – Administrative capacity building	ESF National	2013	551 106
Operational Programme: Entrepreneurship and Innovations Priority 1 – Science and innovations	ERDF National, public National, private	2013	736 104 243
Program for Promotion of Business Competitiveness and Innovation 2007 – 2013	ERDF, National	2008 – 2013	166.7
Support for Competence Centre Creation	EU, National	2008 – 2013	60.8
Investment in products with high added value	ESF, ERDF	2007 – 2013	28
Innovation centre and business incubator development program (ICBUDP)	National	2008+	28.7
New product and technology development (NPTD)	ERDF, National	2009	147.3
INTERREG IVC (Regional development)	ERDF, National	2007-2013	411
Swiss confederation financial instruments (SCFI)	Swiss government	2009-2010	39
Current nationally financed programs			
Scientific Foundations of Information Technology	National	2009	0.84
The elaboration of modern functional materials for microelectronics, photonics, biomedicine and construction composites, as well as development of the appropriate technologies	National	2009	1.37
Development of novel multifunctional materials, signal processing and information technologies for competitive knowledge-based products	National	2010 2011	1.4 1.5

INNOVATION POLICY

The policy makers of Latvia have declared the importance of innovation in many documents.

- The *Law on Scientific Activity* was adopted in 2005, amended in June 2007; it regulates scientific and innovation activities in Latvia.
- In March 2009, the Cabinet of Ministers has emphasised the significance of science and innovations for the development of a competitive economy in its *Declaration of the Intended Activities.*

- The Ministry of Economics has launched the Program for Promotion of Business Competitiveness and Innovation 2007 – 2013, and the Innovation centre and business incubator development program.
- The latest strategy document of the Ministry of Education and Sciences concerning the development of science is the *Guidelines for the development of science and technology 2009-2013*. In April 2010 an action plan for implementation of the Guidelines has been adopted.

The necessary legal documents for further development of RTD in Latvia have been adopted. In many cases, e.g. for managing projects funded by ERDF, the bureaucracy is too heavy and does not stimulate the achievement of important results in RTD, but rather concentrates on the paperwork.

Patents

The number of patents is considered as one of the most important indicators of innovative activity in a country in general and in the scientific domain in particular. However, the advantages of registered patents and licenses are sometimes questioned and mistrusted in Latvia, and there is practically no experience of registering patents at the EU level.

Table 2. Patent applications filed in Latvia

Class of the International Patent Classification	Total number of applications of patents filed in Latvia	Number of applications of patents filed in Latvia by Latvian residents
G - Electricity	441	unknown
G02 - Optics	29	9
G06 - Computing, calculating, counting	55	27
G08 - Signalling	17	12
G09B - Educational Or Demonstration Appliances; Appliances For Teaching, Or Communicating With …	9	7
G11- Information storage	15	4
H - Physics	372	unknown
H03 - Basic Electronic Circuitry	24	19
H04 - Electric Communication Technique	60	21

ANALYSIS OF THE PARTICIPATION OF LATVIA IN THE FP6-IST AND FP7-ICT THEME

The comparison of the number of submitted proposals with Latvian participation and the whole set of proposals for EU27, concerning participation in the FP6 IST Priority and in FP7 ICT Theme (first 4 calls), is presented in the following table:

Table 3. Success and failure rates in FP6-IST and FP7-ICT Theme

	EU Proposals		Proposals with Latvian participation		Percentage of successful proposals		Proposal share with Latvian participation	
	Total	Success	Total	Success	EU	**Latvian participation**	Total	Success
FP6 IST Priority	8383	1123	228	33	13.4%	**14.5%**	2.72%	2.94%

FP7 ICT Theme	4319	583	63	7	13.5%	**11.1%**	1.46%	1.20%

Comparative statistics regarding participation in FP6 and success rates for the 27 EU countries are presented in the following chart:

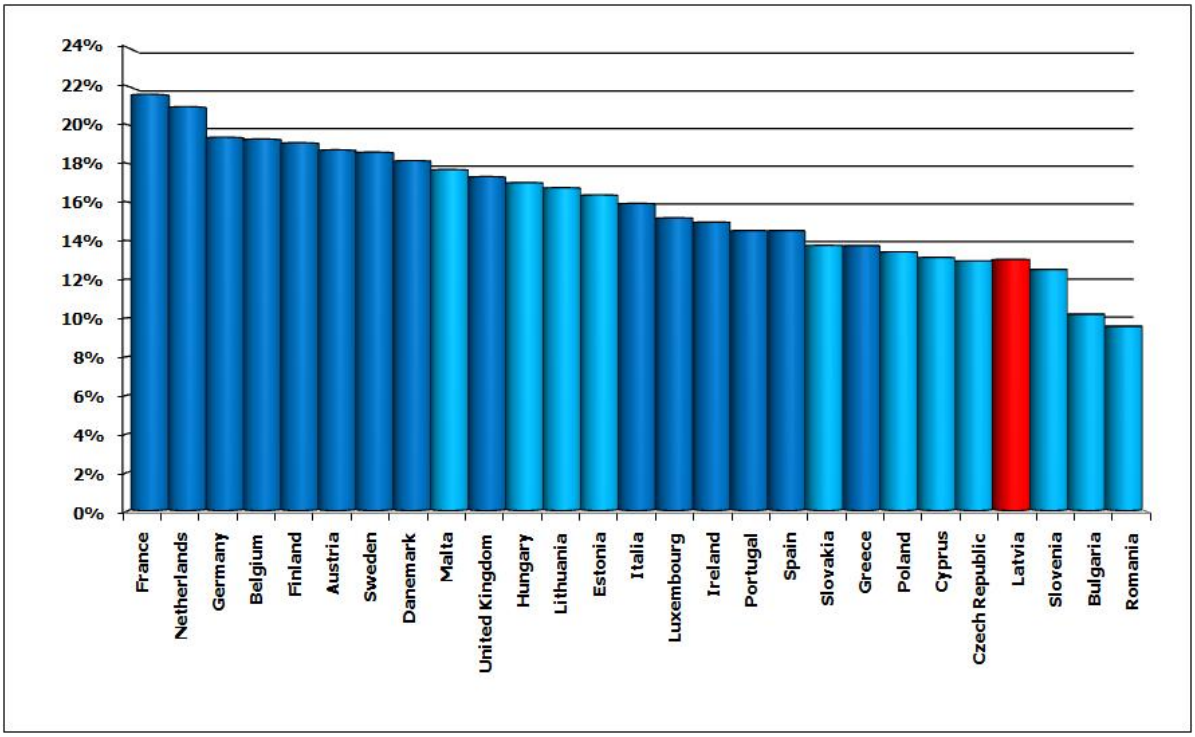

Figure 1. Success rate for the EU27 countries in FP6

In the above chart the countries of EU12 and EU15 are tinted in different hues.

The results show that for FP6, the EU12 countries could not compete on a par with the EU15 countries. The highest rates of success were attained by the EU15 countries, but the lowest by the EU12, Latvia included.

The next graph presents the success rate of FP6 IST project proposals for the EU27 countries versus the percentageof GDP spent on research and development-- GERD. The EU15 countries are marked in dark blue, the EU12 countries in light blue, and Latvia is marked in red.

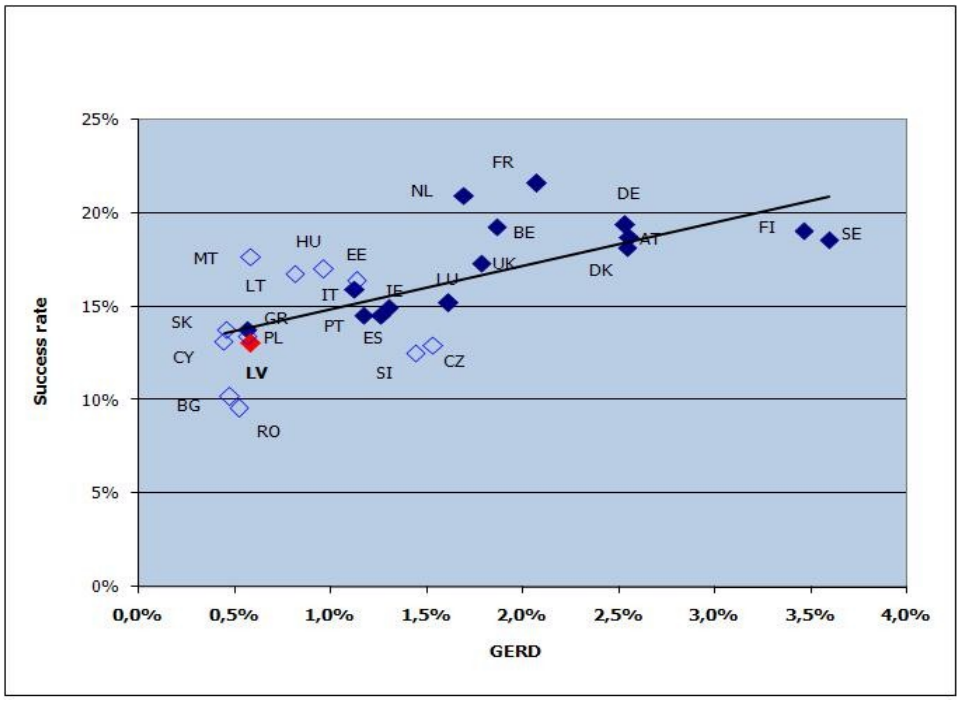

Figure 2.Success rate of FP6 IST proposals vs GERD for EU27 countries

In general, a higher percentageof GDP spent on R&D of the EU15 countries correlates with a better success rate for FP6 IST proposals,as would be expected. However, for some EU12 countries, a fair success rate has been achieved with more moderate spending on research (Malta, Lithuania, Hungary). The trend line shows that a one per cent growth in GERD may result in 1.5% growth of the success rate for FP6 IST Theme proposals.

Latvian participation, their success and financing in the first four calls of the **FP7 ICT Theme** is presented in the following table:

Table 4. Participation and financing of Latvian FP7 ICT Theme projects

FP7 ICT Theme projects	Call 1	Call 2	Call 3	Call 4	Total
Number of participations	24	9	10	20	63
Retained participations	1	0	2	4	7
Percentage of retained participations	4.2	0.0	20.0	20.0	**11.1**

Comparative statistics regarding participation in FP7 are presented in the following chart:

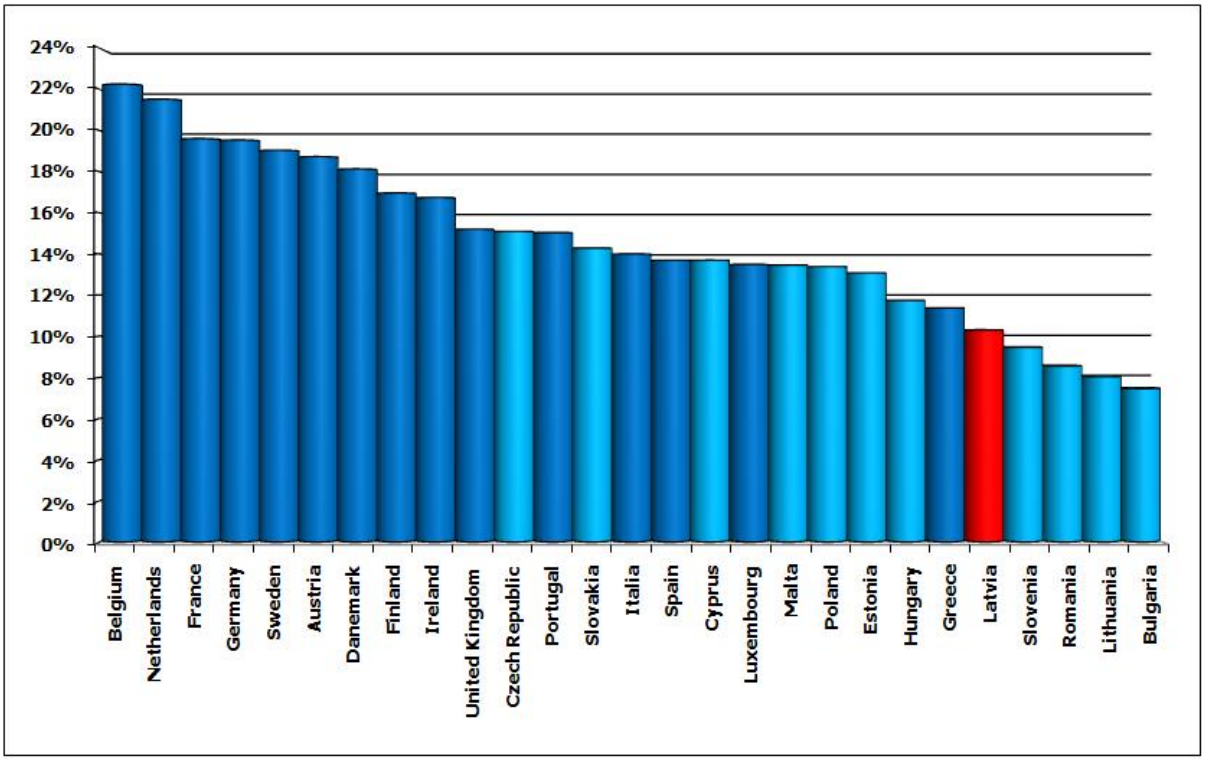

Figure 3. Success rate for the EU27 countries in FP7 (first 4 calls)

The results show that the EU12 countries can compete with some EU15 countries, though not with the more experienced ones as yet. As far as Latvia is concerned, the comparison with other countries shows that it has room for improvement.

Conclusions

The participation and success rates show that Latvia is not yet an active player in the European ICT research area, and its contribution to the development of European ICT research does not fully correspond to its capabilities. The Latvian government and the ICT community should take advantage of all the opportunities available nationally and in the EU to increase research and technology development of ICT.

IDENTIFICATION OF ICT RTD CENTRES OF EXCELLENCE

The capabilities of Latvian ICT research organisations were evaluated with respect to their ability for integration into the FP7 – ICT Theme. Using the information obtained from reviews of published sources, participation record in FP6 and FP7, and Live interviews to assess their RTD capabilities, a total of 35 organizations has been identified.

Live interviews were carried out in order to assess the RTD capabilities, technological expertise and human resources in Latvia and to identify barriers and possible actions to increased integration of Latvia into the FP7 – ICT Theme.

A consolidated list of 17 identified centres of excellence in Latvia was established, as well as a list of 18 identified potential centres of excellence, indicating their fields of ICT RTD in accordance with the FP7 – ICT Theme Challenges and Objectives.

Centres of Excellence are 17 organizations which have a proven track record of high level expertise and experience in ICT RTD, and have a history of successful participation in FP6 and FP7 research projects, as well as other international cooperation activities in ICT research. Centres of Excellence have been selected by the study expert team as the organizations with the highest values for the following criteria:

- Research capacity of permanent staff

- Quality and volume of scientific/technological output
- Experience with collaboration activities
- Links with local economic and social environment

Potential Centres of Excellence are 18 organizations which have a definite ICT research capacity, as well as some experience with EU research projects and other international ICT research cooperation activities. There is a large potential of growth and development for these organizations via participation in EU research projects in the future.

In the data base "*Who is who In ICT Research in Latvia*" there is no distinction between these two groups. A full description of all Centres of excellence id given in the above mentioned document "D9 Latvia - ICT RTD technological audit: a simplified report."

Table 5. Types of organizations that completed the Live interviews

Type of organization	Centres of excellence	Potential centres of excellence	Total number of organizations selected
Higher education and research institutions	12	5	17
Commercial organizations, including SMEs	5	11	16
Other organizations		2	2
Total number of organizations that completed Who is Who Live interviews	17	18	35

Areas of expertise of the respondents and relevance to FP7 ICT Theme

The comparison of the expertise areas for CoEs and potential CoEs is shown in the following chart, which presents the percentage of entities from both groups for all industry sectors:

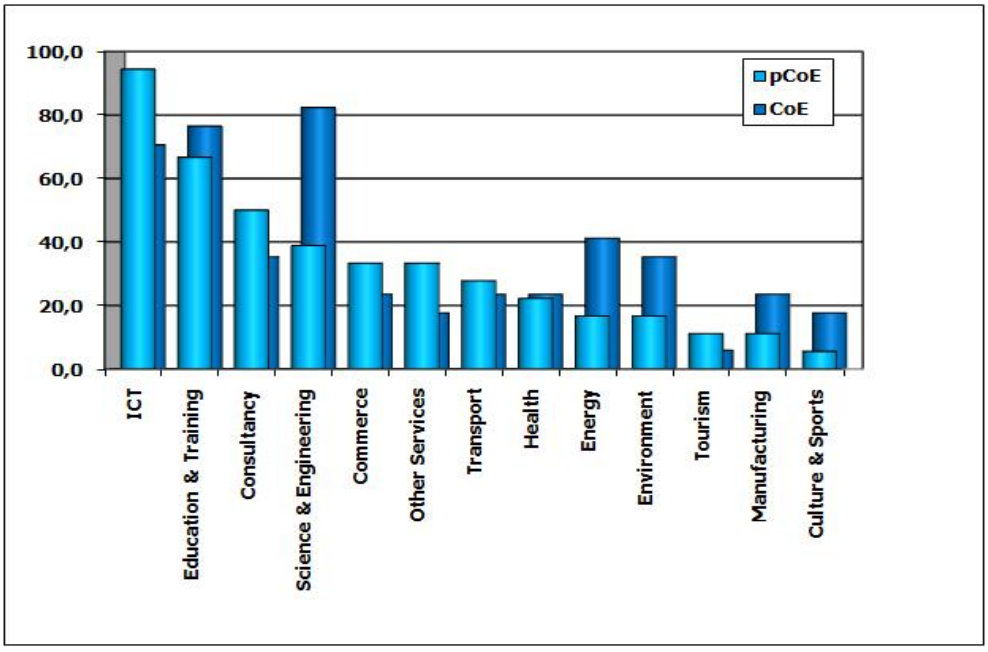

Figure 4. Comparison of areas of main expertise of the potential CoEs and CoEs

The Challenges in decreasing order of frequency are shown in the Table below.

Table 6. FP7 – ICT Theme Challenges in decreasing order of relevance

No.	Challenge	Frequency
3	Components, systems, engineering	22
1	Pervasive and Trustworthy Network and Service Infrastructures	22
7	ICT for Independent Living, Inclusion and Governance	22
4	Digital Libraries and Content	20
6	ICT for Mobility, Environmental Sustainability and Energy Efficiency	19
2	Cognitive Systems, Interaction, Robotics	11
8	Future and Emerging Technologies	11
5	Towards Sustainable and Personalised Healthcare	9

The **most appropriate Challenges** for the Latvian researchers, commensurate with their expertise level, are:

Challenge 1. Pervasive and Trustworthy Network and Service Infrastructures,

Challenge 2. Cognitive Systems, Interaction, Robotics,

Challenge 3. Components, Systems, Engineering,

Challenge 4.Digital Libraries and Content.

SWOT ANALYSIS OF LATVIAN ICT RTD ORGANISATIONS

The main purpose of this section is to present an overall analysis of the strengths, weaknesses, opportunities and threats (SWOT) regarding ICT research.

Principal strengths

Most organisations, with interest in the FP7 ICT Theme, have mentioned their high level of expertise and know-how in particular research areas. This is an important advantage, which is necessary for successful collaboration with European researchers and for participation in European projects. The particular research areas with promising development perspectives are: computing science, system modelling, quantum computing, sensor networks, semantic web, computer linguistics, as well as academic research in the areas of solid state physics, including nano-level physics.

Practically all research institutions have mentioned their close connections with student education as an important strength, which holds true for the structural units of the universities and also for the institutions having independent legal status.

Most of the research organisations noted their well organised infrastructure for research and education, so that a presumed weakness of infrastructure cannot hinder the participation in the FP7 ICT projects.

Several institutions stressed good research contacts with international partners, including cooperation and relationships with both eastern and western partners, which open up additional possibilities for scientific cooperation.

Principal weaknesses

One of the principal weaknesses, discovered in several phases of the study, is the lack of a national strategy for ICT RTD development in Latvia, and the fragmented nature of financial instruments for ICT RTD support with excessive administrative overhead. The existing strategic documents are lacking a European dimension.

Almost all research organisations admit their low level of cooperation with industrial and business partners. The low level of international cooperation, or the lack of it, is a very serious weakness of many research and

commercial organisations that have plans to participate in projects of the FP7 ICT Theme. The analysis of participation in FP6 and FP7 calls also shows insufficient experience of Latvian organizations in project coordination for FP6 and FP7.

The survey discovered another frequently overlooked weakness of the research organisations, and even more so of the commercial organisations, for the development of international cooperation and collaboration, namely an insufficient knowledge of English language. This finding is relevant mainly for the older scientists rather than for the young researchers, but the number of the latter is relatively smaller.

Most of the research organisations mention the advanced age of the leading researchers and of the staff in general as a serious weakness. This can be explained by the lack of the long-term strategy for science development in the country, which has resulted in a disruption of the normal generation change in the research institutions. It is very difficult to attract students for research work, because it is not possible to offer them adequate and competitive salaries.

Principal opportunities

The opportunities of almost all organisations lie in a more active participation in various programs sponsored by EU funds, including the FP7 ICT Theme. A more active promotion of European science policies and European RTD cooperation at the national level could be a stimulus for many companies and academic institutions to join the ERA.

The research organisations, participating in the educational activities, understand that their opportunities consist of the continuous availability of ICT specialists and in the need to improve and modernize their training. Therefore prioritisation of e-education and ICT in government strategy documents (based on the EU Digital agenda) is an opportunity for the near future.

Regarding infrastructure, the opportunities involve closer integration with European level infrastructures, development of NREN, and regular upgrading with the help of EU funds.

One of the important opportunities would be the achievement of closer collaboration between academic institutions and the commercial sector.

One possibility to carry out joint cooperative research with participation of academic and business units is a National program to support RTD competence centres, which anticipates a total public financing of 51.7 MEuros for projects realised 2011-2015. LIKTA, as a leading ICT association, has initiated and is now coordinating the establishment of an ICT Competence centre in Latvia under this support instrument. The ICT Competence involves 14 organizations with representatives of both Industry (10 members) and Academic sector (4members). The main research areas for the ICT Competence centre are: Human Language Technologies and Business Process Analysis Technologies.

Another mechanism of cooperation between the academic sector and ICT industry is offered by the BONITA (Baltic Organization and Network of Innovation Transfer and Association) project: www.bonita-project.eu, which aims to foster interregional development by turning university research into business value. The project has been financed by the European Union's Baltic Sea Region Programme 2007-2013 with almost 2 MEuros. The project consortium represents a mix of institutions responsible for regional technology transfer from eight countries in the Baltic Sea Region, including Latvia.

Principal threats

The most important threat is the global economic crisis and its nefarious effects on Latvia. The depression of the national economy has already had an overall negative effect on the development of science and could lead to further decreased funding for education and research. The need for financing of research is not well understood by the public and budgetary cuts for research are politically easier to make.

The economic problems can have a negative effect on the eventual future industrial partners of the research organisations, and may seriously impair the already established partnerships.

The commercial organisations worry about the predictable rise of competition for their products on the international and European scales. On the other hand, the innovative products based on ICT research results would be helpful in this competition.

The emigration of the scientists is considered as a rather serious threat for research, because the financial support for science has decreased by the government and sometimes also by the ill-advised actions of management.

Regional inequality of infrastructure available to research institutions and companies could be a threat in the future, if no specific actions are taken to support the regional universities and ICT companies. It should be noted, however, that in ERAF projects and ESF Human Resource Development project evaluations, institutions in regions receive additional two points, which would increase their success rate.

BARRIERS AND WAYS TO OVERCOME THEM

One of the most important goals of the study was to identify the barriers and obstacles to successful participation of Latvian organizations in EU research programs. In order to accomplish this task, several investigative activities were carried out by the study experts, such as:

- Inclusion of additional structured questions in the live interview questionnaires;
- Open discussions with respondents about obstacles preventing them to join EU research programmes;
- Interviews and discussions with relevant authorities financing ICT RTD in Latvia;
- Analysis of the results of previous participations of Latvian organizations in FP6 and FP7 calls.

As a result, the main barriers and obstacles to join EU research projects have been identified.

General barriers for all types of organizations

The study discovered that many barriers and obstacles for successful participation in EU collaborative research are related to the type and history of an individual organization. At the same time, some of the obstacles have been pointed out by all types of organizations – research institutes, as well as SMEs and governmental organizations – these are defined as general barriers.

It should be noted, however, that each specific organization may have only some of these barriers, or none. It depends on the profile of the organization as well as on its previous experience joining EU research projects.

Table 7. General barriers for all types of organizations

Barrier	Description	Actions level (Organizational, national, EU) to overcome barrier
No access to EU leading partnership networks	Many organizations have no access to leading EU partnership networks. Therefore they are not able to be included in EU top research consortia.	National; EC
No access to EU leading networks in specific (target) research areas	Quite a few Organizations with high RTD competence and research capacity in specific research areas (FP7 objectives) don't have links to leading EU networks in their research area. Therefore they are isolated and not able to take part in up-front RTD projects.	National, EC
No or minimal experience of participation in collaborative projects	Many organisations with high RTD competence have never participated in any collaborative projects. They do not have experience and understanding of what is required, what to expect, and how to collaborate.	National
No clear understanding about participation rules, conditions, financing schemes	Organisations without any experience find it difficult to read all the materials and understand the differences between various programmes, project types, financing schemes, etc. Lack of understanding of participation rules creates reluctance to participate in EU projects.	National, EC

Not enough resources (staff, financial) to prepare qualitative project applications	Preparation of applications requires a lot of time and resources. Not every organisation has them. Very often the most experienced people, in addition to their daily duties, have to work on the proposals. This might cause human resource problems for the organisation.	Internal, National
Lack of necessary support to prepare projects (information, finances)	Several organisations have complained that they have no resources to study all available information. Also, the management attitude is sometimes reluctant to commit resources. Financial support for preparation of proposals might help.	National, Organizational
Preparation, application and evaluation period too long.	During the interviews, quite a few organisations pointed out that the proposal preparation, evaluation and starting process takes too long. Often organisations, in order to survive, have to change staff, direction of activities and research priorities.	EC

Barriers specific to academic sector and higher education institutions

Academic and higher education organizations have a number of specific obstacles and barriers, which are not characteristic for business entities. These barriers are related to the specifics of academic research as well as to the economic and political situation in science and RTD sector in Latvia during the study period.

Table 8. Barriers specific to Academic sector and Higher education institutions

Barrier	Description	Action level (Organizational, national, EU) to overcome barrier
Weak cooperation with industry sector in Latvia and abroad	Industry and research institutions do not cooperate enough. Research findings and developments are not being implemented by the industry.	National, EC
Participation in national projects (funded by EU funds) dominates over FP7 applications	It is faster and easier to get funding on the national level. It has been pointed out by several organisations that some national institutions are not interested in the results of the research. They only care if all the documents are being prepared correctly, as required to obtain EU funding.	National
Not enough (no dedicated) resources to follow up EU ICT research work programs and calls	Not all organisations have experienced people who can follow all research programmes and calls. This is especially true for most of the regional research and higher education institutions.	National
Lack of orientation to research results and outcomes in national projects; this creates an inappropriate research project attitude/ culture	The fact that for many projects, financed on the national level, there is little interest in the results, but the focus is mostly on the administrative paperwork, stimulates the wrong attitude towards research projects and to research in general.	National, EC
Unclear future support for science, RTD and education in Latvia; this leads to low motivation to work on future projects	Periodical reduction of financial support for research and science demotivates researchers and potential researchers.	National

Brain-drain of young researchers	Difficult economic situation, minimal support from the government, and public opinion, which does not hold education and science in high esteem, incites young, talented people to leave the country.	National
Some RES and HE can't find objectives and challenges in the current FP7 work program that would correspond to their main research priorities	Not all organisations, with high competence in particular fields of research, can find FP7 objectives and challenges matching their interests (e.g. Institute of Polymer Physics).	EC

Barriers specific to Industry and SME sector

The study clearly showed a comparatively low participation rate (and even lower success rate) of business organizations in FP6 and FP7 calls. Interviews helped to understand better the factors, which are keeping large companies and SMEs in Latvia from being successful in EU collaborative research. Most of the barriers are linked to enterprise policy, management attitude and lack of knowledge and cooperation.

Table 9. Barriers specific to Industry and SME sector

Barrier	Description	Action level (Organizational, national, EU) to overcome barrier
Companies don't have RTD strategy or plans	Most of the companies do not consider research as a vital part of their activities, even though that they do research and it is important for their growth.	Organizational-Internal
Participation in EU ICT research projects is not a target for company management	Management is interested in immediate business gains. They are not willing to spend resources on the preparation of proposals, search for partners, etc.	Organizational-Internal
Companies don't have clearly defined responsibilities for RTD and innovation	In many cases, research done for the core business of the company is not recognised nor identified as 'research'. It is considered as a support activity to reach strategic and business goals.	National, Organizational
Weak cooperation with academic sector inside Latvia and abroad	The general opinion prevalent in Latvia is that academic research doesn't help to realize the ICT industry goals. Quite often, academic institutions and business organizations are doing research in similar areas independently, instead of cooperating.	National
Strong focus only on obtaining financial support	Companies are not ready to share their experience and competence with partners. Their main interest is to find financial support for business activities.	National, Organizational
Importance of access to leading edge technologies and international experience underestimated	In several cases, management does not understand that in collaboration projects sharing does not mean only giving away their knowledge, but also gaining experience and knowledge of other organisations.	Organizational, National
Too much focus on short term goals and markets	Lack of strategic long term planning of research activities is one of the main barriers.	Organizational

Barrier	Description	Action level (Organizational, national, EU) to overcome barrier
Development of services dominates over product and technology development	The market and current demand dictate what a company is working on at the moment. Deeper analysis and forecasting is not done.	Internal, National
Advantages of registered patents and licenses questionable, practically no experience to register patents at EU level	High cost of patents and unclear benefits lead companies to look for other ways to protect their know-how.	National, Organizational
Insufficient participation in international / EU events and networking activities; this decreases opportunities to contact best consortiums.	All the barriers mentioned above result in low interest, or in many cases lack of information, about international events and networking activities.	National, EC, Organizational

Ways to overcome barriers are described in the section – Recommendations.

RECOMMENDATIONS AND PROPOSED ACTIONS FOR INCREASING THE CONTRIBUTION OF LATVIA TO THE FP7-ICT THEME

An analysis was done by the study experts, taking into account the answers obtained from Live interviews with the organisations and with national policy making and financing authorities, the main barriers and obstacles to participation in EU ICT research programmes, as well as the main factors behind unsuccessful participations in project applications, and the resulting recommendations for actions to be taken at different levels are given below.

Such actions should help to take advantage of ICT RTD opportunities, to mitigate threats and to overcome weaknesses. The actions could be divided into three groups:

- Stakeholder level activities – activities that should be taken by each individual organisation internally in order to extend research activities and participate in FP projects.
- National level activities – activities that should be taken by official instances (government, responsible ministries, NCP) of the country.
- European level activities – activities that can be taken only at European Commission level.

Recommendations at the Stakeholder / institutional level

Activities that should be undertaken by each organisation internally in order to extend research activities and participate in FP projects.

Table 10. Recommendations at the organisational level

Recommendation	Action	Means	Responsible authority

Recommendation	Action	Means	Responsible authority
Identify strategic objectives of RTD	Advise organisations to introduce research in their strategic documents and place it on the same level with other activities and growth of the organisation. For business organizations RTD and innovation strategy should be an integral part of their business plan, having long term, mid-term and short term priorities.	Meetings with organisation management Strategic planning inside organisation	Organisation management
Define clear responsibilities for ICT RTD	Define clear responsibilities for ICT RTD within the organisation. It might be an identified person or department. It is necessary to inform other research teams in the organisation, NCP and relevant state authorities about the entity responsible.	Meetings with organisation management Allocation of responsible person (group) for co-ordination of research in the organisation	Organisation management
Foster closer collaboration between commercial and academic sectors	Establish permanent cooperation with relevant universities and research institutes / industry on a national and regional base. Follow-up national funding schemes supporting industry-academic collaboration.	Activities involving organisations from both academic and industry sectors (meetings, seminars, projects)	Organisation management
Regularly follow latest information about ERA, FP7 work programme and calls	Advise relevant researchers and research teams, which are not well informed about the research principles of the EU, to study explanatory materials and latest information.	Daily work of the dedicated person (group) in the organisation Smooth information flow in the organisation	Responsible person for ICT RTD Research teams and researchers
Allocate resources for participation at ICT RTD international events	Allocate organisational resources for participation at ICT RTD international events (scientific conferences, information days, etc.); follow-up national funding schemes supporting this activity.	Finding resources from own budget/support programmes for participation at ICT RTD international events	Organisation management Responsible person for ICT RTD

Recommendations at the National level

Activities that should be taken by official instances (government, responsible ministries, NCP) in the country.

Table 11. Recommendations at the National level

Recommendation	Action	Means	Responsible authority
Set education and science as top priorities	Define education and science as top priorities within relevant policy documents. Increase financing for RTD in Latvia, taking full advantage of EU funding.	Consultations among involved stakeholders. Elaboration of necessary policy documents and adoption of necessary changes in legislation. Allocation of relevant financial resources.	Government Ministry of Education and Science Ministry of Finance

Recommendation	Action	Means	Responsible authority
Set ICT as a top priority	Acquiesce the development and spread of ICT in all areas of life in the relevant strategy documents. Increase financing for implementation of innovative solutions in governmental and other sectors.	Consultations among involved stakeholders. Elaboration of necessary policy documents and adoption of necessary changes in legislation. Allocation of relevant financial resources.	Government Ministry of Environment Ministry of Finance
Provide targeted and relevant information to potential proposal submitters	Distribute only relevant information to organisations, filtered by areas of expertise. Organise information workshops and proactive activities to involve Latvian organisations in FP7 projects.	Personalized contacts (meetings, communication). Focused workshops and seminars.	NCP National ICT committee member from Latvia Ministry of Education and Science
Provide consultations on IPR, patents and licences	Organisations require help in understanding issues in IPR related to EU co-operation projects. Consultation on patents and licenses and related issues should be offered.	Individual meetings. Workshops and seminars on the topic inviting also experts from abroad.	NCP Ministry of Education and Science Ministry of Economics Latvian Investment and Development Agency
Provide support for EU partner search	Devise more effective ways of partner search, for example using the "Who is Who" database of this project. Make better use of the NCP network across the EU.	Proactive partner search using outcomes and contacts in the "Who is Who" database from Latvia and other countries.	NCP
Provide financial support for project proposal preparation	Review existing funding programmes and allocate resources for project preparation. As an example, programmes supporting participation in international exhibitions and conferences could be used. The maximum support level per proposal preparation recommended is 50% of the actual costs.	Allocation of relevant financial resources from state budget/EU funds.	Ministry of Finance Ministry of Economics Ministry of Education and Science
Raise the awareness of ICT RTD achievements and excellence areas in Latvia and abroad	Make better use of public relations (press releases, organisation of national prize on ICT RTD, etc.). Work on political and diplomatic levels. Establish a National ICT RTD prize.	Public relation activities (press releases, articles, media clips). National level competitions/prizes. Meetings on political/diplomatic level in the international arena.	Latvian Investment and Development Agency Ministry of Foreign Affairs Latvian Institute Ministry of Education and Science LIKTA (experience of national award for ICT projects)
Promote Latvian ICT RTD excellence centres to leading EU partnership networks in relevant research areas	Organise targeted actions to approach the leading EU consortiums.	Targeted meetings and matchmaking events. Informational materials prepared by the Ministries.	Ministry of Education and Science Ministry of Foreign Affairs
Establish support mechanisms to	Organise targeted workshops in focused areas involving participants	Workshops with participants from industry	Ministry of Education and Science

Recommendation	Action	Means	Responsible authority
stimulate industry-academic cooperation	from both sectors. Provide national funding schemes supporting industry - academic collaboration.	and academic sectors. Allocation of financial support to promote industry-academic collaboration.	Ministry of Economics Latvian Investment and Development Agency Professional associations
Create a specialised course for PhD students and young scientists	Set up a course on European research concepts in the age of knowledge society, including FP7, for all PhD students and young scientists.	Creation of a specialized course. Implementation of the course in the study programmes.	Ministry of Education and Science Ministry of Economics
Focus research efforts on promising specific areas	Regarding the FP7 ICT Theme, concentrate the research efforts in the following 3 promising areas: 1. Computing science, including the quantum computing area and system modelling, 2. Development of sensor networks, 3. Development of the semantic web and other research related to computer linguistics.*	Provide research funding for the specific areas Provide research scholarships to Ph.D. students in the specific areas	Ministry of Education and Science Ministry of Economics Research institutions concerned
Support research in some specific areas closely related to ICT	Additionally, support research in the areas of solid state physics, including nano-level physics, and optical research.**	Provide research funding for the specific areas Provide research scholarships to Ph.D. students in the specific areas	Ministry of Education and Science Ministry of Economics Research institutions concerned

*Regarding the FP7 ICT Theme, concentrate the research efforts in the following three areas:

- **computing science,** which has leaders of high expertise, including the **quantum computing** area and **system modelling**, and moreover demands considerably less investments than other research directions;
- development of **sensor networks**, taking into account the research done at the Institute of Electronics and Computing Science, and at the Faculty of Computing Science, University of Latvia;
- development of the **semantic web** and other research related to **computer linguistics**, taking into account the needs of the Latvian language and the academic and commercial success achieved already.

Additionally, support research in the areas of **solid state physics, including **nano-level physics,** and **optical research,** taking into account the results achieved by theresearchers at the Institutes of the University of Latvia and at RigaTechnicalUniversity.

Recommendations at the European Union level

Table 12. Recommendations at the EU level

Recommendation	Action	Means	Leading authority
Introduce more possibilities for the organisations without previous experience	In order to help organisations without previous experience in FP to participate in projects, possibilities to join existing consortia or submit proposals with partners (e.g. academic and SME) from the same country, should be encouraged.	Invitation of organisations from Latvia with relevant ICT RTD potential to join existing EU consortia/submit proposals Development of necessary schemes and procedures	European Commission, DG INFSO

Recommendation	Action	Means	Leading authority
Promote usage of completed FP project databases	Introduce tools and demonstrations on how to search for information from completed FP project databases (CORDIS), or partner search networks (Ideal-ist).	Promotion of FP databases and search tools at information days, NCP websites, via mailing lists, etc.	European Commission, DG INFSO, National NCP
Provide targeted training	Organise objective and expertise area oriented workshops and training for existing and potential excellence centres from Latvia.	Training workshops and seminars	European Commission, DG INFSO NCP
Promote ICT RTD excellence centres from Latvia to leading EU partnership networks	Introduce a set of targeted actions to link existing and potential ICT RTD excellence centres from Latvia to leading EU partnership networks in relevant research areas, such as a) organize "research ideas match-making events" in Latvia, and b) make full use of "Who is who in ICT RTD" data base created within this study.	Invitation of organisations from Latvia with relevant ICT RTD potential to join leading EU partnership networks Development of necessary mechanisms	European Commission, DG INFSO
Include high competence areas of ICT RTD excellence centres of Latvia in FP7 future calls and in the next Framework programme	Take into account high competence areas of ICT RTD excellence centres of Latvia, when discussing and drafting FP7 future calls and the next Work Programme.	Elaboration of workprogramme and calls relevant to the high competence areas of Latvian organisations	European Commission, DG INFSO National ICT committee member from Latvia

OVERALL CONCLUSIONS

There are a number of organizations in Latvia with definite ICT research capabilities, adequate infrastructure, and experience in EU research projects and/or international ICT research cooperation activities. Several domains of high ICT RTD competence can be singled out, such as quantum computing, language processing and semantic analysis, or advanced digital signal processing, among others.

The success rate of Latvian organizations in FP6 calls is comparable to the EU average, but is significantly lower for the first four FP7 calls. There is a high potential for growth and development for these organizations via participation in EU research projects in the future.

Among the obstacles for successful participation of Latvian organizations in EU research programs, the following could be mentioned:

- Lack of clear long term and mid-term RTD strategy in many organisations;
- Low level of cooperation between the academic and industry sectors for ICT RTD;
- No clear understanding about Framework program participation rules, conditions, or funding schemes;
- Lack of resources (human, financial) for qualitative FP project application preparation;
- No access to EU leading partnership networks.

In order to increase the rate of successful participations of Latvian organizations to EU research programs, targeted actions need to be taken at organizational, national and EU levels, as outlined in this document.

LIKTA CONTACTS

http://www.likta.lv/EN

MaraJakobsone, Vice-president LIKTA
mara.j@dtmedia.lv

http://www.bonita-project.eu

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