



Information Society  
and Media

**Nº IST-2-511331-CA**  
**Information Society**  
**Technologies Promotion in**  
**Baltic States**

The IST4Balt is a multi-partner action that intends to promote and coordinate IST innovation activities in EU entering Baltic States (Latvia, Lithuania and Estonia). The project develops IST Information Dissemination Centre in each Baltic country. The IST4Balt organises seven all-Baltic major conferences, seven technical/training workshops and provides distant and face-to-face training to promote FP6 and other EU programmes in Baltic States. Several IST tools for practical team work between EU and Baltic States will be selected and proposed for implementation. The project will result in creation of Trans-Baltic IST Association, which will coordinate efforts of Baltic States in European Information Society development during and after the end of the IST4Balt.

**Project Coordinator**

**Jean BONNIN**

EDNES  
Maison des Associations  
1A, place des Orphelins  
F-67000 Strasbourg, France  
Tel.: +33 3 90 24 00 32  
Fax: +33 3 90 24 02 91  
E-mail: bonnin@ednes.org

**Project Manager**

**Alexander BERIOZKO**

EDNES  
3, Molodezhnaya St.  
119991 GSP-1 Moscow, Russia  
Tel.: +7 095 133 43 39  
Fax: +7 095 930 55 59  
E-mail: ber@ednes.org

**Contact in the European Commission**

**Jacques BABOT**

Head of sector  
European Commission - DG INFSO  
Rue de la Loi, 200  
B-1049 Brussels, Belgium  
Tel.: +32 2 296 35 94  
Fax: +32 2 296 76 10  
E-mail: jacques.babot@ec.europa.eu

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Dear Readers!

One of the objectives of the IST4Balt project is publishing of three issues of IST4Balt News Journal on a yearly basis. The News Journals will be devoted to IST events and tools relevant to IST activities in the Baltic States.

The present IST4Balt News Journal is the second volume, which covers the period from 1 September 2005 to 31 August 2006.

The main thematic sections of the Journal are the following: IST4Balt Events, Towards a Knowledge Society, IST and Other European ICT Projects, Views and Opinions.



Lugupeetud Lugejad!

Üheks IST4Balt projekti eesmärkidest on aastaajakirja IST4Balt News Journal kolmekordne väljaandmine. Ajakirja teemad ja sisu koosnevad kõigepealt IST uudistest, üritustest ja vahenditest, mis on seotud IST tegevusega Baltimaades.

Praegune väljaanne on teine köide, mis hõlmab projekti perioodi 1. septembrist 2005 kuni 31. augustini 2006.

Ajakirja põhiosad on: IST4Balt üritused, IST ja teised Euroopa ICT projektid, Arvamused ja mõtted.



Cienījamais Lasītāj!

Viens no IST4Balt projekta uzdevumiem ir IST4Balt ziņu žurnāla publicēšana. Izdotie žurnāli tiek izplatīti dažādos pasākumos, kas saistīti ar IST aktivitāšu īstenošanu Baltijas valstīs un citur pasaulē.

Šis IST4Balt ziņu žurnāls ir otrais izdevums, kurš aptver laika periodu no 2005.gada 1.septembra līdz 2006.gada 31.augustam.

Galvenās žurnālā apskatītās tēmas ir sekojošas: Projekta IST4Balt pasākumi, Pretī zināšanu sabiedrībai, Citu IST projektu pieredze, leskati un viedokļi.



Gerbiami skaitytojai!

Vykdam IST4Balt projektą bus išleisti trys metiniai IST4Balt žurnalai apie IST programos renginius, ITT produktus bei paslaugas, kurie atitinka IST programos sklaidos Baltijos šalyse tikslus.

Tai jau antras toks leidinys. Jis skirtas IST4Balt projekto veiklai nuo 2005 m. rugsėjo iki 2006 m. rugpjūčio.

Pagrindinės šio leidinio temos yra IST4Balt projekto renginiai, Žinių visuomenė, IST programos remiami ir kiti ES projektai, Nuomonės ir komentarai.



Дорогие читатели!

Одной из задач проекта IST4Balt является публикация трех ежегодных выпусков журнала IST4Balt. Журналы будут посвящены событиям и технологиям программы IST, имеющим отношение к деятельности IST в Балтийских странах.

Данный журнал IST4Balt является вторым выпуском, который охватывает период с 1 сентября 2005 г., по 31 августа 2006 г.

Основные тематические разделы журнала следующие: События IST4Balt, Навстречу обществу знаний, Проекты IST и другие европейские проекты в области информатики и коммуникаций, Взгляды и мнения.

## Editorial board

Editor-in-chief: L.Novickis (RTU, Latvia) Editors: J.Babot (EC, Belgium), J.Bonnin (EDNES, France), A.Gvishiani (EDNES, France), A.Beriozko (EDNES, France), Y.Merkuryev (RTU, Latvia), V.Shitikov (RTU, Latvia), J.Lavendels (RTU, Latvia), T.Rikure (RTU, Latvia), M.Jakobsone (LITTA, Latvia), E.Zvirblis (INFOBALT, Lithuania), S.Arelis (VITP, Lithuania), K.Baranov (Inforing AS, Estonia), E.Konstantinova (Bi-Info, Estonia); Design: E.Kedrov (EDNES, France)

## About the Project

*Alexander Beriozko (Project manager, EDNES, France),*

*Jean Bonnin (Project coordinator, EDNES, France)*

The project "Information Society Technologies Promotion in Baltic States (IST4Balt, IST-2-511331-CA)" is a Coordination Action for the FP6 IST Priority. IST4Balt is a follow-up of the FP5 IST project "Teleworking as a Tool for Information Society Technologies Programme Promotion to Baltic States (TELEBALT, IST-2001-33041)", 2001-2003.

IST4Balt coordinator is "Reseau pour les echanges en matiere d'education et de recherche dans le domain des sciences de la Terre" (Earth Data Network for Education and Scientific Exchange, EDNES), non-governmental, non-profit, international association that has its legal seat and headquarters in Strasbourg, France.

Six other IST4Balt partners are:

- Riga Technical University (RTU), Latvia;
- Latvian Information Technology and Telecommunications Association (LITTA), Riga, Latvia;
- Association of the Information Technology Telecommunications and Office Equipment Companies of Lithuania (INFOBALT), Vilnius, Lithuania;
- Visoriai Information Technology Park (VITP), Vilnius, Lithuania;
- Business International Info Company (Bi-Info AS), Tallinn, Estonia;
- Inforing AS, Kohtla Yarve, Estonia.

The main goal of the project is to promote the FP6 IST Priority to Latvia, Lithuania and Estonia by implementing fast dissemination and awareness actions targeted on these EU New Member States (NMS). The project will target on the following IST Strategic Objectives:

- 2.3.2.6 Applications and services for the mobile user and worker;
- 2.3.2.3 Open development platforms for software and services;
- 2.3.2.7 Cross-media content for leisure and entertainment;
- 2.3.2.9 Improving Risk management;
- 2.3.2.10 e-Inclusion.

During the project development the following actions were performed and results were achieved.

The IST4Balt project presentation brochure was published in English (by EDNES, 1500 copies, and VITP, 300 copies), Latvian (by RTU, 1500 copies), Lithuanian (by VITP, 300 copies), Estonian (by Bi-Info and Inforing, 1500 copies), and Russian (by Bi-Info, 500 copies), and widely disseminated by the participating organizations in the Baltic States.

The INFOBALT-IST4Balt 2004 seminar "IST FP6 projects promotion in Baltic States" was organized in Vilnius, Lithuania, on October 22, 2004, by INFOBALT and VITP in close collaboration with EDNES (50 participants and 16 presentations). The INFOBALT-IST4Balt 2004 seminar CD was developed and printed (500 copies) by INFOBALT and VITP, and widely disseminated.

The IST4Balt project was presented (information stand and networking session) at the IST Event 2004, in The Hague, The Netherlands, on November 15-17, 2004, by project participants from EDNES, RTU, LITTA, INFOBALT, VITP, Inforing and Bi-Info.

The IST4Balt on the Web system was developed, including the IST4Balt central Web-site at EDNES and the IST4Balt national Web-sites at RTU, INFOBALT, VITP, Bi-Info and Inforing.

The IST4Balt national Information Dissemination Centres (IDCs) were developed at RTU, INFOBALT, Bi-Info and Inforing in collaboration with EDNES.

The Baltic IT&T-IST4Balt 2005 Conference was organized in Riga Latvia, on April 6-8, 2005, by LITTA in close collaboration with RTU and EDNES (more than 500 delegates from 29 countries, 28 sessions with 170 speakers). The IST4Balt 2005 Workshop "IST FP6 – Great Opportunity for Co-operation and Collaboration" was organized in Riga, Latvia, on April 6-7, 2005, by RTU in close collaboration with LITTA and EDNES (more than 70 delegates from 28 countries, 7 sessions with 34 speakers).

The IST4Balt performed the ICT market review and technology studies in the three participating Baltic countries.

The selection methodology for eCollaboration tools for EU-Baltic states team work has been developed by independent experts. Several eCollaboration tools have been selected for the possible further adaptation. The project management teams from EDNES, INFOBALT and VITP evaluated the selected tools according to the developed methodology.

The first version of the IST4Balt training course on the FP6 and its IST Priority has been developed by EDNES in close collaboration with the project partners.

The IST4Balt News Journal Vol. 1 was prepared for publishing (1500 copies) by EDNES in close collaboration with the project partners.

The INFOBALT-IST4Balt 2005 Conference "Evolving Mobile Europe" (200 participants from 20 countries, 53 presentations) and the IST4Balt 2005 Workshop "Participation in IST at the Edge of Sixth and Seventh Framework Programmes" (40 participants from 11 countries, 23 presentations) were organized in Vilnius, Lithuania, on October 24-25, 2005, by INFOBALT and VITP in close collaboration with EDNES, LITTA and RTU.

The Bi-Info-IST4Balt 2005 Conference "Transport and Logistics in International Trade. Information Technologies" and the IST training day were organized in Tallinn, Estonia, on December 8-9, 2005, by Bi-Info in close collaboration with EDNES (150 participants from 11 countries, 23 presentations).

The Baltic IT&T-IST4Balt 2006 Conference has been prepared in Riga Latvia, on April 5-7, 2008, by LITTA in close collaboration with RTU and EDNES. The IST4Balt 2005 Workshop "Towards a Knowledge Society" has been prepared in Riga, Latvia, on April 7, 2006, by RTU in close collaboration with LITTA and EDNES.

In the nearest future IST4Balt will provide (through IST4Balt Web-sites, News Journal, workshops, conferences and training course) relevant information about the present situation with the IST in the three Baltic countries and formulate appropriate recommendations to EU research and marketing telematics communities.

A system of four Information Dissemination Centers (IDCs) will be further developed by the project. The IST4Balt on the Web

system will be further developed focusing on particular application areas. Two issues of IST4Balt News Journal will be published in September 2006 and 2007 in hard copies and electronically.

The project will co-organize major international Baltic ICT events - two INFOBALT-IST4Balt conferences in Vilnius in October 2006 and 2007, Baltic IT&T-IST4Balt conference in Riga in April 2007.

The project will organize four IST4Balt technical/training workshops (three goal oriented technical workshops at the time of the conferences in Vilnius and Riga, and a training workshop in Põlva, Estonia, in June 2006). The workshops will be devoted to the promotion of the FP7 and the IST. They will show new FP7 opportunities for the Baltic countries and will contribute to launching IST project proposals.

IST4Balt will provide training measures on the FP6, FP7 and the IST, demonstrating new intellectual, technical, educational and business opportunities for Baltic States as EU NMS.

The project will initiate the creation of Trans-Baltic IST Association that will unite the IST4Balt participants with leading ICT organizations in Latvia, Lithuania and Estonia. The association will coordinate joint efforts of the Baltic States in IST development focusing on integration to the EU.

IST4Balt Web-site at EDNES, France; [www.ednes.org/ist4balt](http://www.ednes.org/ist4balt)

IST4Balt Web-site at RTU, Latvia; [www.balticit.com/ist4balt](http://www.balticit.com/ist4balt)

IST4Balt Web-site at INFOBALT, Lithuania; [www.ist4balt.lt](http://www.ist4balt.lt)

IST4Balt Web-site at VITP, Lithuania; [www.vitp.lt/ist4balt](http://www.vitp.lt/ist4balt)

IST4Balt Web-site at Bi-Info, Estonia; [www.bi-info.ee/Ist](http://www.bi-info.ee/Ist)

IST4Balt Web-site at Inforing, Estonia; [www.istbaltia.net](http://www.istbaltia.net)

## IST4Balt Events

### IST4Balt Conference “Evolving Mobile Europe”, October 24-25, 2005, Vilnius, Lithuania

*Edmundas Zvirblis (IST4Balt local project manager, INFOBALT, Lithuania)*

Conference “EVOLVING MOBILE EUROPE”\* was organised by INFOBALT - Association of Information Technologies, Telecommunications and Office Equipment of Lithuania in the frame of the project IST4BALT “Information Society Promotion in Baltic States” funded by Information Society Programme of the European Union. The conference and the technical workshop were organized in co-operation with “Earth Data Networks for Education and Scientific Exchange” (EDNES), France and Visoriai IT Park.

The conference and the technical workshop were aimed at strengthening the scientific and technological co-operation between the European Union and the Baltic countries in the field of mobile applications to new methods of work, business, research and development, e-government. The conference and the technical licensed spectrum. Many challenges wait for the Communications Regulatory Authority because of these interfluent technologies:

workshop programs brought together not only participants but also experts and top-class speakers within a large conference program. At the conference and the technical workshop latest trends and themes were discussed.

H.E. Mr. Valdas Adamkus, president of the Republic of Lithuania, noted that Lithuania should ensure proper relations for business and the general public for using the possibilities offered by information technologies and telecommunications. “Lithuania is faced with an even more difficult task than EU’s old members – our country has to catch up with these countries in terms of social and economic development and reach their living standards. It is clear that these tasks will be a reality only after we manage to ensure fast development of knowledge economy,” said the president.

IST4Balt conference reviewed the achievements of the Baltic countries mobile communications industry and the importance of the development of mobile applications in the European Union and global market, with discussions about what the countries need to gain stronger grounds in ambient working environment. The conference also addressed topics like importance of mobile applications and services in a knowledge society, states strategies and business investments into mobile communications science and innovations, broadband Internet, mobile and wireless solutions today and in the future knowledge economy. The IST4Balt conference and the technical workshop showed how mobile and wireless technologies keep business professionals in touch with company resources and information no matter where they are.

IST4Balt conference explored the latest initiatives of mobile communications industry and R&D, and gained key insights through case studies on successful mobile applications development.

All projects, research institutions and companies involved in EC FP6 IST programme and other players of mobile communications and applications sectors were encouraged to participate in the conference and submitted papers for presentation of their activities.

IST4Balt conference and the technical workshop promoted ideas of the modern world focusing at the Information Society technologies. They were open for all representatives of international organizations, professionals, business and science representatives and individuals.

#### Short excerpts from selected speakers

*Vision of Optimally Connected Anywhere, Anytime: the role of the regulatory institution*

Tomas Barakauskas, Director of Communications Regulatory Authority of the Republic of Lithuania

Tomas Barkauskas, director of Communications Regulatory Authority presented a concept of technology, according to which, different technologies lay over each other. This concept sets the guidelines of optimal connection anytime and anywhere. There will be no possibility to choose a non optimal connection in the future. This is the essential outcome of the changing world and globalization.

According to the speaker, the interfluent technologies determine that there will be necessary to think about the solid, harmonized, regulator will have to dedicate enough of the spectrum without separating different technologies; balance flexibility and harmony;

arrange the accessibility to the infrastructure for the newcomers to introduce the innovations.

*EVEREST – A Policy Based QoS Architecture for Wireless Systems*

Peter Karlsson, Ph. D., Director Telia Sonera corporate R&D, EU program management, Sweden

EVEREST – “Quality of Service” (QoS) wireless data transfer systems architecture.

“Everest” is the project of academic institutions and telecommunications companies. The purpose of this project is to evaluate the strategies and algorithms according to which QoS systems are being created. Its results will allow providing the independent analysis of RRM strategies. It will allow the mobile services providers to evaluate whether the market solutions use all the potential of their systems. Such analysis will encourage the cooperation of manufacturers and simplify the compatibility of their solutions.

*WINDECT for Professional Voice Quality on WLAN*

Marjan Spegel, Dr., Head Laboratory for Computer Technologies Intelligent Systems Department, J. Stefan Institute, Slovenia

WINDECT – improving quality of voice transfer over wireless networks.

Voice over wireless LAN networks (VoWLAN) is the object of great interest in academic societies and IT companies. However there are some issues on implementation and quality of VoWLAN. The purpose of WINDECT project is to determine the future of Voice over wireless networks, the complements of the current technologies, which would allow improving the quality of voice transfer.

*PULSERS - Pervasive Ultra-wideband Low Spectral Energy Radio Systems*

Sven Zeisberg, Technical Director Electrical Engineering and Information Technology, GWT mbH, Germany

Project “PULSERS” is being implemented by 30 representatives of IT business and academic organizations. These people are seeking to investigate and develop ultra-wideband radio technology (UWB-RT). The purpose of “PULSERS” is versatile applications in the areas where wireless data transfer is necessary. It is being implemented through informing European society about the advantages of this system and the benefits of the technology standardization.

*SatNEx – A Network of Excellence in Satellite Communications*

Hartmut Brandt, German Aerospace Center (DLR), Institute of Communications and Navigation, Germany

The purpose of the project is to stimulate and develop European scientific researches, which purpose is to expand the use of satellites in communication processes. 22 academic organizations from 9 European countries participate in this project. Scientific research projects, cooperation, conferences are being held using the satellite communications.

*Global Medical Research on Internet*

Magnus Westgren, CEO, Medscinet AB, Sweden

Medscinet presents solutions, dedicated to medical institutions, which can help to quicken the communication processes between doctor and patient, reduce the costs, improve the medical service quality. The new technology will help to create, save and quickly find the patient records. Medscinet has already helped to collect 3 million records about 4 million patients in the world.

*Creating Business Value for the Mobile Enterprise*

Roger Jones, Convergence business development director, EMEA, AVAYA

Avaya together with Nokia presents fixed and mobile telephony convergence programs (FMS – fixed mobile convergence), which are dedicated to the 60 series platform devices. Program Avaya Mobile expands the solutions and personnel mobility of the companies, using IP telephony. This means that from now on, mobile personnel can be reached with a single phone number – trying to reach an employee, both telephones, fixed and mobile, will ring. This will allow the personnel to remain mobile independent of their workplace.

*Emerging electronic communications regime in EU and Lithuania*

Valdas Kišonas, Director of the Information technologies and telecommunications department of the Ministry of Transport and Communications, Lithuania

Currently European Commission seeks to ensure the full regulation of telecommunications in the European Union member states.

Lithuania was one of the first EU member states, which started to accept the new telecommunication acquis. Currently electronic communication regulatory laws are under consideration, the legal base is being created. The most important issue in Lithuanian mobile telephony sector is to create the centralized database, which would ensure the number transfer and provide three 3G mobile telephony licences. This should be done in the beginning of the year 2006.

European Union institutions still have no clear vision of electronic communications regulation in member states, however it is known that real challenges are ahead of national governments and participants of the market.

*Location-based services: integration of advanced technologies*

Viktoras Paliulionis, Doctor of Physical Sciences (Informatics), researcher in the Software Engineering Department of the Institute of Mathematics and Informatics, Lithuania

Location based services (LBS) allow to get information about where is the user of a certain device. LBS consist of technologies such as GIS, internet, means of wireless communications, and GPS solutions. Location determination services require cooperation from many areas. Mobile telephony operators, GIS service providers, digital maps, information processing specialists – all participate in the development of LBS.

*Mobile Public Key Infrastructure (PKI) : one step towards the electronic society*

Ramūnas Šablinskas, Dr., Service Development Project Manager, UAB OMNITEL, Lithuania

Digital signature is the “array” of information about its owner, serving as the means of authentication. It performs the same function as the hand-written signature. Any kind of digital information can be signed using the digital signature. However digital signature can cause certain issues – to sign a document digitally, one needs specific hardware, software, some security issues rise. The alternative for the mobile signature is a digital mobile signature, where the main PKI device is the mobile phone. This solves the problems, mentioned above. It is easy to use, compatible. This is not yet adjusted for a professional use, but it is ideal as means of digital signature for everyday use.

*Pervasive PKI: towards simplifying, mobility, more functionality – expanding PKI-based Application*

Saulius Sidaras, Dr., associate professor, Director of State Institute of Information Technology, Lithuania and Laurynas Pacenka, Head of information and management systems department, State Institute of information technology, Lithuania

There are still now alternatives to ensure the security of Public Key Cryptography and Infrastructure. However technological achievements allowed simplifying the most complex PKI solutions, SIM PKI infrastructure and its applications are already implemented.

After implementing national multifunctional eID, EeID, WeID with more than one certificate, systems will become more secure and reliable. Use of simplified PKI in the systems of lesser importance would allow to maintain high level of security and save funds simultaneously.

\*Take your time to visit the website of the Conference “EVOLVING MOBILE EUROPE” at <http://www.infobalt.lt/konferencija/2005/?l=en>.

### **IST4Balt Workshop “Participation in IST at the Edge of 6th and 7th Framework Programmes”, October 24-25, 2005, Vilnius Lithuania**

*Saulius Arelis (IST4Balt local project manager  
Visoriai Information Technology Park, Lithuania)*

The workshop “Participation in IST at the edge of 6th and 7th Framework Programmes” was organized implementing the Work package 3 of the IST4BALT project: “Infobalt – IST4BALT conferences and workshop” and targeted two objectives of WP 3:

- Promote the information on new opportunities opened by the IST, the FP6 and other EU programmes in research, environmental, educational and business communities of the Baltic States
- Increase drastically the Baltic States participation in the IST, the FP6 and similar EU programmes in the future and continue forming in this way new potential market for IST tools.

Objectives mentioned above are still the hot topic in Baltic States and it was proved in the workshop by the representatives of

IST National contact points providing data on participation of businesses and academia from the region in FP 6.

IST programme COMIST project was invited to contribute to the workshop organization developing the programme, delivering presentations and taking part in discussions.

The Workshop „Participation in IST at the edge of 6th and 7th Framework Programmes” intended to discuss situation with Baltic States presence in FP6 programme focusing on IST and stimulate wider participation of organizations/companies from Baltic States in IST programme, give an overview of the IST Research programme, next call-for-proposal and possibilities and issues concerning participation in FP6 and FP7. The event brought together groups and communities interested in joint activities within IST programme projects and provided floor for presentation of the networks, projects and tools stimulating participation in IST programme. The event also served as networking and matchmaking tool stimulating participation in future FP6 and FP7 calls.

The workshop was organized on the same week as the exhibition INFOBALT 2005 that followed the IST4Balt Vilnius event and was organized in parallel to the conference “Evolving Mobile Europe”. The conference aimed at strengthening of the scientific and technological co-operation between the European Union and the Baltic countries in the field of mobile applications to new methods of work, business, research and development, e-government. The extended conference program brought together participants, experts, as well as top-class speakers, who discussed the latest IT trends and themes. Both events had the same opening session, which started with the welcome speeches of H.E. Valdas Adamkus, the President of the Republic of Lithuania and H.E. Arturas Paulauskas, Chairman of the Seimas of the Republic of Lithuania.

The sessions of the workshop were designed to make the overview of IST programme in Baltic States, to present the IST4Balt project, other projects, concept of European Technology Platform, networks and instruments fostering participation in calls for proposals of Framework Programmes. Other projects targeted on partnership in IST, preparation of the applications, matchmaking were invited to introduce their activities in Lithuania and Baltic States in order to bring the wider range of coordination actions to the audience. Therefore IST4Balt served as an umbrella presenting the variety of IST actions in Baltic States. Following IST projects were presented at the workshop:

#### **IST-WORLD**

<http://ist-world.dfki.de/>

The objective of the proposed support action is to set up and populate an information portal that helps to promote RTD competencies in specific fields of IST in the NMS and ACC. The portal will contain information about RTD actors, such as persons, organizations and projects, and their experience and expertise. The portal will support partner search for IST proposals and commercial projects. The target user groups are organizations from all countries looking for specific RTD competencies, organizations from NMS/ACC wishing to promote their own competencies, and other support actions requiring a knowledge base for their work.

**EPRI-START**[www.epristart.org](http://www.epristart.org)

EPRI-start (STimulate the pARTicipation of SMEs of NMS in IST activities) is a project that aims to stimulate, increase, but at the same time qualify the participation of SMEs from New Member States of the European Union in the IST Programme.

**PRO-NMS**[www.pro-nms.net](http://www.pro-nms.net)

The project PRO-NMS addresses research organisations, SMEs, IT companies mainly from New Member States (NMS) - Poland, Slovakia, Latvia, Lithuania, Estonia, Hungary and one NIS country - Ukraine- to enlarge the participation in Framework Programmes. These countries will be accompanied by partners from Austria and Germany.

**STAR-NET**[www.project-starnet.com](http://www.project-starnet.com)

The aim of the Star-Net project is to be the first step towards the formation and development of a consolidated structure for support of organisations in all New Member States (NMS) and Associated Countries (AC) for participation in IST activities, building on the knowledge, tools and services developed within some of the most relevant IST support actions over the recent years.

**EPIST**<http://www.epist.org>

EPIST is an innovative Portal funded by the European Commission and realised within the VI Framework Program to support activities in the areas of eHealth and eInclusion and to facilitate New Member State (NMS) and Associated Candidate Country (ACC) participation in related IST activities. It allows the creation of a virtual community of selected partners, specialised in eHealth and eInclusion for NMS and ACC.

**COMIST**<http://www.mosaic-network.org/comist/>

COMIST is a Specific Support Action in Ambient Intelligence at Work :

AMI@Work Communities Stimulating the Participation of NMS and ACC Organizations in eWork and eBusiness Related IST Activities. It was evaluated as top-of-the-list in the 3rd Call Strategic Objective to stimulate, encourage and facilitate the participation of organizations from the New Member States (NMS) and the Associated Candidate Countries (ACC) in the activities of IST.

**ORGANIC**

The new information society is creating a need of sharing knowledge. However, most of companies are overloaded by information and at the same time are not able to manage innovation and knowledge properly. For this reason a new job profile is a need for companies. It is the Innovation and Knowledge Manager - a person who can identify the trends and achievements in technology, apply them to particular business, foresee practical technology and market advantages and develop a plan for implementation of such technology achievements.

What have to be theoretical knowledge and practical skills and experiences of such a person? Project ORGANIC will try to answer such questions.

The workshop "Participation in IST at the edge of 6th and 7th Framework Programmes" attracted around 40 participants from 11 countries of Baltic's, Europe and Russia including: government officials and decision makers; researchers and representatives of academic sector; business executives and directors; ICT managers and specialists; ITC auditors and consultants; representatives of IST NCP's.

The workshop also served as the meeting point initiating NMS Alignment White Paper. The Paper intends to present an analysis, strategies and a roadmap for action concerning the strengthening of NMS innovation systems in order to facilitate emerging value networks in key industrial areas. The strategic objective of the White Paper is to bring together stakeholders and key experts to establish consensus and influence future research and innovation agendas. This work was carried out by the representatives of the COMIST project.

The work carried out at the workshop will be continued during analogous event to be held on 20th October 2006 in Vilnius: „IST in 7th Framework Programme: benefits for active participants”.

## IST4Balt Training Day, December 8-9, 2005, Tallinn, Estonia

*Tatjana Buldynjuk (Bi-Info, Estonia),  
Alexander Beriozko (EDNES, France)*

In accordance with the IST4Balt work plan, the Fifth International Conference "Transport and Logistics in International Trade. Information Technologies" was held in Tallinn, Estonia, on December 8-9, 2005. It included the IST4Balt training day organized on December 9.

The Bi-Info 2005 Conference and the IST4Balt training day were funded by the Information Society Technologies (IST) Priority of the Sixth Framework Programme (FP6) of the European Union (EU). The main organizer of the events was Business International Info AS Consulting Company (Bi-Info), Estonia, and the co-organizer was Earth Data Networks for Education and Scientific Exchange (EDNES), France.

The main goal of the Fifth International Conference "Transport and Logistics in International Trade. Information Technologies" was to share experience of specialists in transport, trade and IT industry, who do their business in West Europe, in the CIS and Baltic countries, in the Near East and South-East Asia.

The main topics of the Bi-Info-IST4Balt 2005 Conference were: trade, transport logistics and information technologies in the EU; trade with the third countries; solutions for transportation and warehousing of goods; new conditions for carrying out trade operations in the united Europe.

Target groups of the Bi-Info-IST4Balt 2005 Conference were: transport, logistics and trade specialists; governmental officials, representatives from international organizations; ICT managers, consultants and specialists; Marketing managers; Business

executives and directors; Representatives from industrial enterprises.

December 8, the first day of the Bi-Info-IST4Balt 2005 Conference, included four sessions organized by Bi-Info:

1. EU policy in trade and transport
2. EU policy in taxes, customs dues and charges
3. Logistics in international trade. Overview of recent developments
4. The strategy of solution of key management problems in logistics companies

December 9, the second day of the Bi-Info-IST4Balt 2005 Conference, included in parallel:

1. Tours to Estonian logistic centres and terminals (organized by Bi-Info), by choice:
  - Tour 1. Sillamae Port
  - Tour 2. Port of Tallinn passenger terminals in the City Harbor and cargo terminals in the Muuga Port (Coal Terminal, Container Terminal, Oil Terminal, and multipurpose terminals under construction in the development area)
2. The IST4Balt training day (organized jointly by Bi-Info and EDNES)

The Bi-Info-IST4Balt 2005 Conference attracted 95 participants from 12 countries of Baltic's, Europe and NIS (Belgium, Estonia, Finland, France, Germany, Hungary, Kazakhstan, Latvia, Lithuania, Poland, Russian Federation and UK), including: transport, logistics and trade; specialists; governmental officials, representatives from international organizations; ICT managers, consultants and specialists; marketing managers; business executives and directors; representatives from industrial enterprises.

Representatives of the EC, directors and top-managers of major international transport and logistic companies and associations, trade and industrial enterprises, high-rank executives of transport ministries and port authorities from the EU countries were among speakers of the Bi-Info-IST4Balt 2005 Conference. Over 150 delegates and guests attended the Conference, representing state sector, as well as private business from European, Scandinavian and Asian countries.

The most urgent problems discussed were current EU Transport Policy and EU Customs Code and what amendments should be made in the national legislation in the countries acceded to EU. It was also very important to dwell on how these amendments would affect the practical side of the transport operations in the newly acceded countries, as well as trade and transit freight transportation in EU and non-EU countries. During three sessions nine speakers shared their experience in different sectors of trade, transport, taxes, customs and logistics.

The IST training day included:

- Session 1. Introduction to IST4Balt. FP6, FP7 and IST
- Session 2. FP6 IST projects
- Session 3. Training on eCollaboration tools for EU-Baltic

States team work

- Round table discussion. Development of strategy of aligning New Member States to IST
- Steering Committee Session

The IST4Balt training day attracted 48 participants from 9 countries (Estonia, Finland, France, Germany, Latvia, Lithuania, Kazakhstan, Poland and Russian Federation), including: ICT managers, consultants and specialists; transport, logistics and trade specialists; marketing and service managers and providers; business executives and directors (especially SME's); governmental officials, representatives from international organizations; scientific researchers; higher education students and tutors.

### **Session 1.**

*Chairman: Emilia Konstantinova, Bi-Info, Estonia*

The IST4Balt project was introduced by Prof. Jean Bonnin (President, EDNES, France). The next presentation was devoted to IST4Balt on the Web system and was delivered by Anatoly Soloviev (IST4Balt project engineer, EDNES, France). The IST4Balt on the Web system consists of six national Web-sites hosted at servers of the six project partners in the three Baltic States and the central Web-site hosted at the server of EDNES. All the IST4Balt national Websites are specific target oriented: open development platforms for software and services at RTU (Latvia), telematics for tourism and cross-media for leisure and entertainment at LITTA (Latvia), teleworking and new employment opportunities at Inforing (Estonia), improving risk management at Bi-Info (Estonia), applications and services for the mobile user and worker and networked business at INFOBALT and VITP (Lithuania). At the same time the content of the IST4Balt Web-sites encompasses: regularly updated information on FP6, FP7 and IST, links to Web-sites of other partners and relevant IST projects, calls for applications and reports of IST4Balt gatherings, overview of IST products, etc. In addition to the system description the presentation was also focused on the recent updates and modifications performed at the corresponding Web-sites.

The IST4Balt training course was presented at the IST4Balt training day by Dr. Alexander Beriozko (IST4Balt project manager, EDNES, France).

The IST4Balt training course "The Sixth Framework Programme (FP6) of the European Community for research, technological development and demonstration activities, contributing to the creation of the European Research Area and to innovation (2002 to 2006) and its Information Society Technologies (IST) Priority" is being developed by EDNES. The course is devoted to goals, strategic objectives, general structure and instruments of the FP6, types of proposals and electronic submission software for preparation of proposals; how to find potential EU partners etc. It also covers the IST Priority of FP6.

The main peculiarity and idea of the course is to explain step-by-step how to participate in the FP6 and the IST. A special lecture is devoted to the Seventh Framework Programme (FP7) of the EC.

### **Session 2. FP6 IST projects**

*Chairman: Inga Bakane, RTU, Latvia*

The second session was intended for presentation of several IST projects implemented in the framework of the FP6. These projects represented illustrative examples of successful proposals submitted to the FP6 and typical activity within the FP6 IST Priority. The first presentation was devoted to the project wearIT@work and it was made by Michael Boronowsky from the Center of Computing

Technologies (TZI) of University of Bremen (Germany), which is the project coordinator. wearIT@work is as an Integrated Project to investigate “Wearable Computing” as a technology dealing with computer systems integrated in clothing. The project has 36 partners, among them EADS, HP, Microsoft, SAP, Sony, Siemens, and Zeiss. The partners come from 14 different countries. The project WearIT@work is the largest project world-wide in wearable computing.

Then Tatiana Rikure from Riga Technical University (RTU, Latvia), which is the project partner, made a presentation on the eLOGMAR-M project. eLOGMAR-M (“Web-based and Mobile Solutions for Collaborative Work Environment with Logistics and Maritime Applications”) is a collaborative project initiated to create innovative solutions for port and logistics transport management. The major aim of the eLOGMAR-M is to gather and co-ordinate activities in the field of IT and communication solutions reality) with maritime and logistics applications. The maritime freight route “Baltic Sea feeder ports - Western Europe hub ports (Hamburg) - Mediterranean ports - Chinese ports” is selected as the subject of investigation and demonstration.

The next speaker was Adam Turowiec, director of the Institute of Communication and Information Technologies (ITTI, Poland), who presented the COMIST project. COMIST (“AMI@Work Communities Stimulating the Participation of NMS and ACC Organisations in eWork and eBusiness Related IST Activities”) is a Specific Support Action funded by the EU within the IST Priority of the FP6 and it aims to increase the participation of NMAS organisations in IST activities according to a systemic innovation approach.

The next presentation was also delivered by Mr. Turowiec and it was devoted to the SIMS project, in which ITTI is also a partner. SIMS (“Supporting the Innovation of SMEs in the Mobile Services and Application Supply Business”) addresses the programme’s strategic objective 2.3.2.6 (Applications and Services for the Mobile User and Worker) it is focused on SMEs that are developers and/or suppliers of innovative solutions to providers of mobile services and applications (MSA). The project aims to stimulate the development and use of mechanisms to support their innovation activities including involvement in FP6 activities. SIMS plans to study the demand of such SMEs for innovation support, the supply of information and other resources that they will need, and the channels through which this support is provided.

Then Tuuli Sokmann from Hill&Knowlton Company (Estonia) made presentation of istBonus project. It is an EU funded project (SSA, IST FP6) targeting to upgrade the participation of competent organisations from the NMS & ACCs in the EU-funded research programmes in two broad areas: e-business and e-work. The project deploys its diversified activities primarily in 10 NMS & ACCs countries (Poland, Hungary, Slovakia, Estonia, Latvia, Lithuania, Malta, Turkey, IST4Balt Evaluation report on Bi-Info-IST4Balt 2005 Conference and IST4Balt training day D8 12 Bulgaria, Romania). istBonus targets competent research organizations (universities, institutes, centers, etc.), innovative SMEs and mid range and large enterprises from the NMS and ACC of the EU. The consortium of the project supports the above organisations in their effort to Excel in specific areas of expertise and lead European research initiatives.

The last report was devoted to the EPRI-start project and it was delivered by Deniss Kalinkin, Inforing AS (Estonia), which is the project partner. EPRI-start (“Stimulate the Participation of SMEs from NMS in IST Activities”) aims to stimulate the participation of small and medium enterprises from all ten New Member States of the European Union in the European Union’s IST Programme. During its duration (from March 2005 to August 2006) EPRI-start develops a pool of 150 potential project partners from the New Member States. The project comprises an extensive range of activities to both educate innovative IST-oriented enterprises from the New Member States with no or low experiences in participating in the IST programme and at the same time raise the awareness of existing and newly arising consortia in the IST community to find potential project partners from the New Member States.

### **Session 3. Training on eCollaboration tools for EU-Baltic States team work**

*Chairman: Saulius Arelis, VITP, Lithuania*

The third session was devoted to live demonstrations of several eCollaboration tools considered as potential instruments to be used for the project management within the IST4Balt project.

In the beginning of the session the introductory presentation was delivered by Anatoly Soloviev, IST4Balt project engineer (EDNES). In his speech Mr. Soloviev gave a brief overview of the corresponding Workpackage entitled “IST tools for EU-Baltic States team work: pilots”, described a special methodology developed in the framework of the project and used for selecting eCollaboration tools and preliminary evaluation. Besides, the investigation results on selection, comparison and adaptation of the nine preliminarily selected tools were also given.

Then Mindaugas Zironas (Doclogix company) made a remote virtual demonstration of DocLogix tool directly from Vilnius, Lithuania. DocLogix is a complete software solution for information and business process management, best suited to medium and large organizations. DocLogix provides every employee with secure, traceable and personalized means to manage business critical information and business processes.

After that, another remote demonstration was performed by Conny Ericsson (Marratech) who presented Marratech tool from Sweden. Marratech is the Internet solution for real-time collaboration.

The last demonstrated tool was BSCW (“Basic Support for Cooperative Work”) and the speaker was Elke Hinrichs from Fraunhofer Institute for Applied Information Technology (Germany). BSCW is a powerful and scalable groupware system, which is suitable for small and medium enterprises as well as for companies operating world-wide. BSCW is easy to set up and use and requires no software installation at the users’ sites.

As the main result of the IST4Balt training day, issues and chances of the Baltic States for the participation in the FP6, FP7 and the IST were demonstrated. The IST4Balt project, which was launched to promote the mobile technologies in the Baltic States, was presented to the Baltic, and especially Estonian, audience. The representatives of the Baltic States found lots of similarities between the countries and discussed their cooperation possibilities. The speakers and audience discussed the IST situation in the Baltic States and their issues, chances and possibilities for the participation

in the EU FPs. The audience was informed about the variety of IST projects stimulating participation in the FP6, FP7 and the IST, which were targeted onto the Baltic States.

### **Baltic IT&T 2006 Forum: eBaltics, April 5-7, Riga, Latvia**

*Mara Jakobsons (LIKTA, Latvia)*

The annual conference Baltic IT&T 2006 is one of the most important IT&T forums in the Baltic Sea region, and major subjects this year were eInclusion, eHealth and eGovernment.

The forum has brought together senior government representatives from the Baltic Sea region and other countries, high level officials and experts from European Commission and international organisations, information society leaders and chief researchers, as well as CEOs and top level executives from ICT companies and other high-ranking delegates. Altogether almost 600 delegates participated at different Forum events (including IST4Balt Workshop "Towards a Knowledge Society"). They represented 27 countries - Austria, Belarus, Belgium, Canada, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Italy, Latvia, Lithuania, the Netherlands, Norway, Poland, Portugal, Russia, Slovakia, South Africa, Spain, Sweden, Switzerland, United Kingdom.

The event was organised by the Latvian Information and Communications Technology Association (LIKTA) and Data Media Group. The Honorary chairman for the event was the Prime Minister of Latvia Aigars Kalvītis. The motto of the forum was "Building Effective Partnership Networks".



*The honorary chairman for the international "Baltic IT&T 2006: eBaltics" forum was the prime minister of Latvia, Aigars Kalvītis. On April 6, Kalvītis opened the 10<sup>th</sup> international conference "Information Technologies and telecommunications in the Baltic Sea, Central European and Eastern European Region".*



*An E-inclusion experts roundtable was chaired by the Latvian minister with special portfolio for E-government, Ina Gudele.*



*For the 3<sup>rd</sup> year, the forum has been supported by the Swedish administrative Development Agency VERVA. At the E-government session, "Outsourcing and Beyond Business Models for Electronic Government", the opening speech was made by Lena Jönsson, director general of VERVA. She spoke about E-government in the Baltic Sea states.*



*At the plenary session, “ICT and the Challenges of Convergence”, Paul Timmers, head of the E-inclusion Unit, Directorate General for Information Society and Media, European Commission, talked about E-inclusion policies and priorities in Europe.*



*The European ICT industry was represented at the forum at the very highest level. Mark MacGann, director-general of EICTA, talked about ICT industry challenges in Europe at the plenary session.*



*At the plenary Session, Ronald De Bruin, head of the Co-operation and Support Department for ENISA, talked about European collaboration in the area of network and information security.*



*The Latvia@World project was presented by Professor Imants Freibergs, president of the Latvian Information and Communications Technology Association (LIKTA). He also spoke about true examples of public-private partnership.*



*Interesting information about E-inclusion in the Netherlands was provided by Syb Groenevald from KnowledgeLand in the Netherlands.*



*There was a special session at the forum, “International Co-operation for Bridging the Digital Divide”. It was chaired by Jacques Babot, sector head, Unit F4: New Working Environment, Information Society and Media DG, European Commission.*

**eINCLUSION experts roundtable**

In the roundtable participated eInclusion leaders and experts from NeDAP (Northern eDimension Action Plan), European Commission, ICT associations, social projects and community initiatives, as well as information society and Inclusion responsible senior officials from the ministries. Discussion topics included ministerial conference “ICT for an Inclusive Society” in Riga, June, 2006, the book and manifest “Vit@I Society: The New Social Use of ICT”, public-private partnership in eInclusion projects in the region and co-ordination of eInclusion activities in the Baltic Sea

Region, NeDAP eInclusion action line work plan for 2006-2007. The roundtable as co-organised by the Ministry of Electronic Government Affairs of Latvia, Information Society Development Committee under the Government of Lithuania and Equal transnational partnership “Vit@I Society, Technology for people”. The roundtable was opened and chaired by Ina Gudele, Head of the Secretariat of the Ministry of Electronic Government Affairs of Latvia. All of the forum materials, presentations, events and related publications can be found at [www.ebaltics.com](http://www.ebaltics.com). Planning is underway already for the “Baltic IT&T 2007 Forum: eBaltics”.



The international Equal partnership project “Vit@l Society: Technology for People”, was presented by Else Rose Kupier, director of Brekend Vaatwerk, the Netherlands.



Aurinas Matulis, director of the Lithuanian government’s Information Society Development Committee and action line chairman for NeDAP E-inclusion, talked about NeDAP E-inclusion Action Line activities in the Baltic region.



Stephen Howlett, chief executive of the Peabody Trust in the UK, informed the audience about the Threshold Project – how the social use of ICT breaks down labour market barriers in London.



Juris Binde, president of LMT in Latvia, talked about the subject of more effective development of mobile communications related to social capital in Latvia.



The E-health situation featured a “Virtual Hospital” which was visited by more than 100 representatives of the medical sector over the course of three days.



Much attention was attracted by the session “E-inclusion Policies and Motivation of Governments and Citizens”. Speakers (from the left) included Agrita Groza, deputy state secretary for the Latvian Ministry of Welfare, Professor Imants Freibergs, president of the Latvian Information and Communications Technology Association, Jan Peter Stromsheim, senior advisor to the Department of Education and Training and the Norwegian Ministry of Education and Research, Martin Lundo, senior advisor for Statistics Denmark, Syb Groenevald from KnowledgeLand in the Nterhaldns, and Loreta Križinauskiene, director of the Window to the Future alliance in Lithuania.



*The E-inclusion experts roundtable featured presentations by Paul Timmers, head of the E-inclusion Unit, Directorate General for Information Society and Media, European Commission, Ina Gudele, Latvian minister with special portfolio for E-government, Dr Artis Kapenieks, director of the Distance Education Study Centre at the Riga Technical University, and other E-inclusion experts from 15 countries in all.*



*E-inclusion sessions were organised under the auspices of the Equal project "Training in Computer and Internet Usage of the Unemployed in Latvia". At the session "E-inclusion Policies and Motivation of Governments and Citizens", Agrita Groza, deputy state secretary for the Latvian Ministry of Welfare, talked about E-inclusion policies and facilitation of the relevant motivations in Latvia.*



*On April 7, the plenary session "New Social Use of ICT" was opened by the Latvian welfare minister, Dagnija Staķe.*

## **Overview of the IST4Balt Workshop "Towards a Knowledge Society", April 7, 2006, Riga, Latvia**

*Tatiana Rikure, Leonid Novitskis  
(Riga Technical University, Latvia)*

The workshop "Towards a Knowledge Society" was held in Latvia, in Riga, at April 7, 2006. It was organized by Riga Technical University in frame of the project IST4Balt (Information Society Technologies Promotion in Baltic States) funded by Information Society Programme of the European Commission and in cooperation with EDNES (France).

One day workshop has attracted around 70 participants from different countries, including Belgium, France, Germany, South Africa, Russia, Lithuania, Estonia, Latvia, Poland, Finland, Ukraine, Italy, French Polynesia and Brazil.

The workshop aimed at strengthening the scientific and technological cooperation and collaboration among the European Union countries in field of IT applications and services for the mobile users and workers, open development platforms for software and services, e-Learning, e-Logistics and e-Inclusion.

Professor Leonid Novitskis, IST4Balt Project supervisor and professor of RTU, opened the workshop and welcomed all the speakers and guests at Riga Technical University, where the workshop was held this year. He stressed, that it is the first time, when the IST4Balt workshop is taking place in the university premises, so it is a great opportunity both for university and private sector representatives to find best ways of cooperation and collaboration.

eInclusion session focused on eInclusion policies and motivation of governments and citizens, new methods of work for better employment and inclusion, new social use of ICT, equal access for all, as well as international co-operation for bridging digital divide. The session was co-organised by Equal transnational partnership "Vit@l Society, Technology for people" and Equal project Training in Computer and Internet Usage of Unemployed in Latvia". Session "New Social Use of ICT" was opened by Dagnija Staķe, Minister of Welfare, Latvia.



*Welcome speech, Dr. Jacques Babot, Head of sector of European Commission - Directorate F, Unit F4: New working environment*

Vice-Rector for Science and Research of Riga Technical University Prof. Leonīds Ribickis welcomed all the workshop participants on side of Riga Technical University. He briefly presented RTU - the major technical university in Latvia - which is actively participating in EC projects and welcomed delegates to use all possibilities in finding new partners for future projects as well to learn more about EC IST 6th and 7th FP activities, strategic objectives and instruments.



*Welcome speech, Prof. Leonīds Ribickis, RTU Vice-Rector for Science and Research*

Dr. Jacques Babot, Head of sector of European Commission - Directorate F, Unit F4: New working environment - welcomed participants of the workshop on side of European Commission. He delivered a presentation on the forthcoming 7th Framework Programme of European Commission with special attention to Information and Communication Technologies area. He was calling organizations from Baltic countries and especially from Latvia be more

active and try to take active participation in EC IST 7th FP. He also emphasized importance of such kind of events which are helping to increase involvement of Latvian universities and SMEs in activities of EC IST 6th and 7th FP.

Prof. Jean Bonnin, IST4Balt Project coordinator introduced participants of the workshop with goals and activities of IST4Balt project in Baltic countries. Detailed IST4Balt Project presentation was made by IST4Balt project manager Dr. Alexander Beriozko (EDNES, France).

Claude Marot, JC Consultants (French Polynesia, France) presented four paradigms of change management in the area of ICT and examined by the way of case studies different explanatory patterns of influence relations between technical system and social system:

- the technical determinism,
- the social determinism,
- the socio-technical auto-adjustment,
- the interplay of powers.

Mr. Andrejs Berdnikovs, Institute of Economics, Latvian Academy of Science was presenting report on the Social Challenges of Knowledge Society. He stressed that an important distinction should be drawn between knowledge and information. Information remains passive until used by those with the knowledge needed to select, interpret and utilize it. Thus, only individual with the specific skills and capacities fits the requirements of Knowledge Society. In this sense access to the Knowledge Society is still highly limited and there are great disparities between countries and social groups. In his presentation Mr. Berdnikovs emphasized that not only the idea about the importance of Information and Communication Technologies, but also the recognition of human capital being the principal source of progress and any achievements should be at the heart of building of the Knowledge Society not to create new inequalities, social cleavages and conflicts due to these disparities. Author believes that in the conception of the Knowledge Society the central role should be allotted to human development.

Mr. Ivans Berzins, Institute of Economics, Latvian Academy of Science was talking about the social economic development and the knowledge society with a special emphasize to Latvia and EU. In his presentation he raised the question about "Are the EU and Latvia ready to be a knowledge society until 2010?" To his mind, although the European Union potentially could be a Knowledge Society, to achieve this objective a great effort will have to be done, as its economic structure refers mainly to the activities of the Second Industrial Revolution and as EU is a net importer of technology. Author believes that the only chance for Latvia to reach the level of the Knowledge Society is a well coordinated action by the State stimulating the new economy's real dynamic sectors, as software development, tourism, advertising, printing, and so far, through policies that incentive the establishment of such activities and promoting a real modernization of the economy, instead of the high level speculative scenario. Author stressed that definitely such action should be done through a strong planning and a soft intervention of the State, intending to prepare the conditions to the private

sector to change the way it operates in Latvia, together with a strong educational policy, leading the country to the Knowledge Society.

- In the “e-Learning” session presentations were made about different problems and possible solutions in e-Learning area, presenting real researching results and active projects. Chairman of the session was As. Prof. Vjaceslav Sitikov, Riga Technical University, Latvia.

eLearning session started with a presentation of Dr. Jean-Claude Marot from JC Consultants about strategies to introduce eLearning. He pointed out that numerous major universities and training establishments are actively implementing some type of e-learning project. However, many of them are quickly discovering some difficulties to perform successfully their projects, so they need to rethink their e-learning strategies and revisit the timeless question of how to introduce well e-learning. In his presentation, he examined four strategies of introduction of e-learning :

- strategy giving the greater role to the educational platform (Learning Management System).
- strategy based on the automation of pedagogical process (Computer-aided learning).
- strategy based on the large delivery of e-learning courses on the web (web-based courses).
- strategy of mixing online courses with traditional educational environment (blended learning).

Ms. Tatiana Rikure, IST4Balt RTU Project Manager, Latvia in her presentation covered 3 aspects of successful e-learning: Web-Based Learning (WBL), Intelligent Tutoring Systems (ITS) and collaboration opportunities among learners. The key idea was that Learning should be fundamentally both social and experiential. Building a collaborative learning environment is a key and challenging task in order to promote the quality of learning and life-long learning via Internet. Talking about the importance of qualitative content, the concept, known as Intelligent Tutoring Systems (ITS) was suggested to provide individualized guidance for learners.

Mr. Marc Wienrich from Educational Design, Berlin presented his view on the efforts necessary for the successful introduction of e-learning, an introduction in which sustainable structures for this new form of learning are accomplished and thus make e-learning become an integral part of an organisation’s learning processes.

Mr. Janis Krumins, lecturer at the Faculty of Economics and Management of the University of Latvia presented development activities of the m-learning environment, which is going on at the Faculty of Economics and Management of the University of Latvia and is aimed toward the improvement of the mainstream processes of the traditional academic learning.

- “e-Inclusion” session was organized in collaboration with ESF project promoting constant usage of e-collaboration tools by the young people with special needs. Chairman of the session was As. Prof. Jurijs Lavendels, Riga Technical University, Latvia.

At the beginning As. Prof. Vjaceslav Sitikov from Riga Technical University presented the above mentioned project, which has the objectives to enable fostering of the learning process by e-tools combining simplicity of usage and ability of feed-backs. Involvement of the target group to the project is realized by the appropriate training

of teaching staff working with disabled youth. Latest results of the project were presented in this session. Ms. Ginta Stale from state agency “Social Intergation Centre” continued eInclusion session with presentation and video-material about social and motivating knowledge society solutions for e-Inclusion of disabled.

- The “e-Logistics and mobile services” session also covered theoretical and practical aspects of researching in these areas, including presentations of active projects in this research area, such as eLOGMAR-M, LOGIS-Mobile, wear@work and “City Card” projects. Chairman of the session was Prof. Yuri Merkurjev, Riga Technical University, Latvia.

Dr. Egils Ginters from Latvian Intelligent Systems presented the latest results of LOGIS-Mobile project, which aims at developing a new m-training methodology combining a concise training dictionary in Logistics Information Systems and the latest mobile telecommunication technologies based on GPRS/GSM/UMTS mobile Internet WAP/WML applications.

Mr. Aleksejs Jurenoks, PhD student from Riga Technical University presented eLOGMAR-M project, aiming at supporting logistics and maritime operations by Web-based and Mobile Solutions.

Dr. Michael Boronowsky, Center of Computing Technologies (TZI) of University of Bremen, Germany presented the European Integrated Project “wearIT@work” - the largest project world-wide in wearable computing with a total project volume of about 23.7 million € and 36 partners (mainly from industry), among them EADS, Skoda, HP, Microsoft, SAP, NTT Docomo, Siemens, and Zeiss. One of the major goals of the project is to investigate the user acceptance of wearable computing to foster the economic breakthrough of this groundbreaking technology. Dr. Boronowsky in his speech introduced the potentials of this new paradigm and its connection to future European developments. All the participants were really excited watching video-material about how people’s lives can be changed and will change in the future thanks to modern technology.

Dr. Ralph Gambetta, managing director of Temco GmbH, Germany presented Calypso technology as a serving world-wide validated multiservice system based on a contact and contactless technology for payment, ticketing, identification, information, location and booking operations. It was interesting to compare real development experience in different European countries.

- In the “Development platforms for software and services” session different presentations were made, starting with the presentation about benefits and opportunities of standardization, including presentations about different active projects, and ending with the presentation of e-collaboration tools selected for IST4Balt project management. Chairman of the session was Dr. Alexander Beriozko, IST4Balt Project Manager, EDNES, France.

Mr. Jørgen Friis, Deputy Director-General European Telecommunications Standards Institute (ETSI), France in his presentation addressed the benefits of standardization and explain

the COPRAS project, which aims to build a Collaborative Platform for Research And Standardization.

Mr. Jörg Hafer from Educational Design, Germany introduced and explained the basic concept and architecture of the Competency Portfolio and, within the context of higher education, to discuss the advantages and limitations of a web-based competency management.

Mr. Robert Davies from MDR Partners, UK demonstrated how games and mobile technologies can be combined to provide enriching experiences for children in the school curriculum and beyond, using Advanced Reality Games, played 'live' in the individual territory using Internet, GPRS/3G, SMS and MMS technologies.

Mr. Adam Turowiec, business development director of Institute of Communication and Information Technologies Ltd., Poland made a presentation of intermediate results of the SIMS project which is being executed within. The 6th RTD Framework Programme of the EC.

Dr. Arnis Kokorevics from Latvian Researchers Mobility Centre presented the European Researchers' Mobility Portal and the network of national portals as a specialized career service for separate group of mobile workers. These services have been analyzed as part of support activities for researchers' career within FP6. Other services for mobile workers offered by EU institutions have been also considered. Based on two years of operation, the achievement, problems, cooperation, marketing and promotion of portals have been evaluated.

The last presentation delivered in this session was by Dr. Anatoly Soloviev, IST4Balt Project Engineer, EDNES, France. The presentation was focused on an overview of the IST4Balt Workpackage entitled "IST tools for EU-Baltic States team work: pilots". It gave a description of a special methodology developed in the framework of the project and used for selecting eCollaboration tools for the IST4Balt project management and EU-Baltic States team work and its preliminary evaluation. Besides, the investigation results on selection, comparison and adaptation of the nine preliminarily selected tools were also given. In conclusion, Dr. A.Soloviev presented a brief overview of two eCollaboration tools, which were finally selected for using in the framework of the IST4Balt project.

At the end of the IST4Balt workshop "Towards a Knowledge Society" conclusion session has been organized and chaired by prof. Jean Bonnin, EDNES, France.

Final session composed of 2 parts:

- Reports of Sessions,
- Conclusions.

After the closing session informal discussions were taking place to discuss new cooperation and collaboration opportunities in the future, and to make new contacts among workshop participants.

In accordance with IST4Balt project workplan the next workshop in Latvia will be held in April, 2007.

## IST4Balt workshop "Baltic ICT community on the way to FP7", June 29-30, 2006, Tallinn, Estonia

*Deniss Kalinkin, Konstantin Baranov (Inforing AS, Estonia)*

IST4Balt workshop "Baltic ICT community on the way to FP7" was held on 29-30 June 2006 in Laagri, Estonia. The workshop took place in the conference centre of "Peoleo" hotel.

Workshop „Baltic ICT community on the way to FP7" is organized by Inforing AS in frame of the IST4Balt project (Information Society Technologies promotion in Baltic States) funded by Information Society Programme of the European Commission and in cooperation with EDNES (France).

The workshop aims at strengthening the scientific and technological cooperation and collaboration among the European Union countries in field of mobile services and applications, software and e-services, innovations, e-Learning, e-Logistics, e-Health, e-Work, e-Inclusion, audio-visual and cross-media content for leisure and entertainment.

The workshop programme includes discussion of new opportunities for international cooperation, research and development within the framework of European Commission Seventh Framework Programme (FP7) and its Information Society Technologies (IST) Priority.

The workshop is also devoted to new funding and collaboration programmes for small and medium IT companies (supporting innovations, new projects, R&D activities), presentations of IT/IST companies, services and products available in Estonia.

The workshop assembled approximately 100 participants coming from more than 10 European countries (private and state organizations, scientific and educational institutions, SMEs).

### **Programme:**

#### *Day One, 29th June:*

- Session One: Introduction to the IST4Balt project, EU IST Priority and 7th Framework Programme
- Session Two: Benefiting from the European Commission IST programme: new funding and collaboration opportunities
- Session Three: Innovations and new services
- Session Four: Round table discussions

#### *Day Two, 30th June:*

- Session Five: Estonian IST future: strategies and priorities
- Session Six: European IST: Mobile Services and Applications
- Session Seven: European IST: Artificial Intelligence
- Session Eight: European IST: Audio-Visual Content, Entertainment
- Session Nine: European IST: Software and services, eInclusion, eLearning, eHealth, eWork

In addition, "Baltic ICT community on the way to FP7" workshop proceedings (including CD-ROM) will be printed and distributed between participants. It will contain main information on the IST4Balt project and workshop materials.

**Contacts of the organizing committee:**

Inforing AS  
 Rütüti 14-15, 10130  
 Tallinn, Estonia  
 Tel/Fax: +372 6616115  
 E-mail: [info@istbaltia.net](mailto:info@istbaltia.net)  
 Web-site: <http://www.istbaltia.net/workshop2006/>

**Conference “Mobile Europe: New Opportunities and Strategies” and Workshop “IST in 7th Framework Programme: Benefits for Active Participants” (First Announcement), October 19-20, 2006, Vilnius, Lithuania**

*Edmundas Zvirblis (IST4Balt local project manager, INFOBALT)*

Conference „Mobile Europe: New Opportunities and Strategies” and workshop „IST in 7th Framework Programme: benefits for active participants” will be organized by INFOBALT - Association of Information Technologies, Telecommunications and Office Equipment of Lithuania and Visoriai Information Technology Park (VITP) in the frame of the project IST4BALT “Information Society Promotion in Baltic States” funded by Information Society Programme of the European Union. The event is being organized in co-operation with “Earth Data Networks for Education and Scientific Exchange” (EDNES, [www.ednes.org](http://www.ednes.org)), France.

Below is the programme of forthcoming event: Conference “Mobile Europe: New Opportunities and Strategies” and Workshop „IST in 7th Framework Programme: benefits for active participants”

**Day one – 19th October 2006**

Conference “Mobile Europe: New Opportunities and Strategies”

- Mobile Europe: maximising opportunities and meeting challenges
- Mobility, wireless technologies and convergence
- Strategies for Mobile services expansion
- Broadband development and impact on national and business strategies
- Infrastructure and Interoperability
- Best practises of applications and services for the mobile user and worker area

**Day two – 20th October 2006**

Workshop „IST in 7th Framework Programme: benefits for active participants”

- IST Coordination Actions and IST 4Balt project
- IST and FP7– key subjects and upcoming call for proposals
- IST – success stories

- Fostering instruments: networks, communities and tools
- Presentation of project ideas, consortia and organizations/companies willing to join project
- Discussions and conclusions

The workshop aims to stimulate wider participation of organizations/companies from Baltic States in IST programme. Possibilities and issues concerning participation in FP7, success stories and benefits from participation in the programme will be presented at the workshop. The event is going to bring together groups and communities interested in joint activities within IST programme projects and provide floor for presentations of project ideas or organizations willing to take part in IST programme. The workshop will also serve as networking and matchmaking tool stimulating participation in further FP7 calls.

# Towards a Knowledge Society

## Social Challenges of a Knowledge Society

*Andrejs Berdņikovs (Institute of Economics of Latvian Academy of Sciences)*

### Introduction

Since the emergence of the Internet as a mass medium in the mid-1990s both policy makers and social scientists have emphasized the necessity of the distribution of Internet access. At first, there was widespread belief that the Internet, and especially the World Wide Web, would create an equality of access to information by reducing dramatically information's cost. There also was the conviction that Information and Communication Technologies (ICT) would originate the real possibility for e-governance and e-administration (delivery of government services and information to the public using electronic means) in that way demolishing the monopoly of information on which the power of bureaucrats was traditionally based and so contributing to democratization of information itself.

From then on innovations in computing and communications, indeed, have substantially diminished both physical constraints and costs in the collection and dissemination of information. Moreover, the achievements of digital revolution have founded the technical possibilities for introduction not only of e-governance and e-administration, but also of e-democracy, ensuring new tools for democratic participation. These trends were conducive to the formulation of new theories that idealized the part of information and ICT in both the public and private sphere.

One theory that put the extremely large emphasis on the role of ICT in the contemporary social relations is Knowledge Society theory. Indeed, the rise of ICT and the complex of ICT industries in many respects are coterminous with the move to the modern knowledge-based economy, because the ICT system provides this economy with a new technological base that radically changes the conditions for the production and distribution of knowledge. On the other hand, the euphoria about omnipotence of ICT has contributed to the notion that the Knowledge Society (KS) mainly rests on scientific achievements in ICT. In compliance with this stereotyped notion the concept of a digital divide was formulated, referring to the gap between those who do and do not have access to computers and the Internet as one of the main problems on the path to KS.

However, the concept of KS shouldn't be reduced either to scientific achievements in ICT or to the accessibility and democratization of information. When the initial optimism about gains of digital revolution wore off, observers discerned that ICT not only democratize information, but also create the new ground for social problems.

### New challenges and risks

As ICT gradually and diligently penetrate contemporary social life and relationships it becomes clear that:

- For the most part, groups with higher levels of access to the Internet are the same groups (whites, men, residents of urban areas) that have greater access to education, income, and other resources that help people get ahead.(1) The continuing very high cost to individuals of acquiring a computer remains a potent factor of inequality. Today, only 11 per cent of the world population has access to the internet.
- In the same conditions some kinds of people are more likely to use the Internet than others because of both skills and motivation.
- There is the possibility that new technologies might prove to exacerbate inequality both between states and between social groups within the states rather than diminish it. There are also asymmetries between the town and countryside, and, especially in the South, the possibilities for the countryside to participate in e-governance and e-administration are still very limited. Moreover, new technologies can create new forms of inequality as well – for example age inequality.
- “Info-exclusion” is not only a question of access to information, but also of education and cognitive ability. It results from the knowledge divide as much as from the digital divide, and relates to educational, cultural and linguistic barriers that make the internet alien and inaccessible to population groups marginalized by globalization and other contemporary processes.

So it is completely clear that it is important now not only take into account the eventual benefits of both ICT and KS, but also possible challenges and risks connected with them. Moreover, there should be understanding that providing computers and Internet connections is not the only and most laborious activity to be implemented in order to prepare society for entering KS era. Undoubtedly, the frequently distinction drawn between “haves” and “have-nots” regarding availability of computer and Internet is oversimplified, as is the notion that the problems of exclusion from KS can and should be overcome by providing universal technical access to the cyberspace.(2)

The entering in KS is more tightly connected with a complex array of factors encompassing physical, digital, human, and social resources and relationships. Education, mental outlook and way of thinking must all be taken into account if meaningful access to information and new technologies is to be provided. In this sense, a digital cleavage between individuals is marked not only by physical access to computers and Internet but also by access to the additional resources that allow people to use effectively both new technologies and information.

### Abilities and skills

ICT are crucial for Information Society, but they are not the main and only determining factor for KS. ICT play an increasingly important part in the building of KS, indeed, but one can't get any sense out of use of new technologies and information without appropriate knowledge. In fact, knowledge remains the key factor. In this sense KS and the Information Society are only partially intersected.

Although knowledge and information are strongly connected and interrelated in modern world, a basic distinction should be drawn between them. Knowledge empowers its possessors with

the capacity for intellectual or physical action. Information, on the other hand, remains passive and inert until used by those with the knowledge needed to interpret, select and utilize it. The full meaning of this distinction becomes clear when one looks into the conditions governing the reproduction of knowledge and information. The reproducing of knowledge, indeed, is a far more expensive process.(3)

The full-fledged participation in KS and in its essential constituent parts – knowledge-based economy and knowledge-based democracy demands specific skills and abilities. Beyond the “information literacy” (the ability to locate, classify and sort the information that is now to be found everywhere, for instance, but not only, on the Internet), there are a number of other requirements individual should meet in order to enter perfectly the era of KS. If such factors as teamwork skills, communication skills, learning skills and problem-solving skills were in many respects sidelined during the epoch of Fordism, they have become crucial to the development and well-being of person in the age of Post-Fordism and especially in the age of KS. It is as well important for an individual to understand and anticipate change to fit the standards of KS.(4)

Thus, in creating KS it is crucial to take into account two inseparable linked directions for action. One direction is the development of new technologies, second is the development of human abilities and skills. Unfortunately the significance of the second direction is often either underestimated or understood one-sidedly.

For example, the narrowness of interpretation becomes apparent in widespread, but possibly unconscious bias to represent the concept of KS in exclusive terms. There is frequently encountered notion that it is necessary to attract and retain world-class researchers and promote a creative interaction between universities and scientists on the one hand and industry and commerce on the other to build up KS. But KS should be inclusive, embracing not only community of scientists, researchers and businessman, but the whole society as well. So the skills and knowledge needed for entering KS era should be allotted to all members of society.

#### **Global and national disparities on the way to ks**

Nowadays access to KS is still highly limited and there are great disparities between countries and social groups. One of the urgent questions for international community at present, for example, is bound up with the capability of underdeveloped countries to adapt themselves more or less painlessly to the requirements of KS.

So can the countries of the South catch up and directly access knowledge societies?

In modern world approximately 100 million children are deprived of any possibilities to receive even primary education, while about 785 million adults – some 17 per cent of the adult population in the world – were illiterate in 2005, the majority of whom were women.(5) All technological achievements of digital revolution are beyond of reach of these people. But, what is more important, these people don't have even basic communication and learning skills and abilities required for integration into modern system of social relationships. Telecommunications access, undoubtedly, is a relevant consideration, given that more than two-thirds of the world's people today do not have the advantage of simple telephone connections, let alone computers and links to Internet. Yet, the more difficult and more fundamental problems are not simply those of providing greater technical access to information streams. Rather, it is more important to

provide social conditions favorable for development of people's cognitive capacities, intellectual abilities and skills that enable them, using modern technologies, to control and enhance the material circumstances and qualities of their existence.

Taking into considerations major worldwide knowledge divide and dissimilarity of problems between the North and the South it is possible to suppose that there is not only a single recipe how the standards of KS can be brought in, but even a single model of KS itself. Each country should develop its own way towards KS, taking into account national and local peculiarities.

Thus, for the developed countries it is important to continue in some states already started reforms aimed at both providing of technological access to information for all members of society and transforming of previous approach to education. It is significant to make basic training in new technologies one of the main components of education for all. No less is it important to base the contents of curricula on experiments, innovations and creative approach, and supply all educational institutions with modern technical equipment and highly skilled instructors.

KS, indeed, needs considerable investments in education and training. On the other hand, even in developed countries there is necessity for some preventive policy to diminish the possible social risks that can appear in the course of building KS. In this sense, there are at least two groups of risks – one is socially demographic, second is purely psychological.

As regards to the first group, although there are reasons to suppose that KS can strengthen all previously existed inequalities based on gender, race, ethnic origin and urban-rural dimension, it is possible that new inequalities not palpable in the past will become urgent. For example, inequality based on age cleavage can appear. Taking into account that integral part of KS is a creative approach, there are observations that young people are more inclined to experiments than aged people, who psychologically are more oriented toward their previous life experiences. As a result, youth is often at the forefront of the uptake of technological innovation and its development. The command of foreign languages, especially English, also is conducive to the integration of young people in information processes, while for elderly the language factor as usual is a major obstacle to the participation in the cyberspace. On the other hand, young people are often among the most vulnerable and most subjected to difficult social and economic conditions. So in order to diminish this multidimensional age cleavage some kind of intergeneration solidarity should be promoted.

Second, there are many other psychological impediments on the way towards KS. For example, it is observed that for many adults in Latvia the demand for education is hindered by negative learning experience, low level of differentiation of educational needs, and awareness that education is not a remedy for solving a specific problem. In order to cope with these problems adults with different level of education experience should enjoy specific skills that foster their active participation in life long learning and help them to recognize the demands for education.

Other psychological problem is the inability to find the way in the information flow that leads to confusion and stress.(6) It is paradoxical, but basically logical that in spite of information

mission to help a person feel secure in the modern world the effect achieved is very often opposite. The preparation of society for entering the age of KS should be connected with the educational offer that includes mechanisms aimed at the eliminating the causes of these types of stresses as well.

The problems in poor countries, however, differ from ones in rich or relatively rich ones. If it is important for developed societies to teach citizens the information know-how and provide them with problem-solving skills, the problem still to be resolved in underdeveloped countries concerns the guarantee of basic education. For many poor societies the first step towards KS is overcoming illiteracy, not supplying a few schools with modern technical equipment. Knowledge in these societies as usual is largely reserved for the happy few, for a small circle of privileged individuals. Moreover, many educated people in the South finally don't work for prosperity of their homeland and well-being of their nation, migrating to the countries whose competitiveness to a great extent relies on a capacity to bring in qualified foreign specialists by offering them better job conditions and more attractive salary. However, it is worth noting that the brain drain affects not only developing countries, but also states in transition and advanced industrialized countries.

### **Future tasks: two concepts of knowledge society**

Thus, popularizing and disseminating idea that all countries in their development should orientate themselves to KS standards, it is essential for international community to recognize the impossibility of one unified recipe for KS creation. So to ensure everywhere participation of all in Knowledge Societies it is crucial in the beginning to guarantee all over the world the universal access to education. In this sense, international institutions and national governments should perceive the creation of KS neither as simply development of ICT and support for scientific innovations, nor as simply providing the access to ICT for all members of society. The building of KS rather embraces very broad spectrum of activities, where the central role is allotted to human development.

Accordingly, not to create new inequalities, social cleavages and conflicts while modern world entering the age of KS, at the heart of transformations there should not be the idea of the omnipotence of ICT, but rather the recognition that human capital still is and continues to be the principal source of progress and any achievements. Although the main propagandists of KS never contest either the importance of investing in the human development or the necessity of involving of each human being in the process of creation of new knowledge, their main preoccupation with technological side of KS has been very often evident. Now it is crucial if not to change emphases, then, at least, balance and mutually harmonize them.

So to mutually harmonize the technological factor and human factor it is vital to transform the previously prevalent interpretation of both KS itself and its aims. In fact, two concepts of KS could be defined.

First concept has hitherto dominated both academic and bureaucratic discourse. It has at least three conceptual manifestations, that is, the belief in the omnipotence of ICT in the contemporary social relations, exclusive "scientific community" approach to the building of KS and, what is more important, the perception of global knowledge-based economy in terms of fierce international competition. Many words already have been said in this article about the first two

manifestations, namely, about optimism regarding the decisive role of ICT and scientists in the creation of the basis for KS. Briefly reminding the main points, we can note that, according to the first concept of KS, (1) many social problems can be overcome by providing for all members of society the universal technical access to the Internet (in other words, liquidating digital divide) and (2) the creation of new knowledge mainly is the mission of scientists. The practical implementation of these two postulates inevitably is connected with allotting of society's resources, so, realizing the first concept of KS, it is natural for governments to direct the public investment mainly in the field of scientific research and spreading of access to ICT.

However, more contradictory and definitely more socially dangerous is the third manifestation of this KS concept, namely, the tendency to perceive global knowledge-based economy in terms of fierce international competition. There is a widespread and in many respects already paradigmatic assumption that in the conditions of modern globalization the development of each country is determined by a competitive capacity of this country in world economics. Thereupon the supporters of this assumption argue that modern globalization has transformed the essence of economy in the way that the traditional factors of production and national economic development (natural resources, labor forces, capital, investments, etc.) no longer determine the ability of state to compete with other states, economic blocs of states or transnational corporations. According to this point of view, in order to survive in the competitive international environment each state nowadays should orientate itself to innovations, creative approach, modern knowledge, scientific achievements and broad use of new technologies.(7) Moreover, it is assumed that interstate competition contributes to the improvement of knowledge quality.

Disengaging from the estimation of validity of this assumption, it is obvious that this notion is conducive to psychological perception of knowledge as a matter of rivalry and hence to the reproduction of global social inequality.

However, there is the second concept of KS that seems beginning to conquer popularity in the international community. Moreover, there are trends witnessing that UNESCO could be one of the main supporter and spreader of this concept in the future. In fact this organization world report *Towards Knowledge Societies* (2005) gives the strong basis for such supposition.

What are the main features of this concept? First of all, in the center of it there are not technologies, but human being. According to this concept, KS is the society where main resources are directed at cultivation and developing of intellectual curiosity, creative thinking and cognitive abilities of individual. The investments in new technologies remain extremely important, but, anyway, human capital is perceived as the principal key to any success. Moreover, if the first KS concept inclines to see the creation of new knowledge mainly as the task of scientists, the second one emphasizes the necessity of participation and involvement of all members of society in this process. In this sense, the second concept is extremely inclusive.

One of the fundamental differences between the first and the second concept is that in interpretation of global tendencies and processes the former considers the knowledge in many respects

as a tool for survival for separate state, while the latter stresses the necessity of collaboration between all states in both production and interchange of new knowledge. It is ought to be noted that the essence of such collaboration is expressed in knowledge-sharing theory being popularized by UNESCO now. This theory is founded on belief that knowledge cannot be likened to any other good that can be negotiated on the market. Likewise, knowledge cannot be the matter of rivalry, because in modern interdependent world the effective struggle against many global challenges and risks only possible if knowledge is perceived as the common public good.<sup>(8)</sup> Each person capacities for knowledge should also be developed not just through competition or emulation, but in a spirit of collaboration for the common good.

In order to avoid or at least diminish all existing and eventual inequalities this knowledge-sharing approach should be the cornerstone of the practices and values that are at the heart of KS. The advance of knowledge requires the collaboration of all and knowledge itself only has genuine value if it is shared by all. Such a spirit of sharing and collaboration, of course, may seem a Utopia from the real conditions of corporate competition on the markets of global knowledge-based economy. However, the emergence of network societies and the consequent lowering of transaction costs encourage new forms of productive organization involving exchange and collaboration. In network societies possibilities for exchange, sharing and universal accessibility, indeed, are multiplied.

It seems that intractable problem will not be the furtherance of collaboration between states in global knowledge-based economy, but rather conversion of knowledge into an inexhaustible commons available to all human beings. This conversion requires carrying over of knowledge from the private sphere and the area of national patrimony in the global public domain, where anyone can use it freely. Of course, there are many serious juridical obstacles for this process, particularly in the field of intellectual property rights. Thus, the optimal balance should be struck between the protection of these rights and the promotion of knowledge in the public domain. Looking for such balance is the urgent task for international community on its way towards global KS.

### Conclusions

Resuming the all above-mentioned we can conclude that information Technologies give KS a new technological base that radically has changed the conditions for production and distribution of both information and knowledge. However, the building up of KS shouldn't be reduced to the oversimplified notion of a "digital divide", because the concept of KS moves far beyond the limited view of physical access to ICT. Not only development of new technologies and providing information for each member of society, but also development of human capital and providing skills to manage information effectively are crucial for KS existing and functioning. Digital cleavage between individuals is marked not only by access to computers and connectivity, but also by access to additional resources that allow people to use efficiently both new technologies and information.

Although it is an extremely difficult task, there is imperative request to create such social and education conditions, in which each member of society would fit the requirements of KS. The investing in human capital shouldn't be reduced only to support of community of scientists, researchers, forehanded businessman and managers. Only

the inclusive, the whole society embracing model of KS will be socially just and stable.

Taking into considerations a major worldwide knowledge divide and dissimilarity of problems between the North and the South it is possible to suppose that there is not either a single model of KS or a single recipe how the standards of KS can be brought in. Each country should develop its own way towards KS according to national and local peculiarities. If introducing of creative approach and problem-solving training in curricula is one of the goals to be achieved in rich countries, the immediate task for poor countries is more access of all to basic education. The battle of underdeveloped countries against illiteracy is absolutely vital and urgent as well.

In order to diminish knowledge divide between countries and social groups as well as mutually harmonize the technological factor and human factor it is important to transform the previously prevalent interpretation of KS. This interpretation to a considerable degree has been connected with the perception of knowledge as a tool of survival for each separate state in extremely competitive international environment. Nowadays there is necessity for new concept of KS, where knowledge is perceived as the common public good and knowledge-sharing approach is established as the cornerstone of the social practices and values. Many present and coming global problems can be resolved only if all countries interact and collaborate in the process of creation of new knowledge. The advance of knowledge as powerful source of development of both human and technological potential requires this collaboration as well.

Fortunately, there is evidence that the urgency of correction of previously dominating understanding of KS already is recognized by some sectors of international community. In this regard, UNESCO stand on the matter is highly indicative. In any case, UNESCO world report *Towards Knowledge Societies*, substantially resting on knowledge-sharing idea, earnestly shows how it is possible to evolve from the Information Society to genuine and inclusive KS.

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## Socioeconomic Development and the Knowledge Society: What are EU and Latvia Facing?

*Ivans Berzins (Institute of Economics, Latvian Academy of Sciences, Latvia)*

### Introduction

Since the beginning of the 1970's, the world is experiencing a revolution in the way wellness is generated and reproduced. This is due, firstly, by the deregulation of the financial system in global scale, which has begun with the unilateral decision by the United States to end the convertibility of the American dollars into gold, resulting, in last instance, in the end of the barriers to the international movements of financial assets. In another way, the development of new technologies is imposing radical changes in the techniques of production, constituting a Third Industrial Revolution, with strong impacts and profound consequences in the structure of world's economy. Last but not least, the share of the service sector on the GDP is increasing in the last years, notably in the developed countries (currently, in United States nearly 78% and in the European Union about 70% of GDP), due to the interaction between the rise of new technologies and the liberalization of the financial markets.

There is no doubt that the international economic division has changed, with Asia establishing itself as a high dynamic centre of manufacturing due, principally, to the low wages and high technology utilization, while United States has established as a leading exporter of services, mainly in the software and entertainment sectors. In this way, the world's economy is reproducing itself more and more in the sectors of high technology, in such manner that the Second Industrial Revolution paradigm's sectors are losing their economic significance, although remaining very important to the reproduction of the worker's class's members.

### The rise of the knowledge society

Since its beginning in the Age of Revolutions<sup>1</sup>, the capitalism system has assumed different forms in the way it develops and reproduces itself. These forms vary in their specificities and in the spheres they took place, reflecting the idiosyncratic dynamism of capitalism and its necessity of changing as a way to assure its continuity. In this way, it is possible to verify interdependent and, in some cases, simultaneous changes in two spheres. One, in the political level, reflects on the political shape of State changing it according to the necessities of reproduction and accumulation of wealth; another, refers to the changing of the technological and organizational paradox in which the reproduction and accumulation of wealth occurs, in other words, in the productive sphere on both industrial and services' sectors. To understand why the rise of the Knowledge Society represents a very new way of the reproduction of the capitalism with strong consequences to all spheres of the society, including the

economy and the politics, is necessary to know the basis from where it has risen.

In the political side, the changes of the paradigms of socioeconomic reproduction lead to a modification in the objectives of the economical elite that, as group of interest, has an incestuous relationship with policymakers influencing their decisions. As a consequence of such interaction, politics is dependent of the economic interests, although not completely, of the economical elite which will try to benefit itself influencing the policymakers using and promoting an ideology that looks to give support to its ideas. In this way, since the age of the revolutions until now, by the side of politics, capitalism has assumed three distinct forms: the Classical Liberal, the Keynesian or Welfare State and the Neoliberal capitalism, without changing its core structure.

The Classical Liberal State and its politics were based, mainly, on the presupposition of Adam Smith<sup>2</sup> and Jeremy Bentham that the private capitalist's individual actions would result in a well-being situation for the society that could not be improved by any action of a statesman or legislator. In this way, there would be an "invisible hand" harmonizing the social relationships, solving the conflicts of interest, related to the existent contradictions between production and consumption. With the raise of the 1930's crisis, making a critic to the presuppositions of the liberal political economy, Keynes demonstrated that the economy would admit multiple equilibrium levels, but that just one would result in the full employment. In this way, the direct intervention of the State in the economy, through the State planning, would be necessary to alter the economic units' expectations, and by this to allow the economy to enter in a new expansion cycle.

In both cases, the shaping of the State and the economic policies responded to the necessities of socioeconomic reproduction, which did not change in its basis. The dynamics of the capitalism, since the I Industrial Revolution, passing to the II Industrial Revolution until the 1970's, was based on the mass-production and mass-consumption of goods. If in the Classical-Liberal State the rhetoric of liberalism was useful to guarantee the consolidation of the private property and the relations of social classes, with the crisis of the 1930's and the advent of the Keynesian States was necessary to save capitalism from what could be its decline, guaranteeing the mass production and consumption. The State based on the Keynesian policies provided to the society indirect surplus of income in the form of the Welfare State's social policies, which have permitted to people to consume in a larger scale and provided the necessary dynamism to the economy to grow and to develop.

In the beginning of the years 1970, after approximately thirty years of application of Keynesian economic policies, a great number of changes ended a period of economic growth and of full-employment in the advanced countries, sustained by strategies of active national State intervention and for a regime of administration of the commercial and monetary policy under

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<sup>1</sup> The concept of Age of Revolutions is related to the French and the Industrial Revolution, which led to the establishment of the capitalism. The first one, on the political sphere and the second on the productive sphere. For more details, HOBBSAWM, Eric. *The age of revolutions*. New York, 1st Vintage Books ed, 1996.

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<sup>2</sup> SMITH, Adam. *An inquiry into the nature and the causes of the wealth of the nations*. New York, Modern Library, 1994.

hegemony of the United States<sup>3</sup>. The changes included the effects of the collapse of the Bretton Woods system and the crisis of the petroleum in the world economy, which entered in Defensive recession. The defenders of the liberalism, now denominated as neoliberalism, began to question the Keynesian postulates, mainly in Europe and in the United States, resulting in a turn to the acceptance of the liberal paradigms and the consequent disarticulation of the intervention of the State as the ideal model of economical distribution.

With the end of USSR, the laissez-faire started to be, undoubtedly, the dominant ideology in the international economic scenery, determining the politic and economic model that should be adopted by all countries, in transition or not, socialists or not. That resulted in the end of any possibility of application of State planning, based on the keynesianism or the Soviet planning model, causing the capitalist structure to start to present more and more renting characteristics<sup>4</sup>. As consequence, the world economy became more and more subordinated to the needs of the finance market, in such way three different processes took place: a) the extraordinary expansion of the international flow of goods, services and capitals; b) the strength of the world competition and c) a larger integration among the world economic systems<sup>5</sup>.

By the side of the production sphere, capitalism has faced three industrial revolutions. The I Industrial Revolution, which took place between the end of the XVIII and the beginning of the XIX century and established the capitalism itself in the basis of the manufacture; the II Industrial Revolution, which took place in the second half of the XIX century, changed the paradigms of the organization of the production from the manufacture to what could be called as the modern industrial organization. The main characteristics of the II Industrial Revolution are the surge of new forms of industrial organisation as the taylorism, fordism, toyotism, etc, besides the substitution of the iron by steel and of the steam by electricity and fossil combustibles and by the surging of new chemical products and the development of new raw-materials. The III Industrial Revolution, which began after the II World War, is the result of the American technological development as a military enterprise in the post-war, by the interaction of the military, academic and industrial spheres, within the coordination of the government<sup>6</sup>. This means that the process of technological innovation in the post-war was not carried out by the market forces, but by the direct intervention of the government of the United States aiming to win the Cold War and to establish a technological leadership in the world.

In this way, the interaction of the III Industrial Revolution with the political process of (neo)liberalisation of the global economy resulted in a transformation of the paradigms in which the capitalism system reproduces itself. The mass production and consumption of goods,

based in the paradigms of the II Industrial Revolution, are surpassed by a new paradigm of socioeconomic reproduction, which occurs mainly in the Financial and Service Sector. This occurs as a consequence of the global interdependence of the Financial Markets<sup>7</sup>, a result of:

- a) The deregulation of the Financial Markets and the liberalization of the cross-border transactions;
- b) The development of a technological infrastructure that allows transactions of billions of dollars in seconds;
- c) The nature of the financial products, such as derivatives;
- d) Speculative movements of financial flows;
- e) Market valuation firms (as Standart and Poors, for example) that, sometimes, by its ratings trigger financial crisis.

The process of mundialisation<sup>8</sup> the world is facing nowadays solely is possible because, by one side, of the development of a technological structure that permits a full integration of the economy in a global scale and, by the other side, by the application of the Neoliberal policies. In this way, the Knowledge Society may be defined as the expression of the way the capitalism system reproduce itself nowadays, based on the technological paradigms of the Third Industrial Revolution combined with the process of neoliberalisation of the World's economy, representing a new way wellness is produced and how concurrence takes place.

#### **Concurrence, innovation and knowledge society**

Capitalism has a cyclical pattern dependent of innovation, where the market configuration may varies from concurrence to monopoly, passing through oligopoly, which will determine a society's economic development<sup>9</sup>. As the principal objective in capitalism is to obtain the highest possible profit with the lowest cost, is natural that firms are looking to obtain a privileged position in the market, in other words, to obtain a monopoly, even if temporarily. Although the concept of economic development has been discussed by many schools of taught, the most adequate to understand what the rise of the Knowledge

<sup>7</sup> CARNOY, Martin & CASTELLS, Manuel. *Globalization, the knowledge society, and the Network State: Poulantzas at the millennium. Global Networks: A Journal of Transnational Affairs*, vol. 1, no. 1, January 2001, pp. 1-18(18).

<sup>8</sup> The mainstream discourse about what is called by the orthodoxy as "Globalisation" reduces what is a multifaceted phenomena in a merely matter of economics. The concept of Globalisation refers to the increase of the commercial trade and financial fluxes around the Globe, not taking into consideration the changes in society. In reality, the commercial trade of goods in a planetary scale is occurring since the Ancient age and the financial system is relatively integrated since the advent of the telegraph, in such a way Globalisation is an old phenomena, related only to economic matters. Since the 1970's, as a consequence of the historical changes in the way society reproduces itself materially, there are changes in culture, society, economics and, of course, in politics. To deal with such a complex interaction of social changing, the concept of "Mundialisation", as proposed by some French authors, is more adequate as it takes in consideration a multifaceted interaction of social relations.

<sup>9</sup> The term "concurrence" used in this text does not refer to the neoclassical model of perfect concurrence that is an ideal and not a factual model of market.

<sup>3</sup> HIRST, Paul & THOMPSON, Grahame. *Globalization in question: The international economy and the possibilities of governance*. Polity Press, Cambridge, 1996, p. 19.

<sup>4</sup> CHESNAIS, François. *La mundialisation du capital*. Paris, Syros, 1997.

<sup>5</sup> GONÇALVES, R., BAUMANN, R., CANUTO, O. e PRADO, L.. *A nova economia internacional: Uma perspectiva brasileira*, Editora Campus, Rio de Janeiro, 1998; HIRST, Paul & THOMPSON, Grahame. *Globalization in question: The international economy and the possibilities of governance*. Polity Press, Cambridge, 1996.

<sup>6</sup> Some examples of the technological innovation as a military enterprise are the jet plane, the transistor, the optical fibre, the nuclear energy, the computer and the internet, among others.

Society means is the one proposed by Schumpeter<sup>10</sup>, taking the concept of creative destruction into account<sup>11</sup>. The process of innovation, which led to economic development, refers to a new combination of productive factors isolated or concomitantly, basically in five categories:

- the production of a new good;
- the implementation of a new organizational paradigm in the production;
- the discovery of new markets that were not explored before;
- the development and the discovery of new raw-materials;
- e)the transformation of the market structure (for example, eliminating other concurrent(s));

In this way, development differs from growth, which is only related to the improvement of economic indicators, in other words, a country's economy may grow in a stationary way, without the real development that is innovation-dependent. Also, there is a relationship between development and growth. As capitalism is dynamic and cyclical, if a country is experimenting economic growth and not development, sooner or later the increase of the economic indicators will cease. By its time, the process of creative destruction refers to the replacement of what become obsolete by the "new" that is the result of the process of innovation and those who don't follow the changes tend to disappear as a result of their incapacity in adapting to the new paradigms<sup>12</sup>.

Although the concept of creative destruction and innovation used by Schumpeter is often used to analyse the concurrent patterns in a microeconomic approach, it is very valuable to understand the economic relations between countries in the mundialised world. The nowadays economic structure of the world may be divided in four spheres, relating to the degree of innovation, in other words, to how close some country is to the Knowledge Society. Firstly, there are the countries where the process of innovation often begins, actually in the last 30 years with little exceptions, United States and Japan. Secondly, there are the countries where the innovation rapidly follows and acquires the new technological paradigms, being able to compete with the pioneers, mostly the European Union and Canada<sup>13</sup>. Thirdly, countries that survive with economic paradigms that don't refer to the new, besides few innovative sectors, as Brazil. These countries have an industrial complex of the Second Industrial Revolution, some

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10 SCHUMPETER, Joseph. *The creative response in economic history*. *Journal of Economic History*, vol. 7, n. 2, 1947, pp. 149-159; SCHUMPETER, Joseph. *The instability of capitalism*. *The Economic Journal*, vol. 38, n. 151, 1928, pp. 361-386

11 Should be stressed that economic development is not related to social development, although there is a profound relationship between both concepts. In this way, often what is good to economics is bad to people in general. As the fundamental result of the economic social relations should be the welfare of the society, albeit in reality just the profit matters, usually a conflict of interests occurs.

12 A good example is that fabricants of electronic products don't produce gramophones but compact-disc players. If some had insisted in producing the gramophones, certainly would bankrupt.

13 China is not cited because its development is very peculiar as it is a "copying" country, instead of innovative, with islands of speculative financial activities. In this way, although by the side of the financial market there is a relationship with the Knowledge Society, by the other, the biggest part of the Chinese society reproduces itself with the paradigms of the Second Industrial Revolution and, in some cases, of the First Industrial Revolution.

developed financial system, but the greatest part of the economy is reproduced within another paradigms and innovation is very poor and rare. Fourthly, the countries where the new paradigms are just a utopia as, unfortunately, may be observed in most of Africa. A good example of this kind of utopia may be given by the experience of the mobile communication in that continent<sup>14</sup>.

The division proposed above is, in no way, a static model, because in a country may subsist simultaneously several forms of reproduction of the social economic life based in a multiplicity of paradigms, resulting in the coexistence of various modes of production together in a country or region, frequently change through time. Thus, with the rise of a new mode of reproduction as the result of economic development, one part of the society starts to reproduce its existence within the new paradigms that are substituting the old ones, whilst another continue living in the former structure. This occurs because of the idiosyncratic character of the process of innovation, which excludes those who don't or can't adapt to the new form of economic reproduction. As these people have to continue to live, they reproduces theirs existence by the old forms, constituting themselves a living corpse of the old socioeconomic organization that doesn't integrate the new society. In this way, the same may be observed in the economic relationship between countries, where the economic leadership is assured by the countries where the process of innovation took place and the others experiment a process of economic dependence, in a bigger or lower scale.

This is a very significant characteristic of the Knowledge Society as a new way capitalism reproduces itself. Nowadays, the technical progress is incremental, depending of the accumulation of innovations; while the technical progress of the Second Industrial Revolution could occurs through ruptures without a previous technical and scientific accumulation as it was a diffuse and universal knowledge, the new technical and scientific knowledge, by one side, is protected by patents and, by the other, it is ephemeral. In the same way, with the molecular-digital revolution, both science and technology remains together in the same process, in such way they are interdependent. The first consequence is that the countries or regions that don't have a strong policy stimulating R&D can copy the ephemeral but not the source of the technological and scientific paradigm; the second is that the process of economic reproduction that is carried copying the ephemeral also become obsolete rapidly, meaning that a strong effort to follow the innovative process could led a country or region to remains in a subordinated position in the international scenario<sup>15</sup>. As the process of economic reproduction and concurrence is more and more dependent from new technologies, the economic leadership will

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14 The mobile telecommunication firms, through a very good marketing campaign, convinced people in Africa who live in regions without electricity and water, they have the right to be part of the Knowledge Society. In this way, they are selling used and obsolete mobile telephones and short terms cheap "call-credits". In Congo, where a very significant part of the population survives with less than US\$ 2.00/day, peasants are improvising antennas in the top of 15 meters high trees and car's accumulators are used to charge the phone batteries by a price of US\$ 0.80. In this way, they live below UN's poverty level, but, in thesis, are integrated in the Knowledge Society.

15 OLIVEIRA, Francisco de. *Crítica à razão dualista/O ornitorrinco*. São Paulo, Boitempo Editorial, 2003, pp. 138-139.

remain with the country or region that develops these technologies and retains the patents and the rights to use and to sell the rights to use it to other countries or regions.

### The European Union and Latvia in the knowledge society

Since the 1990's, Europe is facing a poor economic development and growth, even with the enlargement to the Eastern Europe, what signified the openness of new markets and the possibility to gain access to a new market. This is the reflex of the lack of capacity to adapt to the paradigms imposed by the Knowledge Society. While a new international economic division is going on, with Asia establishing itself as a high dynamic centre of manufacturing due, principally, to the low wages and high technology utilization, and United States established as a leading exporter of high-technology products and services, for example, in the software and entertainment sectors, the EU technology balance of payments, which measures disembodied international technology transfers<sup>16</sup>, is negative although

national wellness. If during the Soviet times and in the very period after the independence, the economy was structured in such way that manufacturing and services together, both based on the paradigm of the Second Industrial Revolution (mainly the metal-mechanic complex) were the most dynamic activities, responding, approximately, for 41% and 31.5% of the 1991's GDP respectively<sup>19</sup>, nowadays the situation has changed. An analysis of the Latvian GDP current structure permits to apprehend that the dynamic of the Latvian economy rests mainly on the service sector, which responded for 66% of the Latvian 2004's GDP (last available data), following the changes in the world's economy. The Chart 1 shows the structure of the Latvian economy.

The significant share of the sector of services could be very good to the country, but it is not. Although European Union has agreed in the Lisbon Summit, in March of 2000, to become the most competitive and dynamic knowledge-based economy in the

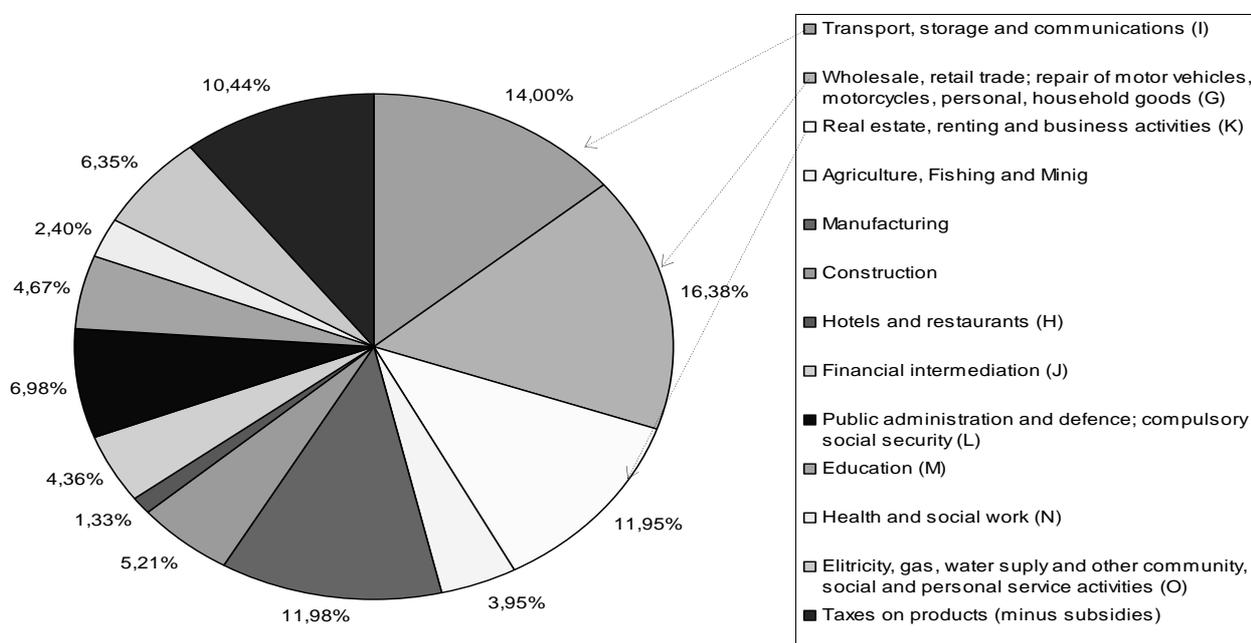


CHART 1  
Structure of the Latvian GDP by activity - % Source: Latvijas Republika Centrālā statistikas pārvalde(1)

increased sharply in the 1990's<sup>17</sup>. In the same way, the United States has been able to maintain its positions as the biggest net exporter of technology in world. Also, in the trade sphere, where in the top 20 products to World's non-fuel export growth, EU15 has the leadership mostly in sectors of the Second Industrial Revolution, as furniture, paper and paperboard, base metal manufactures, plastics, while semiconductors, telecommunications and computers are led by Southeast Asia (excluding China) and Japan<sup>18</sup>. This means that the EU is not a knowledge society yet and a very big effort has to be done to achieve this objective.

Since the beginning of the 1990's, when the Latvia started the transition to a free-market oriented economy, there was a profound change in the dynamic of the generation and reproduction of the

world, capable of sustainable economic growth with more and better jobs and greater social cohesion (in the Employment and Social Affairs' own words), Latvia is becoming more and more distant from this goal. An analysis of the structure of the Latvian service's account shows that nearly 42% of the GDP depends of three sectors: Real Estate operations (11.95%), wholesale, retail trade, repair of motor vehicles, motorcycles, personal and household goods (16.38%), and transport and storage (14%), while manufacturing represents only 11.98% of the GDP. The problem is that the performance of the Latvian economy is based in four sectors that, from which three<sup>20</sup>, by their own idiosyncrasy, may appear very dynamics but after some period of time may completely lose their capacity of both growing and stimulating the economy.

<sup>16</sup> Licenses, patents, know-how, research and technology assistance.

<sup>17</sup> EUROPEAN UNION. *The EU Economy 2005 Review: Rising international economic integration*. Brussels, Commission of the European communities, Directorate General, Economic and Financial Affairs, 2005.

<sup>18</sup> Ibid.

<sup>19</sup> Latvijas Republika Centrālā statistikas pārvalde

<sup>20</sup> Real Estate, Transports and storage, Autos in general and personal and household goods.

The Real Estate sector are growing in Latvia due the abundance of credit, that is pressuring the prices to a very high, not to say surreal level, which reflects in the patterns of the GDP. As most of the money that turns in credit lines is foreign capital, when the banks start to send profits back, there will be a significant pressure over the deficits Balance of Payments, already a real problem of the Latvian economy. While the cheap and abundant credit continues, the tendency of the prices to increase will not ceases, creating a bubble which tendency is to explode. If this occurs, the credit will cease, leading to a crisis to the sector and affecting, by one side, the savings of part of the population leading to a fall of the consumption level and, by the other side, to the complete incapacity to the country finance the Balance of Payment's deficit, as a result of the end of the flux of international money used as credit in Latvia.<sup>(21)</sup> In the other side, the demand for autos in general and personal and household goods is increasing as the growing incomes and available credit permit to people to attend their repressed demand related to these goods. After a growing and very dynamic period of time, the repressed demand tends to disappear and, as people usually don't buy cars and stoves every week, to turn again to normal levels, meaning a loose in its dynamism. By the same way, the transport and storage sector, by its side, depends of the production and commerce of material goods. In other words, the level of economic activity both in the internal side as in the international side determines the level of activity in the transport and storage sector. As the structure of the Latvian economy is very fragile, an international economic crisis may contract the economic activity in the World, what may result in a crisis in the transport and storage sector in Latvia. Last but not least, the manufacturing sector is mostly related to the production of furniture and wood products that use techniques of the First Industrial Revolution, in other words, although some firms use high degree of technology producing high-technology products, as the case of electronic circuits in Ogre, the most of the Latvian manufacturing sector remain in a very poor level of competitiveness, not relating to the Knowledge Society.

### Final remarks

The concept of Knowledge Society refers not only to the increasing interconnection of the World by the new telecommunication technologies that led to the mundialisation, but to a new way the Economy reproduces itself. The Knowledge Society may be defined as the expression of the way the capitalism system reproduce itself nowadays, based on the technological paradigms of the Third Industrial Revolution combined with process of neoliberalisation of the World's economy, representing a new way wellness is produced and how concurrence takes place. countries or regions that don't have a strong policy stimulating R&D can copy the ephemeral but not the source of the technological and scientific paradigm; the second is that the process of economic reproduction that is carried copying the ephemeral also become obsolete rapidly, meaning that a strong effort to follow the innovative process could led a country or region to remains in a subordinated position in the international scenario<sup>22</sup>. As the process of economic reproduction and concurrence is more and more dependent from new technologies, the economic leadership will

remain with the country or region that develops these technologies and detains the patents and the rights to use and to sell.

Although the European Union potentially could be a Knowledge Society, to achieve this objective a great effort will have to be done, as its economic structure refers mainly to the activities of the Second Industrial Revolution and as EU is a net importer of technology. By its side, although there is not available data about Latvia's Technology Balance of Payments, an analysis of the components of the Latvian GDP shows that the country is very far from the Knowledge Society. Firstly, because the Latvian economy is structured in a very fragile basis, mainly in sectors providing economic growth but not development; secondly, because of the idiosyncrasy of these sectors that determines that theirs dynamism is short or, in other words, that the Latvian economy may experiment a retrocession if nothing be done soon. The only chance to Latvia is a well coordinated action by the State stimulating the new economy's real dynamic sectors, as software development, tourism, advertising, printing, and so far, through policies that incentive the establishment of such activities and promoting a real modernization of the economy, instead of the high level speculative scenario. Of course such action should be done through a strong planning and a soft intervention of the State, intending to prepare the conditions to the private sector to change the way it operates in Latvia, together with a strong educational policy, leading the country to the Knowledge Society.

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<sup>21</sup> For example, the prices of the Finnish Real Estate Sector fell down 40% in one week in 1990.

<sup>22</sup> OLIVEIRA, Francisco de. *Crítica à razão dualista/O ornitorrinco*. São Paulo, Boitempo Editorial, 2003, pp. 138-139.

## Four Paradigms of Change Management

Jean-Claude Marot (JC Consultants, French Polynesia)

### Introduction

The problematic of the links between the social change and the technical change is not new, but yet it remains subject for divergent analyses and the increasingly spreading of organizations based on information and communication technologies does not stop to refresh the debates.

It is not a pure academic subject. If you want to manage successfully the organizational changes linked with the technical innovation, you have to take this question into account.

There are various ways to explain the relation between technical change and social change. We shall present here four interpretation patterns:

- Technical-determinism
- Social-determinism
- Socio-technical self-adjustment
- Interplay of powers

According to the situations, an interpretation pattern can be more suitable than another one (we shall see it in the following examples). Indeed, in order to manage the technical change successfully it is necessary to apply the appropriate analysis.

### The technical-determinism

Generally, the technical changes goes with more or less deep change in the ways of life and thinking, in the organization or in the jobs. The first idea which comes to the mind is to consider that the technical innovation is the main driving force of the social change. We shall call this analysis grid, the technical-determinism pattern.

#### Case study N°1

Here is an example where the explanation based on technical determinism seems to be evident. In France, during the decade seventy – eighty, the operator France Telecom has totally replaced its phone exchanges systems. The old systems based on electromechanical switching were replaced by digital systems.

Phone exchange system	ELECTROMECHANICAL	DIGITAL
Diagnosis tools	Measuring instruments of the electrical current	Computer and electronic documentation
Breakdowns	Small problem ⇒ small effects	Small problem ⇒ extensive effects
How to intervene ?	Physically	Virtually
Tele-diagnosis	Almost impossible	Generalized

Figure 1. Example of social impacts of the technical change

Because of the differences between these systems, the job and the organization of work of the technicians in charge of the maintenance were deeply transformed. For instance, the technician who used previously to work with a voltmetre and an analogical diagram in order

to analyze the breakdowns, had to learn how to use a computer and to launch test programs. Furthermore, as the permanent physical presence of the technician in the phone exchange was henceforth unnecessary, the organization of the maintenance became an organization based on teleworking.

#### The change management strategy

It is clear that the coaching of such change requires a strong effort in a technical training. The explanation based on the technical determinism pattern involves a strategy of change in the core of which the technical culture holds the greatest place.

But, is this Interpretation pattern always relevant?

### Social determinism

In fact, there is a way to explain the change radically opposed to the previous pattern. It is the analysis based on the social determinism. Man precedes technology because it is him who conceives it and it is him who uses it. The designer prints in the system his way of thinking and his vision of the organization. Furthermore, the individual and the society alone are responsible for a possible harmful use of the technology.

#### Case study n°2

Here is an example which allows to illustrate the centrality of the man in front of the technical object. At the preliminary time of the implementation of a distance learning device within Telecom Argentina, one of the Argentine operators of telecommunications, the team in charge of the project was inspired by a comparable project managed within France Telecom.



Figure 2. Example of social determinism

Aware that the personnel of France Telecom had put up some resistance to the changes, the strategy of introduction of the device within Telecom Argentina had been conceived to take into account this resistance. Comparable contexts and technical cultures, comparable devices of distance learning, according to the logic of the technical determinism, the personnel behavior was to be comparable.

In fact, unlike the french personnel at once the argentine peoples were taking part of the project.

The analysis has shown that due to their previous experience, the France Telecom personel considered a priori the change as a risk whereas the Telecom Argentina personel regarded it as able

to open new opportunities. Indeed, for several years the internal restructuring of France Telecom had contributed to the deterioration of the working conditions. Conversely, Argentine was just coming out a long period of economic and social instability during which any new occasion could be good to seize in order to improve the lot of the peoples. It is this difference of social culture that explains the difference of attitude in front of the introduction of the new technologies.

*The change management strategy*

The change management strategy which is based on the pattern "social determinism" will favour a step centred on the users behavior.

**Socio-technical self-adjustment**

The third pattern is based on the idea that, in reality, technique and society are alike both determining and determined. The interaction between the two factors produces a new balance that was temporarily destabilized by the introduction of the new technology. We shall call this pattern: "socio-technical self-adjustment "socio-technical self-adjustment".

*Case study N°3*

Here is the case which illustrates this type of analysis.

When in France the price of fuel was not any more decided by the State, the big distributors set up a device of competitive monitoring. In the company studied, some agents in places were in charge of watching the local competition prices. At the beginning of the monitoring, the agents sent the information to the head office by mail, phones or faxes. On basis of this information, the head office adjusted its fuel prices according to those practised by the competition.

As this device was heavy and not very reactive, the head office has decided to equip the monitoring teams with laptops and with secure electronic mail systems.

This new flexibility led to increase the number of messages to a significant extent. Quickly, the head office, swamped with work, became unable to deal with all these informations. This situation placed the Management in front of the following alternative: either to automate the data processsing, or to modify the organization. It is the second solution which was chosen.

The Management chooses to decentralize at the regional level the main part of the decisions regarding adaptation of the fuel prices. In this example we observe alternately on the one hand the rise of an imbalance following the introduction of a new technology and, on the other hand the rectification of this imbalance by an adaptation of the organization.

*The change management strategy*

A strategy of change management which is based on the pattern "socio-technical self-adjustment" tends to favour an approach based on re-engineering.

**Interplay of powers**

The interpretation pattern "socio-technical self-adjustment" could give the impression that the adaptation between technological requirements and social requirements is almost mechanically done as the result of various interactions, as if the nature would loathe the imbalance. Nevertheless, in the previous case we understand well that

the decisive factor is the choice of the Management between two ways and not just a mechanical adaptation. In this fourth interpretation pattern, the player and his freedom are in the core of the dialectic. We shall call this pattern " interplay of powers".

*Case study N°4*

Here is a case which illustrates the important role of the player freedom.

This company provides softwares made to measure. Its marketing peoples remain in close contact with the customers. When the technical questions are too specific the marketing peoples interrogate directly the computer programmers. At the beginning, they phoned the computer specialists about it, but as the line was often engaged and as the programmers complained to be too often disturbed, the company decided that in future marketing peoples and programmers will communicate only by E-mail.

At the beginning everybody is satisfied. Then, gradually the programmers delay or forget answering the questions. Often, in order to spare time, they contact directly the customers without informing the marketing peoples about it. As a result these are often put in trouble in front of their customers. In the final, in order to master again the situation, the marketing man abandoned the use of E-mail for using again the telephone.

What happened? Alternately, the tools of communication allow every player to master the situation to his advantage. The telephone increases the rooms for manoeuvre of the marketing peoples while limiting those of the programmers, the E-mail increases the rooms for manoeuvre of the programmers, but limits those of the marketing peoples. The uncompleted appropriation of the E-mail use is the outcome of the power relation between two players trying to widen their zone of freedom.

*The change management strategy*

The result of the co-détermination between technical sphere and social sphere remains indeterminate as long as the power links of the players did not find a new balance. The change strategy corresponding to this Interpretation pattern implies a preliminary diagnosis and to follow through the power relations.

**Conclusion**

We can distinguish four paradigms of the technical and social change.

	Before ICT	After ICT
Univocity	Social Determinism <u>Keyword</u> Behavior	Technical Determinism <u>Keyword</u> Competency
Inter-action	Interplay of Powers <u>Keyword</u> Power relations	Socio-technical Self-adjustment <u>Keyword</u> Re-engineering

Figure 3. The four paradigms

The relevance of every pattern depends on the one hand of the point of views of the analysis (before or after the introduction of the new technology), on the other hand of taking account or not of interactions at work. Each paradigm casts a particular light and bases a specific management strategy of change.

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# IST and Other European ICT Projects

## eLOGMAR-M Project: IT and Mobile Solutions with Transport Logistics and Maritime Applications

*Leonid Novitsky (Riga Technical University, Latvia)*

*Eberhard Bluemel (Fraunhofer Institute FhG/IFF, Germany)*

*Egils Ginters (Latvian Intelligent Systems Ltd., Latvia)*

*Alexey Jurenoks (Riga Technical University, Latvia)*

### Introduction

The major goal of eLOGMAR-M project is to create a Web-portal for transport services' consumers and to provide mobile access to it. The major idea from logistics point of view is to estimate a start-to-finish rate of cargo transportation and to select the most suitable supply chain.

part of the above mentioned freight route. This region has specific requirements: after the candidate countries (Lithuania, Latvia and Estonia) joined both the EU and NATO, they play the role of a new border between EU and CIS.

Actors from two major target groups are involved in cargo transportation process:

- Transportation group: deep sea and feeder shipping lines, shipowners, terminal operators, block train operators, forwarding companies, multimodal transportation operators, freight brokers;
- Cargo group: cargo owners, traders.

### Approach

We consider the following scheme to reach the major objectives of the eLOGMAR-M project (Figure 1):

Identification and integration phases serve as a technical and organisational platform to create a dynamic, collaborative, virtual pool (Web-portal) of the partners, operating along the selected maritime freight route. However, the phase of demonstration

illustrates the applications of this platform in the sections of the selected maritime freight route "Europe – China".

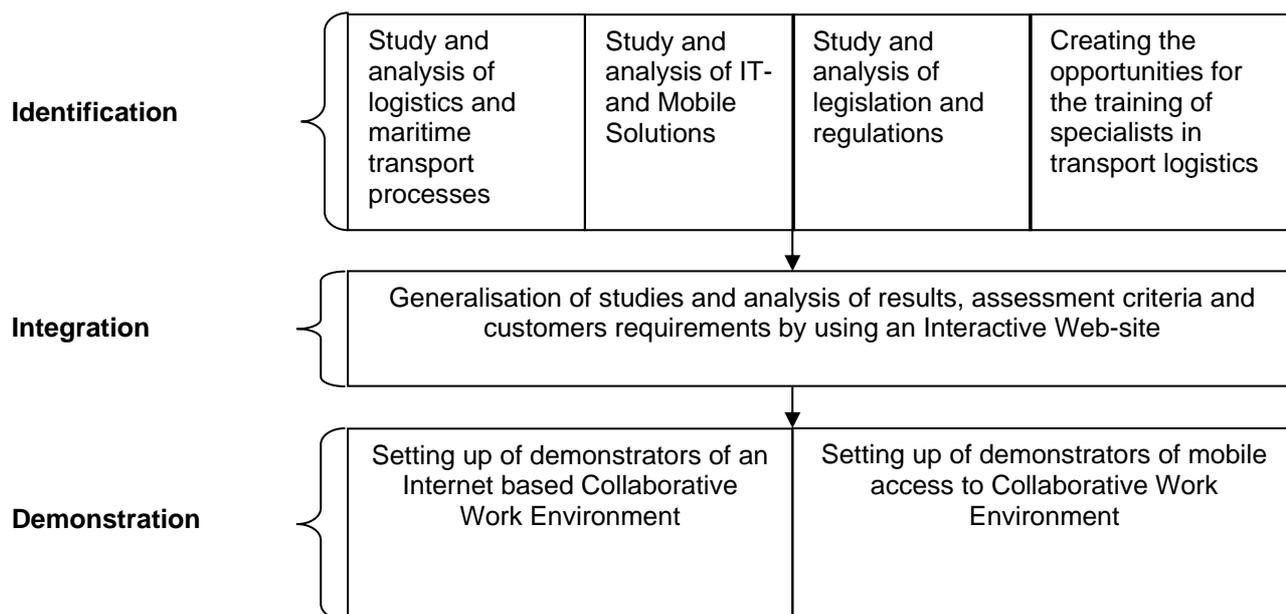


Figure 1. General scheme.

### The maritime freight route and target groups

The maritime freight route "Baltic Sea feeder ports - Western Europe hub port (Hamburg) - Mediterranean port (Thessaloniki) - Chinese ports" is selected as the subject of investigation and demonstration. The rapidly developing trade between Europe and Asia, the polarisation of producers in Asia and of consumers in Europe needs the improvement of supporting services along this transportation routes. Containerships present one half of the turnover measured in gross tonnage along the route "East Asia ↔ North-Western Europe", with China being the largest producer of container traffic originating in Asian countries.

Special attention is also devoted to the study of maritime and logistics processes in the Baltic Sea Region as they form an integral

### Consortium

17 partners from 9 countries are presented in the project's consortium: Fraunhofer Institute for Factory Operation and Automation (FhG/IFF), Port of Hamburg Marketing and Transportation Freight Broker Company RTSB (Germany); Port of Kokkola (Finland); Maritime & Supply Chain Solutions Ltd. (U.K.); Thessaloniki Port Authority and TRD International (Greece); Logitrans Consult and Interbalt Maritime Agency (Estonia); IDC Information Technologies, Riga Technical University and Latvian Intelligent Systems (Latvia); Klaipeda State Seaport Authority and Sonex Computers (Lithuania); Warsaw University of Technology (Poland); China Harvest

Development Ltd. and Beijing HOPE Software (China). The combination of expertise of IT companies and transport and logistics enterprises enables solving problems related to the proposed area.

As long both general web and mobile users need to have the same functionality and difference that we have is different way of accessing that data, we don't need to separate data storage and we

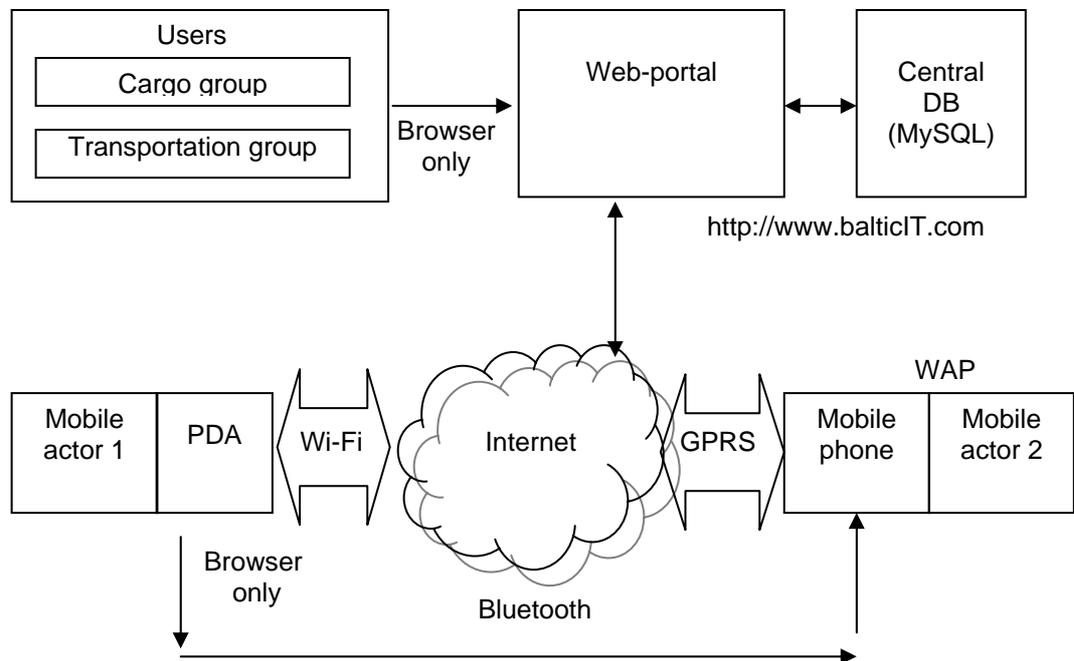


Figure 2. Demonstration scheme.

**Demonstrators of web-based and mobile solutions**

*Frames of demonstration*

Transportation of cargo in containers will be considered (the global container market is a very dynamic one).

*Technical solutions for Web-portal and mobile access demonstration*

HTML (WHL) and PHP languages and MySQL DBMS will be used for Web-portal development and data storage.

Pocket PC devices (Personal Digital Assiatnt, PDA) will be used to demonstrate mobile access to Web-portal.

PDA will support practically the same set of functions as in Web portal and similar demonstration scenario. There are some changes in information presentation in comparison with Web-portal (limited resolution only).

Central DB – central data storage for web portal and mobile solution (My SQL DB).

Mobile actors – mobile users who get information over mobile devices.

Main functionality for mobile users:

- Estimation of start-to-finish cargo rates and suitable carrier.
- Obtaining of Useful Information (brief description of IT&T Solutions, Legislation & Regulation, Education & Training).

Mobile users can have the same functionality as the web users except, data representation on the screen. Keeping in mind the limitations of pocket devices (small screens, inconvenient typing) some web site modification will have to be done. Adapted information set that will be used by mobile users will be implemented. This software for pocket PC users can be installed on the same machine where the web portal will be installed.

can have only one data storage, so Central DB in our figure now can be MySQL database where the data is stored. Pocket PC users will get data from the same source as the portal for web users. The same way should act solution with mobile phones, as long there is specifics only in data representation and data transfer protocols WAP.

Data connector (special software) will be integrated in the web site for pocket PC users as the data abstraction layer for the purpose of independent DB platform. This option will allow us to have light system modifications in that case if data store would change form MySQL to other data store platform, there will be no necessity to change the whole system.

**Exploitation & dissemination**

The exploitation of results is very important for projects funded by the European Commission. For this reason, the consortium core partner group created the Baltic Sub-Regional Competence Centre (BSRCC) in Riga within the frameworks of the BALTPORTS-IT project.

BSRCC is the instrument to create and support a networked, collaborative virtual, organisation aimed at bringing together industrial users, universities and research institutions around the common topic of, e.g. “Logistics, IT-solutions and Simulation with Maritime Applications”.

Besides the further development and maintenance of the central office in Riga, branch office in Tallinn is established under the eLOGMAR-M project.

The main tasks of BSRCC are:

- To create a network of excellence and a training network aimed at bringing together industrial users,

universities and research institutions around a common theme “IT-solutions and e-logistics for maritime applications”. Such a network would be used in future as a kernel for the next RTD projects, including EC activities.

- To improve the systematic exchange of information between different organisations that are interested in virtual collaboration.
- To provide the possibilities of regional specialists training by using Web-based open-distance courses.
- To support the organisation of Internet conferences.
- To introduce partners, operating in Freeport areas of the Baltic States, to the Western and Chinese experience and to the methodologies of privatisation and ports re-engineering processes based on modelling.
- To provide distant access to simulation models, training materials and knowledge located in specialised servers.

Special sessions were organised by the consortium partners within the frameworks of:

- European Simulation Multi-Conference (Riga, June 2005).
- International Conference "Logistics and IT-Solutions in International Trade" (Tallinn, December 2005).
- International Workshop HMS "Harbour, Maritime & Multimodal Logistics Modelling and Simulation" (Genoa, October 2005).
- International Workshop IST4Balt (Riga, April 2006).

The eLOGMAR-M project is especially focused on China. Several events were organised by the project’s consortium partners in China, March 2006:

- A series of meetings with Chinese, Shanghai and Shenzhen Logistics Associations.
- Forum on eLogistics (about 100 people from European and Chinese organisations took part in this event) etc.

**Conclusions**

eLOGMAR-M project is Coordination Action aimed at supporting logistics and maritime operations by Web-based and Mobile Solutions. Project objectives, consortium structure and general scheme of solutions are presented in the article.

**Acknowledgment**

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**Quality Evaluation Methodologies for e-Learning Systems**

*Tatiana Rikure, Leonid Novitskis (Riga Technical University, Latvia)*

**Introduction**

The project “Unified eLearning Environment for the School” (UNITE) is a Specific targeted research project (STREP) for the 6<sup>th</sup> Framework Programme (FP6) of the European Commission. The UNITE consortium aims at developing and establishing a technical platform enhanced with pedagogical guidance for the creation of high-quality e-learning content for secondary school children. The UNITE portal-like platform intends to support the re-use of content material, the exchange of best practices, and the improvement of pedagogic models.

The learning settings are not limited to conventional lessons. UNITE specifically supports forms of learning which are difficult to realise in the classroom and will explore innovative approaches of structuring and delivering content to the learner. Therefore, the pedagogic experts of the consortium are planning to establish a pedagogical framework focusing on mobile learning, exploratory learning and group learning situations. Their input on modes of learning will be transferred into e-learning scenarios which combine the pedagogical recommendations with appropriate technical features provided by the platform.

Constantly while developing the pedagogical and technological concepts, a validation process will be run in 14 secondary schools in 11 countries. In parallel and in close collaboration with the validation in the schools network, the project will carry out an intensive socio-economic evaluation. This will lead to a profound evaluation of the project goals, taking all important aspects into account. Moreover, it will define the basis for the sustainability of the UNITE results after the end of the project.

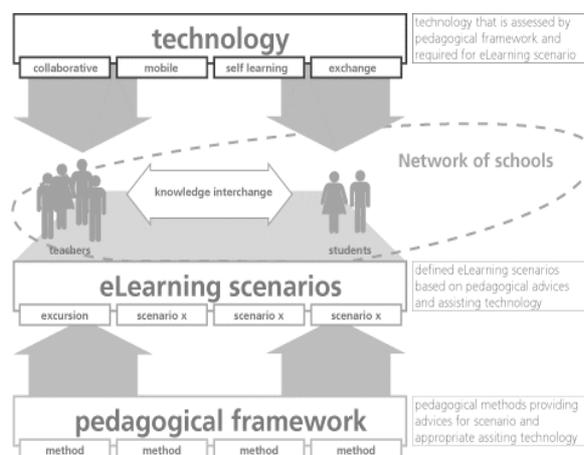


Fig. 1. Building blocks of UNITE.

Division of Applied Systems Software at Riga Technical University (RTU) is a UNITE project partner and main

contributor for the design and development of the validation methodology, which key responsibilities in the project include:

- designing the quantitative assessment methodologies for the validations;
- leading the validation activities in Latvia.

**UNITE validation methodology**

The objective of the validation is to determine the appropriateness, meaningfulness and usefulness of the UNITE system for the selected e-Learning scenarios by meeting the user requirements and expectations. A most efficient validation dictates that the validation method is a repeatable, systematic procedure to produce validation results. In that way the validation is the main instrument for quality assurance in the project UNITE.

Quality assessment of the e-Learning system will be developed and executed on 2 levels:

1. quality assessment of the system:
  - a. at the design phase,
  - b. of the final product,
2. measure efficiency (success) of the system:
  - a. using qualitative evaluation,
  - b. using quantitative evaluation.

**e-Learning evaluation perspectives**

A web-based literature survey of e-learning evaluation and assessment reports, articles and other documentation in English, Russian and Latvian revealed that the existing research can be grouped under the following headings:

- **Particular Product \ System \ Platform Evaluation** describes particular educational software and usually is published or commissioned by the software developers.
- **Performance Evaluation or Learner Assessment** is a powerful indicator of the didactic effectiveness of e-learning.
- **Tools for the evaluation of the e-Learning** include

- data gathering instruments for assessing (e.g. questionnaires, tests, checklists, quizzes with \ without feedback, etc.),
- recording and analyzing tools (e.g. by duration \ frequency of log-in and log-out, number of accessed pages, hit counters, etc.), which include Web-testing tools (e.g. load and performance test tools, link checkers, HTML validators, security test tools, web-site management tools, usability test tools, navigation & configuration testing, etc.).

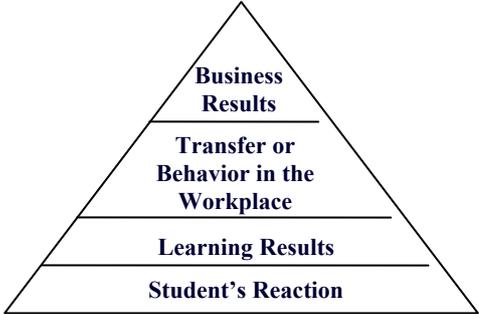
- **Return on Investment (ROI)** assessments show cost-effectiveness of the investments in e-Learning.
- **Benchmarking** suggests different sets of criteria for quality assuring e-Learning.
- **Pedagogical experiments or Comparisons with traditional learning** usually are organized for particular goals \ objectives in the specific context (e.g. institution, in the frame of the project, research, study, etc.).
- **Case Studies** of the particular courses, programs, trainings, etc. also are usually limited to the specific subject area.
- **Quality Management approaches** include official approaches like TQM (Total Quality Management), EFQM excellence model, standards (ISO 9000), Audit procedures, etc.

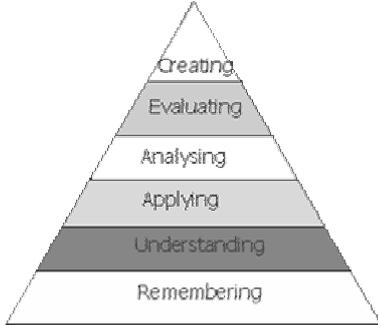
**Quality assessment models**

Measuring the effectiveness of e-Learning is an important issue in the development and use of any e-Learning system or strategy, which not only shows the value of their use, but also allows improving in the future.

The today most popular and used quality assessment models and this paper authors' comments regarding an opportunity to use them for e-Learning system evaluation are given below (Table 1).

Table 1. Quality assessment models overview.

Name	Short description	Comments for usage for the e-Learning quality evaluation
<p>1. <b>Kirkpatrick's Four Levels of Evaluation</b> (classical quality assessment model)</p>	<p>In 1976, USA researcher Donald Kirkpatrick first presented a four-level model of evaluation that has become a classic in the industry [1]. Each successive evaluation level is built on information provided by the lower level:</p> <div style="text-align: center;">  <p><i>Fig.2. Kirkpatrick's 4 Levels of Evaluation.</i></p> </div>	<p>Kirkpatrick's 4-levels of evaluation model allow getting fast and illustrative quality assessment of the e-learning activities. Although Kirkpatrick's model has a lot of benefits, such its relative ease and convenience to use, it suffers from the big amount of subjectivity and doesn't offer any quantitative measures for the evaluation. As the practice shows the last level is the most difficult to implement in the real situation and usually due to this reason it is being ignored.</p>

<p>2. ROI (Return on Investment)</p>	<p>Return On Investment, or ROI, is a form of evaluation that allows organizations to find out if a training program has been profitable for the company. In 1991 Jack J. Phillips created ROI evaluation model to determine if the monetary value of the results exceeds the cost of the training. Because it builds upon information often gathered by using Kirkpatrick's 4 Levels of Evaluation Model, ROI is often considered the 5th level.</p> <p>To calculate ROI, the benefit (return) of an investment is divided by the cost of the investment; the result is expressed as a percentage or a ratio:</p> $ROI = \frac{\text{Gain from Investment} - \text{Cost of Investment}}{\text{Cost of Investment}}$  <p><i>Fig.3. Kirkpatrick's 4 Levels of Evaluation with ROI as the 5th Level.</i></p>	<p>Return on investment model is directed at the financial part of the evaluation. ROI is a very popular metric because of its versatility and simplicity in comparison with other more complex financial evaluation tools such as Net Present Value (NPV) and Real Options. However the actual ROI measurement procedure is quite time and efforts consuming, because it is difficult to isolate the effects of specific training or programs and provide accurate estimates. Costs are only part of the e-Learning equation. The primary advantage comes from increasing the top line, i.e. enabling organizations to do things they couldn't do with traditional training. Moreover, it is important to count only incremental costs, because some of the resources are already available for other purposes, for instance, PCs, LANs, Internet etc. The money already spent on these resources shouldn't be toted up as an expense of e-Learning.</p>
<p>3. Bloom's Taxonomy</p>	<p>Benjamin Bloom (1956) developed a classification of levels of intellectual behavior in learning [3]. This taxonomy contained three overlapping domains:</p> <ul style="list-style-type: none"> <li>• Affective: feelings, preferences, values. (Attitude)</li> <li>• Cognitive: thinking, getting, evaluating and synthesizing information. (Knowledge)</li> <li>• Psychomotor: physical and perceptual activities and skills. (Skills)</li> </ul> <p>Bloom's Taxonomy is a way to classify instructional activities or questions as they progress in difficulty. It is a widely accepted system, and is useful in illustrating how certain question types are better choices for assessing different levels of student mastery.</p>  <p><i>Fig. 4. Six levels of the Bloom's taxonomy.</i></p>	<p>Bloom's taxonomy allows looking in more details at instructional activities and could help to choose the learning strategy in the future, referring to "Assessment is not an end in itself but a vehicle for educational improvement". After considering what should be taught within a course, it is important to decide to which extend and under which circumstances the competencies should be mastered by the students. So, learning objectives can be defined following the Bloom's taxonomy. This model can be also used to choose the type of the assessment questions in testing procedures.</p>
<p>4. Benchmarking</p>	<p>Benchmarking is a process of self-evaluation and self-improvement through the systematic and collaborative comparison of practice and performance with competitors in order to identify own strengths and weaknesses, and learn how to adapt and improve as conditions change.</p> <p>There are different types of benchmarking [4]:</p> <ul style="list-style-type: none"> <li>• <b>Implicit</b> (by-product of information gathering) OR <b>explicit</b></li> </ul>	<p>There are different tools available for benchmarking e-Learning, so this fact could be seen as an advantage in using this methodology [6 – 12].</p> <p>In comparing the different approaches to benchmarking it is concluded that:</p>

	<p>(deliberate and systematic);</p> <ul style="list-style-type: none"> <li>• Conducted as an <b>independent</b> (without partners) OR a <b>collaborative</b> (partnership) exercise;</li> <li>• Confined to a single organization (<b>internal</b> exercise), OR involves other similar or dissimilar organizations (<b>external</b> exercise);</li> <li>• Focused on the whole process (<b>vertical</b> benchmarking) OR part of a process as it manifests itself across different functional units (<b>horizontal</b> benchmarking);</li> <li>• Focused on <b>inputs, process</b> OR <b>outputs</b> (or a combination of these);</li> <li>• Based on quantitative (<b>metric data</b>) AND / OR qualitative (<b>bureaucratic information</b>).</li> </ul> <p>The European Foundation for Quality Management (EFQM) considers the basic philosophy of benchmarking is to [5]:</p> <ul style="list-style-type: none"> <li>• Know what you want to improve/learn about (Scoping)</li> <li>• Identify the ‘Good Practices’ in those areas</li> <li>• Learn from the ‘Good Practices’ - organisations:             <ul style="list-style-type: none"> <li>○ What they are achieving</li> <li>○ How they are achieving it</li> </ul> </li> <li>• Adapt the Key Insights and incorporate the learning into your own process.</li> </ul> <p>In summary, benchmarking enables organisations to adopt, adapt and improve good practice.</p>	<ul style="list-style-type: none"> <li>• Benchmarking is a tried and tested process that can significantly enable organisational learning and enhance organisational performance.</li> <li>• There are numerous approaches to benchmarking and the commonsense approach draws appropriately from a mix of these.</li> <li>• Benchmarking is not simply about performance measures. At its most effective it becomes a core business strategy.</li> <li>• A process orientation is required in the organisation to ensure benchmarking is effective.</li> <li>• The EFQM Excellence Model® provides a very effective route into benchmarking. It encourages benchmarking against measures of performance but also stimulates the search for good practice.</li> <li>• Benchmarking can provide a valuable tool for individual and team development.</li> </ul>
<p>5. <b>Quality audits</b></p>	<p>The principles of Quality Audit are based on the style of quality standards used in several formal national and international standards such as the ISO-900x international quality standards (for instance, ISO 10011-1:1990 Quality Standard) [13, 14]. These standards do not in themselves create quality.</p>	<p>Quality audits – or expert third-party reviews – can help to determine what’s working and what’s not in the e-Learning system.</p>
<p>6. Methodology, which takes into consideration <b>students learning styles</b></p>	<p>QUA evaluation can be organized in relation with students learning styles (visual, kinesthetic, audial) – there are different studies regarding learning styles &amp; its’ influence on learning. Felder-Silverman Learning Style Model (1988) can be used to classify learners according to defined learning dimensions [15].</p> <p>To find out the learning style according to FLSM the following items can be used [16]:</p> <ul style="list-style-type: none"> <li>• Index of Learning Style (Felder &amp; Soloman, 1997)             <ul style="list-style-type: none"> <li>○ 44-item questionnaire (11 questions per dimension)</li> </ul> </li> <li>• Track learners behavior and infer the learning style from it             <ul style="list-style-type: none"> <li>○ Using Bayesian networks to detect learning styles (García et al., 2006)</li> <li>○ Detecting learning styles in learning management systems (Graf and Kinshuk, 2006)</li> </ul> </li> </ul>	<p>All the people learn and process information in different ways, that’s why it’s important to build courses and programs that address multiple learning styles. Assessing the impact of the e-Learning on learners with different learning styles could give an answer how to improve e-Learning system to reach the greater number of students. As the analysis results show usually the best improvement scores have the “visual” learners, which is easy to understand taking into consideration characteristics of the majority of e-Learning systems available today.</p>
<p>7. <b>Pedagogical experiment</b></p>	<p>The major aim is to evaluate didactic effectiveness of the use of a “new” teaching mean in comparison with traditional methods which are applied now at schools.</p> <p>Organisation of the experiment:</p> <ul style="list-style-type: none"> <li>• Two “equal” groups are formed taking into account several factors and conditions (existing level of skills, lessons, time</li> </ul>	<p>This approach was suggested by RTU to use in the UNITE project for the qualitative evaluation of the effectiveness of the e-Learning system.</p>

	<p>etc.);</p> <ul style="list-style-type: none"> <li>• One of the groups will use in learning process “new” tool/system, another one will be taught by traditional methods;</li> <li>• Several characteristics of both groups will be compared, for instance, level practical skills, and final/intermediate marks.</li> </ul> <p>Processing &amp; estimation of results:</p> <ul style="list-style-type: none"> <li>• Wilkockson’s and Student’s statistics criteria are applied to compare groups’ results and to estimate didactic effectiveness of the use of new tool/system;</li> <li>• Additionally variance and correlation analysis is used to investigate an influence of different factors to the effectiveness of teaching process using new tool/system.</li> </ul> <p>Outcome:</p> <ul style="list-style-type: none"> <li>• Estimation of a didactic effectiveness of the use of CBLs;</li> <li>• Recommendations how better to apply new tool/system.</li> </ul>	
<p><b>8. Expert evaluation</b></p>	<p>Expert evaluation is a complex of logical and mathematical procedures aimed at information acquisition from domain area experts, its analysis and generalization in order of optimal decision-making.</p> <p>One of the expert evaluation methods is a “Delphi technique”, consists of three or four rounds of questionnaires mailed to a panel of experts. The first round consists of a few open-ended questions. Group responses are then mailed to the experts so they may independently and anonymously respond to the panel summary. Experts receive a reminder of their own responses and are asked to justify their deviation from the panel's majority judgment. Anonymous responses ensure a nonthreatening format that prevents one expert's opinion from dominating the views of others. Many variations of the Delphi exist, but essential components are <i>sequential questionnaires</i>, <i>continual feedback</i>, and <i>anonymous experts</i>.</p>	<p>Strengths of the Delphi are its combination of qualitative (written) and quantitative (numerical) data and its ability to form a consensus of expert opinion. Limitations are time involved for mailing and receiving replies and lack of stimulation from face-to-face contact. Benefits of the method include inexpensiveness, since it generally does not involve travel to face-to-face meetings.</p>

Different models can be used for quality assessment of the e-Learning systems; each of them has its own benefits and drawbacks. The selection of the appropriate model obviously should be done in accordance with objectives and goals of the evaluation, considering the pros and cons of each method in the particular context.

**Conclusions**

The development of e-Learning products and the provision of e-learning opportunities is one of the most rapidly expanding areas of education and training. E-Learning is also one of the areas that attract the most research and development funding. If this investment is to be maximised, it is our challenge to generate robust models for the systematic evaluation of e-learning and produce tools which are flexible in use but consistent in results.

Measuring the quality of the e-Learning systems should be done with the use of multiple-method evaluation strategy that considers both qualitative and quantitative criteria.

The overall conclusion is that the evaluation of e-learning is fundamentally the same as the evaluation of any other learning but with particular groups of variables playing a more prominent role

and the impact of others differs significantly from their impact in traditional learning.

**Acknowledgement**

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## The Development of Mobile On-site Training in Logistics Information Systems

*Egils Ginters (Vidzeme University College, Valmiera, Latvia)*

*Oksana Soshko, Yuri Merkuryev (Department of Modelling and Simulation, Riga Technical University, Riga, Latvia)*

### Introduction

In today's environment, companies need people who are flexible, team workers, good communicators and learners. Quick changes in today's environment ask for reducing the training time and regular upgrade of knowledge and skills. This is of special importance for vocational training, when trainees have to combine their studies with conventional work. Effective training is a key in delivering this type of workforce. Recent developments in information technology and telecommunications call for a serious reconsideration of the actual training methods and provide possibilities of organising educational processes not only in the traditional way, but also by means of distance learning, exploring e-learning and m-training approaches. Especially important are changes in Information & Communication Technologies and Electronics (ICTE) which have a great impact on logistics and transportation systems.

The LOGIS MOBILE project is focused on one of the most cost effective ways for solving the problems mentioned above - reducing of training material and using the mobile m-training technologies granted by cellular networks.

### From mobile phone to mobile training

Only 36 years have passed since first cellular mobile phone networks were developed in several countries. During this relatively short period, the number of mobile phone functions has increased noticeably. The first big wave of mobile use was voice communication, the second – a communication by texts (known as sms, i.e. short message service), and the third communication by multimedia (known as mms, multimedia messaging service). Now a modern mobile phone is already supported with photo, video camera, movies, games, TV, GPS etc. Nowadays, it is not just a communication tool, but also an organizer, entertainment, radio, mp3 player; much more functions exist and can be mentioned.

Of all the possible uses of mobile phones, the use that will have the greatest impact on the world in the long run is using mobile phones for training and learning. Mobile phones are not just communications devices sparking new way of interaction between people. Mobile phones also have to be used for teaching because [3]: (1) they are particularly useful computers that fit in a pocket, (2) they are always with you, and (3) they are nearly always on.

Calling up your friend to get an answer during an exam is simple example of learning via mobile. Much more, training by using mobile becomes a "just-in-time" training if you are calling up for technical support your software provider and follow his instruction in real time. A classification of types of mobile learning is provided in [4]:

- Voice learning. Languages, literature, public speaking, writing, storytelling, and history are highly adaptable to voice-only technology. Of these, language is probably the most obvious. In Japan, you can dial a number on your phone for short English lessons from ALC Press's Pocket Eijiro. In China, the British Broadcasting Corporation provides mobile phone English-language training. MIG China Ltd. is even subtitling pop songs with their lyrics, highlighting each word as it is sung. Other types of voice-only learning applications exist and are growing in popularity. In Concord, Massachusetts, you can use a cell phone for guided tours of Minute Man National Historical Park. Anglia Polytechnic University (in the United Kingdom) has experimented successfully with using mobile phones for exams, with the students' voice prints authenticating that they are the ones being tested.
- *Short Text Messages.* Short text messages, which can be written quickly, offer enormous learning opportunities. In schools, SMS can be used to conduct quizzes. SMS is also the technology used for voting on the television. Marketers use SMS for informational quizzes about subjects of interest to young people, such as movie and television stars.
- *Graphic Displays.* Most new mobile phones come with a powerful graphic. They present thousands of colours and even three-dimensional images and holograms. Such high-resolution screens allow for meaningful amounts of text to be displayed, either paragraph by paragraph or one quickly flashed word at a time, known as RSVP—rapid serial visual presentation—with the user setting his or her own reading speed. In Asia, novels intended to be read on phone screens are already being written. Better graphic displays also mean that text can be accompanied by pictures and animation. The Chemical Abstracts Service is preparing a database of molecule images that can be accessed via mobile phone. It follows that in many cases, our mobile phones will be able to replace our textbooks.
- *Downloadable Programs.* Now that mobile phones have memories (or memory card slots) that accept downloaded programs and content, entire new learning worlds have opened up. Applications combining elements of voice, text, graphics, and even specially designed spreadsheets and word processors can be downloaded to phones, with additional content added as needed.
- *Internet Browsers.* Internet browsers are now being built into a growing number of mobile phones, especially those that use the faster 3G protocol. Having a browser in the mobile phone puts a dictionary, thesaurus and encyclopaedia into the hands of every student. It gives them instant access to search engines, turning their phones into research tools.
- *Cameras and Video Clips.* In class, mobile phones with cameras provide possible tools for scientific data collection, documentation, and visual journalism, allowing students to gather evidence, collect and classify images, and follow progressions over time (once students learn that privacy concerns are as important here as

anywhere else). Phones can be placed in various (appropriate) places and operated remotely, allowing observations that would be impossible in person.

- *Global Positioning Systems.* Nowadays sophisticated GPS satellite receivers, which can pinpoint a phone's location to within a few feet, are being built into many mobile phones. This feature allows mobile phone learning to be location-specific. Students' phones can provide them with information about wherever they happen to be—in a city, in the countryside, or on a campus. The ability of students to determine their precise position has clear applications in geography, orienteering, archaeology, architecture, science, and maths.

Despite mobile technologies provide wide opportunities for training and teaching, only few illustrations of m-learning exist. Next chapter will introduce LOGIS MOBILE project, which is one of the first projects using mobile cellular telecommunications in vocational learning and training on logistics information systems (LIS) combining them with m-training and e-learning methodologies.

### **Mobile training in LIS: background**

One of the fields most important for national economies of the Baltic States is logistics and transport, especially transit through seaports, where the introduction of intelligent transport systems requests development of professional skills. Especially important is knowledge in Information & Communication Technologies and Electronics, which has a significant impact on the development of logistics information systems, but logistics information systems are the foundation of any intelligent logistics system.

The experience acquired in previous projects- INCO Copernicus Programme AMCAI 0312 (1994-1997), DAMAC-HP PL976012 (1998-2000) approved that there is a shortage of necessary skills at a national and European level. In addition, there are only some logistics managers with good ICTE skills in logistics companies. This inhibits the development of logistics information systems and affects the introduction of intelligent transport systems. Taking these factors into, it was decided to work out a curriculum (syllabus), lectures, and a training course in Logistics Information Systems within the framework of the Leonardo da Vinci project LOGIS LV-PP-138.003 (2000-2002) “Long-distance tutorial network in “Logistics Information Systems” based on WEB technologies” [1]. The project involved the experiences of both universities and logistics companies.

Experience suggests that the amount of knowledge regarding logistics information systems changes very quickly. The 2001 Annual Report of the European Foundation for the Improvement of Living and Working Conditions indicates that more than 2 in 5 workers said that they do not have enough time to do their job. In reality, this means that they do not have enough time to do their job and upgrade their knowledge in the traditional way – in the classroom. This requires two solutions – reducing training time and bringing training out of the classroom. E-learning through Internet on-line access and using PCs would only partially solve this problem, because the cost of buying PCs and using on-line Internet access is not always cost effective and accessible.

**Logis mobile: mission**

EC Leonardo da Vinci programme procedure B project LOGIS MOBILE LV/04/B/F/PP-172.001 (2004-2006) "Competence Framework for Mobile On-site Accelerated Vocational Training in Logistics Information Systems" is aimed at development of new training and consulting methods, which would reduce the time of learning and amount of study material required. It is aimed at designing, testing and disseminating a new m-training methodology combining a concise training dictionary in Logistics Information Systems and the latest mobile telecommunication technologies based on GPRS/GSM/UMTS mobile Internet WAP/WML applications. Using prevalent mobile communication technologies allows diminishing costs of the learning process and moving it from the classes to any other place acceptable for an employee. LOGIS project was mainly dedicated to the new curricula development, because in the year of 2000 there were no so much good and comprehensive study materials in Logistics Information Systems.

geographically better covered access to lifelong vocational mobile m-training and consulting for everybody – students, logistics professionals, trainers, managers etc. using only a mobile phone.

The methodology reduces learning costs and cuts training time. The basic result of the project is a concise m-training dictionary in Logistics Information Systems, which involves a concise version of the newest material in logistics informatics. Concision and preciseness is achieved by a special method when project partner

weight submitted keywords in order to find essentials with the highest value [2]. Trainees will be able to check their knowledge by answering specific questions attached to each of terms.

The common competence framework LOGIS MOBILE involves partners from countries with different level of logistics and transport systems development and contrasting training systems. Universities, SMEs, logistics, and transport associations, which comprise training bodies etc., are involved in LOGIS MOBILE. The project partner network includes Latvian Intelligent Systems, Riga Technical

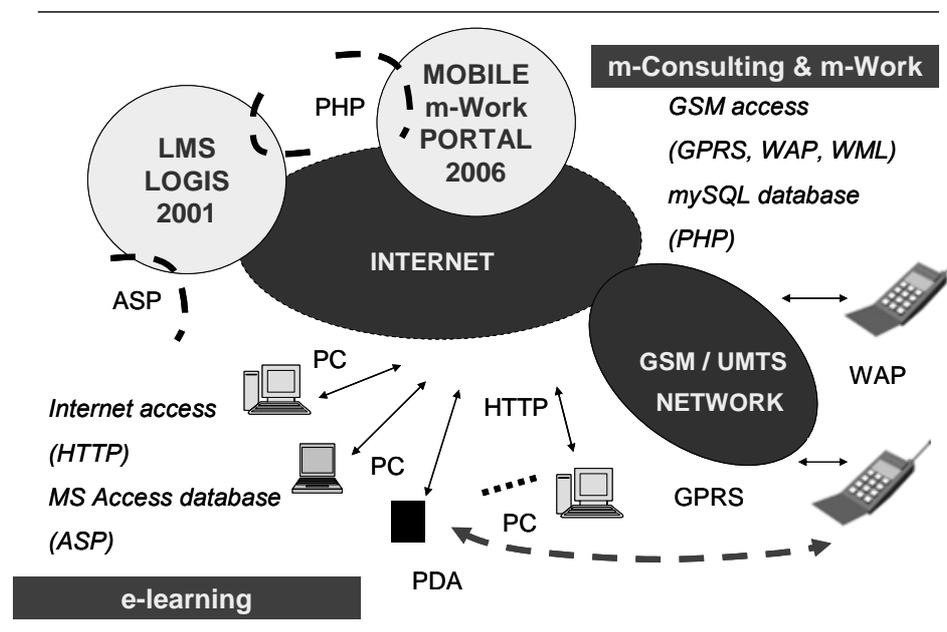


Figure 1. New training system combining e-learning and m-learning

That is why the main purpose of the LOGIS MOBILE project is an improvement of VET methods (essential and technological), in order to allow learning the contents of this and other courses to the users under lack of time conditions.

The novelty of the project, especially essential for the regions, consists in using mobile telecommunications in learning and training in the area of logistics information systems, in combination with m-training and e-learning methodologies. Geographically unlimited access to lifelong m-training and consulting, using only a mobile phone, provides wide opportunities for all trainees like students, logistics professionals, trainers, managers, etc. The approach is more ergonomically convenient than using of PCs and more available for on-line consulting. Participants pay only for data traffic through the mobile phone when using GPRS, but traffic through WAP/WML is low. It ensures cost effective and

University, Latvian National Association of Freight Forwarders, JSC Ventamonjaks, IDC Information Technologies (Latvia); Fraunhofer-Institute for Factory Operation and Automation, Otto-von-Guericke University (Germany); University of Barcelona, Polytechnic University of Catalonia (Spain); Mettle Group (France), Klaipeda University (Lithuania), and Warsaw University of Technology (Poland).

**Logis mobile: outcome**

The theoretical outcome of the LOGIS MOBILE project is a developed methodology on application of mobile technologies for training in logistics information systems. The practical results are both m-learning system (see Figure 1) and a concise dictionary on LIS.



Figure 3. Examples of control questions

The dictionary is composed in the most wide spoken European languages – English, German, French and Spanish and is also available from a web site. The most frequently used terms in Logistics Information Systems are grouped in 7 categories (see Figure 2). 634 terms on Logistics Information systems are handled.

As can be seen from Figure 3, there is a control question at the end of each term explanation, which lets users check their knowledge.

To get this study service, not a computer would be necessary any more, but only a mobile phone (see Figure 4).

It would essentially enlarge territorial coverage and ensure more convenient access. Taking into account GSM/UMTS current development tendencies GPRS/EDGE/UMTS 3G, it is possible to forecast that in the near future a typical mobile phone will become a communicational tool widely used in learning, and exclusive factor that can objectively narrow its use in different parts of the world would be a limited screen size. This condition and limited wireless communication channel throughput require minimising of the study material.



Figure 2. On-line dictionary

**Conclusion**

At the end of the LOGIS project it became clear that in spite of the successful project results, it does not solve one of the 21st century problems – lack of time, which influences greatly the learning process. In fact, time for e-learning is equal to the traditional learning in classrooms. Of course, users can choose convenient time for studies, as well as place with the Internet connection available. This process is less time consuming for teachers and trainers. However, nowadays users are not satisfied with the current situation. Every year new technologies appear on the ICTE market, which are used for the development of the companies’ information processing and business process management systems. It means that a user should spend more time on rising the proficiency and skills level. It is not possible without VET methods change. LOGIS MOBILE project participants have decided to change training methods fundamentally, changing e-learning with m-training, together with reducing the amount of study material. Instead of comprehensive lectures and training book it was decided to prepare as compact as possible concise training dictionary in Logistics Information Systems.

The dictionary is a summary based on validated knowledge in logistics information systems recognized by educational networks of leading European logistics associations. Everybody who wants to improve knowledge in the latest ICTE and logistics is able to use the dictionary in printed, CD, Web/WML form, and especially using mobile phone. Through the concise essence of the material the training time is reduced and the process training of professionals and teaching of students is accelerated. It reduces the time needed for acquiring and introducing the latest ICTE knowledge in logistics and transport. Modern training methods, combining lectures and the training kit created during the previous project LOGIS with a concise training dictionary and using facilities of e-learning and m-training, bring added value to the efficiency of vocational training and lifelong education. The reproduction of the information in English, French, German and Spanish makes it easier to disseminate the knowledge.

## The Network of Researchers' Mobility Portals – a Career Resource for Mobile Researchers

*Arnis Kokorevics (Latvian Researchers Mobility Centre, Latvian State Institute of Wood Chemistry, Riga, Latvia)*

### Introduction

The introduction of a European dimension to scientific careers, making Europe more attractive for researchers from the rest of the world and bringing together the scientific communities are essential for European countries to reach the goals proposed by the Lisbon Summit (March 2000) to create Knowledge-based Europe. The researchers' mobility represents one of the essential factors of the transfer of scientific knowledge and the acquisition of the necessary skills and their adjustment to the needs of research [1]. After accepting the Commission Recommendation on the European Charter for Researchers and on a Code of Conduct for the Recruitment of Researchers of 11 March 2005 [2], the EU researchers' career and mobility policy was expressed for the scientific community of European Research Area (ERA) countries.

It is decided [1] that there is a range of obstacles, which prevent further enhancing of the researchers' mobility and make it less attractive to researchers. Among these obstacles, there is also the lack of relevant information about the available jobs, fellowships and grants, legal aspects (visa, work permits, labour contracts, social security) and daily life issues (accommodation, day-care, language teaching) relating to mobility. It is necessary to receive personal assistance after arriving of researchers and their families in a new country.

EU institutions and member states undertake a range of legal, organizing and financing activities to remove these obstacles or reduce their negative influence [3]. As most significant among them, there are the European Researchers' Mobility Portal (European RMP) and the European Network of Mobility Centres (ERA-MORE) established within the Sixth Framework Programme. The Latvian Researchers' Mobility Portal (Latvian RMP) and the Latvian Researchers Mobility Centre (Latvian RMC), established during 2005, are a part of them [4].

The present article gives an insight into these tools, also locates their place among other services and tools offered by EU institutions to promote the mobility of workers and students. Most attention is paid to the evaluation of information services – the researchers' mobility portals. The achievements and problems, as well as the marketing and promotion of portals, have been evaluated based on the experience of a two-year operation.

### Hierarchy of European e-services for mobile workforce and students

The information and personal assistance services created for mobile researchers by EU institutions will be viewed together and in the hierarchy with other services created also by EU institutions to promote fundamental freedoms of the European Union – freedom of movement for workers, freedom of establishment, freedom to provide services, free movement of goods and freedom of capital movements.

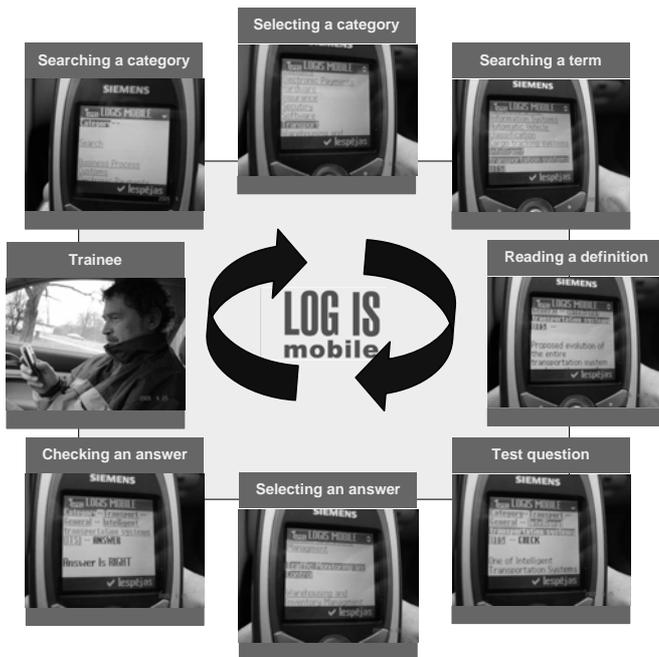


Figure 4. Using the dictionary in mobile phone

### Acknowledgement

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The main of the general type services or higher levels of this hierarchy are as follows:

- “Your Europe” (<http://europa.eu.int/youreurope/>) – the portal provides citizens with detailed practical information about their rights and opportunities in the EU and its Internal Market plus recommendations how to exercise these rights in practice, also informs how the European based enterprises and entrepreneurs should interact with administrations in other countries;

- “Citizens Signpost Service” (<http://europa.eu.int/citizensrights/signpost/>) – an advisory service, which gives guidance and practical recommendations to citizens on specific problems they encounter in the EU and its Internal Market;

- “SOLVIT” (<http://europa.eu.int/solvit/site/>) - an on-line problem solving network in which EU Member States work together to solve, without legal proceedings, the problems caused by the misapplication of the Internal Market law by public authorities;

- “EuropeDirect” (<http://europa.eu.int/europedirect/>) - an extensive network of easy-to-reach information centres and contact points set up by the EU for the public.

All these above-mentioned services will offer information both to physical and judicial persons in all 20 official languages of EU. Of course, there is some duplication of the offered services and information materials.

The specialized service to support a free movement of work-power in European countries is EURES - EUROpean Employment Service. It brings together the European Commission and the public employment services of the countries belonging to the EU and European Economic Area. Its tasks are to give information and recommendations to job seekers concerning the possibilities of employment, working and life conditions in European countries, also to help employers to find most adjusting workers. The EURES can be viewed both as an information and personal assistance service. Its activities envisage covering the needs of all workforce groups ranging from unqualified workers to highly skilled specialists. Such a wide target audience does not allow concentrating attention to separate groups of specialists.

Besides the specialized services created for researchers, there are also those aimed at promoting the students’ mobility and exchange of lecturers. As most important among them, there are the following:

- “Socrates” (<http://www.socrates.lv/>) - European Community action programme in the field of education, and, in particular, its subprogram in the field of higher education “Erasmus”;

- “Ploteus” (<http://europa.eu.int/ploteus/portal/>) – the portal helps students, workers, teachers and lecturers to find information about studying in Europe, training possibilities available throughout the EU, also exchange programmes and grants available in European countries.

The mobility activities of researchers are inseparable from the activities in science, higher education, R&D and the innovation sphere in general. The main information service established by EU institutions for needs of these spheres is CORDIS (<http://www.cordis.lu/>) – exhaustive information about the present Sixth Framework and the next Seventh Framework programmes. There are also other information services devoted to science and R&D: subdivision “Research” of the European Commission portal

(<http://europa.eu.int/comm/research/>), portal “ScienceInEurope” (<http://www.scienceeurope.net/>).

Certainly, this enumeration does not pretend to be exhaustive. The new services and the support action for mobile workers and students are initiated permanently by EU institutions, member states and different organizations. Such a great number of different information and assistance services, as well as support and promotion activities, make the orientation and choice among them, also the evaluation of the offered information quality and its applicability for customers, too difficult. On the other hand, it also makes difficult to find its potential users or customers for new services and initiatives.

### **European Researchers’ Mobility Portal** ([http://europa.eu.int/eracareers/index\\_en.cfm](http://europa.eu.int/eracareers/index_en.cfm))

The European RMP has been launched on July 10, 2003 to improve the access to adequate information on the available programmes and opportunities as well as on the questions related to entry conditions, access to employment, social security rights, and taxation or cultural aspects of the host country. It is complemented with a number of national portals, the largest part of which was launched during 2004 - early 2005. At present, there are 30 national portals linked with the European RMP.

It must be taken into account that the European RMP and the network of national portals are only one of the instruments established by the Commission and the participating countries to promote international and intersectorial mobility of researchers. The other instrument is the European Network of Mobility Centres (ERA-MORE), which was officially launched on June 30, 2004. The Network, when completed, will comprise around 200 centres throughout ERA. If portals are the main information service, then ERA-MORE addresses the need to provide customized assistance to researchers and their families in all matters relating to their mobility issues. Taking into account the extent of Latvian scientific activities and their concentration in Latvia’s capital, Riga, it was decided to establish only one mobility centre in Latvia - Latvian RMC, which is a part of the ERA-MORE network.

The European RMP offers a wide range of free of charge services:

- the possibility to interested organizations – employers (universities, research centres, enterprises, foundations, etc.) to advertise their research job vacancies into a job offers database, also to search for suitable candidates according to detailed and tailored parameters corresponding to their specific recruitment needs;

- the opportunity for researchers to add their anonymous CVs to a job searchers database, also to search for appropriate employment job vacancies posted in job vacancies databases, according to detailed and selected parameters;

- alongside the above-mentioned job offers database, the specialized search engine allows to find job offers in a variety of pages located on employers’ own portals, if employers indicate these pages for popularization through the European RMP;

- the links to the existing websites (international, European, national, regional and sectorial) providing general information about research fellowships and grants, available for researchers;

- the information about the EU researchers' mobility strategy and career policy, its implementation, also other European and national activities related to the researchers' mobility;
- links to the existing websites (international, European, national, regional and sectorial) providing practical information

incomprehension on the researchers' side. Taking into account the information abundance ("noise") and researchers' busyness, they do not wish to share their attention to two similar things or "brands".

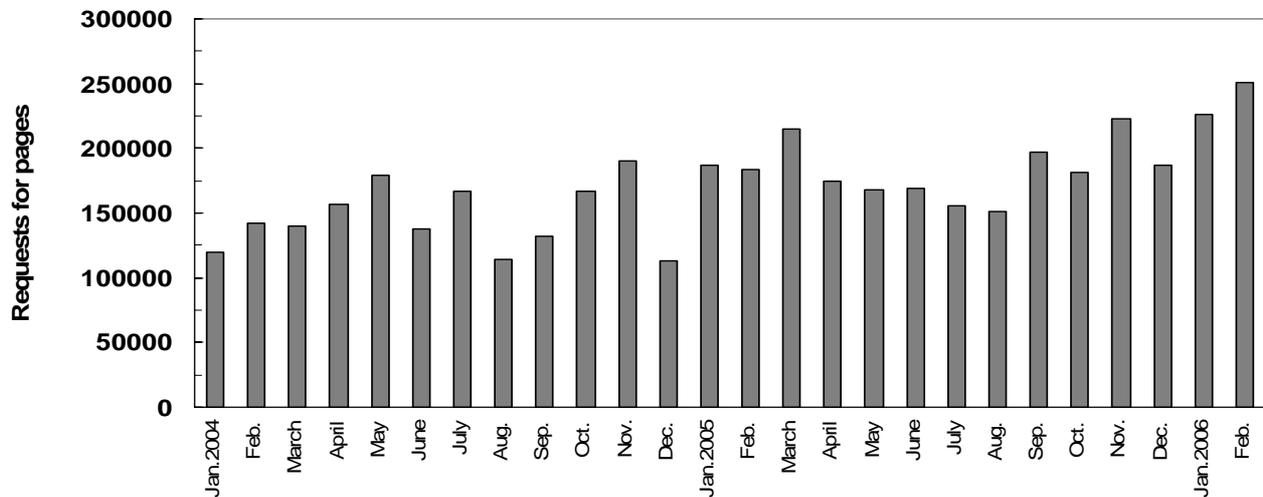


Figure 1. The European Researchers' Mobility Portal – the dynamics of attendance (data received from Directorate Research Generale).

about administrative and legal issues when moving from one country to another, as well as up-to-date information about cultural and family-related aspects (housing, schooling, day-care, language courses, etc.).

It must be noted that more extensive and easy-to-use information about practical aspects relating to mobility issues will be found on national mobility portals. Some of national portals also have their own job offers databases for researchers.

The attendance of the European RMP during the last two years' period increases (Figure 1), although some fluctuations can be observed. Partially, it can be explained by the influence of an academic year. A large part of researchers is involved in teaching activities in higher education, therefore, a decrease of attendance in summer months (vacations) and in December (preparation and start of the winter session, Christmas time) is observed.

The principal influence to increase the attendance will be achieved by the realization of the portal's marketing and promotion activities within the European scientific community – researchers and research institutions. These activities have been realized both on the European level by the Research Directorate Generale and other EU institutions and on a national level by national portals and ERA-MORE centres. The absence of detailed data regarding these activities did not allow making evaluation of the effectiveness of promotion activities and their correlation with the increase of the European RMP attendance.

In the author's opinion, the expediency and effectiveness of marketing of the European RMP and ERA-MORE as two different tools or brands are disputable, because both of them are directed towards the same target - the promotion of researchers' mobility. Especially, it is in the case of countries having only one Mobility Centre, where the team responsible for the Centre operation also deals with the portal's establishing and maintenance. During the contacts with the scientific community, authors observe some

**Latvian Researchers' Mobility Portal**

(<http://www.eracareers.lv/>)

The establishment of the Latvian RMP started together with the project RESMOB-LATVIA in January 2005, although the test version had been available on the Internet from September 23, 2004. A specialized service company as a subcontractor was enchaind for the technical design of the Latvian RMP, its posting on the Internet, and maintenance and providing of a permanent Internet access: the company "Latnet" founded by the Institute of Mathematics and Informatics (Riga, Latvia).

The Latvian RMP acts as the central information presentation service for incoming, outgoing and returning mobile researchers, offered by the Latvian RMC. The portal has been standardized for the ERA-MORE address <http://www.eracareers.lv/> and layout similar to the European RMP. The Latvian RMP will be a bridge between the national-scale information dissemination network (links to universities, scientific institutes, institutions relevant to the workforce mobility) and the information resources offered for mobile researchers by the European RMP and the network of national mobility portals (Figure 2).

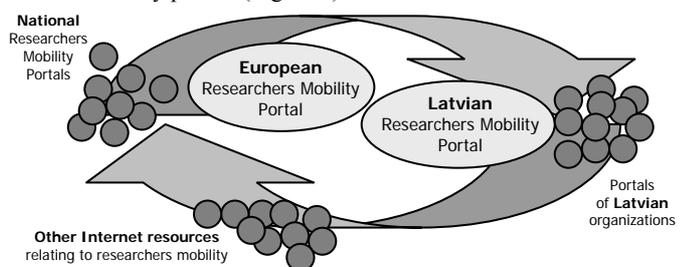


Figure 2. The scheme of Information dissemination channels around the Latvian Researchers' Mobility Portal: information flows, redirection of users.

At present, most attention is focused on establishing the English section of the portal. The target audience of the English section of the portal will be foreign researchers coming to Latvia, their

families and employers as well as returning researchers. Therefore, most probably, the primary object of interest for the customer will be the circumstances of his/her arrival and residence in Latvia and the information regarding receiving personal assistance. Taking into account the small extent of the job market in the field of R&D in Latvia, the Latvian RMP currently does not have its own CV and job offers databases. job searchers and employers are redirected to the databases offered by the European RMP or other resources.

The Latvian section is under preparation and is scheduled for the 1st half of 2006. The target group of the Latvian section will be Latvian researchers, who wish to find career opportunities abroad, and returning researchers. It is planned as a career promotion information service, which explains the possibilities offered by the ERA-MORE network, EU institutions or available from other sources.

It is vital for the Latvian RMC to receive a feedback from the operation of the Latvian RMP. The Web Server Statistics from September 23, 2004 (the starting of the portal testing) to March 27, 2006 (550 days) will help as such a feedback.

During the initial period, the portal had a limited popularity, because no special marketing or promoting had been done (Figure 3). A raise of attendance was observed during April-May 2005. It can be explained by the preparation of the Launching Event of the Latvian RMC and the Latvian RMP 19.05.2005, when extensive marketing actions were performed: mail letters, phone calls and e-mails to possible customers (institutions of higher education, scientific institutes, researchers), meetings with them, advertisements in press and on Internet portals. a minor fall can be observed, which can be attributed to the summer months and the weakening of the activities in the academic community. The attendance rates increased during November and December 2005 and remain high up to the present moment, achieving up to 420 average requests for pages per day (during the last 7 days). It is connected both with the rhythm of the academic year and the marketing activities realized by the Latvian RMC: launching of the e-mail notification list, distribution of leaflets, participation in meetings and information days. Such an attendance rate will be estimated as satisfactory for the first year of the Portal's operation, taking into account the limited size of the Latvian academic community and comparing the attendance of the Latvian RMP and the European RMP (7 700 and 225 000 requests for pages during January 2006, respectively).

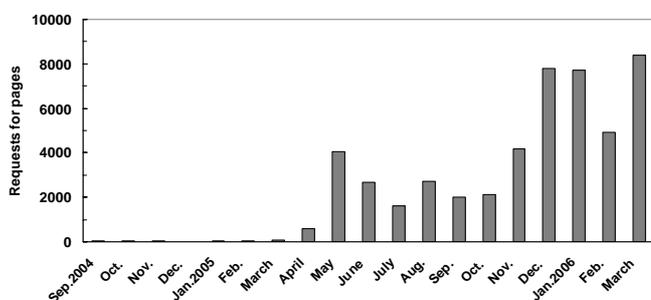


Figure 3. The Latvian Researchers' Mobility Portal – the dynamics of attendance.

Interesting is a comparatively high attendance during Saturdays (7.5%) and Sundays (11.5%), which testifies indirectly that the portal is attended by persons, who search for new opportunities for

their carrier development and make these actions outside their working time and place.

The domain report does not give exhaustive information, because the major part of customers has unresolved numerical addresses or .net, .com or .org type addresses. The majority of the rest of the resolved requests come from Latvia (23% have the address .lv). The high content of visitors having .com (26%) or .net (2.7%) type addresses testifies the portal's popularity abroad, because such a type of addresses is not commonly used in Latvia. A notable number of requests comes from EU and other ERA countries, especially from the neighbouring countries or traditional scientific cooperation partners: Germany (0.75%), United Kingdom (0.70%), Lithuania (0.50%), Belgium (0.47%), Poland (0.45%), Sweden (0.36%), Finland (0.25%) and Estonia (0.23%). It can be explained by the promotion actions of ERA-MORE in ERA countries and redirections of customers between the national researchers' mobility portals. Comparatively rare is the interest from the rest of the world, although more than 100 requests are received from the United States and Canada. People from other parts of the world also visit the Latvian portal. Among the Latvian customers, the personnel of the research institutes of the "Teika" campus in Riga (18%) and the University of Latvia can be identified (2%).

The present server data does not allow making a more profound analysis of the requested content and customer preferences. Nevertheless, both informative pages (php pages) and downloadable materials (PowerPoint, Adobe Acrobat, Word files) are requested by users. A more profound evaluation of the portal has been planned during the next year and must include also other methods for the portal's evaluation: the questionnaires of the users (employers, Latvian researchers, foreign researchers), involving of experts. It will allow evaluating the significance of the content for customers, the perceptibility of the portal layout, the easy use of the portal, and the easy navigation within the portal.

### Conclusions

Together with EU institutions, the established general and specialized information services for mobile workers, students and citizens, the European Researchers' Mobility Portal and the network of national mobility portals establish the modern virtual information media for mobile researchers. They are complemented with the European Network of Mobility Centres (ERA-MORE), which provides customized assistance to researchers and their families in all matters relating to their mobility issues.

The network approach in the establishment of mobility portals and centres allows covering the scientific community of participating countries and involving in co-operation a large number of partners playing an essential role in the R&D sphere.

The overview of attendance for the Latvian Researchers' Mobility Portal confirms the fact that the attendance of a specialized portal must be initiated and will be provided by the realization of permanent marketing actions, which must include also non-Internet tools (meetings, distribution of leaflets, advertisements in press).

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## Challenges for Collaborative Working Environments to Accelerate Innovation and Productivity: BrainBridges EC FP6 IST ERA Coordination Action Project

Arthur E. Lindemanis, Juris Ulmanis and Walter Tuks  
(Riga Business School at Riga Technical University,  
Riga, Latvia)

European policy makers are concerned with strategies to accelerate innovation and productivity gains at the regional, national and European level which have lagged substantially behind the USA, which has enjoyed productivity acceleration led by ICT (information communications technology) since the 1990's [1]. The emerging European Research Area (ERA) on collaborative work environments (CWE) represents one such initiative funded by the EC IST 6th Framework. The importance is reflected in the EC IST statement "Collaboration is at the core of the IST programme" [2] as illustrated in the figure below. The ability for individuals and entities to interact seamlessly over distance across organizational, geographical and cultural boundaries can significantly accelerate creativity, innovation, efficiency, and productivity.

The BrainBridges Project (EC-FP6-IST) is an ERA-pilot Coordination Action entitled "Collaborative technologies and environments enhancing the seamless creativity process leveraging the full European potential" [3]. The BrainBridges objective is to integrate and strengthen the European Research Area programme in Collaborative Work Environments to pave the way for developing a

new information communications technology industry providing CWE technologies, applications and services.

Business Week has already commented in 2003 that "Collaborative Solutions will be the next billion-dollar category". This in turn can be expected to boost European productivity as a whole as individual organizations realize the full potential of CWE to gain competitive advantage.

BrainBridges is bringing together key research organizations and industries together with national research funding organizations to define and develop such a coordinated CWE programme. The BrainBridges consortium itself includes fifteen partners representing research institutions and agencies from ten countries led by the Centre for Distance-Spanning Technologies, Luleå University of Technology. The National Coordinator for Latvia is Riga Business School (RBS) at Riga Technical University (RTU).

Discussions within the community have produced three initial High-Level Objectives for a coordinated CWE programme [4]:

1. Stimulate European cooperation in CWE research & development by initiating knowledge transfer & good practice exchange between national programmes.
2. Increase European competitiveness through CWE support of creativity and productivity, leveraging European multi-cultural, multi-disciplinary and multi-thematic assets.
3. Define a programme that promotes and supports research evolving from heterogeneous dimensions and disciplines, integrating different vertical themes into a unified horizontal programme.

During 2005, the team identified 169 organizations together with over 100 national and regional research initiatives related to CWE with the total research budget estimated to exceed Billions of Euros [5]. However, the CWE activities are typically embedded in more comprehensive IST initiatives such as mobile virtual work, distance learning, e-government or logistics often centered on technological, human, societal and/or organizational aspects. As such, current CWE efforts are not coordinated which significantly reduces the potential impact.

For Latvia, 24 CWE organizations and 16 programmes/initiatives are listed including brief descriptions including contact information [5]. Projects in Latvia are financed by various EU funds, World Bank, UNDP, Latvian budget, private funding, and other sources. Two key organizations contributing to developing CWE are the national ICT association, Latvian Information

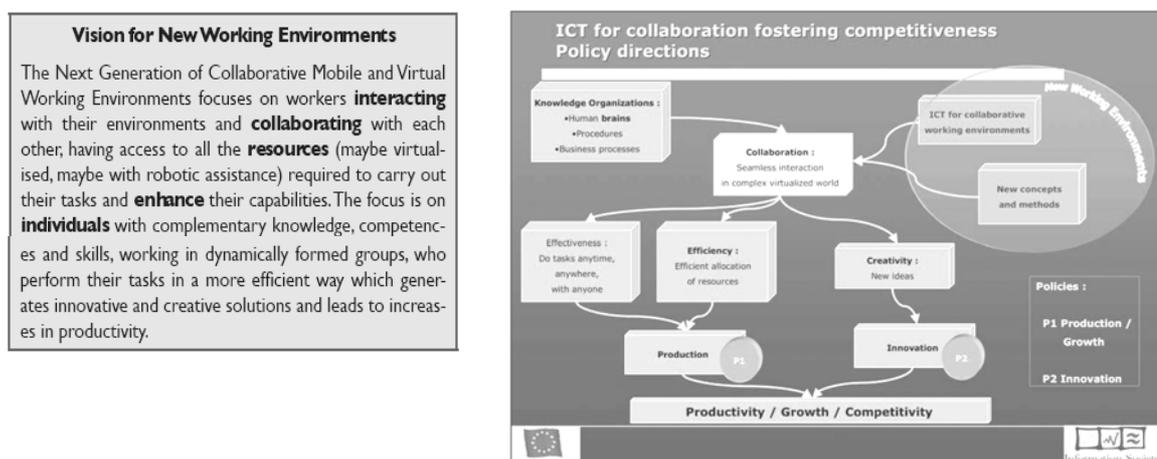


Figure 1. Collaboration based on the EC IST vision for new working environments at the core of EC IST programme policies to accelerate innovation, productivity, and growth needed to reinforce the capacity of European businesses to compete for worldwide leadership [2].

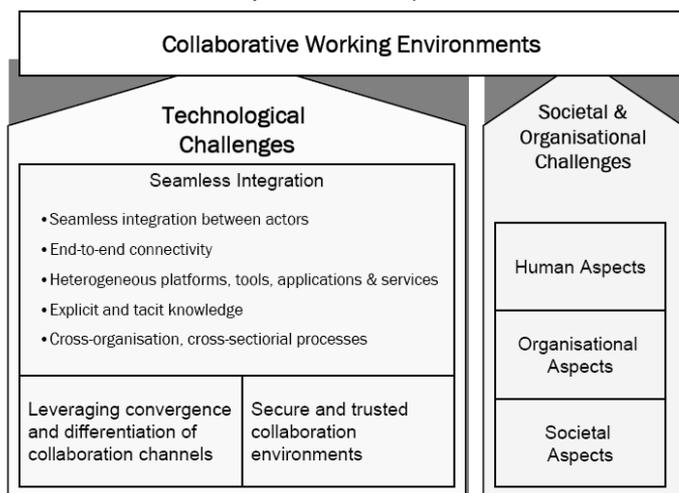


Figure 2- Relationship between Collaborative Working Environments and the Technological and Societal & Organizational Challenges according to BrainBridges [4].

Technology and Telecommunications Association (LITTA), and the leading technology university, Riga Technical University. LITTA brings together key ICT organizations and individual experts. More importantly, LITTA provides leadership for key ICT programmes in Latvia and the Baltic Sea region such as “Baltic IS Cluster” and “Latvia@World”. RTU is one of the largest academic research institutions in the Baltic region. In addition to distance learning, RTU has been involved in numerous international CWE-related projects such as “Kaleidoscope”, “eLogmar-M”, and “IST4Balt”. RTU faculty actively participates in local ICT industry. The new IST programme, “eLatvia”, will be the largest ICT project in Latvia when fully funded at 125 million euro aims at ensuring the dynamic development and competitiveness of the country in the knowledge-based economy. Priorities include e-Government, e-Learning, e-Business and welfare, e-Health, Security, Broadband and access to services.

**RTD Challenge: How to create enterprises that are capable of successfully leveraging the full potential of CWE to accelerate innovation and productivity in the future?**

BrainBridges has identified ten primary CWE challenges shown in Figure-2 [4]. The project has examined the seven technological challenges in depth. The “soft” challenges which encompass human, organizational and societal aspects have received far less attention both within BrainBridges and the EC FP6 and FP7 Programmes. The CWE research technology development (RTD) challenges presented at the EC FP7 IST CWE Workshops “Collaborative Working Environments Supporting Business and Industry” during March 2006 [6] addressed CWE technologies, applications and services largely from the perspective of ICT technology R&D, project managers, individual users, early adopters and the supplier. With a few exceptions, these workshops were silent on “soft” CWE RTD challenges such as the complementary transformations required in business processes, organizational practices and culture. This reflects the contradiction between the policy on research priorities and funded projects where Bror Salmelin and John Nolan state: “The focus is on systematic innovation combined with strong technological and socio-economic research...Only by combining resource-efficiency and productivity with creativity and innovation can Europe achieve full competitiveness” [2]. This contrasts with

the paucity of funded research projects that are truly interdisciplinary socio-economic research. As such, management science is largely neglected.

The Latvian National Coordinator for the BrainBridges Project is leading the investigation into the RTD challenge “Creating successful CWE enterprises”, which expands on the societal and organizational challenges to implementing the new CWE technologies as presented in their position paper [7]. This is relevant since business experience has repeatedly demonstrated that the “soft” issues typically represent the greatest barriers to adopting new technologies not financial considerations or the technology itself. The position paper recommends pursuing an interdisciplinary research approach integrating the technical and project management aspects of ICT with the socio-economic dynamics of business processes and organizations in complex networked systems. The challenge in “Creating successful CWE enterprises” can be separated into 3 primary inter-related areas to investigate:

1. Managing CWE Group Dynamics for performance.
2. Understanding complementary investments and organizational transformations.
3. Developing tools to analyze the socio-economic dynamics of business processes and organizations in complex CWE networks.

**REQUIREMENT:** Research into complex networked CWE systems using an inter-disciplinary approach integrating the socio-economic dynamics of business processes and organizations with the technical and project management aspects of ICT considering longer-term outcomes. The emerging “science of networks” needs to be applied to CWE enterprises incorporating business success criteria.

**RTD Challenge 1: group dynamics.**

Understanding group dynamics in emerging CWEs spanning from individual interactions to collective ecosystems to develop new models for organizational behaviour and management in networked systems.

Ultimately, the future CWE enterprises need to create “Wealth”. To achieve sustainability and drive growth, the CWE “ecosystems” need to produce goods or services that meet or exceed customer’s expectations on schedule and within budget (“Better, Faster, Cheaper” paradigm). Harnessing the efforts and output from CWEs to increase innovation and productivity is complicated by the diverse capabilities, cultures, resources, processes, goals and values. Currently, networked CWEs exhibit poorly understood group dynamics where collaborations spanning from individual interactions to collective ecosystems entail self-interests that can simultaneously be both cooperative and competitive. Nascent autonomous agents and multiagent systems add to the complexity of the human, social community and enterprise interactions in networked CWEs as reported in conferences such as the ACM International Autonomous Agents and Multiagent Systems Conference Series [8].

The “science of networks” encompassing both their structure and dynamics is an emerging science attracting the interest of researchers in many fields – mathematics, physics, computer science, sociology, management, economics and even biology [9]. Cooperation in networked ecosystems is a complex phenomenon

involving both collaborative and competitive interactions with profound implications for future developments in organizational theory [10, 11]. The evolution of cooperation in the “New Knowledge-based Economy” and the future impact on individuals and organizations has been contemplated by various research groups [12, 13]. From a macroeconomic perspective, regional cultural factors must be considered based on their positive influence promoting innovation, entrepreneurship and growth for the US “New Economy” compared to Europe [14]. Addressing individual workers, the emerging trends freeing the knowledge worker both spatially and temporally such as mobility and virtual work are challenging traditional management attitudes [15]. International business studies indicate that hierarchal “command-and-control” management models of the last century have difficulties responding to accelerating changes in technology, product life cycles and customer expectations in today’s hyper-competitive global market [16]. To achieve exceptional innovation and growth, the top performing companies are transforming into “centerless corporations” with shifting networks of alliances over the entire supply chain as extended enterprises or even virtual enterprises without centralized control. Top performing corporations excel in developing “relationship-centric” networks across internal business units and externally with suppliers and customers organizations [17]. These emerging ecosystems employ different strategies that are adaptable and responsive for different phases of the product life cycle and the external environment. Disruptive innovations in particular demand adaptive business models as observed in a range of industries such as telecommunications and electronic commerce [18, 19].

Complex CWE networks pose many inter-related socio-economic issues that should be researched using the new emerging interdisciplinary “science of networks”: Leadership, Team dynamics, Interactivity, Accountability, Motivation, Safety and trust, Capability verification, Competence, Diversity, Conflict, Cooperation versus competition [Co-opetition], Agents and multiagent system, Models and Strategy evolution. These need to be addressed in the context of the total system addressed in the next two CWE RTD challenges.

### **RTD Challenge 2: complementary investments & transformations.**

Understanding the substantially larger and time-consuming complementary investments and corporate transformations required to gain the full benefit from CWE and avoid the ICT productivity paradox.

ICT technologies, applications and services are a necessary but not sufficient condition for either competitive advantage or even survival. Leading research groups and authors contend that advances in ICT rapidly become “commodities” that are essentially available to all competitors in comparable industry sectors as exemplified by ATM systems in the banking industry [1, 20, 21, 22]. Differentiation comes from the uniqueness of how the ICT is embedded within each firm’s business systems [1].

More extreme authors and popular speakers have gained recognition disparaging the productivity gains from IT investments (“IT productivity paradox”) as exemplified by N. G. Carr’s “Does IT Matter: Information Technology and the Corrosion of Competitive Advantage” by Harvard Business School Press (2003)

and “The End of Corporate Computing” in MIT Sloan Management Review (2005). The apparent paradox between ICT investment and observed productivity gains has been positively refuted by Hughes and Morton in 2005 [1] based largely on research by Brynjolfsson and his colleagues [20, 23, 24].

Studies show that realizing the full potential of the benefits from ICT investments in terms of accelerating innovation and productivity gains requires substantially larger and more time-consuming investments in complementary corporate assets transforming business processes, organizational practices and corporate culture. Data from more than 1,167 large US companies demonstrated a statistically significant correlation between the ICT investment per worker (“IT Stock”) and the overall gain in total productivity normalized for each industry sector [23]. The productivity gains for “comparable” competitors vary tremendously by a factor of 2 with almost as many “losers” as “winners”. The authors observed that the productivity and output contributions from ICT investments are up to five times greater after five to seven years which allows for the complementary transformations. Their parallel study of 272 large US goods and services firms found that the complementary investments to avoid the ICT productivity paradox are often 10 times greater than the ICT investment itself [24].

These complementary investments do not assure success unless the overall corporate strategy is effective. The corporate-level strategy and its implementation determine the outcome. The digital networked economy of the future will accelerate the changes and the necessity for future enterprises to “cooperate, adapt and move with agility and speed” in a hyper-competitive global environment where innovation and new designs produced on-time and priced competitively provide the competitive advantage. Detailed analysis at the firm-level suggests that competitive advantage is achieved through the “holistic” integration of ICT by the firm into its business resources, processes and values [1]. This typically requires the perspective of the CEO to lead the necessary corporate transformations and cultural changes that cut across internal organizational boundaries and extends through the strategic alliances encompassing the entire value chain.

The success criteria for implementing CWE and other advanced ICT systems go beyond the technology of the “solution”, financial resources, technical skills, project management maturity or even linkage with business unit level strategies. As the world’s leader in personal computers, Dell’s pc business model has been far more successful than HP, Compaq or even IBM. After having totally reengineered its pc operations in North Carolina using its world-class systems management expertise, IBM recently sold its pc business to the Chinese. K-Mart and Sears lost to Wal-Mart’s more effective retail/wholesale model. In turn, Wal-Mart is currently adjusting its business model in response to competitors such as Target that are exhibiting faster growth rates through more effective use of customer relationship management systems to detect customer preferences. As a market leader in groceries, Tesco has embedded advanced ICT applications into its business processes including e-commerce to create systems difficult to emulate. In contrast, Sainsbury Supermarkets wrote off 260million GBP in 2004 in costs associated with flawed ICT and supply chain systems.

This CWE RTD Challenge “Complementary Investments & Transformations” relates to the first RTD Challenge “Group Dynamics”. Exploratory studies that considered individual and

collective reactions to these complementary transformations observed that their resistance is strongly influenced by self-interests but concluded that the paucity of data prevents more than speculate [25].

The relationships among ICT investments, complementary corporate investments and transformations and corporate-level strategies need to be investigated further for complex CWE networks considering interactions from the individual to the ecosystems levels. An inter-disciplinary approach will be necessary to achieve “Win-Win” CWE scenarios for both individuals and businesses. Understanding the socio-economic dynamics in the underlying strategic business decisions leads to the third CWE RTD Challenge “Socio-Economic Analytical Tools”.

### **RTD challenge 3: socio-economic analytical tools.**

Developing analytical tools to evaluate alternative strategies for introducing CWE into enterprises and ecosystems integrating the socio-economic dynamics of business processes and organizations with the technical and project management aspects of ICT.

Analyzing the socio-economic dynamics of business processes leads to the insight that complex systems are often counter-intuitive [26]. Analytical tools are needed for modeling alternative scenarios for introducing CWE and the complementary corporate transformations into enterprises. Studies have shown that today's business leaders often make dysfunctional business decisions that lead to unexpected results due to their limited ability to understand complex business systems with multiple feedbacks and control loops. Business process dynamics has successfully explained the quality performance paradox at companies such as Analog Devices, Ford, DuPont, Lucent Technologies and National Semiconductor where companies either fail to achieve the intended goals or there has been a substantial deterioration after an initial award winning improvement [26, 27].

The failure rates observed with Enterprise Resource Planning (ERP), Customer Relationship Management Systems (CRM), and other complex ICT projects substantially increase the perceived financial cost on a risk adjusted basis. This leads to reluctance to be an early adopter, particularly among SMEs that do not have the financial capacity to absorb cost overruns and operational disruptions. Current ICT project methodologies rely heavily on industry best practices with limited ability to model the business process dynamics considering the feedback loops and controls for the required corporate transformation. Some industry statistics:

#### *Customer Relationship Management:*

“Clearly, we are seeing that CRM project success is still far from guaranteed. The industry just cannot seem to break through the 30% barrier in terms of the number of CRM projects that are generating significant improvements in performance.”

Software Magazine, July 2005

#### *Enterprise Resources Planning:*

51% viewed their ERP implementation as unsuccessful in a survey of 232 respondents from different industries including government, IT, Communications, financial, utilities, and healthcare

The Robbins-Gioia Survey, USA 2001

#### *New Product Launches:*

“On average, 70% to 90% of new product launches are unsuccessful.”

SAP, ICM Munich February 2004

Tools developed for business process re-engineering such as the “Matrix of Change Tool” [28] are useful at the business unit or project level but fail to provide the critical linkages with the overall business strategy. This contributes to systemic failures such as the divestiture of the IBM pc business. Even more advanced approaches being funded by EC FP6 such as the multivariate methods developed for enterprise system (ES) implementation [29] by the BEST (Better Enterprise SysTems implementation) project [30] need to be extended to incorporate the socio-economic issues from the senior management perspective and the overall business strategy. While the organizational maturity in terms of preparedness for ES implementations is significant, organizational theory finds ICT tools and techniques are often too rigid to accommodate the uniqueness of the firm's business processes, organizational practices, and corporate culture that underlie its business model referring to either the socio-technical model for information systems or information systems cycle model [31]. Accordingly, the robustness and adaptability of ICT “solutions” needs to be radically not incrementally improved.

One approach using business simulations to support strategic decisions has been most successful in quantitative transaction-orientated modeling environments that are data rich. Introducing new paradigms such as CWE involves the socio-economic realms of corporate transformations, change management and disruptive business strategies where the modeling efforts have been largely anecdotal or empirical rather than analytical [18, 19, 26, 27]. The term “business model” itself has been heavily overused in the literature with few attributes amenable to quantitative modeling [32]. There is a clear need to develop tools for analyzing the socio-economic dynamics of business processes and organizational transformations in complex networks to CWE implementation to improve the penetration rates and accelerate the innovation and productivity gains.

### **Conclusions**

Despite vast expenditures, the success record for implementing manufacturing improvement programs, ICT systems and other changes to business processes has been discouraging and slow with a few notable exceptions. The proposed RTD Challenge “Creating Successful CWE Enterprises” addresses the “soft” societal and organizational issues that are often neglected but prove critical to successfully implementing advanced systems that require complementary transformations in business processes, organizational practices and culture. The authors are conducting a study of 500 Latvian companies which will establish a baseline for ICT adoption in Latvia considering these factors for cross-comparison with international studies. The role of management science and business strategy in the future CWE ecosystems should not be underestimated.

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**eMapps.com: Games and Mobile  
Technology in Learning  
[Http://eMapps.com/](http://eMapps.com/)**

*Robert Davies (MDR Partners, London, UK)*  
*Romana Krisova (Cross Czech A.S., Prague, Czech Republic)*  
*Daniel Weiss (Ciberespacio, La Coruna, Spain)*

### **Introduction**

eMapps.com is a project funded under the European Commission's IST 6th Framework Programme (FP6). Its focus is on demonstrating how games and mobile technologies can be combined to provide new and enriching experiences for children in the school curriculum and beyond. The work will concentrate initially on Europe's New Member States and school children in the age group 9-12. It will support creativity in the classroom and outside and will contribute to practice for developing new teaching.

### **Key challenges addressed**

The following are among the key challenges which eMapps.com will address:

1. A major potential barrier to integrating games use in learning and the school curriculum, or at any level, is the perceived mismatch between skills and knowledge developed in games, and those recognized explicitly within education systems. The recognition of skill development achievable through games is an important component in breaking down these barriers.
2. Teachers need to be engaged and to recognize and map the relationships between activities in games and the associated learning before they can embed the use of the game within the wider learning context and be enabled to frame tasks, within the game or leading up to or following on from a lesson.
3. Many of the skills valuable for successful game play, and recognised by both teachers and parents, are as yet only implicitly valued within a school context. In future, learning will move increasingly from the classroom and into the learner's environments, both real and virtual.
4. On a cognitive level, play encourages the development of our concepts about the world. By toying with objects and ideas through playful experimentation we develop an understanding of the physical world and our place within it. But as games increase in complexity and freedom, they will be able to accommodate many different playing styles and personal goals, mirroring the inner dynamics of the player's personality.
5. The problem of narrative, of integrating a linear storyline within an interactive game is widely acknowledged as one of the most intractable problems in the field of games design. Although many techniques exist and will attract developers and gamers for a long time to come, none of them solve the hardest problem; creating a truly dynamic narrative, of creating virtual worlds or Mixed Realities (outdoor and indoor) where although the themes and imagery in the world remain consistent, the actions of different players lead to completely different and credible outcomes.

### **Target audiences**

Key target audiences for eMapps.com are:

- Policy makers in school education who will gain assurance of the benefits and confidence in supporting and investing in games-based learning.
- Teachers who will be engaged and encouraged to recognize and map the relationships between activities in games and the associated learning so that they can embed the use of games within the wider learning context and be enabled to frame tasks, within the game or leading up to or following on from a lesson.
- Parents who will gain a better of understanding of the role which games can play in their children's learning and development.
- Children who will be stimulated and whose learning experiences and performance will be improved by exciting adaptations of a technology they already enjoy.

### **Expected results**

The main outcomes of eMapps.com will include:

- A web-based game learning platform for implementation with the target audiences, using games that can be played 'live' in the individual territory on a new generation of mobile devices using Internet GPRS/3G, SMS and MMS technologies.
- A Children's Living Map of Europe which locates the content and games produced during eMapps.com in a format to inspire others and in which any school or locality can participate
- School teachers/managers or others from each of the eight participating countries will be qualified to implement and disseminate a game training course to other teachers through a series of local events.
- Evaluation of the need, relevance, and practicality of the implemented Game-based learning model will be conducted, and results made public, on the basis of experience in each of the participating countries.
- A Handbook on using games for training in a variety of formats.
- Training courses plus two international conferences on using web-based Games for learning in schools and informal settings, presenting in particular the project methodology and findings in each of the participating countries.
- Exploitation and replication of the results emerging from the project through an extensive dissemination programme including an interactive project website, which will provide access to teachers and other school education staff.

### **Games and mobile technology in learning**

The new emphasis in education is on supporting the learner, in collaboration with peers and teachers/managers or other school education staff, through a lifetime of education, both within and outside the classroom.

There is a natural alliance between learning and personal mobile training technology, so that it is becoming feasible to equip learners with powerful tools to support their learning in many contexts over

long periods of time, with an emphasis on equipping people with the skills and knowledge for a rapidly changing society.

The approach of eMapps.com is closely related to constructivist concepts of learning which hold that, by reflecting on their own experiences, all learners actively construct their own understanding of the world based on both their previous and current knowledge. Constructivism asserts that the knowledge acquired by students should not be supplied by the teacher as a ready-made product. Children do best by creating for themselves the specific knowledge they need, rather than being instructed in what they must know.

Research shows that people learn best when they are entertained, when they can use creativity to work toward complex goals, when lesson plans incorporate both thinking and emotion, and when the consequences of actions can be observed. The past twenty-five years has produced a substantial body of psychological, educational and development literature highlighting the educational potential of digital games. However, this enthusiasm is tempered by the recognition that the majority of commercial 'edutainment' products have been largely unsuccessful in harnessing this potential to effective educational use.

Key design guidelines for achieving intrinsic integration in digital learning games include:

- Deliver learning material through the parts of the game that are the most fun to play, riding on the back of the 'flow' experience produced by the game, and not interrupting or diminishing its impact.
- Embody the learning material within the structure of the gaming world and the player's interactions with it, providing an external representation of the learning content that is explored through the core mechanics of the game play.
- Rather than pursue learning by listening and/or by reading fact-filled and not-too exciting textbooks, engage students in an immersive world has to perform a set of complex actions to achieve desired learning goals.

The advantage of this approach is that learning through performance requires active discovery, analysis, interpretation, problem solving, memory, and physical activity and results in the sort of extensive cognitive processing that deeply roots learning in a well developed neural network. The educational value of the game-playing experiences comes not from just the game itself, but from the creative coupling of educational media with effective pedagogy to engage students in meaningful practices.

On a cognitive level, play encourages the development of our concepts about the world. By toying with objects and ideas through playful experimentation we develop an understanding of the physical world and our place within it. But as games increase in complexity and freedom, they will be able to accommodate many different playing styles and personal goals, mirroring the inner dynamics of the player's personality.

The problem of narrative, of integrating a linear storyline within an interactive game is widely acknowledged as one of the most intractable problems in the field of games design. Although many techniques exist and will attract developers and gamers for a long time to come, none of them solve the hardest problem; creating a

truly dynamic narrative, of creating virtual worlds or 'Mixed Realities' (e.g. outdoor and indoor) where, although the themes and imagery in the world remain consistent, the actions of different players lead to utterly different and credible outcomes.

To solve this problem, we need a way of designing a new learning game where teachers set the theme, the world-space where the game takes place, and the player can then explore and experience whatever permutations of that theme he or she desires. The possibility of different types of interactive narrative that are not bound to specific platforms or stationary mediums, using connected devices, GPS systems or networks (GPRS, UMTS) or multiple users seem limitless. The use of location to trigger events, the presence of other users experience the narrative in the near vicinity, even the ability to bring the narrative into the general culture are all possibilities with emerging technology.

The eMapps.com approach will also require the participants to draw upon a wide range of contextual content and to use new mobile devices in the creation and use of that content, whilst developing and playing game. Playful experiments with objects and ideas help develop our understanding of our place in the physical world

#### **The eMAPPS.com school survey**

In its early stages, eMapps.com has conducted and analysed a survey of the participating schools in order to establish a baseline on current use of games technology by children, as a starting point for its work. Data was collected from a sample of some 233 children in schools selected to participate in eMapps.com between October and December 2005 in the eight participating New Member States.

#### *Q1 Do you own any of these game platforms?*

There is relative uniformity among the schools, across the region, 2.3 platforms per respondent is average for boys, 2.0 for girls. PCs (boys 83%; girls 5%) and mobile phones (boys 60%; girls 77%) are by far the most common platforms among both boys and the girls. Ownership of mobile phones is slightly higher amongst girls. Amongst the 'proprietary' platforms, Sony Playstation (1 and 2) and Game Boy are owned by a significant proportion of respondents, although this amounts to under 20% of respondents in total. Ownership of Xbox or PSP and other platforms is as yet at a very low level.

#### *Q2. Do you play games on any of the platforms listed in Q1?*

About 90% of children responding use one or more of the platforms listed for playing games. Just over 60% of the children use PCs for playing games. Many have access to and use PCs to play games, even if they do not actually own them. Mobile phones are used for gaming by 43-44% of the children who own them. Levels of actual use of proprietary games platforms which the children own are high for Sony Playstation but lower for Game Boy.

#### *Q3. What kind of game do you play? Please write down the game's name.*

155 identifiable game titles were cited by boys and 148 by girls. The grouping of games by children in the selected schools appears to some extent to be function of peer emulation and/or access to specific titles at school or among schoolmates. The Polish children cited the widest variety of games. The popularity and use of

individual game title is more widely dispersed among girls. An average of 2.8 games was cited by each of the boys. This figure was 2.0 for the girls. The suggestion may be that there are fewer attractive games available for girls. There is in general a wide dispersal of game titles cited: a majority of them is cited by only one child. Game titles for PCs and mobile phones are strongly represented. Nevertheless a clear top echelon of the most popular games emerged for the boys and the girls respectively. Action, military strategy and sports games are dominant among those played by the boys. Whilst there are some similarities in the list of top games cited by the girls, mobile phone games are more popular and sports games in particular are less popular. The Sims is by some distance the most popular game title.

#### *Q4 How often and for how long do you play games?*

The boys are significantly heavier and more regular players of games than the girls. 53% of boys play games every day as opposed to 27% of girls. Differences in access may account for some of the variation between schools in different countries. Only in Lithuania do a majority of the girls play every day. Only in Czech Republic do a minority of the boys play every day.

#### *Q5. Do you have an Internet connection at home?*

54% of the boys and 57% of the girls have an Internet connection at home. There is a wide variety of types of Internet connections available at the children's homes. 86% of the boys and 75% of the girls who have a connection have a broadband connection. The proportion of children with an Internet connection at home appears to be significantly lower for the Slovakian schools than in the other countries.

#### *Q6. Do you play games at school as part of the learning process?*

More than half of the children regard themselves as playing games at school as part of the learning process. A higher proportion of girls than boys regard themselves as playing games at school as part of the learning process. There is significant variation between countries, possibly depending upon practice and facilities in the selected schools

### **Alternate reality games (ARG)**

The eMapps.com approach is based on ARG. Unlike other game genres, ARG have no defined playing field or game space but involve immersive, real world encounters which transcend the limitations of the Internet and reach into the everyday world of the player. They can utilise pre-set scenarios, which represent reality graphically and fragmented narratives which the players are required to reassemble.

By their very nature ARG bring together groups of players together into communities that work cooperatively and collectively in an environment of 'Unrealised Reality' to solve the mysteries of the game. ARG allow interactive authoring whereby the creators are able to observe the players virtually in real time and react to what they are doing and feeling. Equally, players can be motivated by being able to affect what happens in the game. Games are built with multiple levels; players can not move into a higher level until competence is displayed at the current level

Although ARG originate and take place predominantly online, they employ mobile and other digital devices and allow simultaneous multi-channel communication.

Students are motivated when presented with meaningful and rewarding activities. Games represent a performance-based environment. Learners are gradually challenged with greater levels of difficulty in a progression that allows them to be successful in incremental steps. In this context, games engage users in pursuit of goals, allowing individual students opportunity to assess their own learning and/or compare it to that of others. They can be played with others (e.g. multi-player games) or involve communities of users interested in the same game. Games also allow users to transfer information from an existing context to a novel one.

Three aspects of entertaining digital games help make them intrinsically motivating: challenge, fantasy, and curiosity.

- the player must be able to tangibly affect the outcome of the game
- there must be an overriding goal/challenge as well as sub-goals and challenges to the player with positive and negative outcomes based on their actions
- the game must require mental or physical skill
- the outcome must be uncertain at the outset
- they must require the player to develop strategies in order to win or succeed
- they must offer multiple paths to success
- players must be able to ultimately overcome most obstacles in the game.

The narrative in eMapps.com games is a combination of different factors implementing the narrative implements some of the concepts from games that are played on platforms such as Play Station, Nintendo, Pc, and PSP but at the same time have a strong ARG component.

ARG games are fundamentally cooperative and collective, because of the nature of Internet. By their very nature they bring groups of players together into communities that work collectively to solve the mysteries of the game. They have no defined or implicit rules for playing. There is no simulation of a virtual world through a symbolic interface. The only interfaces in alternate reality games appear to be the same ones regularly used to communicate with the real world. In ARG, rules exist but they are not defined or written out anywhere the player learns these rules through his observation of and interaction with the game. ARG games allow "interactive authoring" so the creators are able to watch the players virtually in real time, as they experience the game, and react to what players are doing and feeling, immediately if necessary.

### **The eMAPPS.COM platform**

The eMapps.com games platform will enable the implementation of ARG. It runs on digital devices such as mobile phones, PDA, Tablet PC over GPRS and UMTS networks and includes game control mechanisms, forum, chat and pre-set map-based local scenarios. The games are played on an open platform through multiple networks and devices. Weblogs, podcasts and videocasts are key components.

'Pins' located in a pre-set scenario (map-based) are linked to information placed in independently edited photo, audio, video and

text 'blog' folders, using 'drag and drop'. Any mobile device that supports a browser can be used for uploading the content to any folder. The map also supports external links.

The map is a Graphical Interface that interacts with objects and can be used for mapping existing objects in a given territory, based on UTM Coordinates. The map also has a route editor and comes with a series of tools zoom in and out and move up/down/right/left.

The Graphical Interface is independent of the network or software used for uploading. The map supports unlimited amount of layers ranking from satellite images, aerial images, and maps created ad hoc: these layers are geo-referenced over the original map. The Graphical interface supports any language

The pin and map information is saved in XML format. An application that works on smart phones, Pocket PC, lap tops that support browser and multiple operating systems (Symbian, Windows, Unix) is being implemented since the platform needs to know who is calling in order to serve the information effectively.

### Conclusions

eMapps.com will provide a means of designing a new learning game where teachers set the theme, the world-space where the game takes place, and the player can then explore and experience whatever permutations of that theme he or she desires. This approach will also require the participants to draw upon a wide range of contextual content and to use new mobile devices in the creation and use of that content, whilst developing and playing games. The results will have a significant impact in validating new learning paradigms in both school and informal settings and will contribute to strategic thinking about the school and curriculum reform process in the New Member States and more widely across Europe.

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# Views and Opinions

## How to Introduce e-Learning ?

Jean-Claude Marot (JC Consultants, French Polynesia)

### Introduction

The terms "distance learning", "distance education", Web-based courses, e-learning are commonly used to describe a pedagogical situation in which nearly all the learning activities take place with the support electronic tools. With the growth of the Internet use for learning, the term "e-learning" trends to replace all these words. In this presentation I shall use them without distinction.

Currently, numerous universities and training establishments are actively implementing some type of e-learning project. However, many of them are quickly discovering important difficulties to perform successfully the project. For example, they find a significant gap between the number of students that had registered for online courses compared to the number of students who keep up till the end of the course.

This observation has led several institutions to rethink their e-learning strategies and revisit the timeless question of the right device of e-learning.

In this presentation, we will examine four technico-pedagogical devices of e-learning. I have illustrated it with case studies met during my career.

### FOUR TYPICAL DEVICES OF E-LEARNING

The rapid review of the approaches regarding the implementation of e-learning, shows where the e-learning educational design teams are putting their stress:

1) from the technical point of view, the added value of the tools comes :

- whether mainly from the automation of the various operations.
- or mainly from the communications means.

2) from the pedagogical point of view, the added value of this education comes :

- whether from the interactive methods.
- or the good quality of the course contents.

If we cross these two groups of alternatives, we define four typical situations characterizing four strategies of introduction of e-learning :

1) strategy giving the greater role to the completeness of an educational platform (Learning Management System).

2) strategy based on the automation of pedagogical process (Computer-aided learning).

3) strategy based on the large delivery of e-learning courses on the web (web-based courses).

4) strategy of mixing online courses with traditional educational environment (blended learning).

	Automation	Communication
Inter-activity	Learning Management System	Blended learning
Content	Computer-aided learning	Web-based courses

Figure 1. Four typical devices of e-learning

As we shall see further, each of these devices has its advantages and its limits

### THE LEARNING MANAGEMENT SYSTEMS SOLUTION

A Learning Management System (LMS) provides the platform for online learning environment by enabling the management and delivery learning for a target audience. A good platform connects at least three types of interdependent users :

- learners to the content they need and with the other users
- teachers (instructors, tutors) to lead the training, share some applications, interact with the learners and allow more or less the participation of the distant students.
- Training administrators to overall business goals

These e-learning applications include a great choice of functionalities. According to the learning project and related considerations (for example : compatibility with the existing systems), the selection schedule will not comprise the same criteria. It is therefore important to clearly identify what functionalities are needed from the point of view of each type of user and in regard with the project objectives. It is also recommended to test the selected device before the definitive choice. It is equally possible to rent some e-learning system or to evaluate a such e-learning mode by the way of an open-source software.

### Case study n°1

In view of the abundance of pedagogical functionalities offered by the new online educational softwares, the decision makers are often tempted to choice this way in order to jump directly from traditional training to e-learning practices.

I will quote the case of a group of SMEs willing to train its staff management for e-commerce. A provider of e-learning convinced these SMEs to use a new system of collaborative learning for its first experience of e-learning. This attempt has ended in failure. The main raisons of this failure were the following :

- Technical raisons : unsuitability of the computer equipment used on some workplaces
- No mastery of the tool: due to the number of functionalities this tool use is complex. It turns out that the users (learners, teachers, tutors, administrators) were not sufficiently accustomed to exploit suitably all the system resources.
- Inadequacy of pedagogical methods: the trainers provided static documents to read or print, without direct

communication with the learners. The instructors did not create specific scenarios for collaborative learning context. Indeed, it is a mistake to believe that the tool is going to create spontaneously the conditions of a collaborative work between peoples who did not work together usually.

In summary, this is not the tool -however sophisticated it is- that facilitates the introduction and the adoption of the e-learning. In order to be efficient, online educational devices have to be exploited by users aware, that is to say, users who have already an experience of pedagogical use of information technologies and who are able to design the relevant pedagogical scenarios.

#### THE COMPUTER-AIDED LEARNING

It is a training system where the computer is the main tool. Unlike the audiovisual techniques, the computer does not allow any passivity of student. Combined with the telecommunication networks this type of device allows - in theory- to train simultaneously a big number of students to whom a perfectly controlled quality of education is provided, without direct participation of trainers, and however adapted to the rhythm and to the capacities of each.

On the basis of this analysis, some companies did not hesitate to set up a distance learning system essentially based on the CAL. However, the practical experience shows that a too simple software, not allowing diversified educational strategies, is rarely the most profitable forward.

A computer-assisted learning of good quality needs adequately effective softwares. It represents considerable investments that only the big companies can generally accept. But, beyond the cost and beyond the quality of the softwares, the introduction of a learning system based on the CAL raises other questions.

#### Case study n°2

It is a large company composed of many establishments geographically dispersed which wants to bring the in-house training closer to the workplace of its employees. The women are particularly concerned because few agree to move themselves periodically several days away from their residence in order to attend courses in the training centers of the company. The company sets up a computer-aided learning based on an Intranet dedicated to its personnel training. In parallel each establishment dedicates a working station to the self-learning. One year after the setting up of the device, only one percent of the potential participants has used this new opportunity of the training access.

Two raisons explain this failure :

- As it's a self-learning system, the human support for helping the learners in difficulties and to motivate them doesn't exist. Indeed, interaction on one hand between the users and a tutor and on other hand between the learners themselves, is one of the most important instructional elements of contemporary distance education. It is a widely held that a high level of interaction is desirable and positively affects the effectiveness of any distance education course.
- Due to the output constraints, and because the workers must leave their workplace for learning, the direct

managerial staff doesn't favour the participation to the self-learning modules. Thus, the impact of the context appears also to take an essential part in the success of e-learning. The managerial staff behavior in this case shows that the introduction of elearning on the workplace can involve organizational changes. And without these changes, the training could be not effective.

#### THE WEB-BASED COURSES

Many educators have recognized the potential of using the Internet for instruction. Although many Internet technologies such as e-mail, listservs, ftp and conferencing can be used to assist with teaching, the World Wide Web remains the most popular medium. It provides a user friendly front end and easy access to text, graphics, audio and video materials that may be used in a common and consistent format. Most education Web sites provide besides the courses, basic information such as syllabus, schedule, announcements and reading lists. The popularity of the Web for use in education can be seen from sites such as The World Lecture Hall ([www.utexas.edu/world/lecture](http://www.utexas.edu/world/lecture)) or Teaching & Learning on the Web ([www.mcli.dist.maricopa.edu/tl/](http://www.mcli.dist.maricopa.edu/tl/)) that contain links to hundreds of courses created by educators worldwide.

The main strategy of introduction of e-learning regarding this device is based on the delivery of e-learning courses carefully designed.

#### Case study n°3

Here is an example of basic steps for the development process of a typical online course.

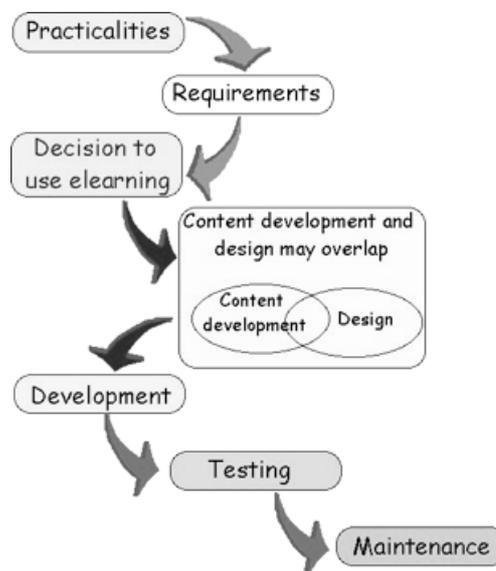


Figure 2 : basic steps

If you are interested, you can find more informations on this subject on the MediaMatch web site (<http://mediamatch.derby.ac.uk>). The central players of the construction of web-based course materials are the content provider (educator) and the programmer. They have to work closely together, particularly at the step of CONTENT DEVELOPMENT and TEST. Working together must ensure that the advantages of using elearning are utilised, and that the course package are a true

reflection of the capabilities of the media and not simply an on-screen book.

However, most of these so-called educational Web site just provide accessibility to static Web page that users can either read or print. At a superior level some of these creations take account of the interactive components of the Web in order to best involve the active participation of the user. Nevertheless, without human tutor, the effectiveness of the latter educational Web sites cannot be compared with the one of a good Computer-Aided Learning software.

It is different when the device includes synchronous or asynchronous communication, discussion groups, conferences, whiteboards,... involving the direct participation of users and tutors. Some of these type of materials are being made available in courses that meet in classrooms regularly and use Web materials as supplementary tools. This latter example is called a blended device.

### THE BLENDED LEARNING DEVICES

Qualitative studies about experiences of traditional learning supplemented with information technology activities state that students progress from learning to use the technology for learning till constructing new knowledge within their personal knowledge structures.

Moreover, these studies state that, in the same way, the teachers progress from learning to use the technology for teaching till designing new adapted pedagogical methods.

### Case study n°4

Here is an experience led within a secondary school that joints the traditional teaching and the use of communication technologies to learn.

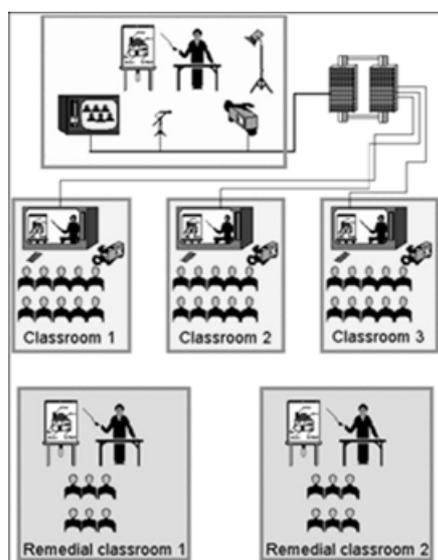


Figure 3 : A blended learning device

This experience involves a close collaboration between three school-teachers of English of three different classrooms. While one of the teachers uses the internal videoconferencing of the establishment in order to insure simultaneously the course for a part of the pupils in each the three classrooms, the two other teachers

insure, face to face in two separated premises, the courses for the part of the remaining pupils.

Pupils who don't have difficulties to learn English follow the mediated teaching alone.

Pupils feeling difficulties to learn English are distributed in small groups with the two teachers remaining who insure a remedial teaching.

The pedagogical efficiency of this device has been validated during this experience. Today this new learning method, called «blended learning», is in increasing progress. As in our example, it combines partly the online learning methods and partly the teaching face-to-face in traditional classroom.

### CRITICAL ELEMENTS OF INNOVATION ADOPTION

The previous experience was promoted by a motivated educational design team. It is partly the basis of the success of this experiment. The device gave all the chances to favour interactivity between learners on the one hand, and between teachers and pupils on the other hand. The twinning between mediated learning and face-to-face learning allows an optimum individualization of education.

But, at the fringe of this pedagogical innovation, several problems subsisted: for example, the three teachers directly involved had to adjust their schedules of work, that also required the colleagues acceptance and the administration agreement. On the other hand, institutional rules to regulate the pedagogical usage of communication technologies and to support the individual initiatives of the teachers did not exist, and so on...

In brief, this experience existed only thanks to the support of the director of the establishment. For lack of organizational changes, when he left the experience has stopped despite its pedagogical interest.

To sum up, the approval and, ultimately, the success of an e-learning initiative require a broad consensus within the concerned players (decision makers, influencers, end users), the top management agreement and involvement, the optimal conjunction of tools and humans interactivity and the adequation of the organization.

### Conclusion

Beyond the logistical advantages of Internet, the growth of e-learning encourages to innovate at the pedagogical level in order to be more efficient in the learning communities. But e-learning will not happen by just wishing it to happen or by implementation of sophisticated systems. It takes a lot of hard work to built a solid project, to get managers and end user adopt it and to proceed to the changes requested in the organization and pedagogical methods.

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## Views and opinions

- automatically save title of Web resource (Web page or Web site),
- automatically or manually save selected part of Web resource ( the selected part in different tools is named as a note, a comment, an annotation or a snippet),
- manually type a list of tags separated by comma or empty space.

Tag or keywords are selected intuitively and they will be used later for search an appropriate web page. In browsers bookmarks are saved in hierarchical folder system and typically one bookmark is saved in one folder. Tag using enables to prevent from this limitation. When you use tags you can add any number of tags to your selected Web site..

When you select and tag Web page you may save information:

- only for you,
- for your team,
- for everybody.



Figure 2. A screenshot with the window to bookmark Socializer website.

A lot of social bookmarking tools enable to see tag collections (your personal or everybody). The tag collection is named infocloud (information cloud) or tag cloud. Typically in the infocloud the most often used tags are larger.

When you use social bookmarking tool you can search not a whole Web but selected and evaluated by other people Web sites. It means that you additionally filter and search in preliminary analyzed and evaluated set of Web sites. Therefore you can expect better and more reliable search results.

When you search and personally bookmark you collect and save your own personal experience that can be reused. When you use social bookmarking tool you collect and save your personal experience but you are enabled both to share you experience and use experience of other people both in your team and everybody who are interested in your subject or topics.

You can find people who have the same interests and both share you information communicate them.

Other benefit is that you can save not only the main information (title, URL, note and tags), but a copy of a whole web page. It is rather important feature as companies, especially new ones, publish

a lot of interesting information about the companies mission, vision and main features. Later you can not have a chance to find this information.

Enterprises, e.g. IBM, analyze and implement social bookmarking tools evaluating benefits of the tool when using inside of the company.

You can find lists of tools at different websites. One of the lists is at Socializer website. The Socializer allows you to easily submit a link to several social bookmarking systems. Instead of having a link to each social bookmarking website, you have a single link to all of them!

<http://ekstreme.com/socializer?url=http%3A//ekstreme.com/socializer/&title=Socializer%20-%20free%20automatic%20social%20bookmark%20submission>



Figure 3. Socialiser website with links to different social bookmarking tools.

Using of social bookmarking enables better analyze collected information. It is recommended to develop your own system of tags and add some additional (service) tags that mean level of priority, your project, proposal to see them once more in the future etc. These service tags will enable better group and classify your information and use additionally a collective intelligence of others.

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## Mobile Positioning

*Alexey Jurenoks (Riga Technical University, Latvia)*

From mainframes to minicomputers to PCs, computer hardware has long been bulky—so bulky that not only was it not mobile, but it was kept in special air-conditioned rooms on a raised antistatic floor. Ethernet technologies developed to allow these computer systems to communicate first privately and then publicly, worldwide over the Internet. Developments in liquid crystal displays and hardware miniaturization allowed computers to become "mobile" as laptop computers. However, laptops are actually movable computers and not mobile computers. Radio signaling systems technology, complex cell networks, and further miniaturization of computer processors and memory made mobile phones possible. As mobile phones become more like computers and begin to process data and run applications, and as other small devices use mobile networks for communications, it is possible to see computers and wireless communications converging.

This new class of devices includes data-capable mobile phones, wireless personal digital assistants (PDAs), and even in-vehicle computers. What makes these devices fundamentally different from other computers is their inherent mobility. They provide anytime, anywhere instant access to applications. They travel with you. You don't wait for them to boot. You don't wait for them to dial an Internet service provider (ISP). Most important, you frequently use them while you are doing something else. In-vehicle navigation devices are used while driving. Mobile phones are used while walking to an appointment, waiting in a lobby, or riding an elevator. Anyone who has tried to use a laptop while driving a car knows that it is almost impossible. Traditional computers have interfaces that are designed for focused attention and stationary use.

In a stationary computing environment, it matters little where a user actually is other than to set the correct time zone and language. When real mobility is added to computing, a new world of applications and capabilities are enabled that take advantage of knowing precisely where a user is. These applications include dynamic navigation and real-time traffic, advanced emergency services and roadside assistance, instant concierge and intelligent travel services, and the ability to use location in a variety of other services to significantly improve personalization.

Mobile location services are actually a subset of a larger set of new capabilities enabled by advanced personalization technologies: context-based services. Applications that are context-enabled not only are able to customize themselves based on where a user is, but also on who the user is and the role the user might be playing at a given time. An electrical engineer seeking information on microprocessors is likely to be interested in a different level of detail than a human resources professional. However, roles are more

than personalizing based on job titles and areas of expertise. Individuals themselves have multiple roles. An individual can be an employee, a university professor, a father, or all three. Both time and location give powerful indicators to the context in which someone is using an application—and therefore how it should be personalized.

There are a variety of positioning solutions available, which can be broken into three groups: handset-based positioning methods, network-based positioning methods, and hybrid positioning methods (a combination of handset- and network-based positioning). The various solutions have a general trade-off between speed of location determination and accuracy. Depending on the application you are developing, accuracy might be more important than speed or vice versa. For example, if you have an application for deployment on mobile phones that allows a user to look up the nearest coffee shop to his or her location, it might be sufficient to use the latitude and longitude of the cell that the user is calling from as the user's location. It might also be preferable to return a list of potential matches as soon as possible rather than wait for a GPS reading. In some cases, both speed and accuracy might be important. A mobile location services application designed for an in-vehicle system in Europe requires very accurate positioning responses because roads are so narrow and close together. It also requires very fast responses because of the speed of the moving vehicle.

### Cell of origin

Cell of origin (COO) or Cell-ID is a purely network-based location positioning solution. The solution uses the latitude and longitude coordinates of the base station serving the mobile device as the location of the user. As such, COO has the highest response time and was the most widely deployed positioning solution in 2001. It can, however, be very inaccurate.

Accuracy is dependent on the size of the network cells. The simplest cell networks have transmitters that are omni directional, transmitting equally in all directions and producing a circle. Because circles don't tessellate well, mobile network architects try to approximate them to hexagons, as shown in Figure 1.

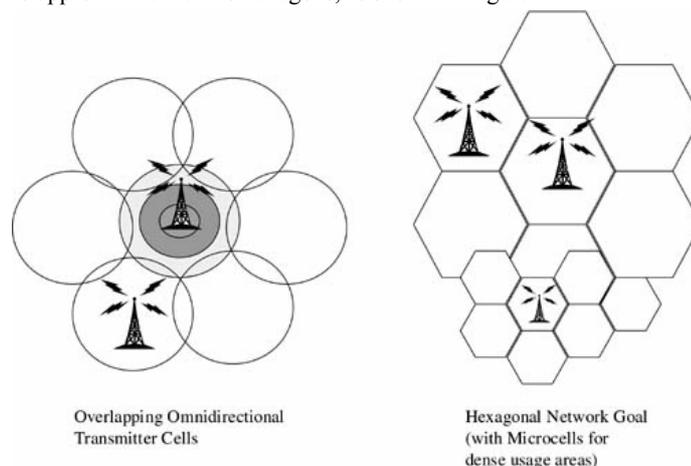


Figure 1. Base Station Configuration in a Cellular Network.

Cell size in a typical large urban network is from 100 to 1,000 meters, which is the approximate accuracy of COO. A typical response time is from 2 to 5 seconds, with 2.5 seconds being a normal response.

COO is often also referred to as cell global identity (CGI) and complemented with timing advance (TA) information. The TA is the time difference between the start of a radio frame and a data burst, which is used to approximate where the user is within the cell.

### A-GPS

The idea behind A-GPS is that a wide area differential GPS network is set up with receivers that operate continuously and have a clear view of the sky. This network is connected to the GSM network, and when a mobile device requests a position fix, assistance data from the reference network is transmitted to enhance the performance of the GPS receiver.

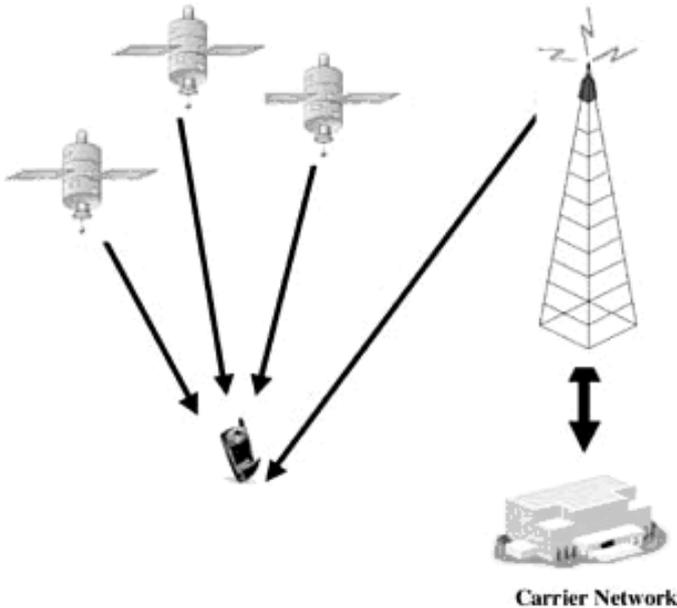


Figure 2. A-GPS.

The information from the GPS reference network can enhance several aspects of the positioning performance. The A-GPS process allows the GPS sensor to initialize and locate satellites much faster, it increases the accuracy of the positioning, and it requires less power than a standard GPS system. Additional information can also be given to the GPS sensor from the network to further improve performance, including differential GPS corrections and base station location. A time to first fix in standard GPS can take as long as 10 minutes, as a GPS receiver that does not know where it is has to search the entire frequency space ( $-4$  kHz to  $4$  kHz) and the entire code phase space (1 to 1,023 chips) to locate visible satellites.

A-GPS requires both a GPS receiver in the handset and a reference GPS network that can provide information to assist the GPS receiver in the positioning process. Commercially available solutions are available from Ericsson (<http://www.ericsson.com>), Sirf (<http://www.sirf.com>), and SnapTrack, a Qualcomm company (<http://www.snaptrack.com>).

### Enhanced-Observed Time Difference

(E-OTD) is similar to time difference of arrival (TDOA), but is a handset-based positioning solution rather than a network-based solution. E-OTD takes the data received from the surrounding base stations to measure the difference in time it takes for the data to reach the terminal. The time difference is used to calculate where the mobile device is in relation to the base stations. For this to work,

the location of the base stations must be known and the data sent from the different base stations must be synchronized.

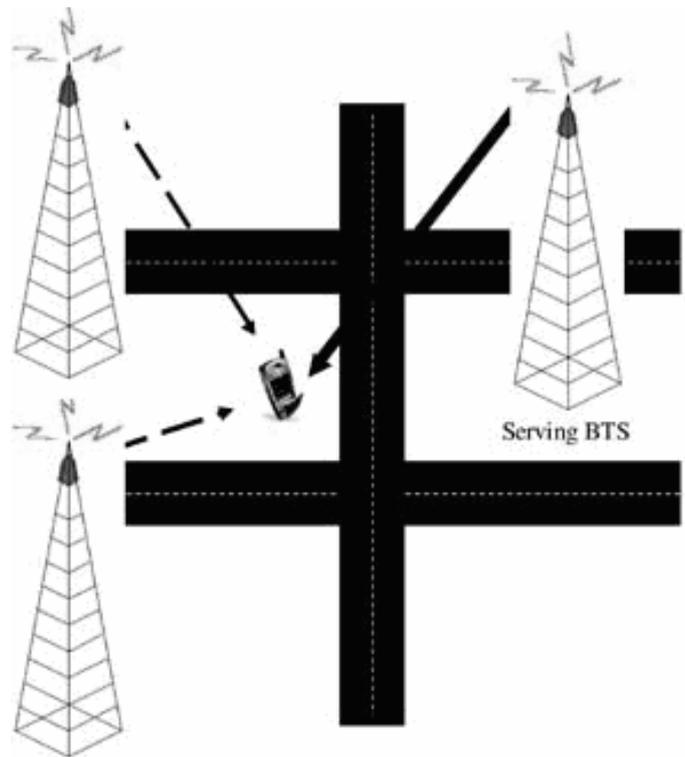


Figure 3. E-OTD.

Base stations are typically synchronized using fixed GPS receivers. Accuracy of E-OTD is expected to be as good as 50 meters using GSM and even greater with 3G networks. E-OTD requires additional memory and processing power in the handset, and can be used both when the terminal is idle and when the device is handling a call. E-OTD does have one major advantage over simple GPS in that it works indoors and in overcast weather conditions.

### Angle of arrival

Angle of arrival (AOA) is a network-based method of determining position that does not require a mobile device upgrade to operate. In AOA, a mobile device's signal is received by multiple base stations. The base stations have additional equipment that determines the compass direction from which the user's signal is arriving. The information from each base station is sent to the mobile switch, where it is analyzed and used to generate an approximate latitude and longitude for the mobile device.

An advantage of AOA is that it supports legacy handsets. Disadvantages include the fact that every base station needs to have an equipment upgrade. Users might also be concerned about privacy issues because they are not able to disable positioning from the handset.

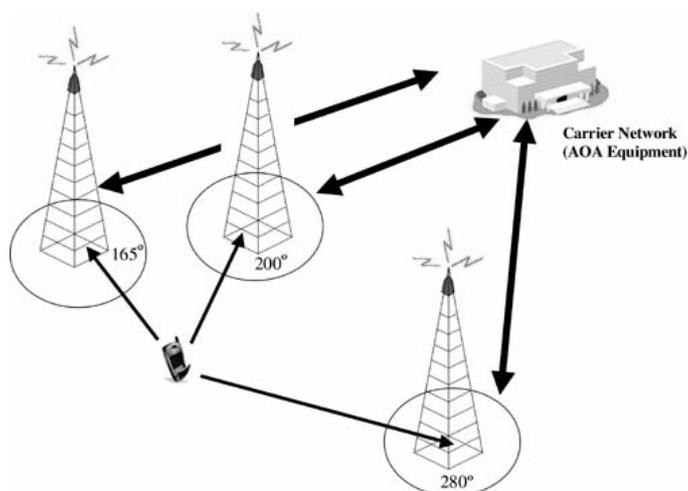


Figure 4. AOA.

### Time difference of arrival

The positioning method known as uplink time of arrival (TOA) is based on the time of arrival of a known signal sent from the mobile device and received by three or more base stations. The signal is the access burst created by having a mobile device perform an asynchronous handover.

The TDOA values are calculated by pair wise subtracting the TOA values at the SMLC. The position of the mobile device is then calculated by hyperbolic trilateration, provided that the geographic coordinates of the measurement units are known and the timing offset between the measurement units used in the measurement are known.

Additional technical details are presented by the 3rd Generation Partnership Project (<http://www.3gpp.org>) in GSM 03.72: "Digital Cellular Telecommunications System (Phase 2+); Location Services (LCS); (Functional Description) – Stage 2":

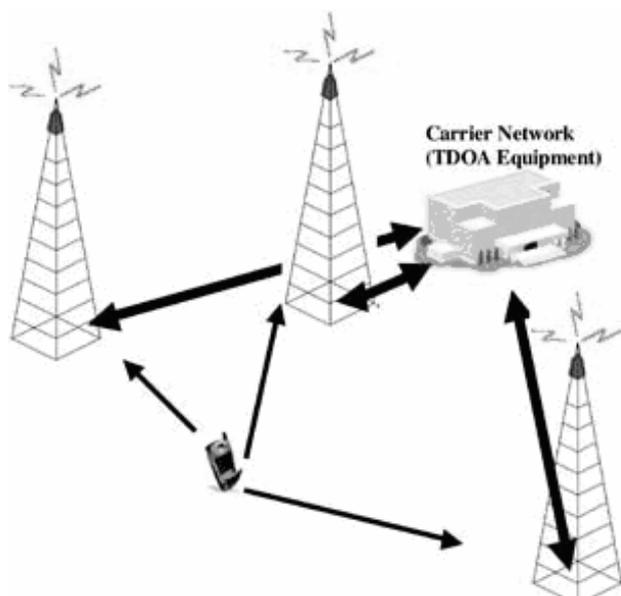


Figure 5. TDOA.

Access bursts are used for detecting the TOA at the listening measurement units. At a positioning request, the units which should

measure the TOA of the Mobile Station (MS) signal are selected and configured to listen at the correct frequency. The MS is then forced to perform an asynchronous handover. Under such circumstances, the MS is transmitting up to 70 access bursts (320 ms) with specified power on a traffic channel (which may be frequency hopping).

The TOA measurements are performed at each measurement unit by integrating the received bursts to enhance the sensitivity, and therefore increasing the detection probability and measurement accuracy, and by applying a multipath rejection technique to accurately measure the arrival time of the Line of Sight component of the signal. The presence of diversity, e.g., antenna diversity and frequency hopping will improve the multipath rejection capability and therefore the measurement accuracy.

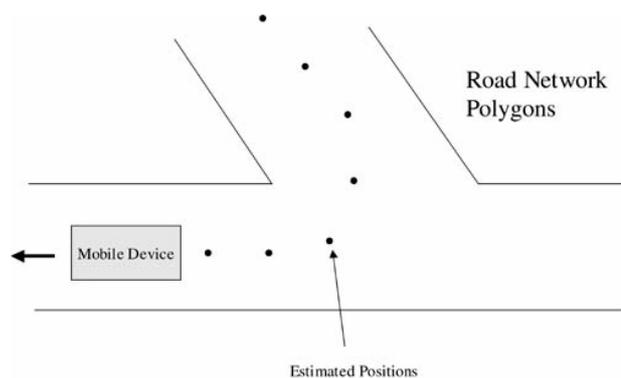
When an application requires the position of a mobile, it has to send a request to SMLC for the identification of the mobile and the accuracy level parameter. Depending on this accuracy level, SMLC decides how many measurement units to include in the positioning request. The measured TOA values together with the accuracy parameter of the TOA value are collected and transmitted to the SMLC. The SMLC utilizes the TOA measurements in combination with information about the coordinates of the measurement units and the RTD (Relative Time Difference) values (a and b above) to produce a position estimate. The SMLC delivers the position estimate together with an uncertainty estimate to the application.

The uplink TOA method requires additional hardware to accurately measure the arrival time of the bursts. Different implementation options exist for this positioning method. For instance, it is possible to either integrate the measuring units in the BTSs or implement them as stand-alone units. If the measurement units are implemented as stand-alone units, the communication between the measurement units and the network is preferably carried out over the air interface. The stand-alone units can have separate antennas or share antennas with an existing BTS.

### Map matching

Map matching is a technique to improve and correct dead reckoning. It uses distinctive features of a mobile device's movement and a road network, for example, to find a corresponding point. This comparison takes place when conspicuous movements such as turning take place. A second method of map matching calculates the distances between the estimated position and the edges of the polygon the device is traveling on. This method is primarily used to relocate position before the estimated position moves too far from the road network.

In mobile location services, estimated position might be generated by GPS or A-GPS, and then sent from the mobile device to the processing center via SMS. This generates what is sometimes called a string of pearls, used for map matching. Recent developments include algorithms to allow map matching for personal navigation by extending the techniques used for map matching in vehicle navigation.



*Figure 6. Map Matching.*

### **Conclusion**

The infrastructures being deployed by mobile operators and the automotive industry provide a platform that enables an entirely new category of applications. Focused on mobility-based computing, they have capabilities that today's stationary-based application development model doesn't even consider. Just as the most innovative applications for the Internet were not developed by Internet backbone providers, it is likely that the most successful "killer apps" will be developed by third-party software developers.

However, these new opportunities are not without challenges. Mobile location services require the combination of a number of independently complex technologies. Quality map data coverage, high-speed wireless data services, systems integration, and business models are just a few of the challenges that must be faced in building an application.

## Contacts

### **Saulius Arelis**

Visoriai Information Technology Park  
Lithuania  
E-mail: saulius@vitp.lt

### **Konstantin Baranov**

Inforing AS  
Estonia  
E-mail: mereinfo@stv.ee

### **Andrejs Berdnikovs**

Institute of Economics of Latvian Academy of  
Sciences  
Latvia  
E-mail: andrejs@economics.lv

### **Alexander Beriozko**

EDNES  
France  
E-mail: ber@ednes.org

### **Ivans Berzins**

Institute of Economics, Latvian Academy of  
Sciences  
Latvia  
E-mail: berzins@economics.lv

### **Zigmas Bigelis**

Visoriai IT park  
Lithuania  
E-mail: zigmasb@techas.lt

### **Eberhard Bluemel**

Fraunhofer Institute FhG/IFF  
Germany  
E-mail: eberhard.bluemel@iff.fraunhofer.de

### **Jean Bonnin**

EDNES  
France  
E-mail: bonnin@ednes.org

### **Tatjana Buldynjuk**

Bi-Info  
Estonia  
E-mail: Conference3@bi-info.ee

### **Robert Davies**

MDR Partners  
United Kingdom  
E-mail: rob.davies@mdrpartners.com

### **Egils Ginters**

Vidzeme University College  
Latvia  
E-mail: egils.ginters@lis.lv

### **Deniss Kalinkin**

Inforing AS  
Estonia  
E-mail: deniss.kalinkin@gmail.com

### **Arnis Kokorevics**

Latvian Researchers Mobility Centre  
Latvian State Institute of Wood Chemistry  
Latvia  
E-mail: arnis@eracareers.lv

### **Mara Jakobson**

LIKTA  
Latvia  
E-mail: mara.j@dtmedia.lv

### **Alexey Jurenoks**

Riga Technical University  
Latvia  
E-mail: aleksejs.jurenoks@inbox.lv

### **Arthur E. Lindemanis**

Riga Business School at Riga Technical University  
Latvia  
E-mail: alindemanis@rbs.lv

### **Jean-Claude Marot**

JC Consultants  
French Polynesia (France)  
E-mail: jcmarot@claranet.fr

**Yuri Merkuryev**

Department of Modelling and Simulation  
Riga Technical University  
Latvia  
E-mail: merkur@itl.rtu.lv

**Leonid Novitsky**

Department of Applied Systems Software  
Riga Technical University  
Latvia  
E-mail: idc@balva.lv

**Tatiana Rikure**

Riga Technical University  
Latvia  
E-mail: rikure@cs.rtu.lv

**Oksana Soshko**

Department of Modelling and Simulation  
Riga Technical University  
Latvia  
E-mail: oksana@itl.rtu.lv

**Valter Tucs**

Riga Business School at Riga Technical University  
Latvia  
E-mail: valter.tucs@rbs.lv

**Juris Ulmanis**

Business School at Riga Technical University  
Latvia  
E-mail: juris.ulmanis@rbs.lv

**Edmundas Zvirblis**

Association INFOBALT  
Lithuania  
E-mail: zvirblis@infobalt.lt



