

Regional Cooperation between Universities, Research Institutions and Industry

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Due to the fact that Slovenia is a small country in every aspect, we should cooperate at all levels of society in order to succeed among the global competition – to turn our smallness into an advantage. Thanks to this smallness everybody knows almost everybody else, which gave us a basis for cooperation in the past. In more recently, various mechanisms have emerged in Slovenia for encouraging more formal ways of cooperation among entities of the society, such as centres of excellence, technology centres, clusters, technology networks and technology platforms.

In Slovenia, the players in the area of Information Communication Technologies (ICT) have established a solid tradition of collaboration between companies and research and development (R&D) institutions, which is of great importance in the world where development is rapid and where it is of vital importance for R&D companies to produce new products and solutions as quickly as possible if they want to expand. Today, almost all the leading Slovenian companies in the area of ICT are members of the ICT Technology Network (ICT TN), where they can find a place for cooperation and for the successful development, production and sale of integrated and user-friendly solutions and products.

In this paper we will present ICT TN and its organisation. Special attention will be given to presentation of the four projects that members of ICT TN work on. The Centre of Excellence for Information and Communication Technologies (CE ICT), the Next Generation Network (NGN) Interoperability testing laboratory SINTESIO and the Technology Platforms (TP) are especially interesting projects because it is not just the technological aspect but also the social aspect – in the form of networking and collaboration – which is important.

Keywords: Technology Network, Technology Platforms, Centre of Excellence, Interoperability testing laboratory.

Regionalno sodelovanje med univerzami, raziskovalnimi institucijami in industrijo

Glede na to da je Slovenija v vseh pogledih majhna dežela, bi morali razviti sodelovanje na vseh družbenih ravneh, če hočemo uspeti v globalni konkurenci – le tako bi našo majhnost spremenili v konkurenčno prednost. Zaradi te majhnosti se skorajda vsi medsebojno poznamo, kar je bilo v preteklosti temelj za sodelovanje. Nedavno tega so se v Sloveniji pojavili različni mehanizmi za spodbujanje bolj formalnih načinov sodelovanja med družbenimi subjekti, kot so centri odličnosti, tehnološka središča, grozdi, tehnološke mreže in tehnološke platforme.

V Sloveniji so akterji na področju informacijskih in komunikacijskih tehnologij vzpostavili trdno tradicijo sodelovanja med podjetji in institucijami za raziskave in razvoj, kar je velikega pomena v svetu, kjer se odvija hiter razvoj in kjer je za razvojna in raziskovalna podjetja življenjskega pomena, da kar se da hitro izdelujejo nove izdelke in rešitve, če se hočejo širiti. Danes so skorajda vsa vodilna slovenska podjetja na področju informacijskih in komunikacijskih tehnologij člani informacijske in komunikacijske tehnološke mreže, kjer lahko najdejo prostor za sodelovanje in uspešen razvoj, proizvodnjo in prodajo integriranih in kupcu prijaznih rešitev in izdelkov.

V tem prispevku bomo predstavili informacijsko in komunikacijsko tehnološko mrežo in njeno organiziranost. Posebno pozornost smo namenili predstavitvi štirih projektov, na katerih delajo člani informacijske in komunikacijske tehnološke mreže. Središče za odličnost informacijskih in komunikacijskih tehnologij, naslednja generacija mrež, skupna uporabnost testnega laboratorija SINTESIO in pa tehnološke platforme so še posebej zanimivi projekti, kajti pri njih ni pomemben le tehnološki vidik, pač pa tudi družbeni, ki se kaže v obliki mrežnih povezav in sodelovanja.

Ključne besede: tehnološka mreža, tehnološke platforme, središče za odličnost, skupna uporabnost testnega laboratorija.

1 Introduction

Many good and even excellent ideas never come to realisation. Every product, every technology and every concrete result was started as just an idea in the head of an individual. Although ideas do not represent anything concrete, they can be the beginning of something big, important and special. In the past several years, the end

solutions, products and services in the area of ICT have become so complex that is nearly impossible for individual developers to realise them on their own. The developers have to cooperate with each other in order to create a product out of the original ideas and to meet the needs for freedom of choice for the end-users, more quality products and services, disabling locking-in for individual solutions and technologies, better surveillance of investments,

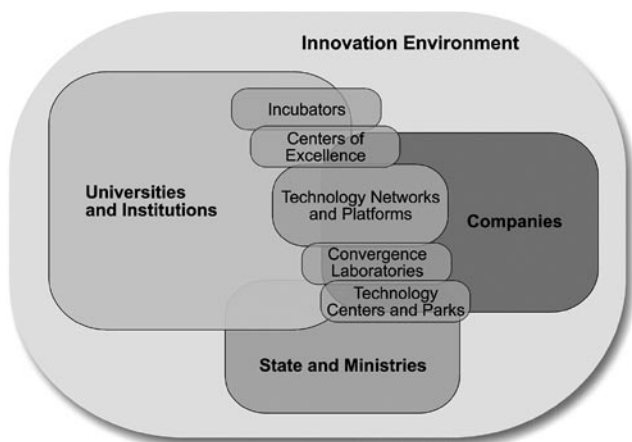


Figure 1: Innovative Environment

ensuring wider usage of the technology, easier market entry and growth, sharing knowledge, reducing time-to-market and lowering the business risk for developing new and innovative products and services.

Therefore in 2003 almost 40 companies, universities and their members, public and other research institutions and other legal entities decided to establish the ICT TN which provides an opportunity to realise ideas and enable success. Since 2005 ICT TN has been operating as a consortium of members who have expressed interest in cooperating on the realisation of common development strategies and the achievement of consortium goals. The aim of the consortium is to ensure efficient mechanisms for the support of joint technology development projects and the establishment of an integrated environment for innovation in the field of ICT. ICT TN presents the innovative environment as shown in Figure 1.

2 The ICT Technology Network

Upon the establishment of the ICT TN, its member companies and institutions set some key common goals: to develop new technologies, services and content for achieving greater added value, to develop an environment of innovation and development, to gather new knowledge for the companies within the network and to positively influence other commercial and non-commercial sectors. The consortium achieves its goals through several organisational bodies, e.g. the General Assembly, the Project Council, the Executive Manager and the Project Office (<http://ict-slovenia.net>, 2006).

Among all the similar associations of companies, universities and research institutes in Slovenia, ICT TN has achieved the highest critical mass of knowledge, capital, added value, export and influence across the economic competitiveness of Slovenia as a whole. It unites 47 members who generated income of €1.8 billion in 2005 and, with their prevalently complex technological products, have achieved a more than 20% share of export. In total, the network members employed 13,500 people of which almost 9,000 were in companies. The development potential of the

network is best reflected in the more than 1,000 researchers employed in its member companies and institutions (ICT Technology Network (2006)).

During the 2003-2006 period the partners realised several activities and projects with a total value of about € 6.15 million within this network. The partners provided 47% of funds for the financing of those projects from their own resources while 53% came from public resources acquired from the state budget and EU funds. The projects and activities of the ICT TN mainly have a technological impact on society, though some of them also have an important social impact. The projects and activities fall into the following types:

- Centre of Excellence for ICT (CE ICT);
- NGN Interoperability Testing Laboratory - SINTESIO;
- Technology platforms (TP);
- e-Region.

2.1 The Centre of Excellence for ICT

The Centres of Excellence (CE) are high quality multidisciplinary groups of researchers from academia and industry that represents the critical mass of knowledge and a proper research infrastructure for the breakthrough to the peak of global science and/or integration into the international network of excellence (<http://www.mvzt.gov.si/index.php?id=962>, 2006). The critical mass of experts and knowledge is oriented towards joint integrated projects from partners with real market possibilities. CEs were developed and implemented in cooperation with the Slovenian Ministry of Higher Education and Technology. The Slovenian government also supported the CEs with a total of almost €1.3 million over a period of two years with the possibility of receiving more funds for another two years.

The CE ICT was established in 2004 on the initiative of ICT TN with the aim of achieving combined excellence in technical, applicative, innovative, developmental and research areas in the wider multi-disciplinarian area of ICT. CE ICT unites 26 partners with 16 research teams and over 120 researchers. In the 2004-2006 period they carried out six R&D projects with a total value of €1.9 million (<http://www.ltfе.org>, 2006).

The result of the first project, “*Technologies for the Education and Development of Innovation Environments*”, was the development of technologies enabling new convergent e-services and new e-content within the broadband information infrastructure and a multi-media centre as a part of the ICT Technology Network innovation environment.

The evaluation environment was established for the appraisal of the efficiency of automatic speech recognition systems. The speech synthesiser, a system for the recognition of user gestures and a software application for the semi-automatic determination of parameters for x-ray photographs were developed in the second project “*Voice and Image Technologies within ICT*”.

In the third project, “*Managing the process of development and information technologies in developing solutions for e-business*”, the AMD (Agile Methodology

Development) method and the AMT (Agile Methodology Toolset) support tools for the recovery, formalisation, adaptation and constant upgrading of the methodology for developing information solutions.

The fourth project, *“Protocols and Integration of Services in NGN Convergence Systems”*, established an environment for testing and development for the NGN systems (call servers, application servers, the media and signalling gateway and terminal equipment). Analyses and studies were carried out and NGN services were developed (the “Personal Communication Portal”, “CSTA-Parlay X Gateway” and “Outlook Add-on for Click-to-Dial”).

The results of the fifth project, *“Wireless Communication Platforms”*, include the design of the modem part of the WiMAX base station, simulation of WiMAX radio signal propagation and the calculation of radio signal coverage, the possibility for the application of adaptive (“smart”) antenna systems and studies of the ecological aspects of radiation affecting living organisms.

In the sixth project, *“Verification of the Correct Functioning of Communication Systems”*, the verification of the correct functioning and reliability of software for telecommunications system was carried out for the formation of the IUA protocol model, which is a part of the SI2000 V6 switching system.

2.2 SINTESIO

SINTESIO is an open, non-profit NGN interoperability testing laboratory approved by the European Telecommunications Standards Institute (ETSI) and established by industrial partners, standardisation bodies and the university. The aim of the testing laboratory is the preparation, organisation and realisation of testing the conformance, interworking and interoperability of NGN and IMS standards.

The idea to set up the permanent open NGN interoperability test site (SINTESIO) was born in 2004 and it was realised through cooperation with Iskratel, the Faculty of Electrical Engineering and the Slovenian Institute for Standardisation. When the basic concepts were developed, the idea was introduced to ETSI in 2005, which strongly supported the idea and gave it its endorsement. ETSI, especially TISPAN and Work Group Six (WG6), also actively joined in the preparation of further concepts concerning setting up the interoperability testing laboratory.

The activities of SINTESIO are based on the open, neutral and professional provision of services with the support of high-level technology and a sustainable infrastructure. It includes the organisation and realisation of projects and events such as interoperability testing, seminars and workshops for the successful promotion and support of open standards, interoperability and the application of ICT products, applications and services (<http://sintesio.org>, 2006).

The laboratory significantly contributes to the continuous development of network platforms, sites for interoperability tests and methodologies. The importance of this contribution is significant due to the fact that interoperability in the area of ICT presents one of the most important conditions for the successful development of

the information society. Interoperability brings positive effects to the ICT industry – especially in the area of the small and medium enterprises that dominate Europe. It also enables easier market entry and growth, information and investments, and improved sharing of knowledge; it reduces the time-to-market and lowers the business risk for developing new innovative products and services (INFRACOM 2005).

2.3 Technology Platforms

TP is a development policy mechanism introduced by the EU where the challenges of individual fields meet and the strategic advantages and opportunities of individual areas of technology are determined. In the field of R&D, they encourage target-oriented investments and thus promote a more efficient approach to innovation as well as the co-ordination of activities within European and national research programmes. TPs also support the continuous development of appropriate know-how related to individual technological areas and to the use of new technologies. The initiative of the economy is emphasised in TP. Their open structure means that in order to be efficient they have to engage all the key factors of the economy, institutions, universities, public institutes and the state, as well as promoting partnership with other sectors, thus also forming the basis for a political dialogue. Following the example of the European TPs, Slovenian TPs also unite the participants in the formation of common strategic programmes. Together with the Chamber of Commerce and Industry of Slovenia, members of the ICT TN have established three TPs that cover the ICT area.

The eMobility TP covers the area of mobile and wireless technologies and services. Although one of the basic tasks of the TP is the formation of guidelines for R&D in this field, the activities of eMobility TP, in accordance with its mission, cover other fields as well. Its long-term activities encompass education and training as well as the promotion of the field of mobile technologies and services in Slovenia.

The Slovenian TP for software and services (NESSI), linked with the European NESSI platform, presents an open point for the pooling of knowledge, strategies and potentials for the faster development of this internationally competitive and penetrating sector. It encourages improved connectivity, the global accessibility of e-services and the faster introduction of research findings and new technologies into business and private life.

The basic aim of the media in the e-networks TP (NEM) is to encourage the development and introduction of advanced audio-visual and multimedia broadband services and applications for the benefit of the users. The NEM is focused on an innovative mix of various media forms, content and interactive models delivered seamlessly over technologically transparent networks to improve quality, enjoyment and life, reduce physical distance and eliminate the digital divide. NEM presents the convergence of existing and new technologies, content and manners of interaction, including broadband and mobile networks as well as new forms of media.

2.4 The eRegion

From geographic perspective, the eRegion is an area of some 200-500 kilometres distance around the point of observation in which business, government organisations and individuals extensively use ICT for doing business and supporting everyday activities (ICT – Powered eRegion, 2005). The formation and function of these eRegions enables handling and dealing with many of the contemporary challenges that Europe is facing. The implementation of the goals of the Lisbon Declaration and the policies of the EU TP stimulates different forms of regional partnership. ICT-driven solutions in particular enhance cross-border partnership and foster cross-regional cooperation among geographic neighbours. In the case of Slovenia, the eRegion expands around the wider circle of the crossroads of the fifth and tenth European mobility corridors in Ljubljana, Figure 2.

Combining the important geographic location with an excellent level of ICT development, Slovenia has the advantage of being a centre-point in a trans-national eRegion. Renowned companies, institutes, research facilities, faculties, test centres and laboratories are equally dispersed across the Slovenian territory and can easily connect and cooperate with similar centres across national borders. Such bilateral and multilateral international projects can significantly contribute to the extensive use of ICT and can increase the percentage of technology inclusion among the population.

The trends of merging and converging enable different economic branches to cooperate and intermingle thus forming a unique technological opportunity that is not to be missed. These trends of development and research characteristics coincide with the European political evolution and the expansion of the EU, which has removed obstacles and provided the conditions for successful international cooperation and projects. In this respect, the eRegion can assume the role of an “ICT Innovation Platform” and a “Living Lab” for the intelligent and safe circulation of people, knowledge, services and goods. A living lab is where scientific knowledge, cutting edge research and technological excellence meet the real environment and the working market.

Throughout its history, Slovenia and its ICT sector has proven capable of setting high goals and successfully implementing them. Thus, it is expected to play the leading role in the establishment of the eRegion. The ICT TN and its members are ready and highly motivated. We seek broad partnership and large scale support to target logistical, organisational, interoperable, regulatory and, last but not least, political issues.

3 Conclusion

The ICT TN is a group of diverse partners that complement each other in a way that strengthens the ability to transfer

technologies and to master new ones, as well as the development of new technologies in priority R&D areas. The ICT TN mainly contributes to the realisation of goals such as the more efficient transfer of knowledge into the products, services and processes with high added value and an accelerated process of setting up new technological enterprises; improved collaboration between carriers of knowledge (universities, R&D and education institutions) and industry and increased investments into application R&D in the priority areas of technological research. The achievement of these goals through projects such as CE ICT, SINTESIO, TP and the eRegion will enable the rise of Slovenian global competitiveness and a faster BGP growth.

4 Literature

ICT – Powered eRegion (2005), ICT Technology Network brochure.

ICT Technology Network (2006), ICT Technology Network brochure.

INFRACOM (2005) Interoperability Framework for Converged Multi-services network, Project proposal documentation.

Andrej Krenker obtained his BSc in 2003 at the Faculty of Electrical Engineering, University of Ljubljana, Slovenia, where he works as junior researcher. His area of research and development is focused on analysis of ICT fraud, its detection and prevention.

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