

Express Diagnostics of potential for ICT R&D collaboration with the European Union

Armenia

2009

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“Express diagnostic of potential for ICT R&D collaboration shall contribute to the definition of collaboration potential in the field of R&D ICT with the European Union.

“Express diagnostics” be based on the following data collection and analysis: (1) Eventual existing reports in Russian or in English on the relevant topics; (2) Picture of ICT R&D activities; (3) Existence of national programmes aiming to support R&D ICT and their volume of funding, or relevant national actors such as NCP ICT; (4) Examples of existing international collaboration and past or existing collaborative projects with Europe - FP6, FP7.. – but also with other countries, such as the USA; (5) Motivation of national stakeholders to collaborate with ISTOK-SOYUZ

(extract from ISTOK-SOYUZ contract)

1. The National ICT Sector and its Governance in Armenia

1.1. The National ICT Sector

The vision of IT Sector development in Armenia is:

- Sustainable information society with advanced ICT infrastructure, high-level computer literacy, high level of computer saturation and internet access, extended use of e-services systems, existence of large local IT market and progressive knowledge-based industry.
- Developed and internationally recognized Information Technology sector, with companies creating big surplus value and providing complex engineering solutions and services, local IT products competitive in international markets.

The current situation in ICT industry in Armenia may be characterized as an aggregate of certain partial achievements. The national ICT sector includes:

- Governments:
 - Government of Republic of Armenia,
 - RA Ministry of Economy,
 - The National Academy of Sciences of Armenia, that play a key role in setting broad policy directions.
- Bridging organizations:
 - The Information Technologies Development Support Council (ITDSC) which acts as intermediary between government and the rest of the ICT system.
- Private enterprises:
 - The Union of Information Technology Enterprises (UITE), that has the mission to make Armenia an internationally recognized ICT/High Tech leader, by providing focused, value-added services and initiatives, which include valuable networking, industry advocacy, business and educational services.
 - Enterprise Incubator Foundation that is a joint effort of the Government of Armenia and the World Bank to assist the local Information Technology sector by providing a comprehensive package of business, training, and facility services. EIF provides office space and services to IT companies. (domestic and foreign owned), clusters and business federations;
 - Synopsys, Inc., a world leader in electronic design automation (EDA) software for semiconductor design. Synopsys established its presence in Armenia in 2004, shortly after Armenia's declaration of Information technology (IT) as a priority business for the country.
 - Virage Logic Corporation, the market leader in application-specific embedded memory cores. A sampling of customers includes such companies as Agere, Agilent, Alcatel, AMCC, AMD, AMI Semiconductor, ATI Technologies, Broadcom, Conexant Systems, Ericsson, Fujitsu, Hitachi, IBM, Infineon Technologies, Intel, LSI Logic, etc.
 - Bi-Line, one of the IT industry leaders. The company has two main operating segments: hardware and systems integration and software development. Bi-Line is a distributor, dealer and service provider for a number of leading computer equipment and systems manufacturers including Alcatel, APC, Canon, Cisco, IBM, HP, Oracle, and Siemens.
- Universities and R&D institutes that provide key R&D ICT knowledge and skills:
 - Yerevan State University,
 - State Engineering University of Armenia,
 - Russian-Armenian (Slavonic) University,
 - European Regional Institute of Information and Communication Technologie (ERIICTA),
 - American University of Armenia (AUA), the Russian_Armenian Slavonic University,
 - Yerevan University of Management and Information Technologies.
 - Institute for Informatics and Automation Problems.
- Infrastructure organizations:
 - Arminco, is a leading Internet service provider in Armenia today that provides information, knowledge, advertising, IT consulting, and system integration services through itscore business areas. Being aMicrosoft Certified Partner, Arminco Ltd founded a Microsoft Certified Training Center in Yerevan.

- Armentel, is the largest telecommunication services provider of the country. ArmenTel CSC (brand Beeline), owned by VIMPELCOM OJSC, has always acknowledged its role and importance in the development of telecommunication sphere.
- Intracom Armenia, is a subsidiary of INTRACOM TELECOM, a leading telecommunication solutions provider, headquartered in Athens, Greece. The Company focuses on the design and delivery of high technology turnkey projects in the fields of telecommunications and IT (public administration and banking).

In 2006 Armenian IT industry revenues amounted to approximately 84 million USD versus 38 million USD in 2003 thus growing by 122%. An average annual growth rate of 30% was recorded for 1998-2006.

Basic figures of IT branch in Armenia are:

- about 120 enterprises actively work within the branch;
- general number dealing with the branch makes more than 4000 person;
- average annual salary of programmers makes 3600-7200 US dollars;
- annual volume of production is estimated about 55-60 million US dollars approximately 98% of which is exported;
- share of IT branch of the gross domestic product makes 1.7%;
- volume of production annually grows approximately by 12%.

Competitive advantages of branch IT in Armenia are:

- research potential corresponding to the world standards in the field of informatics, physics and mathematics;
- presence of highly skilled experts;
- cheap labor force;
- state support of the branch;
- steady and continuous growth of IT branch;
- presence of Armenian communities in Europe and Northern America;
- presence of the legislation directed at the protection of intellectual property.

Exhibit 1: Selected key organisations within the National ICT Sector

Type of organisation	Name of organisation (in English)	Website (where available)
Government and legislative bodies		
Government body	RA Ministry of Economy	www.mineconomy.am
Academy of Sciences	The National Academy of Sciences of Armenia	www.sci.am
High level councils in the field of ICT or similar "bridging" organisations"		
High level council	The Information Technologies Development Support Council (ITDSC)	www.itdsc.am
IT Association	The Union of Information Technology Enterprises (UITE)	www.uite.org
Foundation	Enterprise Incubator Foundation	www.eif-it.com
Private sector organisations		
CJSC	Instigate	www.instigatedesign.com
CJSC	Synopsys Armenia	www.synopsys.am
CJSC	Algorithm-Service	www.algserv.am
LLC	EpygiArm	www.epygi.com
LLC	Smart Systems	www.SmartSystemsLLC.com
CJSC	Sourcio	www.sourcio.com
Inc.	Synergy International Systems	www.synisys.com
CJSC	Viasphere Technopark	www.viasphere.com
International Corporation	Virage Logic	www.viragelogic.com
ICT R&D Knowledge institutes (institutes, universities)		
University	Yerevan State University	www.yu.am
Institute	Institute for Informatics and Automation Problems	www.ipia.sci.am

University	State Engineering University of Armenia	www.seua.am
Department of Institute for IAP	Information Society Technology	dm-lab.sci.am
Infrastructure / technology transfer organisations		
Ltd	Arminco Global	www.arminco.com
CJSC	Armentel	www.beeline.am
Ltd	Bi-Line	www.bi-line.am
LLC	Intracom Armenia	www.intracom.am

1.2. The ICT Governance System in the country

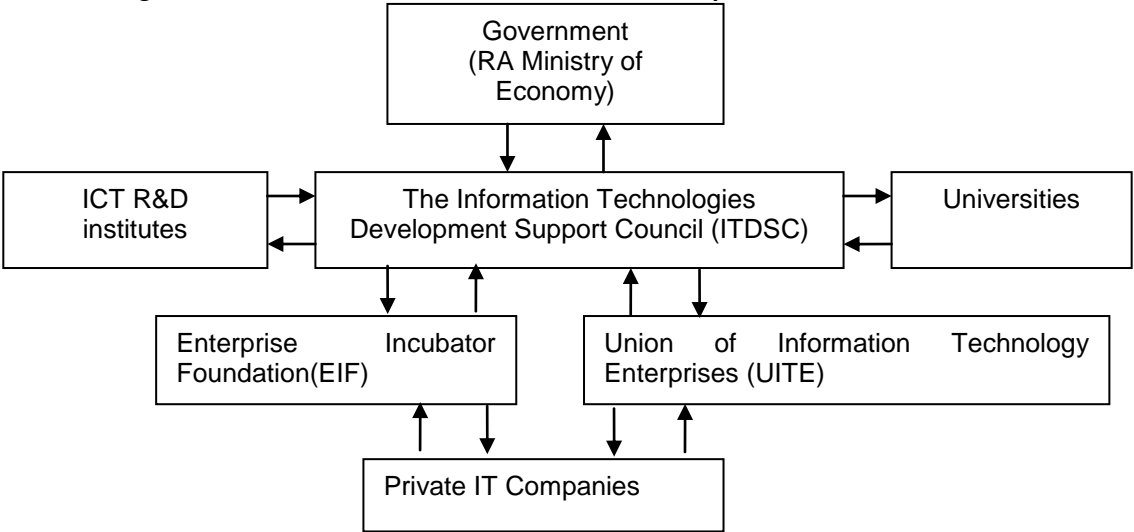
The development of IT industry and information society (hereinafter Industry) within the last decade has been a vital lever for the improvement of the competitiveness and productivity of economy in all developed countries, as well as for development of management, innovation and R&D systems and corresponding infrastructure. It was also declared a priority sector and a platform for knowledge based economy.

The need for the development of the Industry in Armenia is preconditioned by the imperative to identify a form of development which considers the current factors such as the comparatively high level of the scientific and educational potential of the population, traditional effectiveness of applied, creative and R&D activities, as well as limitations on the transportation channels, natural resources and territory.

Attributing great importance to the development of the industry of information technologies not only as a separate sphere but also as a vital pillar for overall economic growth of the country and improvement of the productivity and competitiveness of Armenia’s economy globally, the Government of the Republic of Armenia made a special emphasis on ensuring the continuous increase in IT industry effectiveness, application of industry services and products in other spheres of economy and formation of information society in the country.

IT industry was proclaimed as a priority sector of Armenian economy by the Government of the Republic of Armenia back in December 28, 2000. Afterwards in 2001 ROA Government asserted the “RA Concept Paper for the Development of the Industry of Information Technologies” and Information Technologies Development Support Council chaired by the Prime-Minister was established by the Order No ԼՂ -896 of the President of the Republic of Armenia July 20, 2001. The Information Technologies Development Support Council (ITDSC), linking the Government with IT business, educational institutions, IT non-governmental organizations, donor and international organizations, organizes and holds discussions favoring solution of issues related to development of information society and IT industry. Enterprise Incubator Fund was established by ROA Government Decree N 1165 of November 27 under the credit agreement signed with the World Bank.

Exhibit 2: Organisational Chart of the National ICT Governance System



2. Trends in the National ICT Sector and in National ICT Policy Objectives

2.1. Overview of the main trends in the National ICT Sector

2.1.1. Statistical data

Exhibit 3: Comparable indicators of economic performance

Indicator	National performance	
	2002	2008
GDP per capita	1387 USD	3689 USD
Real GDP growth rate (% change previous year)	113.2%	106.8%
Labour productivity per person employed (EU25=100)
Inflation rate (average annual)	101.1%	109.0%
Unit labour costs (growth rate)	24.9%	17.5%
Unemployment rate (as % of active population)	10.8%	6.3%
Foreign direct investment intensity	149.0 mIn USD	1132.40 mIn USD
Business investment as a percentage of GDP	0.06%	0.08%
ICT Expenditure (% of GDP)	0.9%	2%
Broadband Penetration Rate (% population with broadband access)	30%	60%
Computer and related activities	19.75 mIn USD	66.13 mIn USD
Internet users	187000	194000
Consumption of local IT products in the internal market – GDP	0.2%	0.8%
Share of e-services provided by RA state entities against the total	1%	25%
IT workforce	3000	8000
IT productivity per employee	14000USD	20000USD
IT industry revenues	80 mIn USD	100 mIn USD
IT Exports	48 mIn USD	90 mIn USD
IT R&D companies	5	20

The economic trends in Armenia will have the following effect on ICT activities:

1. Rollouting robust, scalable national ICT broadband backbone network, data centers, networks, systems & applications platforms.

2. Equipping & operating (at least 100) Tele-Centers and internet centers per year in selected Armenia locations minimum 500 centers in 5 years.
3. Rollouting (at least 3) pilot e-Government projects in first 3 years and ensure their further replication and application.
4. Increasing IT workforce & qualified university graduates by 1500 persons per year.
5. Establishing IT Enterprise Development Fund.
6. Introducing Capability Maturity Model (CMMI) in (20) IT companies per annum.
7. Increasing Armenian software sales.
8. Developing already operating incubators and building, equipping & operating techno-parks, business incubators, and university-based Technology Transfer Centers (TTC) in target Armenian regions.
9. Implementing marketing campaign for "Armenia IT brand" to penetrate targeted high growth IT markets.
10. Increasing home, educational and public sector computer penetration computer penetration.
11. Increasing population Internet penetration (in terms of physical, financial, content and language access).
12. Increasing the expenses of RA state entities on local IT products in total expenses of state budget.
13. Creating Large Techno-City Techno-Parks & incubators.
14. Developing Local open joint stock companies (registered in the local and international Stock Exchange).

2.2. National ICT Policy Objectives and Trends

2.2.1. Objectives and Targets of National ICT Policy

Armenia aspires to become a leader in target IT markets and an advanced knowledge-based information society. To reach this ultimate goal Armenia must transform itself from a country outsourcing low value IT services to a provider of high value leading-edge IT products and services with knowledge based information society - a society rooted firmly in world class technical education, information and communications technology (ICT) infrastructure, and computer literacy.

"INFORMATION TECHNOLOGY SECTOR DEVELOPMENT CONCEPT PAPER" was developed by the working group established by the Order No 113-Ն of the President of the Republic of Armenia of July 3, 2007 and was discussed with interested government bodies, representatives of private and public organizations, as well as with local and international experts.

The main goal of the document is to outline the vision and goals for the development of IT sector (the IT industry and information society) in the Republic of Armenia, as well as the challenges, their strategic solutions and implementation stages. During the implementation of this concept the society, all strata of society, all governmental groups and entrepreneurs will directly fill its influence.

The Concept Paper is an action plan based on strategic approaches with clearly defined focus designed to stimulate the development of information and communication technologies (ICT) in the country thus providing a leading position for Armenia in the world and development of information society in country.

The Concept Paper includes issues related to production of information technologies, telecommunication and information society, as well as comparative directions for their solution.

The provisions of the Concept Paper will be implemented through clearly defined programs and within definite timelines, evaluation of tangible results and regular monitoring to clarify next steps and provide accurate guidance, matching international best practices with available resources, the participation of local and foreign partners and investors involved as a result of the close cooperation among state, private and public sectors and their joint efforts.

Action plan to achieve key milestones is the following:

- 1) Short-term (1-3 year period): build world class ICT infrastructure to support Armenian IT industry and information society development.
- 2) Mid-term (3-5 year period): strengthen Armenia's ICT infrastructure and ensure the presence and penetration of the "Armenia IT brand" in the global market.
- 3) Long-term (5-10 year period): achieve full "Armenia IT brand" penetration in global markets and, particularly, in targeted high-growth market segments. Contribute to the growth of ICT, increase in sector revenues and development of knowledge-based economy through ICT infrastructure and information society development.

3. R&D ICT Co-operation with the EU

3.1. Co-operation involving private industry

Currently over 200 IT companies operate in Armenia from which 50 are foreign companies (covering 30% of IT product market). Armenia's IT market attracted many foreign investors within the last decade. There was a significant increase in the share of European (17-23%) and US contributions (70%) as compared with 2003. Approximately 70% of products and services of IT companies are exported to more than 20 countries.

The industry export generated approximately 60 million USD in 2006. Almost 60% of export goes to the US and Canada, 20% to EU countries, 16% to Russia and CIS countries. The number of specialists employed in IT sector is 5000 as of 2006 with an annual 17% increase as compared with the year of 2003.

1. Arminco, established in 1992, has been at the forefront of the Internet evolution and is a leading Internet service provider in Armenia today. Our goal is to utilize the leading position of Arminco in Armenia in order to develop and offer first-class services to customers in Armenia and its neighboring countries. Arminco Network is based on fiber optic ring, covering Yerevan city from North to South and from West to East. Arminco provides information, knowledge, advertising, IT consulting, and system integration services through its core business areas: Arminco Software products; Arminco Hosting and Design; Arminco Technical, Network and Software Support; Arminco Radio Modem and Leased Lines(dedicated access); Arminco Internet Dial-Up and Roaming; Arminco Microsoft Training and Certification Centers; Arminco Satellite Telephone Communications. Being a Microsoft Certified Partner, Arminco Ltd founded a Microsoft Certified Training Center in Yerevan in 2001. The center provides MCPLS courses, certificates, status

of MCSA and MCSE, as well as organizes IT seminars. Arminco's key employees are Microsoft and Cisco Certified Professionals holding Microsoft certificates such as MCP, MCP+I and MCSE, and Cisco certificates such as CCNA, CCNP, and CCIE.

2. Instigate CJSC is an engineering company with hardware and software teams. There are company representatives in US and EU. Currently more than 80 engineers work in Instigate CJSC. The main area of the experience is System Level electronic system prototyping, development of massive parallel algorithms, system level simulation, WSW decomposition and co-design, RTL design. The company is collaborating with US and EU customers.

3. Synopsys, Inc. is a world leader in electronic design automation (EDA) software for semiconductor design. The company delivers technology-leading system and semiconductor design and verification platforms, IC manufacturing and yield optimization solutions to the global electronics market. Synopsys is headquartered in Mountain View, California, and has more than 60 offices located throughout North America, Europe, Japan and Asia. Synopsys established its presence in Armenia in 2004, shortly after Armenia's declaration of Information technology (IT) as a priority business for the country.

Currently, the company employs several hundred qualified Armenian engineers, and is one of largest IT employers in Armenia. To support its growth, the company is investing in IT education, and is engaged in a number of pioneering and successful cooperation programs with major Armenian universities, such as Yerevan State University (YSU), State Engineering University of Armenia (SEUA), American University of Armenia (AUA), and the Moscow Institute of Electronic Technologies (MIET).

4. Virage Logic Corporation is the market leader in application-specific embedded memory cores. It's products include memory compilers, software tools that enable the development and reuse of memory cores, and custom memory design services. It's customers typically include the leading semiconductor and electronic systems companies. Market and technology leaders developing next generation System-on-Chips (SoCs) rely on Virage Logic products. A sampling of customers includes such companies as Agere, Agilent, Alcatel, AMCC, AMD, AMI Semiconductor, ATI Technologies, Broadcom, Conexant Systems, Ericsson, Fujitsu, Hitachi, IBM, Infineon Technologies, Intel, LSI Logic, etc.

Exhibit 4: Main opportunities for ICT co-operation and policy responses

Description of opportunity	Measures addressing the opportunity (if any)
1. Existence of ICT infrastructures corresponding to international standards.	Establish and enlarge partnership with countries with successful IT industry and corresponding international institutions, join international IT organizations, conventions and programs. Develop Armenia's image as regional IT center by assisting regular implementation of internationally significant events
2. Existence of favorable business environment for implementation of activities in IT industry.	Develop ICT infrastructure (national broadband backbone network, low-cost internet access, computer penetration, universal services).
3. Promotion of foreign direct investments.	Implement amount of grant, venture and foreign direct investments in IT sector, involvement of international projects (R&D, IT etc.). Increase in IT exports.

Exhibit 5: Main barriers to ICT co-operation and policy responses

Description of barrier	Measures addressing the barrier (if any)
1.No "Armenian IT Brand" positioned in the global IT market.	Establish and develop presence of Armenian IT products in key global IT markets and enhance cooperation with the Diaspora to attract investments and promote the "Armenian IT brand".
2. Limited export markets for Armenian IT products and services.	Support and ensure the presence of Armenia's IT products and services and "Armenian IT brand" at industry's major exhibitions.
3. Insufficient presence of prominent IT companies in Armenia.	Implement targeted long-term programs and engage prominent IT companies in the country's economy to improve Armenia's image and promote the "Armenian IT brand" with the help of their experience, reputation and contacts.

3.2. Co-operation involving universities and public research organisations

Various activities were undertaken directed to the development of cooperation with various R&D, IHE and scientific-educational institutions.

1. Armenian scientists are involved in the following FP7 projects:
 - Black Sea Interconnection. The project aimed at establishing local and international fiber optics quick-acting segments in Eastern European and Southern Caucasus countries and linking it with GEANT2 European Research Area. Geographical wide landscape and canals' high conductivity enable it utilize among Armenian, European Union and other scientific and educational area scientists and researchers to provide the development of the effective collaboration. BSI has been operating since March 2008. Among participants are Austria, Azerbaijan, England, Turkey, Greece, Georgia. National Academy of Sciences represents the Republic of Armenia in this project. As a result of the project implementation the telecommunication network will be established, which will promote the development of e- literature, e-learning and other services in Armenia, will expand the areas of informational technologies and measures, will promote the development of science, education and other spheres.

2. SEE - GRID e- Infrastructure for a regional science. The project aims at promoting the integration of the Armenian calculating resources with the international calculating resources through the joint quick-acting optic network and establishing calculating environment with high productivity. Scientists from Armenia, Switzerland, Bulgaria, Hungary, Albania and other European countries participate in this project. The Institute for Informatics and Automation Problems and Yerevan Institute of Physics participate in the project from Armenia. The cluster system ArmCluster with high productivity set by the Institute for Informatics and Automation Problems is the first in the region and is quite familiar to European scientists and experts. At the present ArmCluster is the largest supercomputer in Caucasus region with the peak performance 523.4 GFlops (Billion floating point operations per second) and 2 GByte memory per node. Being the most powerful supercomputer center in the field of science and education in Armenia the ArmCluster constitutes the core of Armenian GRID infrastructure.
 - The main goals of the creation of the cluster are:
 - Creation of a high-performance computation infrastructure and provision of efficient information resources to the research and technology organizations and centers in Armenia and South Caucasus region .
 - Development of intellectual software packages designed to back up the scientific researches .
 - Development of basic means for the integral medium of global real-time Automatic Control System, their design and testing, with Emergency Control Systems and its Seismologic Data-Processing Subsystems taken as examples.

3. IDEALIST - The network system supporting European projects referring to the informational and telecommunicational technologies. The project has been implemented in FP6 also. The system provides the information about potential partners for collaboration and liaises with partners from different countries to prepare the cooperative projects. The system has the database that contains the information about more than 50 thousand partners from professional centers as well as representations about in 50 countries. Information Society Technologies Center has a responsibility for the project implementation.

4. Yerevan State University launched the cooperation with the American Research Institute of South Caucasus, which structure includes universities of Chicago, Indiana, Illinois, Texas, and also Californian University of Berkeley and Los Angeles, Brown's University and New York State the University in Steinbruck. The current cooperation is shown in programs KIMEP, TEMPUS, DAAD, CRDF, IREX, ACIE and Fulbright, in activities with Institute of Eastern Europe Research at Warsaw University, with Russian Society of Friendship with Armenia, NATO Public Diplomacy Office, European Fund of Democracy (Brussels), USAID CAPS Project, the Armenian General Benevolent Union (AGBU), British Council and within the framework of the program "Yason". Now the grant of ISTC "National Computational Grid Infrastructure Development" is dedicated to the investigation of IT Infrastructure Library performance for computing Grids and development of the software prototype for effective adaptation of the library concepts to Grids and is performed in the IT Educational and Research Center of YSU.

The cooperation with various international educational organizations, including the European University Association, International Association of Universities, Eurasian Association of Universities, European Political Studies Network is continued. The cooperation is also continued with the American Councils, OSI AF, CRRG. In recent years the Department of Algorithmic Languages of Yerevan State University has successfully collaborated with New York State University to prepare specialists with advanced ICT competences on joint learning programs.

The signing of agreements with Thracian University of Greece, University Lyon-3 (France), University of Burgos (Spain) is planned. The memorandum with Southern Federal State University of Russian Federation (Russian Federation) was signed.

5. During the last few years the State Engineering University of Armenia (Polytechnic) has participated in different international programs, such as TACIS, TEMPUS, COPERNICUS, INTAS. The result of these programs was the establishment of the Faculty Development Center, Student Career Services Center and University-Industry Liaison Center. Some interanational grants in the ICT area have been realized: grant of SCOPES "Correct Wavelength-scale Computer Simulation of Resonant-cavity Light Emitting Diodes by an Advanced Method of Single Expression" (2005-2008), grant of ISTC "Development of Scientific Computing Grid on the Base Armcluster for South Caucasus" , (2007-2009). The university participates in a number of European and International Programs on University Management, Curricula Development, and Research. The projects realized by the staff of the University are financed by such international funds as: TACIS, TEMPUS,

COPERNICUS, IREX, The Institute of Open Society, USAID, DAAD, COST, EUROMED, INTAS, NATO, USIA, CRDF, EURASIA, ISTC, Mac Arthur Foundation etc.

6. Information Society Technologies Center (ISTC) was founded in 1999 as a spin-off from Discrete Modeling, Analysis and Recognition Department of Institute for Informatics and Automation Problems of National Academy of Sciences. Basic objective is the science intensive RTD, motivated by challenge of supporting development, implementation and wide use of information society technologies in Armenia, supporting the State and Society in Regulation in Knowledge Triangle - RTD, Education and Innovation. ISTC works in tight with IT Standardization TC of National Institute of Standards, FP7 ICT and INCO NCP Armenia, and INFOSO DG EC. ISTC carries out both theoretical investigations: Discrete Optimization, Cryptography, Logic, Algorithms, Intelligence, Distribution and Complexity; as well as Information Technologies Development: systems with Data Mining, Word Processing, Internet Automation, Image Processing and Understanding, Network protection, etc. ISTC is involved in Science Management and Outsourcing activities. Particular applications address systems for Earthquake Data Analysis and Special GIS; Software Agent systems, CSP models for WSN and Network Protection, OCR system for Armenian character sets, software for classification and prediction, Data stream analysis algorithms, Wireless Networks.

Example projects are:

- INTAS 96-952 Concurrent heuristics in data analysis and prediction;
 - NATO Linkage Grant HTECH-LG 96-1170 Distributed Information Systems for Critical Social Issues;
 - ESPRIT (ICIMS-NOE 9251)INCO COPERNICUS AMETMAS-NOE;
 - Extend Project;
 - People Programme;
 - A Network Of Excellence in Advanced Methodologies and Tools for Manufacturing Systems; Esprit 23802, INCO COPERNICUS Extension GEIXS, Geological Electronic Information Exchange System;
 - IST 12637 SPARTA, Security Policy Adaptation Reinforced Through Agents;
 - INTAS 00-626; Data Mining Algorithm Incubator;
 - INTAS 00-397; Data Mining Technologies And Image Processing: Theory And Applications;
 - 04-77-7173; Data flow systems: algorithms and complexity.
7. The UNL Programme is being developed by Institute of Advanced Studies of the United Nations University (UNU/IAS) in cooperation with research groups from around the world. The initial stage of the UNL Programme involves the development of modules for 17 languages the six official languages of the United Nations, Arabic, Chinese, English, French, Russian and Spanish, and the other eleven languages, German, Greek, Hindi, Italian, Indonesian, Japanese, Latvian, Korean, Mongol, Portuguese and Thai. In the future, all the languages of EU member states and the whole 189 member states of the UN will be involved sequentially. Armenian group of UNL researchers, particularly Institute for Informatics and Automation Problems of National Academy of Sciences of Armenia and Institute of Language Studies of the National Academy of Science of Republic of Armenia have shifted their researches focus beyond the application of new information and communication technologies thus emphasizing their attention to all the aspects of UNL investigations. The Armenian UNL-ARM team, which after detailed familiarization with the resources provided by the United Nations University and Institute of Advanced Studies about Universal Networking Language UNL, channels all its energy to the creation and development of Armenian module for UNL and research works for the way of presentation of Armenian language in UNL formats. After some successful and hard works the UNL site was created and granted by IATP of International Research and Exchange Program. The first phase of the linguistic works was funded by the United Nations Development Programme Project "Support to the Information Society and Democratic Governance". The main goal of the UNL Arm team is to add the Armenian module to the existing modules worldwide and allow people to translate their texts among variety of languages.

4. ICT Co-operation with other foreign countries

Armenia's IT market attracted many foreign investors within the last decade. There was a significant increase in the share of European (17-23%) and US contributions (70%) as compared with 2003. Approximately 70% of products and services of IT companies are exported to more than 20 countries. Currently over 200 IT companies operate in Armenia from which 50 are foreign companies (covering 30% of IT product market). The industry export generated approximately 60 million USD in 2006. Almost 60% of export goes to the US and Canada, 20% to EU countries, 16% to Russia and CIS countries.

Several cooperation agreements and memorandums of understanding were signed with other countries such as Republic of India, Arab Republic of Egypt, etc., as well as with such prominent international companies as Microsoft, Alkatel, Hewlett-Packard, Sun Microsystems, National Instruments, etc.

The organization of numerous events within the framework of IT Month and annual DigiTech specialized information, telecommunication and high tech international exhibition has become a tradition. The first international congress of Armenian technologies was held in San Francisco, USA in 2007.

5. Conclusions & recommendations

On 15 May, 2009 the kick-off meeting brought together the primary ICT stakeholders and informed them about the beginning of the ISTOK SOYUZ project in Armenia and the opportunities it provides to the national ICT domain. It was expressed the importance of international cooperation in ICT with the European Union countries and countries of EECA in the Framework Programmes (FP6, FP7).

The Framework programs of the European Union are a powerful facility fostering implementation of the innovation economy in Europe and other countries. Therefore participation of Armenian institutions in FP7 is a catalyst for creation of new technologies in the telecommunications of Armenia. Tightening cooperation with the European Union is rated as an important step towards further RTD progress in ICT and is the way of better integration of Armenian research organizations into the European Research Area.

Annex 1: Overview of ICT Policy Documents

Main policy documents concerning ICT policy adopted/published since 2003

Title of document (in English)	Date (of approval, publication, etc.)	Organisation responsible (Ministry, etc.)	Legal status (Law, Government Decision, strategy (white) paper, action plan, etc.)
On Adoption of the Programme of the Government Support on ICT Sector Development for 2009	December 25, 2008	RA Government, RA Ministry of Economy	Government Decision
On Approving the Information Technology Sector Development	August 28, 2008	RA Government, RA Ministry of Economy,	Concept Paper, RA Government decree No35,
On Electronic Document and Electronic Digital Signature	December 14, 2004	RA Government	RA Law NՀO-40
On Electronic Communication	July 8, 2005.	RA Government	RA Law NՀO-176
The National Statistical Monthly Report Form for Information Technologies (form No 1-IT).	2005	RA Statistical Service	Report Form

Annex 2: Overview of ICT Policy Measures in the country

N	Title of ICT policy measure	Overview
1	Legal Framework	Review, elaborate or develop a legal framework contributing to IT growth in line with international standards and strategic aims of successful countries, define and ensure that effective enforcement Mechanisms.
2	Financial and Economic Incentives	Implement grant programs with private and public sector involvement targeted at R&D development and start-up companies. Establish investment and venture funds with the involvement of the Government to support industry companies and assist in the implementation of targeted programs.
3	Education	Implementation of targeted programs to improve computer literacy in education (from schools to higher education institutions), state system, public centers etc. Creation of educational-informative environment and content, implementation of modern ICT tools, educational process management and distance e-learning systems in educational system, training of professors, use of modern teaching methods. Design mechanisms for assessment of workforce demand and management of graduates' quality.
4	International Partnership	Establish and enlarge partnership with countries with successful IT industry and corresponding international institutions, join international IT organizations, conventions and programs. Implement targeted long-term programs. Develop Armenia's image as regional IT center by assisting regular implementation of internationally significant events.

Annex 3: Key ICT stakeholders in the country

N	Full name of organisation	Contact person	Position	Email	Role (function) of the organisation in the ICT sector: eg. policy maker, infrastructure organisation, R&D institute, funding agency...
1	The National Academy of Sciences of Armenia	Yuri Shoukourian	Vice-President of NAS RA, FP7 NCP Coordinator in Armenia	shouk@sci.am	Policy maker
2	ITDSC	Armen Grigoryan	Secretary	secretary@itdsc.am	Infrastructure organisation
3	RA Ministry of Economy	Vache Kirakosyan	Head of IT Department	vkirakosyan@mineconomy.am	Policy maker
4	Yerevan State University	Rouben Topchyan	Head of Department	rouben@ysu.am	University
5	Yerevan State University	Samvel Shoukourian	Head of Department	samshouk@sci.am	University
6	Enterprise Incubator Foundation	Garegin Choukaszyan	Head		Infrastructure organisation
7	Institute for Informatics and Automation Problems	Vladimir Sahakyan	Director	iiap@sci.am	R&D institute

Annex 4: Relevant documents (reports...)

1. IT industry was proclaimed as a priority sector of Armenian economy by the Government of the Republic of Armenia in December 28, 2000.
2. In 2001 ROA Government asserted the “RA Concept Paper for the Development of the Industry of Information Technologies” .
3. Information Technologies Development Support Council (ITDSC) was established by the Order No ՆՂ -896 of the President of the Republic of Armenia July 20, 2001.
4. Enterprise Incubator Fund was established by ROA Government Decree N 1165 of November 27 under the credit agreement signed with the World Bank.
5. 2001 “Viasphere Techno-Park” has been operating, having more than 30 IT companies operating on its territory.
6. As a result of cooperation with RA Ministry of Economy the RA Statistical Service has developed and started to use the national statistical monthly report form for Information Technologies (form No 1-IT).