Project Report

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Authors (organizations) :

Givi Kochoradze (GRENA)

Abstract :

This document presents the national ICT R&D environment in Georgia. It's an update of an older document created under EXTEND project.

1. THE ICT R&D ENVIRONMENT IN GEORGIA

1.1 The National ICT Sector and its Governance in Georgia

1.1.1 The National ICT Sector

Information and Communication Technology (ICT) plays important role in development process of the Georgian economy. As the result of economic reforms carried out in Georgia the liberalized and de-monopolized market was settled in the country. There is the favourable environment for investments and for implementation of new services and info-communications means. Competition is progressively developing which positively effects on the service quality and its accessibility for the population.

Regarding the Governance of ICT sector in the country it must be underlined that the Ministry of Economy and Sustainable Development is responsible for policy development from the government in the field of ICT. At the same time the mission of the Ministry of Economy and Sustainable Development is to provide stable and high temps of economic growth with working up and implementation an effective economic policy. The government of the country is implementing consistent structural and institutional reforms with aim to provide most favourable business environment.

In 2000 the national regulatory authority in ICT - Georgian National Communications Commission – (GNCC) has been established in Georgia. The GNCC is governed by very strict rules implying transparency, independence, consultation and conflict of interest avoidance.

On the other side ICT sector is one of the component part (subject of teaching and development) for the most Georgian universities, high education schools and research institutes in which there are several ICT specializations and scientific directions. There are private companies, SMEs, NGOs in the field of ICT (especially in telecommunication area), which are mainly working as a service developer and provider companies.

For stabile and secure communication among the governmental bodies Georgian government has launched Georgian Governmental Network (GGN) project that has started in November 2006. The first phase of project was accomplished and the Georgian Governmental Network was connecting more than 800 of different ministries and agencies. There is established network management center, maintained installation and switching in the net of IP telephony and also its technical service. At the same time mentioned network offers the customer the wide Internet services. In parallel almost all ministries started development of e-services. In 2010 the Data Exchange Agency (DEA) was created. The mail goals of DEA are following:

- E-Governance development,
- Creation of the data exchange infrastructure,
- Information security.

In 2008 creation of the Georgian school network and its connection to the Georgian Governmental Network started. In 2011 all Georgian schools and resource centres where connected via Virtual Private Network.

The modern technologies based GGN stipulates the development of IP protocol-supported, integrated and protected VPN type of computer network all over the Georgia that enables the online interconnection of governmental bodies, exchange of any type of digital data between central and regional agencies, considerably decreasing the communication costs of state authorities, allowing the use of high-speed, as well as that of the ordinary internet access at affordable rates.

1.1.2 The ICT Governance System in the country

The governance of ICT sector in Georgia is conducted by the Ministry of Economy and Sustainable Development. Namely, inside of the ministry there is the department of ICT, which is responsible for the policy in ICT development and management. At the same time Georgian National Communications Commission is a high level coordination structure making regulation and coordination in ICT sector. In R&D field the main actors are state universities and scientific institutions. The private sector is represented by telecommunication and information technology companies with total annual revenue in range of several hundred million USD. There are the small ICT companies and NGOs as well, which are involved in the process of service and education. There are quite a few companies in Georgia which are engaged in the process of technology transfer from the country.

The telecommunications sector in Georgia is well organised in terms of trade associations, with the Telecommunication League, Broadcasters Associations, Cable TV Association and Internet Association defending the interests of their respective sectors. These associations are involved in the consultation processes of the Georgian National Communications Commission and they are effective interlocutors on behalf of their particular part of the industry.

1.2 Trends in the National ICT Sector and in National ICT Policy Objectives

1.2.1 Trends in the National ICT Sector

Public switched telephone network

In 2008 the modern digital switches amounted 92.3 % of general capacity of installing switches. In 2008 the number of the public switched telephone network's subscribers reached 674730 comparing with 570000 in 2005. In 2008 the penetration of the public switched telephone network in the country on per 100 inhabitants reached 15.4%, in the urban areas – 27.9%, and in rural areas – 1.6%.

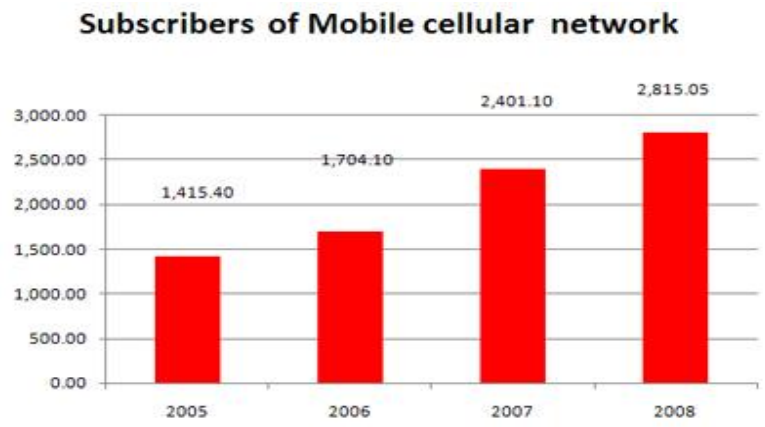
The biggest share in the PSTN service segment belongs to the JSC "Silknet". Combined shares of three companies, those of Ltd "Akhteli", Ltd "New Net" and JSC "Silknet" reach more than 95% in this segment.

Ltd "GTC", Ltd "MagtiCom" and JSC "Silknet" offers the customers CDMA standard wireless fixed telephone services. The number of wireless fixed telephone services subscribers increasing day by day and reached approximately 85000.

Mobile cellular radiotelephone network

In 2008, number of active subscribers in mobile networks grew up from 1415400 subscribers (in 2005) to 2815055 (in 2008).

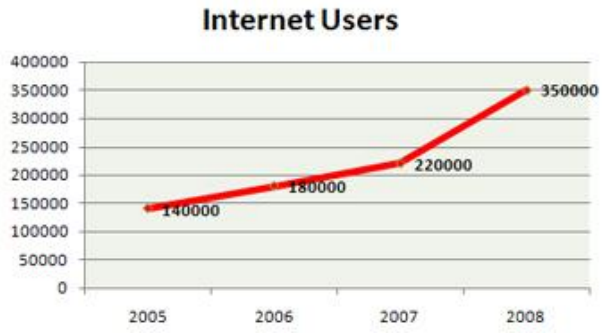
In 2005 the penetration of the active subscribers of the cellular phone networks reached 32.7% on per 100 inhabitants, while this number in 2008 was 64%.



Rapid expansion of the mobile service has significantly eased the access issue for urban as well as rural areas of Georgia. The growth of the cellular telecommunication segment is one of the highest parameters of the Georgian telecommunication sector. Three dominant companies Ltd "Magticom", Ltd "Geocell" and Ltd "Beeline" covering more than 95% of the populated area. All three companies have already developed 3.5G systems in Georgia.

Data transfer and internet network

The number of users switched to the Internet increased up to 350000, comparing with 140000 in 2005.



The number of data transmission and Internet users is increasing day by day. On the ISP market works 18 internet service providers. Four providers are offering wireless broadband services (Wi-Max) for individual and business users. Customers are free to choose a provider. ISPs are subject to class authorization. Past years three major ISPs have merged and were created Ltd "Caucasus Online".

In 2008 "Caucasus Online" constructed high capacity an undersea fiber optic link between Poti (Georgia)-Balchik (Bulgaria) (total bandwidth of nearly 1.3 Terabits) and Georgia directly

connected to the Global Internet network. This project makes positive influence on Georgian ICT sphere. In addition Georgia has direct fiber optic cable connections with Azerbaijan, Armenia, Russia and Turkey.

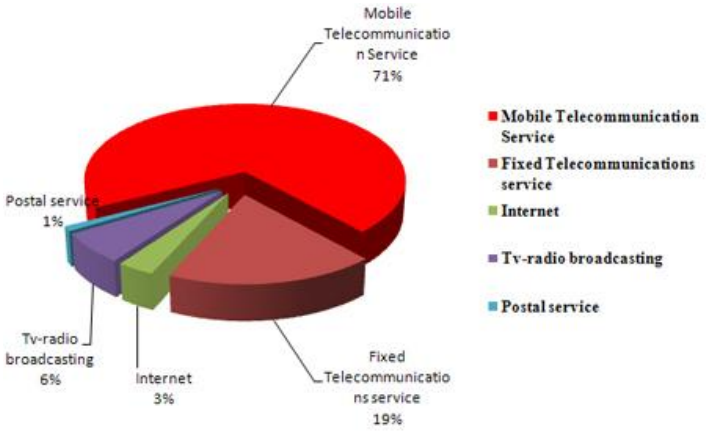
TV and radio broadcasting

TV broadcasting covers the 96% of the whole population of Georgia, radio broadcasting – 90%. It is considerable.

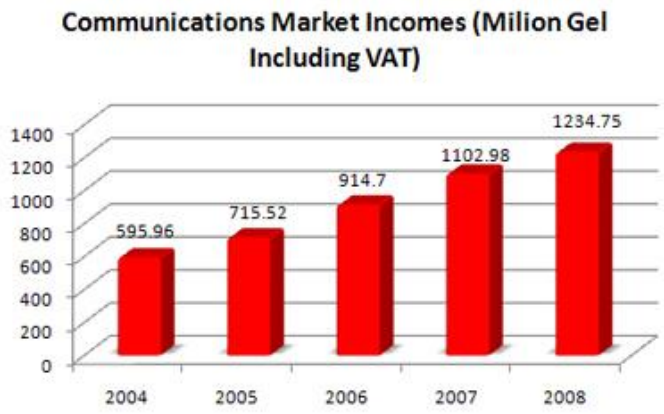
The main economic indicators of the field

In 2008 increasing tendency remained at the telecommunications market. In 2008 the field income amounted 1248260000 GEL comparing with 595960 GEL in 2004, which can be considered as indicator of the success resulted from the reforms. The increase is 109.5%. Communications market income dynamics is brought below.

Communications market in segments – 2008



In 2008 market share of the mobile telecommunications was 71%; fixed telecommunications – 19%; Internet – 3%; TV-radio broadcasting – 6%; postal service – 1%.



1.2.2 National ICT Policy Objectives and Trends

REGULATORY ENVIRONMENT FOR ONLINE SERVICES
Digital Signatures

From 2000 onwards, the State Department for Informatisation created five draft laws on e-commerce, one version of which consisted of eight chapters and forty-four articles and covered information provision, e-documents, document copies, electronic signatures, verification, ownership of e-signatures, and various other ecommerce issues. Some of these proposals were technology specific and therefore not in line with international standards. Other significant issues raised by industry were that the draft laws included requirements regarding the government licensing of digital signature providers, the impossibility of anonymous or pseudonymous transactions, and inadequate concern for consumer data privacy.

The ICT department of the Ministry of Economy and Sustainable Development is responsible for the issue of digital signatures. The draft legislation described above is being used as the basis for work in this policy area.

The current draft law on e-commerce retains its very broad scope (divided into sections on digital signatures, digital documents and electronic commerce). Progress has been slow partly due to the need to iron out some of the flaws created during the initial drafting process and to focus on harmonising the new Georgian law with the experience and approach of EU e-commerce and e-signature legislation, as well as the United Nation's model e-commerce law. It is also necessary to amend the draft in order to adapt to recent changes in Georgian law.

Payment Systems

In the absence of a comprehensive e-commerce regulatory framework, e-payment systems have not been in great demand. However, development of services is started, despite the absence of a detailed legislative package. For instance, the TBC bank has been quite active in international e-payment projects. TBC Bank joined SWIFT in 1996 and is integrated into the Visa Electron credit card system. Currently all Georgian Banks are providing a basic range of online services to customers, including the purchase of phone cards, utility bill payments, accessing historical data, and other account status operations.

E-Commerce

According to interviews carried out for this study with ICT organisations in Georgia, about two third of businesses have websites, although no clear statistics are available regarding either how these can be divided between SMEs and large organisations or between sites that target B2C and B2B. During last few years e-commerce developed significantly in Georgia.

E-Government

E-Government is started in Georgia, several ministries and governmental agencies are implementing e-services to the population of the country. At the Data Exchange Agency creation of Global Governmental Gateway is under development. G3 is a complex of hardware and software, which creates unified geographically, distributed information system for the entire country. Institutions integrated in the system are able to safely exchange information via e-services. Data Exchange Infrastructure connects various information systems at minimal cost for their owners. For those existing information systems, it is only necessary to add data adapter, which provides connection with unified system. The above mentioned measure will enhance information availability and guarantee its safety. Additionally, the system will create opportunity to establish new combined e-services for streamlining the process of communication with citizens and governmental organizations.

E-Health

Currently Ministry of Labor, Health and Social Affairs is providing the following e-services:

- **Case Registration System -** Register and react to medical cases in real-time in-stead of retrospectively, inspect, analyze it and react accordingly on medical cases.
- **Birth and Death Registration -** Electronic system of registration medical notices about births and deaths.
- **Cardio surgery -** Electronic lists of patients waiting for operations within state program of cardiac surgery.
- **Health Care Providers -** Health care facilities involved in state healthcare programs and their contact information.
- **Classification Module -** The system helps parties to receive accurate and comprehensive information on medical classifications.
- **Reporting Module -** This module enables providers to submit information electronically to contractors for pulled service.
- **Ambulatory Module** United database, where are registered all beneficiaries by medical facilities.
- **Analytical Module -**Based on different indicators flexible tool for information flow monitoring and analysis.

E-Learning

Several universities are in process of developing their distance learning programs (Tbilisi State University, Georgian Technical University, Chavchavadze State University, Caucasus Business School, etc). In addition the Georgian Research and Educational Networking Association GRENA is running Distance Learning Center for ICT education.

1.3. R&D ICT Co-operation with the EU and foreign countries

1.3.1 R&D ICT Co-operation with the EU

Georgian private companies have successful cooperation with same foreign companies. For example "Magticom" company is cooperating with Metro Media (USA). With the efforts of Georgia Internet provider –"Caucasus Online" and with financial support of European EBRD Bank under the Black Sea Poti (Georgia) – Balchik (Bulgaria) optical cable was constructed. Company "GeoCell" is became partner of leading European company "Telia Sonera". There is close cooperation between Georgian "Global Erty" company (Telecommunications, International and long distance calls, Internet services, Telephone numbers, and data transmission) and Russian companies "RosTelecom" and MTT. "Global Erty" company has cooperation with TVI Connect (Netherlands) company as well. Company "Silknet" is cooperating with Kazakh Telekom, etc.

Licensing and Authorisation

In Georgia, licences are required for fixed and mobile telecoms operators, cable operators and Internet service providers. Licensing obligations are based on the Law on Communication and Post (1999) and the Law of Georgia on Principles for Issuing Entrepreneurial Licences and Permits (2002).

There are also some fundamental problems, such as the technology specificity of the licensing requirements in the Law on Communications and Post. In particular, all the technologies requiring licensing are specifically enumerated, meaning that any new technology would not automatically be covered. General authorisations are provided for in the Law on Communications and Post, but the requirements are generally considered by industry as being too narrow to be of practical value.

Article 20 of the Law on Communications and Post (1999) gives the GNCC the right to assess available spectrum and distribute it with the assistance of other "interested" (undefined) agencies, assign radio frequency, supervise compliance with conditions of licences and take action where the law has been violated.

The 2.4GHz and 5GHz bands are not subject to licensing requirements. ISPs and data transmission companies (who already have a licence) can be given a permit for use of these bands.
There are, in total, six different types of permit related to Wi-Fi use (independent of the licences needed if the entity is a telecommunications provider) and separate from the registration of the equipment itself.

Mobile Services

The Georgian mobile market consists of three GSM and CDMA operators and accounts for 60 percent of income in the telecommunications market according to GNCC estimates. The three players currently on the mobile market are GSM operators Magticom, Geocell and Beeline. Virgin Islands-based company Bloomfin won an auction for a GSM licence in February 2006, paying 71.9 million GEL (33.12 million Euro). Telenet was also planning a CDMA-450 network covering the whole territory of Georgia in order to provide broadband and voice services. With regard to 3G licences, one 800 MHz (3x) band was auctioned in June 2005. The auction attracted three bidders

and was won by Magticom. During the course of the auction, the bid went up from an initial 5 million GEL (2,305,426 Euro) to a final price of 26 million GEL (11,992,366 Euro).
A second 3G licence was auctioned in February, 2006. The initial price was set at 8,491,392 GEL (3,911,371 Euro) and was won by new entrant Argotex Ltd for 9,191,728 Euro. Argotex subsequently sold the licence to Magticom, having never launched services and having paid one third of the licence fee. A third licence was auctioned in May, 2006. With an initial starting price of 3.9 million Euros, the auction was eventually won by Telecom Invest Georgia with a bid of 8.6 million Euros.

ICT Education

There are several large scale projects at the Ministry of Education and Science to develop ICT at secondary schools of Georgia. In 2011 all 2200 schools were connected the Internet. All schools were equipped with modern computers and other IT equipment; in addition all fist class students are receiving Netbooks. There is program of e-books library for students of secondary schools.

1.3.2 Co-operation involving universities and public research organisations

Until now cooperation with European Commission framework programs was assisted by the National Contact Points of EC in Georgia in ICT. During the period 2000-2011 were carried out a lot of projects in the frame of **FP6 and FP7 programs** (Tristan-East, Idealist-East, Idealist-Extend, Idealist fp7, Idealist 2011projects, Extend, etc.).

There were implemented a lot of projects in the frame of **TACIS program** ("Creation of effective model of science administration, review of EU experience and elaboration of recommendations for science policy together with the Ministry of Education and Science of Georgia, with its implementation"; "E-Society", "European studies", etc.).

International scientific-technological foundations - **ISTC and STCU** have very fruitful activity in Georgia. Until now ISTC supported the local and international projects in the country (in all fields of science, including ICT) to the amount of about 33 million USD. The same statistics in regard of STCU is – about 10 million USD.

Target initiative program was launched by Shota Rustaveli National Science Foundation with STCU and CNRS concerning joint funded projects, in which one of the main directions was ICT.

During the years was very active participation of Georgian scientists in INTAS programs (was accomplished in 2007).

There were implemented several projects implying case-studies in ICT such as:

1. **Deer Leap Project** – concerning computerization of public schools of Georgia;
2. By the Research and Educational Networking Association (GRENA) was coordinated the EU funded TACIS project **Development of e-Societies in South Caucasus (**Armenia, Azerbaijan and Georgia). This project gave a prime opportunity for the introduction of modern online educational services with state-of-the-art courseware (e-Content) to be developed in close cooperation with mainstream education institutions in the region.
3. European Commission funded Tacis project – **European studies.** The Institute for European Studies (IES) was established at Tbilisi State University and is an MA in

European Studies (MAES) Program operational since 2006. The IES has involved 4 Faculties in this Master Diploma, aiming to provide the students with the best knowledge about Europe.

4. Project **Electronic Caucasus** implied Creation of the infrastructure for development of information-oriented societies in the countries of Transcaucasia;
5. The main goal of the NATO **Virtual Silk Highway** project was to bring highly cost effective, global Internet connectivity to the National Research and Educational Networks (NREN) in South Caucasus (Armenia, Azerbaijan and Georgia).

List of some projects in EC FP6 program

1. Distributed Optical Gateway from Eastern Europe to **GÉANT/Porta Optica Study**.
2. Project – **"Organizing Caucasus and Central Asian Internet Offerings to NRENs/OCCASION".**
3. **Tristan-East** project aimed training and education of Georgian multipliers for receiving experience in preparation of European Commission framework projects.
4. **Idealist-east** project main objective was involvement of Georgian scientists in FP6 partner search system in IST.

Some projects in 7th Framework Programme

1. **Black Sea Interconnection/BSI** project. Project intended bridging the digital divide that exists between the South Caucasus countries and Europe by establishing connectivity for research and education networks in the South Caucasus countries to GÉANT2. In addition, operational support supplied from the partners to achieve the sustainability of the network.
2. **E-Infrastructure for regional eScience (SEE-GRID-SCI)** project**.** The project was the leverage the SEE e-Infrastructure to enable new scientific collaborations among user communities. SEE-GRID-SCI stimulated widespread Infrastructure uptake by new user groups extending over the region, fostering collaboration and providing advanced capabilities to more researchers, with an emphasis on strategic groups in seismology, meteorology and environmental protection.
3. The goal of **IncoNet EECA (**Eastern Europe and Central Asia) project is to set up a sustainable, knowledge based, bi-regional dialogue platform between stakeholders from the EU-Member States /Associated Countries and from the countries of Eastern Europe and Central Asia. The project will facilitate a coordination of S&T policies building on common interest and aiming at mutual benefit in order to strengthen the cooperation between EU and EECA.
4. The **BS-ERA.NET project** aims to develop and strengthen the coordination of public research programmes conducted at national and regional level. The project provided a framework to network and mutually open national and regional research programmes, leading to concrete cooperation in the frame of a Black Sea Research Programme (BSRP) conducting to the development and implementation of joint activities in the region. The main goal of the BS-ERA.NET is transnational cooperation based on the bilateral and/or regional national programmes or transnational cooperation including intergovernmental structures.
5. The aim of **Idealist 2011** is focused on: reinforcing the ICT NCP network by promoting trans-national cooperation; Identification and promotion of good NCP practice; Provision of training and twinning measures tailored to the specific needs of ICT NCPs;

Provision of a quality checked Partner Search for the proposers; Raising the awareness for NCPs' services including the performance of practical initiatives which benefit cross-border audiences, etc. It contains a series of subsidiary objectives defining steps necessary to achieve the overall target of the project, namely a significant improvement of the ICT NCP service throughout Europe.

6. The **INNOTRANS** project was initiated by Estonian Ministry of Foreign Affairs in 2008 in the framework of development co-operation support. The project implied interactive training and study visits. The main target group for the project was Georgian civil servants dealing with Research & Development & Innovation (RDI) policy, Georgian technology transfer and innovation support structures' managers, leading scientists and administrators at Georgian R&D institutions.
7. NATO project **Establishment of Connectivity Nodes in South Caucasus Countries.** In this project pparticipated 3 Caucasus companies ARENA, AzRENA, GRENA and GRNET from Greece. Main goals of the project comprised: Establishment of backbone connectivity node in each beneficiary country and their connection to BSI-GÉANT channel by fiber optics. Performing training in new type of services and network security that are available in GÉANT; Support in implementation of new services and network security features.
8. STCU project **Creation of Integrated information space in the frame of GUAM for the distance scientific-technological collaboration and learning.** The main goals of the project were: To create United Informative Space (UIS), which will be single centralized database, in which information comes from the national servers and vice versa. At the same time UIS represents standardized informative flows between the bases of mentioned clients in the real mode of time. Project implied integration of national S&E networks of GRENA, UARNET, AZRENA and CIRN in united corporate network and incorporation of indicated national servers in it.
9. **European Grid Initiative: Integrated Sustainable Pan-European Infrastructure for Researchers in Europe InSPIRE** project. Distributed Computing Infrastructures (DCIs), encompassing both high-performance and high-capability computing resources have become a vital Research Infrastructure that underpins collaborative research activities within Europe and beyond. The integration of secure controlled access to distributed storage and computing resources, through middleware and high-performance research networks, will enable researchers to deal with the data deluge coming from today's research instruments (e.g. LHC, telescopes, computer simulations and micro-array analysis).
10. **High-Performance Computing Infrastructure for South East Europe's Research Communities HP-SEE** project. HP-SEE focuses on a number of strategic actions. First, it will link existing and upcoming HPC facilities in the region in a common infrastructure, and provide operational solutions for it. As a complementary action, the project will establish and maintain GEANT link for Caucasus. Second, it will open this HPC infrastructure to a wide range of new user communities, including those of less-resourced countries, fostering collaboration and providing advanced capabilities to researchers, with an emphasis on strategic groups in computational physics, chemistry and life sciences.
11. **Policy dialogue in ICT to an Upper level for Reinforced EU-EECA Cooperation PICTURE project.** The overall aim of the project is to engage the EU and EECA stakeholders from across research, academia, industries, government and civil society to enrich and support the EU-EECA ICT Policy Dialogue, and to reinforce strategic partnerships between EU and EECA ICT organizations.

1.3.3 ICT Co-operation with other foreign countries

There is close cooperation among Georgian with USA scientific and commercial organizations, which was established with the help of Georgian Research & Development Foundation (GRDF). The mission of **GRDF** is: to develop the Georgian scientific-engineering potential and to promote research and development activity in priority fields. During the period 2000-2011 by GRDF, in Cooperation and financial support of CRDF foundation (USA) were conducted the following important programs including development of ICT sector in the country: Business Partnership Grants Program; Georgian National Science Scholars (NNS) Program; Science and Technology Entrepreneurship Program (STEP) Business Partnership Grants (BPG); Georgian National Science Scholars (NNS) Program and others.

Staff members of the Shota Rustaveli National Science Foundation **(RNSF)** were actively involved in the implementation of the NATO Individual Partnership Action Plan (IPAP). A National Information Point (NIP) of the NATO Program "Security through Science" functions at the Rustaveli National Science Foundation is fully engaged with the dissemination of relevant information and provision of consulting assistance to Georgian scientists. Georgian National Science Foundation has close relations with BSEC in S&T sphere. RNSF staff members systematically participate in the meetings of the Working Group on Science and Technology of the BSEC member States.