Information Technology Prospects in the Caucasus
1st ISN Executive Conference

Tbilisi, Georgia, June 13-15, 2001

Sponsored by the
International Relations and Security Network (ISN)
(Switzerland)

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Foreword

The International Relations and Security Network ISN is one of the leading actors and implementing agents in information technology (IT) for the Partnership for Peace (PfP) community. As such the ISN serves as a main repository of data, information, knowledge and expertise on information technology trends and dimensions in PfP countries and regions. To this end, the ISN organizes, sponsors and participates in a series of Executive Conferences designed to analyze and evaluate the course of the information revolution in all PfP regions: Central and Eastern Europe, the Balkans, Southeastern Europe, the Baltics, the Caucasus, and Central Asia.

What follows is a summary of the results of the ISN's First Executive Conference on Information Technology Prospects in the Caucasus held at ministerial level at the Sheraton Metechi conference facility in Tbilisi, Republic of Georgia, 13-15 June 2001. The ISN is a Swiss government contribution to PfP and is run by the Center for Security Studies and Conflict Research at the Swiss Federal Institute of Technology. The ISN Executive Conference series is an official Swiss PfP contribution and is inscribed in the Partnership Work Program area of cooperation Defense Policy and Strategy. It draws upon the best available expertise and resources on the topic and emphasizes multidisciplinary analysis, including technological trends, economic opportunities, legal challenges, social implications and political ramifications. The ISN Executive Conference aims at:

- Developing PfP knowledge on the relationship between the IT revolution and the work of high-level security and defense policy-making
- Developing PfP competencies associated with sensitive technical and policy positions at the intersections between IT and policy
- Proposing fresh perspectives for planning, evaluating, and implementing institutional and organizational reforms in the context of IT
- Promoting PfP capacity to relate virtual and real components of information in critical phases of decision-making

The ISN Executive Conference series is designed to provide selected participants with a well-balanced perspective of the problems and opportunities presented by IT to security policy in general and to specific strategic-military domains in particular. A careful blend of geo-strategic (military-technical) and geo-societal (social-political) approaches are presented and discussed by renowned regional and international experts.
This First ISN Executive Conference on IT Prospects in the Caucasus achieved all of these objectives. Sponsored and organized by the ISN in cooperation with the National Information Learning Center (NILC) in Tbilisi, the Georgian Research and Educational Networking Association (GRENA) in Tbilisi, the Georgian Political Science Association (GPSA) in Tbilisi, the International Center for Human Development (ICHD) in Yerevan, and the International Research and Exchanges Board (IREX) in Baku, it brought together some 150 representatives from governments, ministries, the corporate community, academia, the non-governmental sector, and the diplomatic community. The following countries sent official political delegations: Georgia, Armenia, Azerbaijan, Ukraine, Germany, Switzerland, and the United States.

Why was the ISN Executive Conference series launched?

First, the Executive Conference is a results-driven meeting with a clear set of objectives, means and visions. It assembles some of the best minds working on IT issues in the various PfP regions. It does so in order to identify, analyze and evaluate the key trends and prospects of the information revolution in four strategic domains: technology, economics, politics and society.

Second, the results and findings on the strategic direction of IT in various PfP regions are instrumental for a number of key IT initiatives in the NATO PfP program. There is a significant lack of a clear understanding of not only what exactly the current state of IT is in PfP regions, but also of the direction that technological innovation and research and development are taking. By making the findings of this conference freely accessible through the present publication to the

PfP community, the ISN can make a significant contribution to enhanced decision-making on IT matters on various fronts. Indeed, as Switzerland has assumed a lead role in IT initiatives in and for the PfP community along with other partner countries, awareness and knowledge of IT prospects in the PfP region have transcended mere academic interests and have become crucial and instrumental for the implementation of projects.

When examining IT aspects in PfP regions, three issues come to mind: the digital divide, webspace-losers and webspace-users. With the declining myth of the Internet and the crumbling of idealistic notions of a global village, these three notions - the digital divide, webspace losers and webspace users - have become a central concern. New technologies can be used for different purposes than the ones for which they had been originally designed; new technologies, once introduced, do not replace, but complement existing technologies. These two phenomena have certainly been one important reason why we have bid farewell to exaggerated expectations and hopes of the digital revolution.

While the 1970s focused on the "microelectronic revolution", and the 1980s on "telematics", the 1990s became symbolized by the letter "e" - "e" for "e"-banking, "e"-commerce, "e"-learning and what not. Indeed, an information and knowledge-based economy has replaced an economy based on material goods. While the extent to which this substitution has occurred has varied and still varies from country to country, it has occurred universally to some extent. Knowledge, not labor, has become a key factor of productivity. What has happened in this transition, however, is something that is frequently disguised and overlooked: the move from the industrial age to the information society has been pushed rhetorically by smart marketing strategies of providers of new technologies and services.

Business interests and objectives have been pursued - legitimately, one might add - on the basis of a marketing strategy that sought a greater acceptance of these modern technologies by public opinion. Plenty of room and attention has therefore been given to "e-commerce" in that regard, but virtually none to "e-nequality", or the digital divide. The digital divide refers to both the rift that exists today within countries and between countries. Why is this important?

New technologies - and we see this everywhere - have a tendency to fragment societies. The business community generally delegates the resolution of this problem to governments and the political process and pursues a networking strategy in order to continue to sell products and services.

By looking at information technology trends and prospects in four dimensions, the ISN Executive Conference series attempts to distance itself from both technological determinism and technological imperative. The information revolution is not as ineluctable and automatic as the industrial revolution; economic interests have had an important triggering effect, as have cultural conditions and public policy. Further, technological innovations do not necessarily determine the direction of social change either. In fact, we have seen time and time again that power structures of societies have proven remarkably resilient to the emancipatory use of information technology and communication networks.

As moderators and coordinators of framework conditions for information technology, governments need to move beyond the creation of favourable investment and production environments for IT corporations. What is also needed is an awareness of the diverse interests and social consequences in the implementation of network-based technologies and organizations.

Access is important and basic. The more important question, however, remains: how can people generate and maintain web-based information in order to improve their lives? In other words, it may not be enough to create good conditions for e-commerce and e-government. What is at least as important is to generate the sustaining conditions for equality of opportunity for network accessibility. For this reason, the ISN also invites representatives from renowned institutions and foundations which have worked on these issues. As Georgia, Azerbaijan and Armenia restructure their regulatory and legislative environments to encourage investments, and as they work on extensive infrastructure programs along with major international partners, this is an important point for consideration.

The ISN Executive Conference on IT prospects in the Caucasus has generated some answers to pressing questions. Discussions were lively, productive and stimulating. The Conference was held in a working atmosphere and came to a successful conclusion.

Special thanks go to the co-organizers from Georgia, Armenia and Azerbaijan, notably Zviad Kirtava of NILC, Ramaz Kvatadze of GRENA, Ashot Khurshudyan of ICHD, Vitali Izmaylov of IREX, Stephan Libiszewski of the Swiss Mission to NATO, Walter Kaffenberger of the NATO

Science Committee and the conference staff of the Sheraton Metechi in Tbilisi, Georgia. The ISN would also like to extend its gratitude to the Ministries of Information and Informatics of Georgia, Armenia and Azerbaijan for their support.

Zurich, July 2002

Michel Hess, PhD
ISN Coordinator

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Executive Summary
Technological Track

Objectives - of the technological dimension track were:

- To understand situation with information technology in Armenia, Azerbaijan and Georgia.
- To define problems in the development of IT in the region and fined possible ways of their solution.
- To discuss application of the existing information technology taking into account realities in the communication systems of the region.
- To define role of International Organizations in the development of Internet in the region.
- To discuss technical possibilities of collaboration in IT between the countries of the region and define fields of application of the existing infrastructure.
- To discuss questions of the future collaboration in information technology between ISN and IT organizations in the region.

Agenda/Content - during three parallel sessions of technology dimension track eight talks were presented and summary of intermediate and final results were discussed on two plenary sessions.

G. Giuliani present a short outlook of possible IT trends and technologies over a timeframe of the next 10 years. The following questions were discussed:

- Internet as a global and decentralized communication computer network with common protocols.

- Human computing: speech understanding, natural language processing, adaptive systems and interfaces learning systems.
- Connected world: distributed operating systems, wired and wireless networking, bandwidth explosion and Internet growth, E-commerce/business.
- Silicon world: shrinking computer, mobile computing.

The main conclusion was that IT technologies are developing really fast and in some cases even became outreach of the demand of society.

V. Izmailov described history of Internet development in Azerbaijan with information about calendar, type of services and prices for these services. The detail description of current situation with IT technologies in Azerbaijan has been done. The total connectivity map, number of ISP's and registered users, number of hosts according to RIPE, international projects on IT development in Azerbaijan were discussed.

The short overview of Azerbaijan content on Internet has been made: local portals, search engines and other resources. Local resources are still very limited which restricts number of users in the country.

The following problems of Internet development in Azerbaijan were underlined: legislation, bad quality and high prices of communication, difficulties with domain name registration and problem of the unique national fonts.

Based on the experience of UNDP activities in Azerbaijan S. Gadjiyev drown attention to several examples how International Organizations can contribute to the ICT development in the country. One of the most impressive country-level ICT effort initiated, formulated and implemented in close partnership of the government and UNDP is Data Transmission Network of the State Customs Committee. The network has been successfully installed connecting 12 regional offices and customs checkpoints with the central office of SCC. In addition, institutions such as the State Committee for Statistics, the Ministry of Economic Development and National Bank is also benefited from the enhanced and transparent data gathering process. It is planned to complete the Data Transmission Network country-

wide. Special customs clearance and control system will be introduced to bring to the minimum direct contacts between customs officers and clients.

Another example of UNDP intervention in the ICT development in Azerbaijan is the assistance in preparation of the country electoral data transmission concept and implementation of elements of electoral data transmission network. The EU and UNDP jointly funded Drug Control project for Armenia, Azerbaijan and Georgia.

Following increasing demands for ICT experts UNDP with UNESCO and State Committee for Science and Technology established the training centers in information and communication services in Baku, Sumgayit and Nakhichevan.

UNDP is taking an active part in the preparation of the National Strategy of ICT for Development in Azerbaijan.

T. Pitskhelauri presented one solution for the establishing computer network in the Kakheti region of Georgia where communication system is in bad condition. For the connection of scientific and educational institutions of Telavi (Kakheti Region) to the Georgian research and educational network radio-bridges Aironet BR-2000E and 24 dbi antennas placed one on 160 m height on the Tbilisi TV tower and other on 40 m height on the TV relay mast near Telavi were used. Distance between these two points is 59 km. Testing result showed that signal strength and quality with 512 Kbps connection rate is stable, with zero packet losses and average round-trip time is 30 ms. This technology can be used for the Internet connection in regions were communication infrastructure is poor.

S. Karumidze discussed Internet and data transfer developments in Georgia starting from eighties, including X.25 protocol, off-line e-mail service and introduction of online Internet services.

Following aspects of current situation with ICT development in the country has been presented:

- Access to Internet (connectivity via dial-up and leased lines, e-mail service and web hosting).
- Internet service in regions of Georgia.
- International bandwidth.
- Local telecommunication infrastructure.
- Telecommunication policy and regulation.
- Georgian resources in Internet.
- Georgian country level domain.

Existing problems and ways to overcome them have been presented.

Problems of security in electronic data exchange and Internet on the example of mail systems has been touched in the presentation of G. Gomelauri.

In the presentation of A. Khurshudyan preparation of Armenian industry for the production of equipment necessary for the development ICT technologies has been discussed. Fiber optic and radio-modem production is planed in Armenia. Questions relaited to Armentel monopoly in communication, country level domain and language problems, importance of the Internet local exchange point has been discussed.

G. Avaliani discussed situation with mobile communication in Georgia. Currently number of operators is four in the country, however only one company Magticom have Mobile Internet WAP - Wireless Application Protocol service. Low transmission speed and limited resources restricts number of potential users of this system. In the second half of 2001 Magticom plans to introduce high-speed data exchange service General Packet Radio Service - GPRS. The major advantage of the GPRS system that it fully enables Mobile Internet functionality by allowing inter-working between the existing Internet and the new GPRS network. However relatively high price of these services and low income of population limited number of users.

Discussions - the main massage of the conference is that Internet is developing fast in the region. International connection bandwidth was increased from several hundreds of Kbps

to several tenths of Mbps per country during last five years. Important step in the development of regional connection was installation of fiber optic lines in Armenia, Azerbaijan and Georgia. Inside cities connection is also improving but with less success. Number of Internet users increasing and for today 20000-50000 users are connecting to Internet depending on the country. However several problems exists in the development of information technology in the region:

- Main problem is difficult economic situation in the countries of the region where salaries of the majority of population does not allow them to buy computer and get access to Internet.
- Low awareness of population how to use Internet, this concerns individuals as well as managers of organizations especially in state sector.
- Legislation laws in the countries, mainly in Armenia and Azerbaijan, do not really support creation of competitive environment for the development of the telecommunication infrastructure. Assistance of International Organizations is highly welcome in this field.
- Up to now most of ISPs in the region receiving connectivity to Internet via satellites, existing Trans-Asia-Europe fiber optic channel is not used yet due to very high prices. Inside countries ISPs are starting to use fiber optic lines for regional connections, however in these case prices are also high because of the monopoly of companies owing these channels in the countries. Local telecommunication systems in cities are in bad condition, though some progress in recent years has been made in several major cities.
- National domain .AR and .AZ belongs to private companies in Armenia and Azerbaijan that creates some problems. The organization willing to register domain in country-zone is not able to identify if the selected domain name does or does not already exist, prices for the domain registration is 3-4 times higher than registration in the COM or ORG zones, as a result, large number of information resources are not registered in country-zone. In Georgia .GE domain is maintained by non-governmental organization Internet Development Group - Georgia, prices for registration new domain names are low and information about registration procedures are available on web-site.

- Internet resources on national language are very limited in all three countries, only several hundreds per country. This restricts interest to Internet users with poor knowledge of foreign languages. The majority of Internet sites in countries are prepared in English, since aim of creators is to introduce their companies to the world. More progress with the use of national languages is expected if international software companies start support of the Unicode - new international standard of encoding of characters, however interest of these companies are restricted due to limited number of users.
- Although technical possibility of having high bandwidth connection between countries of region exists, up to now it is not used because of low demand in the exchange of information and high prices. First step in this direction was signing in 2000 Memorandum of Understanding between Networking Organizations from Armenia, Azerbaijan and Georgia to create single management organization Caucasian Academic, Research and Educational Networking Association - CARENA. The main aim of CARENA is the development of the Caucasus regional network and work for the integration of this network with European and global networks.
- Relatively low level of education in telecommunication and computer networking of professionals working in this field. Universities and high schools of the region can not provide high quality software and hardware engineers. Organization of training and workshops with participation of high level western experts will be useful.
- Several International Organizations are supporting IT development in the region NATO, UNDP, OSI, IREX. Very impressive example is NATO new initiative "Virtual Silk Highway" project, which plans significant improvement of Internet connectivity of academic, research and educational networks for eight countries in Caucasus and Central Asia. Realization of this project starts in October 2001.

In conclusion, conference organized by ISN in collaboration with NILC, GRENA, ICHD and GPSA was important event in the IT development of the Caucasus region. It was underlined that future partnership in organization of regional events, especially training workshops in information technology will be very useful.

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Internet Development in Azerbaijan

By Vitaliy Izmaylov

"Hey guys, it looks like we are almost chatting with the US Ambassador!"

This message was posted on an online forum with US Ambassador to Azerbaijan Ross Wilson that was organized by a local newspaper on 21 February 2001. This case not only shows how excited Azeri Internet users are about the opportunities provided by advanced information technology. What is more important is that such a scenario was barely imaginable only a few years ago, and today it is a shining example of the rapid development of the Internet in Azerbaijan.

This is where we are today. Let us have a look at the road that brought us to the present bright state of affairs in the development of the Internet in Azerbaijan.

The History of the Internet in Azerbaijan: How it all started

As in most other countries, including Georgia, the Internet was introduced in Azerbaijan from within academic institutions. An initial memorandum regarding the connection of the country to the Internet was signed with the Turkish research foundation, TUBITAK, in 1991[i]. In the same year, Azerbaijan had established dial-up Internet access. Permanent Internet access was established in 1995 through the Azerbaijan Academy of Science.

Azerbaijan experienced a bumpy ride on its journey down the information superhighway. The most daunting problem for improving access to the Internet was the poor condition of the nation's telecommunications infrastructure[ii]. The Azeri

government was taking some steps towards improving the condition, but progress was slow. Also, all relevant work appeared to be limited to the capital of Baku. As a result, the burden of improving Internet access fell on a handful of Azeri scientists and computer experts, with the help of a few international organizations. The United Nations Development Program (UNDP), the Soros Foundation, the International Research and Exchange Board (IREX), and NATO were among those who assisted the country in its process of developing an Internet infrastructure – mostly by providing equipment and communication facilities – but as their activities were not coordinated; their efforts did not result in a speeding up of the development process.

Besides the poor telecommunications infrastructure, the country also faced a number of other complex problems on its way down the information superhighway, including the following:

- Lack of public awareness and understanding of computer technology
- The high cost of computer equipment in comparison to the average worker's salary
- Very high prices for satellite connections due to a monopoly held by the Azerbaijan Ministry of Communications
- A near-complete dependence on international funding for Internet development, which made long-range planning difficult

However, the opportunities provided by the Internet were recognized by emerging private businesses, and, as a result, three Internet Service Providers (ISPs) began providing services in 1997:

- Sinam-Invest, a commercial provider with the best connection but also with the highest access prices
- InTrans, a commercial provider that had a large number of clients, many of whom used the company's e-mail system
- AzerIn, a commercial provider that had the lowest access prices but could only offer a low-quality connection via Turkey

All three providers had satellite connections. By then, the Azerbaijan Academy of Sciences [thus the official name on website] had a satellite connection with two

channels – one via Turkey and the other via Russia – using a system that was separate from the local commercial providers.

International organizations like OSI (the Open Society Institute) and IREX made significant contributions to Internet availability in the country. Also, the so-called "Oil Contract of the Century" brought big oil companies along with their IT infrastructure into the country, which allowed technical specialists such as system administrators, network designers, and IT trainers, to use the Internet for their work. All of these developments raised public awareness in the field of IT, including the Internet.

The Internet in Azerbaijan: Where we are today

Ten years later, Azerbaijan has made significant strides in Internet access compared to 1991. In the following, we shall examine the main indicators for measuring Internet development.

Examination of main indicators

A common and important indicator of how far Internet access has been developed is the speed of changes in Internet access prices. Over the past five years, the access price has dropped from US$12 per hour to US$0.60-0.70 per hour. Price drops make the Internet more widely available in terms of financial accessibility, although it is still expensive in relation to the average salary of US$50 per month.

Another indicator of Internet development is the number of registered Internet users. The official number of user accounts registered by local ISPs in Azerbaijan at the end of 2000 was about 10'000. The actual number of Internet users, however, is significantly larger: many users who have no registered accounts with local ISPs access the Internet via free public services provided by international organizations such as OSI and IREX. In addition, the students of about ten universities (located in Baku and in the regions) have access to the same international organizations' networks. There are more than 100 Internet cafés in Baku alone. The total number of the Internet users in Azerbaijan may be estimated at about 25'000. It is important to

work on increasing the number of users since the Internet, like any other communications tool (such as telephone, fax, etc.), generates a so-called "Network Effect": the more users get involved in the network, the more value the network has for them.

The number of local ISPs is a clear indicator of web penetration in the country. Currently, there are about 12 ISPs in Azerbaijan compared to only three in 1997. The competitive open market has led to price cuts and broad increases in the services offered.

Whereas one of the commonly accepted indicators for Internet development is the number of hosts per zone, this is not the case in Azerbaijan due to ownership of the country domain name. These circumstances are not specific to Azerbaijan, but are also applicable to some other CIS countries. According to the statistics provided by RIPE for April 2001, 691 hosts are registered in the AZ-zone. But the real number of information resources hosted from Azerbaijan is significantly bigger; according to some researchers it is three to four times more than the official figure of 691.

Overview of local ISPs

As mentioned above, there are 12 ISPs in Azerbaijan, and about 95% of these are concentrated in Baku. It should be stressed that there is a tendency for telephone companies (both public and private companies) to take the lead in the ISP market. This tendency can also be seen in the rest of the world. AzeuroTel and AzerCell (Azeronline) are the telephone companies that provide Internet services in Baku and the regions of Azerbaijan and have a chance to take leading positions in the ISP market.

Most of the ISPs such as Adanet, AzEuroTel, and Azeronline are joint ventures, with 50% of the stock being held by the Ministry of Communications; this is in accordance with Azeri legislation.

Content development

Currently, a number of international organizations working in Azerbaijan allocate grants to local projects aimed at the development of national content on the Internet. Some examples of this are the Small Grants Program of the Internet Access and Training Program (IATP), grant programs from the Open Society Institute (OSI), grants of the Carnegie Corporation and the World Bank's Global Development Gateway (GDG) project. Additionally, many private, governmental, public, local and international organizations work to advance their own presence on the Internet, which certainly contributes to the increased availability of Azeri information resources on the Internet.

Another example of efforts aimed at encouraging local content development can be found in the two national public awards, Humay (http://www.humay.com/) and Ulduz (http://www.ulduz.com/) for the best national online information resource. The Humay Award for the best website of year 2000 was given to the "Tutu" Publishing House for its creation of a website that presents information on the regions of Azerbaijan (http://azerbaijan.aznet.org). The site's development was partly financed by the IATP Small Grants Program.

Problems of Internet development

The following four main problems were identified for the current stage of Internet development in Azerbaijan:

- Legislation
- Domain name
- Communication
- Language

Legislation

In the absence of a clear government policy and legislation with regard to communication, and to the Internet in particular, loopholes allowing uncontrolled and illogical actions emerged. For example, at a time when Internet access prices were going down, the Azeri Ministry of Communications raised the prices for leased lines and fiber-optic lines: In 2001, prices for the installation of fiber-optic lines were ten times higher than announced at the beginning of the year, while the cost of usage increased by up to four times.

As an example, prices for the Trans-Asia-Europe fiber-optic channel are shown in the table below.

Temporary tariffs according to the direction of traffic:
Baku-Yevlakh-Ganja-Tovuz-Agstafa-Gazakh

Bandwidth	Payment per month in US$	Payment per year in US$
64 Kbit/s	**1330**	**14364**
128 Kbit/s	**2200**	**23760**
256 Kbit/s	**2950**	**31860**
2 ? bit/s	**14760**	**159408**

These prices are appropriate for expensive satellite technology and are by far in excess of the prices for the same channel in Georgia.

Moreover, a new random and arbitrary payment was introduced by the Ministry under the guise of "payment for phone lines used for fax or dial-up services". If a telephone line is used for fax or dial-up connections, the line owner is required to pay an additional 20'000 manats (about US$5) per month, although the Ministry does not incur any additional expenses for dial-up or fax communication over the telephone lines.

Another example can be found in the prices for VSAT -channel licenses that are established without a clear basis and without any clarifications for users. The prices change often; furthermore, these changes are sometimes used to apply pressure to

obstreperous ISPs. The current price for a license is 50'000'000 manats (about US$11'000).

The biggest problem is seen in a conflict of interests: The Ministry of Communication is both a private concern playing the ICT market, and a regulatory institution for the same market. This conflict is leading to the monopolization of the telecommunications market.

The lack of policy and transparency is confirmed by the case of the Internet beauty contest held at the end of the last year. A simple telephone call to the Azeri ISPs was sufficient to shut down access to a web site that parodied the original contest website. Under the circumstances, it is necessary to define who has the right to restrict access, when this right can be used, and why it should be given to anybody.

Domain names

The ownership of the national domain ".az" rests with a private company, Azerbaijan Communications. This situation emerged from an ICANN policy that allowed registration of the top-level country domain ".az" not by an organization representing the country, but by a private company. The company as the owner of the ".az" domain does not perform any implied duties regarding the correct administration of a national domain, and does not maintain any policy regarding the registration of domains within the ".az" zone. It causes a number of problems, some of which are listed below:

- an entity wishing to register a domain in the ".az" zone has no way of verifying whether the selected domain name already exists or not
- there is no way of identifying the owner of a second-level domain
- the cost of domain registration in the ".az" zone is three to four times higher than registration in the ".com" or ".org" zones; at about US$215, the price is hardly acceptable. As a result, a large number of Azeri information resources are not registered in the ".az" zone (including the one which received the National Public Award as the best site of the country).

Consequently, most of the local websites registered in the ".com" or ".org" zones or alternative zones were created as "az.com" and "az.org". This applies to international, state and private organizations alike, as the following examples illustrate:

un-az.org	United Nations in Azerbaijan
tqgk-az.org	State Committee On Students Registration
osi-az.org	Open Society Institute
echo-az.com	Private Newspaper
job-az.com	Business International Recruitment Service
voxpopuli-az.com	Vox Populi

One possible solution to the problem would be the creation of an entity equally representing the interests of the governmental, non-governmental and private sectors, and to appeal to ICANN to re-register the ".az" domain.

Communication

The problems in this field are related to the problems of ICT Development policy. Due to the lack of such a policy in Azerbaijan, each ISP, organization, or oil company has created its own infrastructure using appropriate technologies.

Certainly, a greater prevalence of local ISPs can speed up the country's Internet development; but a greater number may also cause problems when ISPs fail or simply refuse to cooperate. Bearing this in mind, the diagrams below show a common but abnormal situation with local traffic as a result of lacking cooperation among local ISPs. For example, to reach the server of a local ISP that is physically located across the street from another local ISP, the user of the first ISP has to use a route that passes through New York or London – which takes 10-15 times longer than if the servers communicated locally.

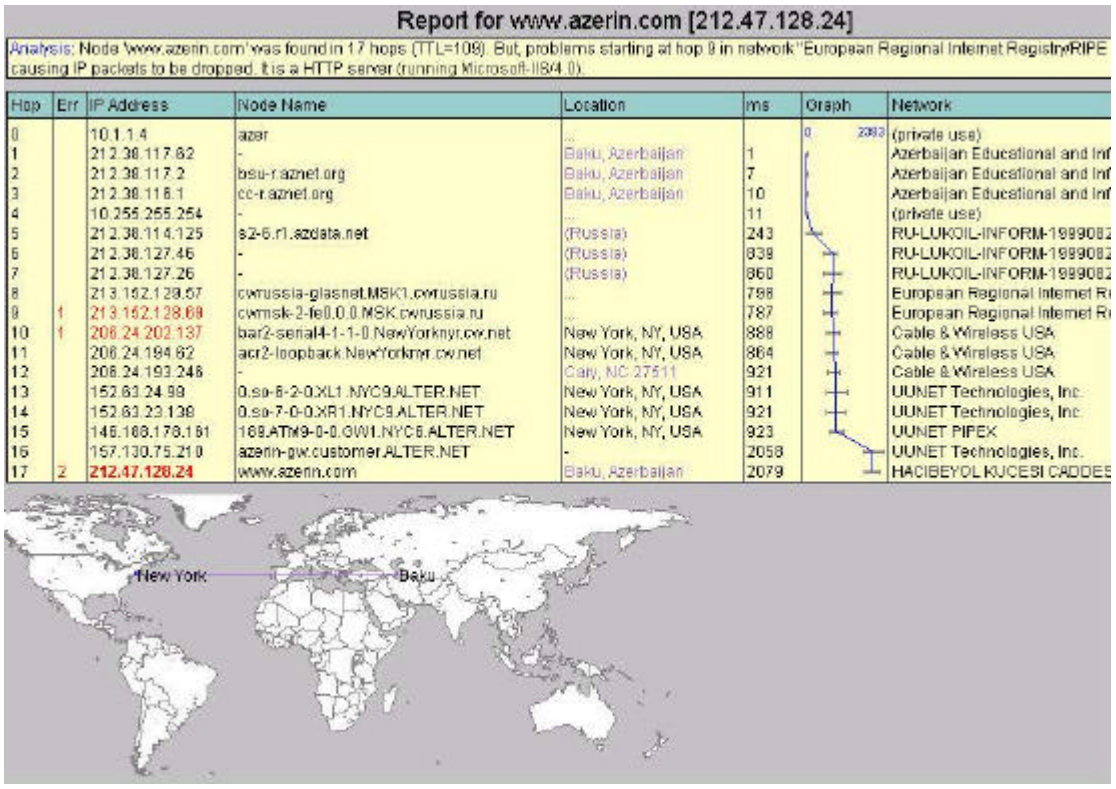

Image 1. Connection from ISP Adanet to an ISP server managed by Azerin.

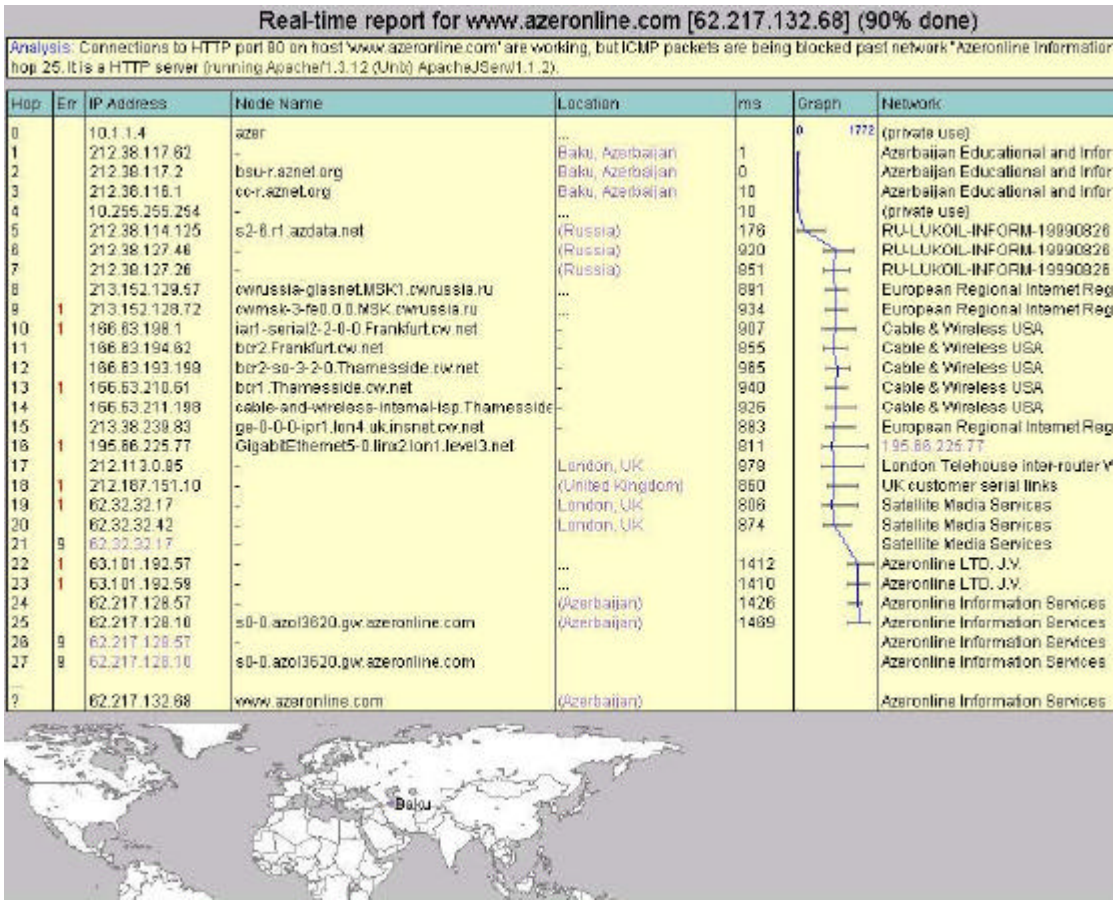

Image 2. Connection from Adanet ISP to Azeronline ISP server

This is irregular from a commercial perspective, too. Internal traffic is an opportunity for an ISP to generate additional profit without heavy investments if information is accessed directly – instead of being relayed through a circuitous international route. Azerbaijani ISPs would ultimately realize higher profits from direct cooperation internally because they could cut down the expenses incurred when using routes located on the other side of the world.

Language

The language problem is associated with a mix of sub-problems: the country's transition from the Cyrillic to the Latin alphabet, confusion in terms of orthography, the absence of widely accepted, standardized Azeri fonts.

In 1991, Azerbaijan officially abolished the Cyrillic script, adopting a modified Latin alphabet in its place. This was the same year that the Internet started taking hold in the country. The problems do not only concern the content in the local language, but also the Azerbaijani content presented in English, especially in the case of documents that were translated from either Russian, Cyrillic Azeri or Latin Azeri.

Consequently, the English spelling of Azeri names is chaotic. For example, the name of Gence (a city in Azerbaijan) is spelt with as many as 11 different permutations. As a result of such spelling confusion, searching for the name on the Internet is complicated and the results often flawed. Witness the following search results found by the Yahoo search engine:

Query		Results
Ganja	+Azerbaijan	579
Gence	+Azerbaijan	283
Ganca	+Azerbaijan	163
Gandja	+Azerbaijan	81
Gyanja	+Azerbaijan	42

Genje	+Azerbaijan	12
Gendje	+Azerbaijan	8
Gjanja	+Azerbaijan	6
Qanca	+Azerbaijan	2
Genja	+Azerbaijan	2
Gendja	+Azerbaijan	1

By the way, all these results refer to the second largest city in Azerbaijan.

Regarding the problem of lacking standardization in Azeri fonts, the main breakthrough has been the inclusion of the Azeri alphabet in the UNICODE standard developed by Microsoft. However, the UNICODE standard fonts are only accessible with Windows 2000, which is obviously expensive software for the majority of Azeris.

As a result, Azeri users (especially those who speak only Azeri) are very limited in the amount of online information resources they can view – even the resources that are presented in Azeri language; thus, a "digital divide" is exacerbated by a "language divide."

Therefore, the UNICODE standard may be considered a long-term solution to the font standardization problem. In the meantime, standardization of extended code assignments is a cheaper interim solution.

Conclusion

By following the recommendations of the National Strategy of ICT Development, most of the problems stated above could be solved. This document is currently under development by the Azeri government and the United Nations Development Program (UNDP).

A clear answer to the question "*Where we are now and what is going on?*" will resolve 90 per cent of the problems associated with the question "*How do we deal with current the problems?*" So there is hope that the material presented above will make a contribution to efforts aimed at further Internet development in Azerbaijan.

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[i] Turkish newspaper Hürriyet, 6 November 1995 [p.?].

[ii] Radio Free Europe / Radio Liberty report, by Julie Moffett, August 25[?], 1997.

Information Technology Prospects in the Caucasus
1st ISN Executive Conference

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International Relations and Security Network (ISN)
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Development of Internet in Georgia

By Sandro Karumidze

Internet and personal computers (PCs) are becoming more and more popular in Georgia. Today, most Georgians are aware of the Internet and its benefits for work, study or entertainment.

History

Computer technologies became available in Georgia at the end of the 1960s, when it was still a republic of the Soviet Union. Computer centers were established at ministries, factories, universities and research institutions. However, as a result of the demise of the Soviet Union and of the subsequent economic crisis, these computer centers were closed. PCs were introduced to Georgia in the 1980s, and were used mostly for word processing and accounting purposes.

Until the end of the 1980s, computers were not used for exchange of information in Georgia. The development of computer networks based on the X.25 transmission protocol had only just begun. However, the introduction of PCs facilitated more active use of e-mail communication. In the beginning of the 1990s, several e-mail service companies were operating, including Satco, Kheta (www.kheta.ge) and a few others. They were regional nodes of the Soviet Relcom computer network and were used to exchange massages via dial-up access to e-mail servers in Moscow. E-mail was provided to commercial users and academic and research institutions by providers Kheta and Acnet (www.acnet.ge).

At the same time as e-mail providers, X.25 networks were established, providing permanent online connections from several cities of Georgia to Tbilisi, and from there to the global X.25 networks. Use of these networks was limited to a few banks and several other government agencies. One of these X.25 networks, Iberiapac (www.iberiapac.ge), is still operational and owned by Infocom.

The first online Internet connection was established in July 1995 with financial support of the US government. A project managed by the American NGO Parliamentarian Human Rights Foundation [no such organization in the internet] provided Internet access to the Parliament of Georgia via the provider Sanet (called Mimosi Hard at that time). The first Georgian web site created under this project was that of parliament (www.parliament.ge).

The Georgian academic and research community received Internet access with support from the NATO Science Program and the EU INTAS program. in 1996
In the same year, Iberiapac started to provide Internet access through the X.25 network, which, unfortunately, was very slow.

There was no real competition to Sanet until 1997, when several Internet Service Providers (ISPs) started to operate. This competition prompted price cuts from US$5 to US$1.7 per hour for dial-up connection.

The Internet Center of the Open Society – Georgian Foundation (www.osgf.ge), ,the local branch of the Soros Foundation, was also opened in 1997. The center grated free dial-up access for Georgian non-profit institutions and started to operate a public center providing free Internet access and training to population.

An important milestone in the development of the Georgian Internet was the launch in 2000 of ISP Rustavi Online (www.online.ge). It is owned by the popular TV channel Rustavi 2. Online subsequently started a permanent Internet advertising campaign, as a result of which the Internet has become a household term throughout Georgia.
Today, there is fierce competition among ISPs in Georgia and the number of web sites is increasing.

Both Internet access and web sites with local content are very important for the development of the Internet in Georgia.

Access to Internet

There are more then ten Internet Service Providers (ISPs) operating the Georgian market. Most of them provide services in the capital of Tbilisi. Three ISPs have regional representations and one provides services exclusively in Batumi.

The standard services provided by ISPs are Internet access via dial-up networking and leased lines, as well as e-mail and web site hosting.

Dial –up

All ISPs provide dial-up services, however these offer various types of service and pricing structures. Most ISPs provide services per minute. There are three main types of providing services: subscriptions, Internet cards, and service without subscription based on fees charged to a specific phone number.

For subscription-based services, users receive a permanent login name and password. Users pay a fixed monthly fee and additional costs depending on the time spent online. The basic monthly fee usually includes several hours of working online. Some providers doesn't have fixed fees and only charge for time spent online. Institutions, various companies and NGOs often use this type of service.

A relatively new type of service is based on Internet cards. A login name and password is printed on each card. Each card is equivalent to a certain number of units. Users must scratch the opaque coating off each card for password access. Usually users can activate several billing modes with their login name and password. Internet cards are convenient for individual users. They can use the service whenever they want and, since cards are available at many supermarkets and other stores, they don't have to pay bills in cash at ISP offices or through money transfers.

The third type of dial-up service lets users access special phone numbers and charges them based on time spent online, without requiring them to take out subscriptions. This service is provided in cooperation with phone companies, which allow the ISPs to register and charge for dialing phone numbers. It is convenient since there is no need for a login name and password, though users must pay their bill at the phone company's payment center. Since users pay only after taking advantage of the service, this method is more expensive than Internet cards.

The rates of all ISPs vary according to the time of the day and there are also special weekend discounts. Every ISP has a different pricing structure, users have a lot of choice and often it is not easy to decide which provider to choose. Prices of access vary from US$0.30 to US$0.60 per hour during business hours, and less than half that price during the night or weekends. Some ISPs even provide free access during night hours.

Often local telephone calls are included in this price so users don't have to pay separate bills to phone companies.

So far, there are only two companies offering unlimited access for flat monthly fee. This service costs between US$30 and US$36 per month and is especially attractive for frequent Internet users.

The quality of the dial-up connection depends on the user's telephone exchange and the quality of local phone lines (the so-called "local loop"). Users who are connected to modern digital telephone exchanges can connect at a speed of up to 56 kilobits per second (kpbs). These are clients of the Akhali and Kselebi telephone companies (New networks and Akhtel). Others can access at a lower speed of up to 33kbps if the quality of local copper phone lines is good. The quality of service also depends on international connectivity bandwidth of ISPs and the time of the day.

More and more access lines to dial-up modem pools are being established. Rustavi Online and Sanet have the largest number of modems. In Tbilisi, each of these companies has about 300 dial-up lines. These modems are distributed among several

central telephone exchanges. This helps to improve Internet access from various phone exchanges or companies. Hunt groups are organized so that users can automatically get free line dialing just one particular phone number.

When discussing services to individual users, it is important to note that most of them don't have bank accounts and even less have debit or credit cards and payment checks – not to mention online banking. This is why users have to pay their bills either at their ISP's office or at payment centers of telephone companies.

Leased lines

Most of the ISPs provide lease line services. These services are provided via asynchronous and synchronous (xDSL) modems, fiber and radio Ethernet links. The service most in demand is via low-speed leased lines with 33 to 115 kbps asynchronous or 64 and 128 kbps. ISP provides these services via copper pairs leased from phone companies. Since only few ISP have more than one node, Points of Presence (POP) at different leased lines cannot be easily provided to locations that are remote from ISP premises. Thus leased line services are mostly available in downtown Tbilisi. Asynchronous US Robotics Courier modems (for 33 kbps connections) are often used for connections. There are other brands that are used both for different leased lines: Russian produced Zelax, Tainet, Telindus, RAD, Pairgain and few other brands.

Several companies provide services via fiber-optic and radio Ethernet services. Wanex (www.wanex.net) has built and is expanding its fiber backbone with PoPs at several locations in Tbilisi, mainly multistory building where many companies and NGOs rent offices. A fiber-optic connection can provide a connection of over 100 megabits per second (mbps) to the Wanex office. Sanet provides connectivity via radio Ethernet technology with up to 2mbps speed. Radio Ethernet connectivity is provided by non-commercial academic provider GRENA as well. Both radio Ethernet networks will be soon upgraded and will provide 11mbps throughput.

Prices on leased lines vary greatly from US$40 to US$200 for 33.6 kbps asynchronous and from 300 to 900 for 64 kbps synchronous leased lines (these prices include local taxes). Usually prices are flat rates based on bandwidth, and few

providers charge based on quality of the line – Committed Information Rate (CIR) and amount of received information. In many cases it is possible to negotiate prices and terms of services if the particular company has a strong interest in concluding a contract. ISPs provide discounts on high bandwidth (more than 128 kbps) and long-term deals.

ISPs usually install the leased line and provide equipment like modems and routers to their costumers. Leased line services usually include several free e-mail accounts, free web and domain name hosting and other benefits.

E-mail service

E-mail service is free if the customer has Internet access service from ISP. However users pay extra for multiple e-mail accounts. As a rule, additional (POP3) e-mail accounts are available. However Rustavi Online allows its customers to check e-mail via web interface and Sanet has free web e-mail service at www.posta.ge.

Web hosting

ISPs provide their customers with 5 to 10 megabytes (MB) free web hosting. For others, the basic price for 10 MB is about US$15. All ISPs can provide virtual web hosting, domain registration and other services on demand.

Regional Internet Services in Georgia

As mentioned above, only a few companies provide Internet services outside Tbilisi. The first of these was the state-owned company Infocom that operates the Iberiapac network. Iberiapac is the oldest Georgian computer network providing data transmission services. For many years it has operated a network based on the X.25 protocol. This protocol allows users to transmit work through low quality non-digital (analog) lines, though transmission speed is low. Iberiapac establishes new points of presence (PoP) in more and more cities every year. But in most cities, Internet connectivity is very slow since the nodes are connected to Tbilisi only at a speed of 33.6 kbps or sometimes less. In several cities where digital lines are available, Iberiapac offers much better services. But its main competitors Sanet and Rustavi Online have PoP network nodes in these cities as well.

Rustavi Online, which has PoPs in Batumi, Kutaisi, Poti, Rustavi, Gori and Zugdidi, is second only to Infocom in terms of coverage of Georgian cities. Sanet has PoPs in Kutaisi, Poti and Rustavi.

All these companies provide regional dial-up and leased line services. As in Tbilisi, the quality of services depends on the type of telephone exchange users are connected to, and on the distance between users and the ISP offices. Often it is very important since copper lines in regional cities are in very bad condition.

Prices in the regions are higher than in Tbilisi and depend on the cost of establishing a regional link, since most ISPs have international connectivity via Tbilisi. The only ISP with direct international connectivity is Batumi Net (former Basri Net), which provides services in Batumi.

Abkhazia and Tskhinvali Region (Sauth Osethia)

It should be mentioned that there is no ISP service in the Georgian regions of Abkhazia and Tskhinvali. These regions are under the control of separatist groups, and the government in Tbilisi has no authority there. It is still possible to access the Internet from these regions over long-distance phone lines by dialing an ISP access number in Tbilisi or in Russia. However, the price of the connection is over US$10 per hour and quality is quite low. International organizations plan to establish local ISP services in these regions by the end of 2001.

Other Telecommunication Services of ISPs

Several ISPs provide other services in addition to typical Internet services. In some cases, companies are really telecommunications service providers rather than just ISPs.

Taro Invest (TI service www.ti.net.ge) has been providing voice over IP international phone calls for several years. Global Erty provides phone services and other telecom data services in cooperation with its international partner Global One. As mentioned above, Infocom provides data transmission services to more than 20 cities in Georgia using the X.25 transmission protocol.

Rustavi Online offers Virtual Private Networks (VPN) through IP protocol services in the cities where it has PoPs. Wanex provides VPNs in downtown Tbilisi, where it has laid fiber optical cable. VPN services will be provided in Tbilisi and in regional cities by the GRENA educational network following the expansion of its network from September 2001.

International Bandwidth

The main and most precious resource for successful ISP operation is bandwidth. All Georgian ISPs' Internet access is via satellites connecting them to ISPs in USA, Europe and Russia. Most ISPs have their own satellite connection, although several minor ISPs buy connections from bigger ones. Satellite bandwidth is constantly increasing and the total bandwidth of all ISPs has increased from 64kbps to about 20mbps. The largest ISPs have 4-6 mbps downlinks and 1 mbps uplink connections. Their main satellite link is usually backed up by a smaller alternative connection. By the end of spring 2001, access to major Georgian ISPs was provided by international Internet companies such as UUNet (US), Netsat Express (US), SMS-Internet (UK), QPNQwest (NL) and DeTeSat (DE).

During the past several years, the price of international bandwidth has fallen dramatically from US$6000 for 64 kbps bi-directional channels to less then US$2000 for a 1mbps receive-only channel. This drop in prices is mainly due to new satellites focusing on providing services to this part of the world and the use of new transmission technologies like Digital Video Broadcasting (DVB) for provision of Internet services.

During last years, it has not been too difficult for Georgian ISPs to receive licenses for satellite transmission antennae, and no license is required for receive-only satellite antennae.

The reason why satellites are used exclusively for Internet access was the lack of other reliable telecommunication facilities. Traditional microwave systems were only providing connectivity to Russia and were of low quality. The first fiber cable system connecting Georgia to the rest of the world only went into operation in 2000. Though operational, fiber-optic cable is quite an expensive alternative to satellite unless

connectivity is provided via southern Russia. The reason is that the price of fiber-optic connection is based on distance, and that Georgia is quite far from Western Europe, where Internet connectivity is relatively cheap and is of high quality. It is possible to buy Internet connectivity in Russia, where prices seem competitive, but Georgian ISPs still use satellite connections via Western partners.

Connections to Russia will play a greater role in the future. A significant part of Georgian ISP traffic goes to Russian web sites, since Russian is a language most Georgians are familiar with. Interest in Russian websites can increase in the future if economic and cultural cooperation between Georgia and Russia is developed.

The fiber-optic cable connecting Georgia to Russia and Europe is connected to Azerbaijan in the east and Armenia in the south. Via Armenia and Iran, it is connected to the Trans Asia Europe fiber cable system (TAE). Today, what little Internet traffic there is between Georgia and other countries of the Southern Caucasus is basically limited to e-mail correspondence. Good connectivity to neighboring countries will probably have an impact on economic cooperation in the future, with the possibility of building reliable VPN networks and running teleconferences.

Local Telecommunication Infrastructure

It is very important for ISPs to have access to a well-developed local telecommunications infrastructure. The existing infrastructure can be used to build backbones for connecting Internet nodes, or PoPs, and to provide users with Internet access.

The local telecommunications infrastructure in Georgia is in quite bad condition. Though there has been some progress in recent years, it is only felt in Tbilisi and several major cities. The rest of the country still uses old telecommunication equipment and often damaged phone cables.

The major recent development has been the installation of modern digital telephone switchboards (central office exchanges) in several districts of Tbilisi as well as Kutaisi, Poti, Zugdidi and Batumi. Thus, using old copper lines, these stations have significantly improved the quality of their telephone and Internet services.

In Tbilisi, these stations are connected to each other via fiber-optic cable using a digital SDH system. This gives users not only a good connection to other phone stations, but also provides a digital connection to ISP equipment and dial-up connection at a speed of up to 56 kbps. In addition, a digital connection allows better authentication and billing services.

The SDH fiber-optic cable system in Tbilisi allows better connection between PoPs and ISPs as well, though prices are quite high and a number of ISPs prefer to lay their own fiber-optic cable. The price of fiber-optic cable is going down, so probably the tendency for ISPs to lay their own cable will grow stronger with increasing demand for bandwidth.

An important development for regional Internet access was the project of laying fiber-optic cable across Georgia from west to east, operated by the telecommunications company Fopnet. This cable provides high quality digital services and connects Tbilisi to several major Georgian cities. It is the only high-quality digital fiber-optic cable system in Georgia. The only alternative to it is the digital microwave system connecting Tbilisi and Kutaisi, which will be extended to Poti in the near future. This microwave network is operated by Georgian Telecom (www.telecom.ge).

There are other projects for building fiber-optic cable systems in Georgia, and when they have been completed, Fopnet will have stronger competitors.

Internet access through TV cable can become an alternative to dial-up and lease line services using a copper telephone infrastructure. There are several cable companies in Tbilisi and in other cities. However, they do not offer Internet services over TV cable yet, probably due to the high cost of important equipment and of cable modems. In addition, many cables are in bad condition due to unauthorized connections and damages.

When discussing the local telecommunications infrastructure, it is important to mention networks built by mobile operators. Though the Internet services they offer are very limited, other regional telecommunication companies and ISPs can use the

infrastructure. With the introduction of GPRS and third generation (3G) services, mobile network operators can start providing Internet services as well; however, these services will be more expensive than service provided via dial-up connection.

It should be noted that although some ISPs exchange local traffic and provide backup for each other, there is no high-speed Internet traffic exchange point.
The creation of such a node could improve the services of every provider and accelerate the creation of more Internet resources in Georgia.

Telecommunications Policy and Regulation

Telecommunications policy and regulation are important factors determining the development of the Internet. There was no monopoly on international Web access in Georgia for several years, and there is no monopoly for international phone calls. Although until several years ago it was quite difficult to get a license for satellite transmission stations, this is no longer a problem.

The new law on Postal Services and Telecommunications, which was accepted by the Georgian Parliament in 1999 and amended in 2000, is a big improvement over previous one. The law created a legal basis for the establishment of the Georgian Communications Regulatory Commission as an independent telecommunications regulation authority, and laid down certain rules for the regulation of the telecommunications industry.

The law governs the regulation and licensing of international connectivity; however, amendments are necessary to provide open access to the local telecommunications infrastructure. This is very important since almost the whole local infrastructure is owned and controlled by the Georgian Local Line Company (GLLC), the state telecommunication company that will be sold following an international tender later this year.

If not properly regulated, the new private owner can and probably will restrict access for other companies, including local ISPs. The competitive advantage of owning the cable infrastructure will allow the proprietor to put all ISPs and most of the telecommunication companies out of business with ease. As a result, Georgia could

end up with a monopolist providing expensive and often low-quality telecommunications and Internet services.

It is important for Georgian legislators and telecommunications regulators to follow international conventions as well as the recommendations of the World Trade Organization (WTO), the International Telecommunication Union (ITU) and the European Commission to create an environment that fosters competition and the introduction of new telecommunications technologies and services in Georgia.

Internet Centers

In the context of Internet access, it is important to mention, in addition to ISPs, the various computer labs with Internet access, public Internet centers and Internet cafes. In many countries where individuals can't afford their own computers, this type of Internet access point is very important for access to e-mail, web and other Internet resources.

For several years, the only sponsored Internet centers in Georgia were operated by the Open Society Georgia Foundation (OSGF, initiated by the Soros Foundation), the National Information Learning Center (NILC, www.nilc.org.ge) and IREX (www.irex.org.ge). These centers were free of charge and open to the general public. Until last year, there were only a few commercial Internet cafes due to the high costs of connections.

As a result of low Internet prices, several Internet cafes opened in downtown Tbilisi during the last year. The cost is from US$0.50 to US$1.50 per hour. However, this is still more than many people can afford. Internet centers are available in Tbilisi, though there are centers operated by OSGF and IREX in Kutaisi, Batumi and Poti.

It is important to mention that the creation of public Internet centers in places where people can't access the Web from home or from their offices can have a dramatic impact on the life of that city or region. Centers with multiple workstations can serve several hundred people per week, providing the whole region with vital communications tools and access to information worldwide.

In addition to public centers and cafes, Internet services are available at schools and universities. Unfortunately, there are only few universities, primary and secondary schools with computer classes that are connected to the Internet. Only a few universities have 33.6 to 128 kbps leased lines. Most educational institutions with computers have only dial-up Web access.

Users

The number of users of commercial Internet providers is confidential. However, given the available bandwidth and the known number of dial-up lines, it is possible to estimate the maximum number of dial-up accounts and leased lines. This information is easier to get from providers since it helps to advertise their services.

According to information from ISPs, the total number of dial-up lines available to providers is about 1200. Extrapolating from international experience and experience gained operating the Soros Internet Center's dial-up access, we can estimate that 12-15 dial-up internet accounts per line are ideal, and that a higher ratio of accounts per line results in low-quality service and customer complaints. Based on these assumptions, there are probably 15'000-20'000 dial-up accounts in Georgia. In addition, the country reportedly offers about 200 leased lines, mostly at 33.6 kbps. Some leased lines are connected to multiple workstations, as in the case of the Parliament or the Georgian Technical University (www.gtu.edu.ge), which have several hundred computers each. At a very rough estimate, we can assume that about 3000-4000 computers are connected to leased lines.

At a rate of 2-3 users per computer, there are about 50'000-75'000 permanent Internet users in Georgia. This calculation may be optimistic, but the figure accounts for just 1-1.5 per cent of the total population, which is far behind US, Europe and many developing countries.

An important variable for measuring the pervasiveness of the Internet in a given country is the number of hosts (computers with a unique internet address). This calculation is made by Réseaux IP Européens (RIPE, www.ripe.net), an organization

responsible for the distribution of IP addresses in Europe. According to RIPE, the number of unique IP addresses [in Georgia] in March 2001 was about 1800. However, this should not be taken as a hard figure since some ISPs use non-European IP addresses.

Georgian Internet Resources

Unfortunately, there are far less Georgian Internet resources than Georgian Internet users. There are only a few hundred Georgian web sites. Most of them are simple brochure-type sites prepared by amateurs. The vast majority of Georgian Internet sites are in English, since their creators' aim is to introduce themselves and their companies to the world. The Georgian Parliament web pages mentioned above are mostly in English as well.

One of the reasons why most Georgian web sites are in English is a lack of international software that supports Georgian alphabet characters.

Though there has already been a standard code for Georgian characters for some years, it is not widely used and international software companies don't support it. The reason is that there is no software market in Georgia and almost all users, including state and private organizations, use pirated software.

More progress in the use of Georgian can be expected if international software companies start supporting Unicode (www.unicode.org), a new international standard for encoding characters. Microsoft has begun to support Unicode in its products, but unfortunately Georgian is still not well represented; there are no good keyboard drivers and fonts In spite of these difficulties, the number of web sites in Georgian is increasing. Most conform to the State Encoding Standard, which is a good sign. There are up to ten professional (semiprofessional) Georgian web studios today. Some of these have only been in business for a few years.

The most widely known Georgian Web directories are www.georgia.net.ge and www.geres.ge.

Since Georgian characters are not supported, transliteration is widely used and e-mail correspondence is usually typed in Latin characters. The main reason is once again the lack of support for Georgian fonts in the Windows 95 and Windows 98 operating systems, as well as in the most widely used e-mail clients, MS Outlook and Netscape Messenger.

Georgian country Top Level Domain

In the context of Georgian web resources and e-mail, it is worth mentioning Georgia's country top-level domain ".ge." Domain names are maintained and managed by ICANN (www.icann.org) at the international level. Georgia's domain is maintained with the support of the non-governmental organization Internet Development Group Georgia (www.idg-georgia.org.ge).

The cost of registering new domain names is affordable for local companies and individuals. The price of a second-level domain (xxx.ge) is US$15 per year. It is important to mention that the first registered third-level domain (xxx.org.ge) is free, which lets many state organizations have their own domain name, since they can rarely afford to pay for such service. Information about registration procedures and the rules governing the ".ge" domain can be found at www.nic.net.ge

Problems and challenges

In conclusion, the following problems and challenges for the development of the Internet in Georgia can be identified:

First of all, the country is going through a difficult economic period. The salaries earned by the majority of population do not allow them to buy computers and get access to Internet services. In addition, the energy crisis leaves people without electricity during most of the winter season. The majority of the population is yet

Internet illiterate. This is equally true for individual users and company or NGO executives. Most managers are unaware of the competitive advantage to be gained from using the Internet and other information and communications technologies in their business.

Another problem is a lack of professional education for communications and computer professionals. Georgian universities and colleges cannot train high quality software and hardware engineers. Students often have to study on their own using information found on the Internet and in the few available books and magazines.

The challenges for commercial ISPs and web studios are obvious. The following should be identified as the priorities of Georgian government and international community interested in supporting the development of information and communication technologies (ICT) in Georgia.

- Defining policies for creating a competitive environment that is conductive to the development of a telecommunication infrastructure
- Protection of online privacy
- The development of legislation governing online financial transactions

Since Georgian government lacks significant financial resources, these measures represent what is most affordable and requires little in the way of investment. Other measures can only be implemented with support of international financial institutions at this stage:

- Raising awareness among executives of corporations, non-governmental companies and state institutions about the use of ICT
- Support in improving educational curricula and teaching ICT students at colleges and universities
- Organizing short term specialized courses for professionals
- Extending the Internet into the regions of Georgia by organizing public Internet/Information centers and training for local users

The Open Society Georgian Foundation and the Open Society Institute have set these priorities for the coming years and is interested in cooperation with other institutions.

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Executive Summary

Political Track

The 21st century is an era of rapid technological development. Information technology has an impact on every aspect of human life. It affects all spheres – social, economic, and political. The main objective of the conference and of the working groups was to find out to what extent information technology can be leveraged to effect economic, political and social change. What has been and will be the course of the information revolution in the South Caucasus?

In a working group to discuss the political dimension, we heard presentations on a great variety of themes and held interesting discussions on many problematic issues

"The aspects of informational policy within the process of political modernization." In this presentation, Henry Kuprashvili outlined his vision of a state information policy and described the complex multifunctional task of information policy, which is to establish and develop as part of a comprehensive national structure:

a). A legal system governing the dissemination of information.

b). A national (governmental and nongovernmental) system of information resources.

c). An information and communications infrastructure.

d). An effort to mobilize the scientific-technical and industrial potential of the information industry.

e). A market for information products and services.

f). A training system for IT professionals.

The above-mentioned systems, taken together, can help form and develop a unified information space for the state as a whole. They are also instrumental in ensuring information security and integration into the global information space.

The successful establishment of an information space and the usage of the information for political, scientific and practical purposes has to be done by relying on the relevant information analysis, prognosis and on the basis of computer technologies. There can be no doubt that each stage of information processing requires technological expertise and the application of modern information technologies. In this context, the main difficulty consists of finding financial resources, especially in the case of economically weak countries.

Kuprashvili talked about the creation of a legislative framework regulating the IT sphere, and gave examples of steps already taken in this direction (for instance, the adoption of a new administrative code, one chapter of which is dedicated to the free access to public information).

He also addressed questions concerning a functioning global system of modeling, called "Didgori", and research undertaken by the Strategic Research Center of the National Security Council.

He also briefly discussed the role of traditional mass media in the light of modern trends in IT and questions of state security.

We also discussed the use of information technologies in border controls. The speaker, Gorgoshidze from the State Department of Border Defense, raised the question of operative communication between border crossings and the necessity of having a functioning operative information center. He emphasized the role of IT in safeguarding the security of the country's border zones.

The next discussion concerned the very interesting and challenging topic of the prospects of digital democracy in Georgia. It's obvious that only a very small portion of the Georgian population has access to computers, as well as to very basic social needs, and it will be necessary to prevent "digital exclusion" as much as social exclusion, both of which will create very difficult conditions for these marginalized people in the future. There is no doubt that Georgia has accepted Western culture, which has brought many new developments including ICT, and the main strategy should support this process in order to maximize the benefit of this new phenomenon for the country.

The issue of ICT applications in politics and governance itself raises a lot of questions. For instance, is the technology secure enough to ensure that everybody's opinion is taken into consideration during the decision-making process in the country, and that no group of privileged citizens emerges that have better access to ICT? How

useful can ICT be during elections? How much better can the government provide its services through the Internet? How will it affect corruption? Can IT become a tool for making government more transparent and accessible?

But there is no doubt that in this very interesting transition process, our country should not remain on the sidelines and make maximum use of the benefits of ICT for politics and governance.

The next speaker, Bakuradze, touched upon the notion of the "digital democracy" (a rather vague notion for many people), and gave a brief history of its development. He also emphasized the important role of ICT for democratic governance in Georgia and the increasing opportunities for citizens to participate in decision-making processes by means of digital democracy. The objective is to make the work of government more transparent, accessible and understandable for citizens by means of ICT.

In his report, Bakuradze supplied addresses of Internet sites (unfortunately all foreign) that are good examples of modern, developed media.

Finally, he reviewed the future prospects and reminded the audience that the development of ICT will change our culture, as well as the form and style of communication between people, and that it will affect our traditions whether we like it or not. It will be a long process that should raise living standards considerably.

Bagrat Tunyan presented his paper on "Challenges of the Information Revolution in the Caucasus". Tunyan discussed problems related to the creation of information societies.

What benefits can the establishment of information societies bring to the countries of the South Caucasus? The first benefit would be an increase in productivity and the improvement of the IT infrastructure. The establishment of an information society increases competitiveness, hampers inflation and improves industrial performance. The information society can also accelerate the emergence of a market economy and of democracy. It provides new opportunities for disabled people and supports their social integration. The use of IT must not be limited only to the developed part of the world. Information societies must be created in the developing countries of transition as well. It seems necessary to establish a framework for productive forms of co-operation in the whole world and to support the goal of international consensus. Only information exchange can lead to a more wide-ranging, more effective development of information societies all over the world. The Internet has an impact on every area

of human life – commerce, culture, environment, health care, governance, education, etc.

Zurab Chiaberashvili spoke on the theme of "The influence of IT and information on the Georgian Education System".

Students in Georgia today receive the greater part of their training after graduating from university. Only a very few people have the necessary technical skills for a career in IT. Technology and education should develop together and supplement each other, but the reality in Georgia is the opposite, as the two fields are diverging. This will result in a discrepancy between education and reality, as there is a demand for technical training but the national educational system cannot meet this demand.

Students are in touch with the professional requirements of the working world, whereas lecturers are not. There is no technical instruction. The rules and strategies of management are a closed book to students. This leads to situations where students teach their lecturers.

We have to conclude that the development of IT, in the world as a whole and in our countries in particular, plays a decisive role in creating an open, democratic form of governance and in the shaping of a democratic society. It's a great tool that should be used reasonably.

In the "Political Dimension" working group we discussed a very wide range of questions related to the impact of IT on the political system and came to the conclusion that IT development plays a key role in the creation of an open, democratic rule and in the formation of democratic society.

All our group sessions were held in a constructive working atmosphere generated lively discussions and resulted in interesting conclusions.

The first and most important result of the conference is the fact that such a conference was held at all (it was the first of its kind). Here we had an opportunity to sit together and discuss problems of common concern to all Caucasus countries. We had an opportunity to hear the opinions of governments, independent researchers, and NGOs. This is the first step towards finding solutions to the challenges we are facing now in the rapidly changing world.

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The Challenges of Information Revolution in The Caucasus

By Bagrat Tunyan

The year 2001 was an important one for the integration of Armenia into European structures. In January 2001, Armenia together with Azerbaijan was officially accepted to the Council of Europe. This means that currently, three countries of the southern Caucasus are members of the European family. Accession to membership in European bodies is very demanding and requires the governments in question to make significant efforts to integrate their policies into the current developments in Europe. And it will be much easier for the republics of the southern Caucasus to develop a joint strategy for their integration into Europe.

The European countries are currently entering a new phase of economic development: they are changing from traditional industrial economies to e-economies. What are the challenges that the countries of the Southern Caucasus will face in the new information society and how can the gap in access to information between the developed and the transitional economies of Europe be reduced in the new knowledge-based society?

The current transformations in the social development of the Caucasus states under the conditions of transition to the market system are coinciding with the global processes of transformation from industrial to post-industrial societies. That's why the peculiarities of the transition period demand a political and economic analysis of the information revolution.

The Armenian economy, as well as the economies of the two neighbouring countries, is in the midst of a difficult process of transition from a centrally planned economy to one based on market principles. The formation of a new society is connected to the transition from mechanized industrial production to the production and exchange of knowledge. These countries face additional challenges on this path of transition that are connected to the

information revolution and the creation of information societies in the region. Moving from the industrial age to an information society is a difficult task for these politically and economically weak states. Information and communication technologies are developing at a breath-taking pace. Rapid growth can be seen in mobile communication, the exponential growth of the Internet, the restructuring of business sectors, the new phenomenon of e-commerce and changes of marketing distribution channels. Digital technologies make it easy and increasingly cheaper to access information and to store and transfer it. National frontiers are losing their significance. We all, regardless of the country we live in, are becoming global players, and services and goods can be produced in any part of the world.

What benefits will the countries of the Southern Caucasus have from becoming information societies? First of all, they should experience an increase in productivity and an improvement of information technology systems. The establishment of an information society increases competitiveness, hampers inflation, and improves the entrepreneurial culture. In an information society, the customer and the seller often do not meet directly; this saves valuable time while encouraging e-commerce. The information society acts as a catalyst for the market economy and democracy. It provides new opportunities for disabled people and supports their social integration. Finally, the information society contributes to social cohesion and raising the standard of living. Of course, the first and the most important place is held by the Internet as the most innovative product of the information revolution.

Today, the Internet has changed the way the people in most of the developed countries and in some of the developing countries interact, and it has advanced the conversions of many countries to information societies. Information is becoming more and more valuable as a commodity and as a society we want more information, and we want it at our fingertips. This is what the Internet can deliver.

According to a widespread definition, "the Internet is (an) ... interconnection of servers worldwide that provides communications and application services to an international base of business, consumers, educational and governmental organizations, research institutes and other organizations."

With the advent of the Internet, we have become part of the 'e' generation. 'E' is the new prefix, and everything seems to have an 'e' in front of it: e-development, e- commerce, e-

business, e-design and so on. A whole specific language has been coined, with words and acronyms such as digital signatures, electronic data, extranet, intranet, Internet, portal, ISP and so on. No less, however, would be expected from any self-respecting emerging entity.

The impact of the Internet is being felt across the region and across the world. The uptake of the Internet is huge and growing. This usage is having a profound impact on education, business, government and civil society.

Under these circumstances there are many issues to be faced by the governments of the Southern Caucasus states in addressing the development of information technology in their countries. These are compounded by the complication of governments being in charge of the development as well as the regulation of the Internet, and in some aspect also being among its consumers. How efficient can the corrupt governments of the region be as the regulators and developers of the IT sectors? Clearly, the NGOs should speak up more about these issues. But now I would like to address some issues that I think will advance the development of the information and communication technologies in the region.

The first of these is the taxation system. With the blurring of borders that is synonymous with trading on the Internet, issues are raised relating to the income derived from Internet transactions, particularly in terms of general and value added taxes. At the 1988 conference on 'A Borderless World', organized by the OECD, a paper on 'taxation framework conditions' was endorsed. This paper was incorporated within the ground rules for the digital marketplace, and affirmed that the issues are not new, just caused by a new way of doing business. In brief, it is found that international cooperation on taxation needs to continue concurrent to domestic efforts to address the regulation of taxation.

Another issue that is to be addressed within the information revolution is that of copyright and the protection of intellectual property rights. Intellectual property rights have been a bone of contention for sometime - particularly between the US and China due to the black-market trade in counterfeit CDs and software. The same problem currently exists in all the countries of the Southern Caucasus. Given the easy transmissibility of music, CDs, software and the like over the Internet, the problems will be compounded, especially for retailers and manufacturers.

Another fundamental challenge is privacy. In developed countries, the barriers to accessing the Internet are relatively minor, while in countries like Armenia, Georgia and Azerbaijan, where people feel their privacy is threatened or compromised, there will be a reluctance to use the Internet to its potential. If people believe that details about themselves can be gathered and abused, they will avoid using the Internet, and recent examples of hackers stealing credit card numbers only serve to fuel that concern. On the other hand, e-commerce cannot be developed until credit payment systems are developed in these countries. In that respect, these two issues are interrelated.

The problem of privacy also raises the issues of consumer protection. For instance, how can we work to ensure that consumers will have the same rights in terms of purchasing goods and services over the Internet as they do when they visit a store? Whose consumer protection laws should apply? Should it be the laws of the country where the transaction originates; where the transaction takes place or from where the goods are dispatched?
With the development of IT, Internet crime is a primary security concern. As well as concerns over the potential for Internet terrorism, including the spread of subversive material through the Internet, there is also the danger of malicious sabotage, which could be internal or external.

Another issue of concern should be the content of the Internet. Different countries and different cultures have very different perceptions of what is permissible and appropriate content on the Internet. The issue is compounded when national laws of censorship cannot be respected without considerable difficulty. The problem is that the Internet has no boundaries. When you enter an Internet page you can be anywhere. Of course, the countries of the Southern Caucasus have their peculiarities and their own cultural values, and these cannot be ignored in these processes.

Portals offer a way of controlling access by restricting site availability. This ultimately influences the audience through exclusion of offensive materials. Most countries are interested in arrangements like portals, which offer some degree of control and an opportunity to regulate content that may potentially contravene national censorship legislation. There is, however, an ongoing struggle between those who want to regulate the Internet and those who seek to stop regulation.

One law for the Internet would clearly be rejected and would have no hope of working. The standards of modesty of the Southern Caucasus countries, for example, are very different from those of popular Western culture. Another contentious issue is the publication of objectionable or dangerous material. One of the Internet's most prolific sellers is pornography. How will we stop the pornography-marketing machine from making it more available and hence how will we, for example, control our children and abusers of our children from accessing and distributing offensive material further?

Today, questions like these are being addressed by a number of both established and new bodies that have emerged across the world, including the OECD, the EU, the US Department of Commerce, the Internet Law and Policy Forum, the Internet Society and the Internet Engineering Task Force. As well as grappling with more intricate questions, there are fundamental issues to be agreed upon: for example, do we want to regulate access to the Internet at all? And governments should definitely cooperate with these institutions in order to create an efficient body of regulations for the development of the Internet in our countries.

For governments everywhere, the Internet is a huge opportunity despite the challenges, and they should take this fact into account. The central motivation for governments must be to encourage the flow of information to advance business and the national economy, to enhance communication with citizens and to encourage a culture of learning to support this. It can be a real tool for making the work of the state apparatus more transparent and less corrupt. Today, the US has lead the way in terms of government communications with the general populace over the Internet.

There is still considerable uncertainty about the roles of governments in facilitating the development of the Internet. Their challenge is to not over-regulate and discourage the usage; but to create a secure environment to encourage uptake. The question should be whether to regulate through a legislator or to allow the market to drive regulation through the establishment of portals and self-regulation.

The business opportunities provided by the Internet are also important. The greatest appeal of the Internet for business lies in the low cost of access, the low cost of transactions and the limited entry barriers. Provided you have the infrastructure in the first instance, it is relatively easy to develop some type of Internet involvement. It is an even more important factor for the

transitional countries like the Southern Caucasus republics. For executives looking for partners and markets abroad, the Internet is an excellent tool.

For some firms, the opportunities may include an Internet site and email, while the scope for more sophisticated and "aggressive" companies can include initiatives such as e-procurement (buying and selling online), electronic forms, supplier catalogues and so on. The benefits for businesses are in profitability and productivity, reduced transaction costs, increased global reach, internal business process reengineering, and there are opportunities in e-commerce.

The Internet is a great enabler for the businesses in terms of engaging in international commercial trade. There is real-time global communication, greater interaction than ever before, opportunities for far enhanced internal management - particularly of the supply chain (reduced inventory, faster supply times). Geography is no longer as much of a determining factor as it was before.

In essence, there is great potential to be derived from using technology to enable and reengineer business processes, and from diversification to e-business modules that take advantage of the environment.

E-business is the area that the world's attention has concentrated on for the past five or six years. It has emerged as the source of seemingly endless opportunities for businesses, and the advent of a generation of Internet millionaires testifies to this perception. E-business is the management of business via the Internet; it consists not only of buying and selling, but also of servicing customers and collaborating with business partners. The development of intranets and extranets is considered to be part of e-business, as is knowledge sharing, which has spawned a massively profitable industry. Increased visibility of information is changing how businesses operate and allowing considerable improvements, efficiencies and cost savings. E-business is already a huge part of how contemporary companies are doing business and in the developing countries have a great opportunity to take advantage of being a country in transition and to adopt these new methods of doing business.

E-commerce is a subset of e-business. It is the buying and selling of goods and services via some form of electronic data transmission. E-commerce can be conducted through the Internet, e-mail or electronic fax.

Most fundamental is the need for technical infrastructure to encourage transactions within e-commerce. As mentioned already regarding the need to develop credit payment systems, for developing countries like Armenia, the lack of basic infrastructure is the first challenge to overcome. From there, the infrastructure needs to have sufficient bandwidth, it needs to be able to support high traffic density, and it must be able to provide secure and reliable connections. This is a serious problem for Armenia also because of the monopoly in the telecommunication sector.

The opportunities are huge for the Southern Caucasus states in terms of developing business applications, as there are many experts in the region who, after a short training course, can really compete with Western experts in the field. Currently the global software market is very competitive; as soon as one version of a software product is released, the next is already under development. It is the same for hardware - you could update to the latest model every 3 months if you had the inclination and the cash. New groups of companies are emerging that 'host' applications. This enables small to medium companies to reduce setup costs but still participate in the 'online' world.

Certainly the Internet has changed the rules on the market. There are many opportunities for service providers, and these reflect shifts as companies seek to meet consumer demand. This is fuelling the formation of alliances between content and software developers and developers of service solutions.

The market is demanding better solutions for businesses. This demand is the key imperative for two areas of trade: business-to-business (B2B) and business-to-consumer (B2C). Businesses are also under constant pressure to improve their level of customer service. The gap between businesses and consumers is closing and expectations are rising - poor service can't be concealed and is unlikely to be accepted.

In implementing the solutions that are being developed, a number of changes to the workplace must be accommodated. While it is a truism that change is constant, people's opposition to it is also constant. For any implementation to work, you have to have an effective deployment and change management strategy.

New laborsaving e-commerce initiatives may mean reduced workforces. This will impact negatively on individuals, corporate culture, and, in the short term, productivity. Technology changes also mean significantly changing paradigms for how people work; they are expected to be adaptable, and need to be committed to life education. Their fear and dislike of change, and ensuing unemployment and resentment, mean that change management strategy should never be overlooked.

We are no longer working in a safe, controlled area; and people can become restless when certainties cannot longer be taken for granted. The challenge is to see that new technologies have the potential to enhance how we work, as well as to open up entirely new worlds.

In the developed countries there has been huge growth in the use of corporate intranets. This is changing corporate culture and the way companies communicate internally. As long as all staff has an Internet browser on their PC, the intranet is a logical place for all corporate communications. What this means is that employees are better informed, knowledge is more easily shared, and there is less duplication of effort.

It is important to remember that it is not wise to go for technology-driven solutions; rather, entrepreneurs should always look to the business requirements, and integrate technology with traditional ways of doing business. The benefit of technology is in operational improvements. Users/consumers demand new features as their expectations change. This drives business change and businesses need ways to differentiate themselves. Technology can enable them to do so.

The benefits of the information revolution and better education are enormous and profound. New information changes our worlds. It is through education and effective knowledge sharing on the Internet that we can truly maximize the benefits.

A noteworthy development in the educational field is of hologram technology that would allow students to have a 'virtual' teacher in the room with them. If students could have access to good teachers independent of their location, the benefits would be significant - especially for home schooling, and where teaching is restricted to certain subject areas or teachers are nonexistent. It may not be as good as a teacher that is physically present, but there is huge

potential for distance learning (national and international) for school and university students, and for continuing education. The opportunities are also endless in terms of encouraging all people to learn about other cultures and specialized subject areas, and to contact peers from places that they are unlikely to have ever contemplated. In addition, for government and business to continue to thrive and evolve there is a critical need for expertise. The education system must be able to provide an adequate basis for young people to train to become the leaders of tomorrow through providing them with relevant skills and understanding.

The information revolution will also have a dramatic effect on civil societies of the three South Caucasus states. The Internet will become part of mainstream communication. Email has revolutionized how we socialize. It is perhaps the most successful medium of international communications in terms of ease and cost. It has supplanted the fax to a significant degree, and as more people set up voice recognition software on their PCs, it will increasingly impact our oral communication.

There has been a lot of media coverage of the wave of Internet dating, with a regular supply of stories of people meeting, corresponding and marrying due to their Internet connection. People see the Internet medium as safe: they can judge how literate their correspondent is; how articulate; and often people find it easier to write what is difficult to say. People also have the benefit of being able to ponder their response before communicating. On the downside, you lose the benefits of environment, ambience or of being totally certain that your correspondent is who the say they are. The inclination has not changed, but the medium has, and it has its own special set of connotations.

There is also a growing trend towards using the Internet for personal content. This creates a boom industry of its own as people move to buy digital cameras, scanners, and use graphically enhanced email messages. As more users realize how easy it is to create personalized calendars, cards and publishing, the cost of the technology goes down. On the other hand, we are fast becoming a global society with a very short attention span - we are being compelled to become more adept at reading email headers in filtering through the increasing amounts of communication that comes our way over the Internet.

Medicine is another area that stands to gain from the information revolution. By using the Internet, doctors and nurses can share access to guidelines and patient records. This could

expedite referrals, and having a national database could assist hugely in terms of ensuring improved prioritization and reduced waiting times for patients. The Internet can be used as a convenient and efficient tool for convening Internet conferences on various diseases and for consultations. It's hard to imagine the huge array of medical information on the Internet making the human side of medicine less necessary, but as far as it can assist professionals in caring for people, the opportunities presented by systems that organize records and facilitate guidelines and best practice sharing is very important.

One major social issue that has already arisen out of the changing economic context driven by the Internet is the fact of unequal access to information and communication technologies in our countries. It will be indispensable to bridge the gap for the poor people in order to help them benefit from technological developments. Free computer courses should be offered to 1'000'000 people claiming state benefits, as part of a move to ensure that all citizens of the countries of the South Caucasus have access to the opportunities that the Internet has created. This at least will go some way towards ensuring that the benefits of new technologies are shared across the community. Clearly, if education includes computer training from an early age, at all schools and in all areas, an emerging imbalance can be avoided.

Surely, the development of an information society cannot be limited to the developed part of the world. The information society must, therefore, be created in the developing and transition countries as well. It seems necessary to establish the groundwork for productive forms of co-operation in the whole world towards an international consensus. Only information exchange can lead to a more extensive, more rapid and more cosmopolitan development of the information society. The Internet has an impact on every area of life: commerce, culture, environment, health care, transport, research, education, etc. It is of great importance that sites be available in different languages.

What remains to be done? For the Southern Caucasus countries in particular, and for the developing countries in general, the information revolution and the new information and communication technologies hold enormous potential despite the difficulties outlined above. For instance, the new wireless technologies will extend modern communications into areas that it would have taken conventional copper wires decades to reach - if they ever had. People in remote communities all over the world can have access to knowledge beyond the dreams of anyone in the industrial countries even a quarter of a century ago.

Although traditional channels of communication will remain important, the new information and communication technologies hold great potential for broadly disseminating knowledge at low cost, and for reducing knowledge gaps both within countries and between industrial and developing countries. Market competition can unleash the private sector to provide the communications infrastructure and services and expand the use of new communications technologies in developing countries. But governments have to ensure appropriate regulation to guard against the power of private monopoly, and supplement the market to ensure access for the poor.

Despite the call for a small government and some observers' prognosis that the state is withering away or is becoming powerless, governments play a crucial role in moving us from where we are today to where we want to go. In fact, among those who study the information society and the developments in electronic commerce in particular, there is general agreement that the private sector should play the lead role in developing, adopting and utilizing this new form of doing business. The role of government is to provide the policy and legal framework and stimulate e-commerce by being an early user.

Three elements are essential for the successful development of information societies and the potential benefits as promised by the information age. First, there is the need for appropriate, supportive and positive policies - the need for congruity of policy standards and interoperability among nations to promote international cooperation for the development of open, global standards. Policy reform is essential for governments, individually and collectively, to hasten the development of an information infrastructure by dealing with the following issues:
a) Convergence of telecommunication, media and information technology sectors; b) security of information systems; c) privacy; d) intellectual property, e) content regulation, and f) tax policies.

The second element is the development and accessibility of the necessary infrastructure consisting of an interconnected, interoperable broadband communications network, telecommunications devices (like computers, fax, TV), software, information services, data bases and trained individuals who will build, maintain and operate. This telecommunications

infrastructure will serve as the gateway that will connect nations to their national, regional and finally, to the global information infrastructure.

The third element is the relevant and supportive regulatory environment that is based on the propositions that

a) the private sector should lead, and that the expansion of information and communications technology use should be market-driven and that
b) governments should support and enforce a predictable, minimalist, consistent and simple legal environment for commerce that is based on private contracts, with internationally harmonized default rules.

In addition to these, the four main principles in developing regulatory frameworks for the information society are:

1) Providing open access. There is a need to develop specific regulatory and technical conditions to enable the interconnection of networks and the interoperability of services at the national, sub-regional, regional, and global levels.

2) Promoting competition. There is a need to open the telecommunications equipment, services and networks markets to competition. This will stimulate the development of information infrastructures by reducing prices and tariffs, stimulating private investment, and introducing new services. Productive forms of cooperation to promote economic efficiency and consumer welfare should be allowed while shielding against the risk of anti-competitive behavior, in particular the risks of abuse of market dominance.

3) Ensuring Universal Access. It is imperative that all sectors of society have access to information infrastructures at affordable prices. Accessibility is the key to ensure that the benefits of the information society are made available not only to the rich but to the poor as well.

4) Creating effective regulatory institutions. The presence of competent institutions that are market-friendly and that do not substitute their own judgment for the market's is a necessary condition for rapid development. These regulatory institutions should support and enable the rapid emergence of new competitive infrastructures and services at the national and regional levels.

To develop, information societies in the region require a globally harmonized legal framework. Industry and governments need to work closely together to identify which

policies require change or elimination to facilitate the Information revolution. In addition, it is critical that any regulatory approach be minimal, globally harmonized and technology-neutral.

In the case of electronic commerce, new regulations should not be imposed merely because commerce is being conducted in an electronic manner. That is, e-commerce should be treated as just one of the ways of doing business. Thus, the best way to deal with most of these issues is to ensure that the same rules apply both offline and online. Despite the voices of the pioneers who claim that the Internet is so different that traditional law cannot apply to it, the general consensus seems to be that the law as it already exists applies in most ways to Internet communication. Where new rules are required in addition to this approach, those rules should be based on a principle of minimal regulatory involvement with the primary delivery through industry self regulation and codes of practice.

Transparent regulators and regulation are essential to the success of telecommunications in general and, in this context, to the development of electronic communities. There are two facets to this. The first is that the regime in which electronic business is developed must be open and predictable. Secondly, if disputes arise, clear mechanisms are required for those disputes to be resolved by the regulator. This will enable the rapid and efficient development of the necessary infrastructure that underpins the electronic communities of the future.

The challenge for the information society is how to give these countries in transition the maximum benefit from transition. It is for us to respond, adapt and make the most of it - to work within the opportunities presented, deal with the challenges and use change to the advantage of our society. There is a great need to develop the information technology and infrastructure of each nation of the world to usher them into the information society. Failure to create such an infrastructure will keep states on the wrong side of the digital divide.

Ensuring global equality of access to ICTs is a huge task: Eighty per cent of the world's population has no access to reliable telecommunications, while South Asia, with 23 per cent of the world's population, has less than one per cent of the world's Internet users (UNDP Human Development Report 1999). Many communities do not have electricity, let alone the necessary computers, cables or satellites to be able to use the Internet. Others cannot afford the high cost of Internet access. Bill Gates has argued in his book 'The Road Ahead' that innovations like the Internet will lead to more democracy. But while it may be true that new

technologies may break government monopolies on information, they are not necessarily value-free.

The Internet, which is becoming increasingly commercialised, brings with it ideas and ideologies that may reinforce rather than break down existing global inequalities, and may have damaging or unwanted influences on traditional cultures. The fact that most websites are in English serves to exclude the ninety per cent of the world's population who do not speak the language. Knowledge may be power, but knowledge sharing is empowering. An information society involving every part of Europe, regardless of its level of development, with data protection guarantee is a vision we should reasonably make every endeavour to achieve. With the development of such a society in all Caucasian countries, the concept of sustainable development of the region should be redefined to include a government's, region's and the world's capacity to build successful knowledge societies equally accessible for all people.

Action to reduce information poverty can include:

- Working to improve equality of access to technology for both women and men, for disabled people, and for poorer groups within individual societies and globally
- Encouraging the development of appropriate and sustainable technologies in Armenia and in the regions
- Lobbying governments, development organisations such as the UN Development Program, the World Bank, and the Asian Development Bank, and the newly established UN Information and Communication Technology Taskforce to make technological capacity building a priority
- Encouraging private technology enterprises to take into account the need for research, development and marketing approaches that reduce, rather than increase, global inequalities
- Sharing ideas about implementing creative and effective local projects that can combat poverty through access to technology, showing that technological achievement is not just limited to large-scale development projects

While building a highly modern information infrastructure in Armenia and in other Caucasian countries may sound ambitious and costly, the cost of not doing it will be much greater in

future. Indeed, to compete in the new global economy, developing countries must make the development and effective use of information infrastructure a top national objective. They have to seize the opportunities offered by the new technologies to enhance private provision of information and telecommunication throughout society. If done well, these strategies promise to enhance educational systems, improve policy formulation and execution and widen the range of new opportunities for business.

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Diplomacy In The Light of Information Technology Development In The Caucasus

By Nairi Petrosyan, Co-Author Ara Brutian

All through the history of international relations, the flow of information has always been the essence of diplomacy. Now, after the informational society has replaced the industrial society and when Internet penetrates every sphere of human activity, diplomacy is undergoing a process of drastic transition to a new, higher level of informational operations. The development of information technology has drastically changed the nature of diplomatic activities and at the end of the 20th century, Internet diplomacy has emerged as one of the major branches of foreign services' activities.

IT is an efficient way of making general positions known world-wide and a tool that can assist the government's own foreign servants in representing their nation and its interests. Today, the majority of foreign ministries throughout the world have their own websites that provide information to anyone interested. Twenty-five or thirty years ago, diplomats had the task of gathering information in the field (at least by establishing valuable contacts and reading local newspapers) to get information and expertise on the country where they worked. Today, diplomats can stay in their offices for weeks running searches through the web and exchanging emails with their colleagues and contacts. And this is of course the advantage of IT development.

But that development also puts diplomats under the constant pressure of effectiveness and speed. The Internet lays down new rules of international relations – it requires permanent awareness of the situation and special abilities and skills to work with the huge flow of information provided by it.

It must be mentioned that in regions with complex conflict situations such as the Southern Caucasus, information technologies provide the diplomats with a common informational field to communicate with each other. It also provides an opportunity to make the position of conflicting parties known worldwide. In a situation where there is no direct communication between the parties to a conflict, the Internet can provide the opportunity to become familiar with the situation and events on the other side. These are the main opportunities and requirements of IT for diplomacy. In the following, they will be considered much concretely.

Diplomacy emerged centuries ago as a postal service, and an ambassador simply delivered a message from his sovereign to another one. So diplomacy arose in the informational field of human activities. Over centuries, diplomats extended their functions and became decision-makers, negotiators, and communicators; in a word, a contemporary diplomat now must be an idea generator. So it could seem that the informational function of diplomacy has gradually become overshadowed by the other activities.

Actually, diplomacy has never been far removed from its informational functions. All of its more recently acquired activities and attributes turn out, on closer examination, to be just derived forms of information dissemination. The 20th century witnessed the transformation of the industrial society to the information society. The impetuous development of network systems that entered its latest stage with the Internet revolution opened the qualitatively new field of high-speed information highways to the socio-political activities of human society. Humankind is undergoing a process of rapid change and often people do not consciously understand it. So how does the rapid development of IT affect diplomacy – the field of human activity where speed and operational flexibility are most required?

A modern diplomat's work is versatile and has many aspects. All aspects of diplomacy are actually different forms of work with information. A good diplomat deals with information like a jeweler treats a diamond – his mastery depends on his aims, skills and abilities in giving shape to a rough and unpolished diamond, in finding a ring to match, and in grinding and cutting the diamond into brilliant facets. IT technologies

have transformed, metaphorically speaking, the diamond-cutter's workbench into a laser-based high-tech miracle. So, just as it depends on the mastery of the jeweler whether the diamond will become a beautiful gem, so it depends on a diplomat's skills whether he can achieve his goals by receiving, processing and delivering information using the latest IT.

So how does a diplomat, or, more concretely, a Caucasian diplomat work with information using IT technologies? It seems useful to consider the work of a diplomat using IT technologies looking specifically at the three steps of receiving, processing and delivering information.

The *first dimension* of diplomatic work using IT lies in gathering information. It involves getting acquainted with the huge flow of the information and selecting from it the important and valuable parts. The process of familiarization and selection depends on the final purpose of the diplomatic efforts. A diplomat searching the Internet must always have a concrete aim and direction in mind – it is the first prerequisite to avoid getting lost in the large and rapid flow of information.

In the Caucasus, the aims of diplomacy are defined by the several regional conflicts in the region, namely, the Nagorno-Karabakh conflict, the Abkhaz conflict and, of course, the Chechen conflict. So, in the information-gathering phase, a Caucasian diplomat will usually search for information on a particular conflict, information on the international reaction to that particular conflict and information on similar conflicts or situations. What, for example, will an Armenian diplomat typically look for on the Internet? What are the criteria while first investigating the information? He or she will usually look first for specific information on the Nagorno-Karabakh conflict – whether in the form of reports from diplomatic missions or from other colleagues sent by email, whether the information is taken from the Internet resources of the other sides of the conflict in question, be they Azerbaijani official and non-official resources or from the Internet resources of other countries involved – for example the countries, co-chairmen of Minsk group or neighboring regional powers.

Information on international reactions to the conflict is very important feedback and can serve as a guideline in assessing international opinions on the particular conflict. An Armenian diplomat will typically search for articles and other information on the

Nagorno-Karabakh conflict to assess public opinion in the countries involved and also to pick up the unspoken messages underlying these articles. It is important to identify whose points of view a media resource relates. When considering similar conflicts, a diplomat is usually interested in procedures and methods, feedback and pitfalls that can be taken into account in dealing with a particular conflict. For example, an Armenian diplomat would thoroughly investigate the Abkhasian conflict, the Pridnestrovie conflict, and other similar conflicts; he would search for studies on international mediation or dealing with territorial and ethnic issues.

It is important to mention that the diplomat's email inbox not only serves his personal correspondence. Some very important information sources send their newsletters to subscribers, which is really a much more rational and time-saving way of getting information than Internet engines. Some interesting and very informative subscription tools include Groong, a source of Armenian and diaspora news, and the Snark and Mediamax news agencies. These sources really satisfy the criteria of reliability and speed required by the diplomatic work.

The *second phase* of processing the information using IT can be considered the most demanding and important stage of the process. Here, the diplomat selects the important pieces of information in order to arrive at a larger picture. This is a skill that can only be acquired through years of work and practice. Be it by intuition or because he knows so, the diplomat must have the ability to work according to the 80:20 rule –*80 per cent of the useful information can be found in 20 per cent of the text, while the remaining 20 per cent of information can usually be found in the remaining 80 per cent of the text*. So while working with information, a diplomat must be able to discern the important 20 per cent of the text from the remaining 80 per cent.

The *third phase* of working with IT technologies concerns delivering information. This can be expressed in numerous ways, and there is one point worth mentioning: the traditional ways of receiving and sending information through diplomatic channels – ordinary mail, telex, and telegraph – are still important tools of diplomatic communications. Currently, the channels provided by the newest network technologies such as email or Internet web pages are more effective and more available than

traditional channels of information. This has both advantages and disadvantages. A diplomat who wants to communicate rapidly and effectively will find no better medium than email. On the other hand, even the newest network technologies cannot guarantee the privacy of Internet communication; it still needs to be developed to a level that satisfies diplomats' security requirements. So we can conclude that for diplomats, email is worth using for routine, non-sensitive diplomatic correspondence.

On the other hand, delivering information involves much more important aspects than pure correspondence. The work of the foreign ministries' public relations departments is a case in point. In the Republic of Armenia, the transition to network-based work was made in the second half of the 1990s, and now it is more or less completed. The media receive information, such as press releases or media advisories, by email. Not only the foreign ministry, but also the other state agencies are now undergoing a process of transition to the latest generation of IT. No less importantly, the Internet due to its near-ubiquity provides a good opportunity for disseminating the main concepts and information on everyday activities of the agency represented. This is done mainly through official web pages, particularly those of the Armenian foreign ministry and the foreign ministry of the Republic of Nagorno-Karabakh. Web sites provide the most effective and the most convenient channels of information, and modern diplomacy is expected to make the best use of them.

The Armenian foreign ministry website (http://www.armeniaforeignministry.com) in particular contains basic information for anybody interested in its activities as well as press releases of the ministry, information on its organizational structure, on Armenian embassies and consulates, on other foreign missions abroad, and it includes important data on Armenian visa regulations, information on diaspora issues and genocide recognition; of course a special section is dedicated to the Nagorno-Karabakh conflict and its development. This website still has potential for further development.

To underline the power of information presented through the Internet, one should remember how during the both Chechen wars the Chechens succeeded in representing their own point of view through Internet. The fact is that the Chechens were much more successful than the Russians in this respect, especially during the first Chechen war. The minister for information during the first Chechen war, Movladi Udugov, later became

the minister for foreign affairs of Ichkeria. That experience was taken into account during the second Chechen war, when one of the best Russian PR officials, Sergei Yastrzhembski, was given responsibility for information policy vis-à-vis the Chechens. And there is reason to believe the assessment of some experts that nobody knows who won the first Chechen war, but that the Chechens won the informational war .

Proxy wars on the Internet have, by the way, become a reality not only in the Northern Caucasus. Several months ago, Armenian and Azerbaijani web resources started battling each other, with the Azeris trying to destroy some Armenian websites, and the Armenia-based "Liazor group" answering by temporarily making unavailable some Azeri websites. This episode underlines the growing importance of Internet-based information sources in recent years.

On the other hand, now that communication between the two conflicting countries has decreased to a minimum, the Internet provides great opportunities to find out and to communicate with and about each other. This is also true of Armenian-Azeri relations.

The Internet has also changed diplomats' tasks and the way they go about them. Because websites can be refreshed almost every minute, a diplomat's working day begins with scouring the news on the Internet. So the Internet has made diplomats' working day much more action-filled and intense. The Internet has transformed the discrete process of informational flow to an analogue-type non-interrupted flow.

In any conditions, diplomacy requires its representatives to have an edge on the rest of society in terms of speed. It should be remembered that in the Middle Ages, diplomats, like merchants, were the most prolific travelers. Now that the Internet has propelled everybody to a higher plane of speed and informational flow, diplomats are still required to be ahead of everyone else even under these new conditions. So, competent use of state-of-the-art IT is required of diplomats. Though there was nearly no communication between Armenia and Azerbaijan as recently as five or six years ago, the representatives of the two countries could not now refuse to communicate with each other even if they wanted to, because they are living in a drastically changed society with slightly different information flows. The Internet, while providing diplomats with an extraordinary range of information tools for their activities, also requires them to become almost as fast and effective as the web is.

To conclude, it is worth stating once more that the latest development of IT of course made it much easier for diplomats to communicate. Nobody could imagine some decades ago that even in such inaccessible regions as the Caucasus, information would be so readily available. The development of IT has made the state borders much more permeable.

On the other hand, this availability of information has brought with it certain obligations for diplomats. The work with IT requires some skills and abilities that help to identify, process and deliver the needed information. The Internet recognizes neither day nor night. The point is, that if all through the history of international relations, the diplomats have always been the fastest in their work, now, when the Internet has immersed all of us in a much more dense information flow, diplomats are still required to be the fastest and the most effective, especially in such a complex region as the Caucasus.

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Prospects of Digital Democracy and E-governance in Georgia

By Archil Bakuradze

Is "Digital Democracy" a new form of democracy alongside traditional models of representative or participatory democracy? What is meant by the term? Is it an Internet enthusiast's daydream or future reality? How should Georgia deal with Information and Communication Technologies (ICT), which are affecting people's social, economical and political lives and emerging as a new aspect of modern culture? These and other questions are addressed in the following paper. But the goal of this paper is not to answer these questions, rather than to initiate discussions on Digital Democracy and E-Governance in Georgian society.

DEFINITION

The term "Digital Democracy," meaning a reformation of democratic institutions and practices through the use of ICTs, occurs in scientific literature together with ideas such as "electronic democracy,""tele-democracy" and "cyber-democracy." The idea of a "Digital Democracy" involves bringing together all existing tools and potential for disseminating information using digital technologies. Currently, in the West, the notion of digital democracy can refer to a fairly wide range of technological applications, including televised popular assemblies or citizens' juries, e-mail access to electronic discussion groups, and public information kiosks. In Georgia, this type

of activity is relatively new and is not yet widespread. But taking into consideration the speed of ICT development in our country during the last decade, we should admit that digital technology is about to enter the mainstream.

BACKGROUND

Since Georgia became a member of the European family the country has faced the necessity of being more open towards the new "Information Age" and supporting the expansion of the Internet and ICT to all regions of Georgia. Following is the abstract of "A manifesto for local online communities," presented to the UK Government Policy Action Team (http://www.partnerships.org.uk/cyber/index.htm): "Every citizen, regardless of their economic circumstances, should be able to share the benefits of the Information Age – including better communications, greater participation, electronic life learning, and e-commerce. To achieve this they should have access to local community technology centers, plus public online forums and services to create online community..." ICT opens interesting opportunities to Georgia in terms of developing public participation, building democracy and increasing the effectiveness of governance.

"Transition" would be a good headline for the past decade of Georgia's history. The dramatic changes in society have left millions of people in shock. It was obvious that change would be very painful for the post-Soviet society. Much like a zoo animal released into the wild, many Georgians found it difficult to fend for themselves after being protected by the state for so long. Others who had already been more independently minded before the breakdown of the Soviet system were able to adapt better to the subsequent upheavals. The infant Georgian state is facing the dilemma of having to build a strong legal state, a free market economy and civil society, all of which are necessary components of democracy, or return to the status quo ante. It will take time to accumulate an experience of democracy, to make some political experiences, strengthen the political culture and empower individuals and communities to participate more actively in determining the formula of their social

and economical well-being. Where does ICT figure in the future model of Georgian democracy?

DIGITAL DEMOCRACY REQUIRES DEMOCRACY AS MINIMUM

The issue of using ICT in politics and governance raises a lot of questions. For example, are enough precautions being taken to ensure that everybody's opinion is taken into consideration during the decision-making process in the country, and to prevent one group of privileged citizens from having better access to ICT than others? How beneficial can ICT be during elections, or in the period between elections in measuring the reaction of single members of the society? How much better could a government provide its services through the Internet? How will the Internet affect corruption? Can it make the work of government more transparent and accessible? These and many other questions need to be addressed in discussing the impact of ICT on politics in Georgia.

To answer these questions, we should first of all discuss what democracy really means, what its weaknesses are and what challenges are associated with the emergence of a digital democracy.

Representative models of democracy have been established in many societies in the course of the 20th century. The underlying concept is that it is only by conceding a great deal of their power to a small group of politicians, whose job it is to represent their common interests, that citizens can live in a democratic society at all. Conversely, its opponents have argued that elected representatives often do not represent the "will of people" and are prone to elitism. More recently politicians have become tarnished with allegations of sleaze, corruption, self-seeking behavior and sound-bite policies that may have produced widespread disillusionment and apathy amongst citizens and particularly the young. Footnote:

Participatory democracy has been seen as the closest approximation to direct democracy involving the public in decision-making processes. At the same time, participatory democracy is not the final answer. It may cause a lack of participation in

decision-making on issues of national or global concern, because citizens may only be interested in local issues. From the following definition of politics, it is clear that even the existing forms of democracy cannot claim to be ideal models. “Politics is a phenomenon found in and between all groups, institutions and societies, cutting across public and private life. It is expressed in all the activities of co-operation, negotiation and struggle over the use and distribution of resources. It is involved in all the relations, institutions and structures, which are implicated in the activities of production and reproduction in the life of societies...”

Footnote? Note: This is a “definition” of politics, not of participatory democracy, and it does not follow from the above that participatory democracy is in any way flawed. This “definition” is also so general and vague that its value seems questionable.

Therefore, Loader and Hague in their study describe the following main features of modern democracies, which can only be realized with the help of ITC and interactive media:

- interactivity – users may communicate on a reciprocal basis
- global network – communication is not fettered by nation-state boundaries
- free speech – net users may express their opinions with limited state censorship
- free association – net users may join virtual communities of common interest
- construction and dissemination of information – net users may construct and share information which is not subject to official review or sanction
- challenge to professional and official perspectives – state and professional information can be supplemented from other sources
- breakdown of nation-state identity – users may begin to adopt global and local identities

Taking into consideration these features, ICT can clearly be of great benefit for the development of democratic governance in Georgia:

1. Digital Democracy will support a greater participation of citizens in the decision making process

ICT is an advanced tool for improving communications between media and public, because it offers excellent opportunities to make feedback from the objects of information. One may imagine how different will be transference of information and possibility to observe immediately the reaction of viewers. This kind of communications will never change or replace the need for physical, face-to-face communication. Most people are used to communicating more directly and will continue to do so. But the face-to-face communication is increasingly being replaced by e-mail, fax, and telephones – a shift that has completely changed relationships between people. While some members of the older generation are reluctant to use the new technologies, the younger generation is comfortable with the new style of communication and uses it as a matter of fact.

Compared to current technologies, the future development of ICT will offer society more opportunities. Arming individuals with ITC government may handle the power to the society. This will lead to a situation where everybody may express their opinion about issues of local or national import without restrictions. Electronic surveys, plebiscites or elections will be arranged more frequently. In order to access high quality and impartial information, citizens will be able to choose from multiple sources of information and express their views using electronic discussion forums. ICT may be equally beneficial for all levels of decision-making, from the regional to the local levels.

2. Turnout at local or general elections can be increased

Modern societies in the developed nations are facing the problem of citizens' indifference to elections. In Georgia, it is very difficult to evaluate election turnout, because official figures are not reliable. There is a tendency towards less participation in elections and especially in general elections. There are two possible explanations for this phenomenon: one is that low turnout is a consequence of expectations of the electorate being met and the result of acceptable governance. The second and more pessimistic explanation would be that low participation in the electoral process is a consequence of people's indifference, and of a perception that the individual vote does not count – this attitude would be extremely deleterious to democracy. In any case, ICT will facilitate online voting within a matter of minutes. At the same time, it

should be recognized that ICT and digital democracy are not a panacea that will solve the problems of the community's indifference towards elections and of lacking participation in the political decision-making process. These problems can only be solved by a developed and vibrant civil society.

3. Use of ICT may improve delivery of public services

In many developed countries, for example in the UK, the government has worked out programs for shifting the delivery of public services to electronic channels. All types of information, assistance, permits etc. could be downloaded from the Net. It is possible to arrive at a level where all governmental services are provided through the Net if connectivity is fast enough. Such a reform would significantly improve the quality of these services and make them more accessible to the public at large.

4. The government will have excellent opportunities to make its work more transparent, accessible and understandable for its citizens, which in conjunction with the previous point will reduce the scope of corruption in Georgia.

After reaching independence, Georgia adapted its legislation to European standards. For example, the new administrative code regulates the relationship between the people and the government, and guarantees the right of every individual to be informed about the business of government. According to the law, every citizen has the right to obtain any information that is in the public domain. This code, much like many other laws, is not enforced. Increasing access to public information and services will limit corruption, because lack of and unequal access to information is the root of almost all corruption cases.

Beyond the issues mentioned above, certain questions, which are open to empirical investigation, begin to emerge in relation to the role of ICT in the creation of a strong democracy:

- to what extent can ICT make the government more accountable (at both national and local levels)?
- to what extent can ICT be used to create a citizenry that is more informed in matters of state?

- to what extent can ICT facilitate citizen participation in decision-making concerning affairs of state?

THE QUESTION OF ACCESS

In looking for the benefits of digital democracy, a very important issue is access. Typically, such concerns, particularly as expressed by governments, have focused on broadening access to ICT hardware and software and providing widely available basic training in their use (the present British government sponsored "IT for All" and "Computers do not Bite" initiatives are good examples).

It is obvious that only a very small portion of the population of our country has access to computers, as is also the case with very basic social needs. But "digital exclusion," which will put such "excluded" people in very difficult conditions in the future, should be avoided in the same way that social exclusion is.

We are already in the position of having "digitally excluded" part of the population. Social, financial or other kinds of exclusion within society are normally seen as a problem for the minority groups (typically belonging to a vulnerable population group). Every country in the world, including very developed states, is facing the problem of social exclusion (used here as an umbrella term for all types of exclusion), and usually only small percentage of the population experiences this problem. In Georgia, the majority of the population is socially vulnerable and this leads to a disproportional distribution of wealth, with most of the people living below the poverty level and in the absence of a bona fide middle class. A limited number of privileged people have managed (in most cases, based on merit) to overcome social problems. But currently, the majority of the population is socially excluded. This also includes people who lack ICT access.

In Georgia, ICT is widely available to those who have gained access due to their economical or more frequently "social wealth." Among the socially wealthy people we may include the newly established NGO community, for whom ICT is an

indispensable work tool. Digital exclusion is a reality today and as society develops further, this problem will become more visible and relevant.

ICT access will be restricted for the majority of Georgian citizens in the future as well, because the population's consumer power is very low and the market would not be able to supply everybody with computers, as was the case with TV. On the other hand, the young Georgian state does not have the capacity to subsidize this sphere and in addition provide training to its citizens. For the majority of people, computers are difficult to comprehend. There is a widespread opinion that middle-aged and older citizens cannot learn to work with computers. Existing teaching programs funded by the donor community are mainly focused on the young people. In addition to the above-mentioned problems, Georgia was not developed to equal extents everywhere, therefore some regions are badly underdeveloped compared with the capital. In the majority of territories outside Tbilisi, for example in mountainous areas, neither the basic infrastructure nor communications function properly. This has given rise to great concerns regarding unequal access to ICT.

But even if all these problems were solved and everybody had full access to ICT, this would not be enough to establish direct democracy. Digital democracy and new technologies will not motivate people to be more educated in questions of governance, be more active and take part in decision-making. This should be a precondition to the development of ICT.

Recently, the issue of the Georgian language was raised in society. Even this state language is not comprehensible to all citizens. Neither is English. The lack of a common language is also a barrier to equal access to information. With respect to the Georgian language, some linguists have found that the language has experienced a dramatic change over the last century, and the current official language of government is quite incomprehensible for the important part of the population, and as a consequence messages are not correctly conveyed to the population through the media. As a result, the main political news is related orally. In the information age, information should not only be available; it should be shaped in a way that adds value. Digital democracy will offer people alternative sources of relevant political

information, including through many-to-many communications, which would ensure that this information is delivered in the clearest manner.

> To risk stating the obvious, the value of ICTs to citizens is heavily contingent upon the type and quality of content to which they have access to. If ICT is to promote "strong democracy" then attention must be paid to providing relevant information, in user-friendly format, at times and in locations at a cost which do not present barriers to access. Communities themselves can be involved in considering how ICTs might be applied to meet their information needs (which may, quite legitimately, range from accessing news about the local football team to finding out about current government policy proposals). Furthermore, armed with knowledge concerning the potential of ICTs to meet their information needs, community is empowered to apply pressure on the relevant information providers (across public, private and voluntary sectors) if the required information is not forthcoming. But perhaps the most exciting development of all if that the "many to many" nature of communications facilitated by the latest ICTs, means that citizens and communities can become information providers themselves, sharing information about themselves and shaping an identity for dissemination within the local community and beyond to the wired world." (B.Hague and B.Loader)

In addition to the difficulties already mentioned, there is another important challenge to the development of ICT. This is the quality of information, or more clearly the amount of excess or unnecessary information. Under the current level of development, the press in Georgia provides a wide variety of editions and views. Very frequently, the quality of information in the press is low due to low professionalism, making the media sometimes look irresponsible because their reporting seems to be a distortion of reality. This is why the transmitted information is powerless in most, but in not all cases. For the contemporary reader, it is very difficult to elicit useful information from the flood of data. Selecting relevant information requires a unique skill. This skill will be more necessary in the future, as the amount of available information becomes practically unlimited.

TESTIMONY OF DIGITAL DEMOCRACY

Georgia is looking forward to becoming a full member of the European family. The physical distance between Georgia and the heart of Europe is quite long; but electronic technologies provide an opportunity to link up with the rest of the world in cyberspace. The process of decentralization, along with the rapid regional integration

of states, is reason enough to create a common forum for discussions, where participants may cross-fertilize and promote the integration process.

Since Georgia joined the Council of Europe, Georgian legislation has been subsumed under European law and Georgia can be held accountable for breaches against EU rulings. The process of building a constitutional state and the development of civil society require a well-functioning legislative process. In this regard, it is important to share the knowledge and experience gained in state building with neighboring countries. Access to European legislation, and dissemination of information about individual cases that add up to an integrated body of human rights legislation, are among the most important contributing factors for building democracy in Georgia.

How will ICT contribute to the development of good governance? Good governance is generally understood to mean transparent and accountable government, representing the interests of all groups in society, and having a coherent structure of power distribution between different levels of decision-making. Citizens should be able to participate not only at elections, but also during election campaigns by actively questioning and scrutinizing election programs. None of these criteria have been realized as yet.

The following are examples of modern, developed information sources from Western Europe and North America, which could be characterized as Political, E-Democracy and Internet Society websites:

I. UK Politics Site: www.ukpol.co.uk

The site provides information about all aspects of British politics, including issues on elections, parliament news, information about MPs, local elections, manifestos, constituency profiles, news from the House of Lords, the Scottish Parliament, the Welsh Assembly and the Northern Ireland Assembly. There are links to more than 2'500 political websites.

II. Hansard Society Site: www.hansardsociety.org.uk

The site promotes effective parliamentary democracy.

E-Democratic Sites:

III. Gateway to online parliamentary discussions: www.democracyforum.org.uk

Democracy forum is an online public space for discussions and debate concerning the British parliamentary democracy. "There are many issues concerning parliament, legislation and democratic citizenship which call for intelligent public debate. This web site is intended as one forum that debate to take place. It is open to all citizens, but there are rules of debate, which we ask all participants to follow. This is a monitored debate," the site says.

IV. Minnesota E-politics site – a pioneer in US E-democracy: www.e-democracy.org

"Minnesota E-Democracy is your credible non-profit, non-partisan, trusted host for on-line political and community discussions that matter. E-Democracy is neutral and respected host of online public issue discussions at the state and local levels. Our discussions open up the political process and allow you to play a serious public agenda setting role on your own time from anywhere in real world public affairs."

V. www.policity.com – Canadian public affairs site:

"Policity.com is a collaborative, non-partisan site dedicated to the government discussions of "citizen-centered governance. Policity offers opportunities to learn, share and work together online. It has been designed for people to interact, test their ideas and become part of an international network."

Policity.com is made up of two main parts: CP Center, a center for the discussion of citizen participation issues and techniques, and the ESD Clearinghouse, which provides information on electronic service delivery for government officials.

VI. www.holyrood2000.co.uk– Scottish communities' site:

"Com.com/holyrood is a Millennium project that uses the latest technology to enable communities across Scotland to communicate with their new parliament at Holyrood, and much more.

VII. Site concerning e-government issues: www.kable.co.uk

As is obvious from the above web sites, digital democracy and e-governance are already a reality. Even though this is a very new development, it is growing with impressive speed and will be widespread in a couple of years. Georgia should be embracing these cultural changes, which may be of great benefit to society. Beyond the positive effect on the country, its good governance and democracy, this is an excellent way to accelerate the process of integration.

FUTURE DEVELOPMENTS

Many interesting projects could be developed and implemented for Georgia at the local, regional or country levels. E-governance can be also easily promoted, starting with use of the Internet for improving communications between the government and citizens with web access. Following the recommendations of the National Anti-Corruption Program, ICT may be applied to enhance the government's transparency and accountability.

Besides state initiatives, there is a strong potential in the NGO sector to make cyberspace available for discussions about issues concerning politics, civil society and the protection of human rights.

It is of paramount importance to widely develop educational programs oriented not only towards youth, but towards adults as well. Special attention should be given to improving computer literacy among civil workers, politicians, and political staff in order to promote the ideas of digital democracy and e-governance.

A debate regarding the quality of, and access to, available information will be required of Georgian society. Citizens should start building skills to identify the most reliable and best-quality information. These programs can't be driven by market forces, which are very weak in Georgia. There is a need for state programs or, if possible, international development assistance.

ICT will no doubt change our culture as well as interactions between people. ICT may grate with Georgian traditions, because this type of communication is completely new. Integration to the Western world is introducing a lot of new features to society. It is impossible to evaluate the process and say that this is good or bad. Of course, this is a matter of choice, because many people might prefer to live without any ICT or even TV or telephones. But if we wish to build an economically self-reliant and socially stable state, based on a vibrant civil society, we should be very active in developing new technologies.

Therefore, the social discourse on these developments will be of paramount importance. Whether we like it or not, ICT is developing fast and encroaching on our everyday lives even faster. Digital democracy is not a status or position that one can arrive at. It is a long and difficult process of development and increasing the level of education of the people.

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Executive Summary
Economic Track

The Information and Communication Technologies brought the economic relations to a new altitude by becoming as a key economic forum for commercial and financial exchange transactions. The economic opportunities given by electronic economy are such as exponential reduction of transactions and opportunity costs, rationalization of individualized services, electronic transactions etc.

When we look at worldwide history we can see that the cost reduction of Information Technologies by dropping significantly raised e-commerce as a share of all commerce. The reasons for e-commerce flourishing are improvements of customer relations and services, facilitation of communications, reduction of costs, brand-name image, improvements in supply chain management, flexibility, price – performance ratio and transparency, reduction of IT management costs etc.

However, despite the given opportunities Caucasus still hesitates the engagement of ICT to business. For each business, country and region there should be developed and carefully assessed e-commerce strategies. These strategies should cover all aspects of economic activity including electronic stock controls, quality control schemes directed to product quality and flexibility improvements, reduction of production cycles, better customer services. Despite, e-economy through the more information possibilities makes the economic environment more competitive, it also facilitates the entry to the market for new entities and gives partnership opportunities.

The two questions raised in economic dimensions for Caucasus countries were:

- Is there an emerging e-Commerce and in what sectors? How will the new economy develop in the Caucasus? (New economic paradigms, new methods of work, new business models);
- What are the greatest obstacles to an «amazoned» industry?

Armenia: Electronic And Information Technology In The Banking Sector

After the dissolution of the Soviet Union and gradually liberalization of the Armenian economy the number of banks were increased from only 6 banks (of which 5 were state owned) in 1991 to 74 at the end of 1993. However these banks were fragile and in the wake of the break down of Soviet Union trade and especially payment system the number of banks in the economy fell to 36 (33 domestic and three foreign branches) by end – 1996, and has stabilized around 30 thereafter.

It should be noted that the reduction of banks was associated with the increase of number of branches and capitalization of overall banking sector. There are operating in Armenia 219 branches and 62 operational offices in 2001. All these facts assure the accelerating role of the banking system as intermediaries in the Armenian economy.

An Inter-Bank Committee on Payment System Development in Armenia was established in April 1994 with participation of official representatives from the CBA and the commercial banks.

The development of the Domestic Payments System has been accomplished in the following phases, reflecting the concentration of payment activity in Yerevan and difficulties in physical and electronic delivery at the inter-regional level:

- The implementation of new payment procedures in Yerevan,
- The implementation of new payment procedures for intra-regional payments,
- The implementation of new payment procedures for inter-regional payments,
- The special interbank organization (Courier Service system) for inter-bank paper transfers was implemented in Yerevan in 1994 April and in regions of Armenia in 1994 November. In Yerevan it delivers payment documents within a day and in regions twice per week,
- In May 1994 working out of interbank clearing system,
- In February 1995 establishment of ”the-same-town” payment system,

- In 1997 setting up CBANet interbank computer network and electronic based real time gross settlement system (electronic payment system - EPS),
- As from 1997 a SWIFT “base terminal” installed in CBA to service foreign transactions using SWIFT,
- In June 2000 a new joint stock company, Armenian Card (ArCa), has been created by CBA and 10 major banks to develop a unified plastic card system,
- A new securities and settlement system has been designed for processing government securities settlement held by CBA.

The development process of Information technologies usage in the banking system shows how can simple systemizations for own accounting reasons expand and become full-coverage, countrywide electronic system serving all stakeholders including clients.

The developments in electronic an information technologies introduction in the banking sector in Armenia showed that there are situations when Central Bank has to take an initiative as it was during implementation of S.W.I.F.T., CBANet and EPS systems. Otherwise, in case plastic cards, banking sector didn’t get appreciable results thus banks turned to Central Bank asking for managing and coordinating the works.

The Social Impact Of Internet In Armenia:

The social impact of international technologies in South Caucasus region is not yet but supposed to be significant. The social-economic situation, transport blockade, unemployment and other conditions led the South Caucasus nations to loose educational, art, social and inter- and domestic business relations. The role of Internet in restoration of such relations is vital.

The way people conduct business has vastly changed with the wide use of the Internet. Some businesses in Armenia now have websites that allow people to conduct business via Internet. This is a field that all experts predict would grow and advance greatly in the years to come. Many people use the Internet to get information before making a purchase. This is a way that the consumer learns much about his next purchase, before he actually goes out to purchase. One sits comfortably in his home and surfs the web for interesting places to visit, what can be done in those places, and then which company offers the best deals or prices. The potential tourist has the world to surf through with the help of the "mouse". Different types of cruises are offered over the Internet, for different kind of interests, ages, destinations and affordability.

E-Business in Azerbaijan: Reality and Prospects

Despite the high level of Internet development in Azerbaijan the problem of real applications of electronic business still exists. In Azerbaijan, probably the most interested parties in e-business are the banks. It provides ability to the commercial banks to manage financial resources effectively. In its turn by reaching stable and strong economy the level of democracy would rise in the country. Also banks are the main institutions that are in some way can act in e-economy in legal terms and in transparent way.

However Azerbaijani legislation doesn't fully provide and support e-commerce development. There is a law that still prohibits operations in Cyberspace with money. Thus despite legal basis exist for electronic signatures the money transfers via Internet are illegal.

There are only 300 points of sales (POS) and 30automated trading machines (ATMs). Also only 5 banks are able to issue debit and credit cards and 2 banks can implement international card processing.

On the level of regional cooperation Information Technologies could become a real venue for Azerbaijan, Armenia and Georgia. The problem of this sector development lies in governmental policy. And there is a tendency to change legislation towards freedom of e-business. The perspectives in Caucasus are huge, but 3 countries of Caucasus cannot find common language to utilize these possibilities.

The problem exists also in Internet world development regarding communication and promotional possibilities given by IT. There are so less corporate sites exist in Azerbaijan. From 60 banks only 20 have websites. Not all banks are able to invest even in the automating of processes. So software development also suffers.

The trend shows that there is a big evolution for e-business: two Internet shops were established as a "window" allowing to surf, analyze, find products and prices. Also prepaid Internet Cards invented for payment purposes through the Internet.

The number of banks making services in the Internet will rise in the future and probably in 2005 Azerbaijan will have real and strong banking sector.

Development of Multimedia. Multilingual Information Products for Business Promotion in Georgia.

Multimedia products allow developing of business communication sector in Georgia. By providing information to interested parties – both domestic and foreigners – Georgian business sector becomes more attractive to investor and also

investors get complete necessary information for doing business in Georgia. Publications are mainly in digital format like CDs or Internet. These publications developed by Techinformi include CD-ROMs for promoting business and culture in Georgia.

Business CD includes a multilingual program for facilitating business activity in Georgia and includes about 8000 pages of information. Even when you change language in the program the structure remains same. In that program one can find laws, economic, regional information, database on enterprises and advertisements of companies. Also video and audio presentations are included. Information regarding enterprises includes huge directory of names and some CVs of managers while advertisements include history of companies, their annual reports and business proposals.

An easy updateable version allows to change and update information with the user friendly interface by using a relational database system based on SQL database principles.

Cultural CD mainly promotes Georgian values and directed to tourists as well as those just interested in Georgia. The general information includes maps, symbols, anthem, and general data on Georgia. Also you can find there mountains, fauna, art, life traditions, sport, history, traditional agricultural products (wines), Tbilisi information, ethnic groups of Georgia and even generally used words in Georgian language.

Of course all these products are developed and promoted by using strong marketing skills. They are distributed with fee.

Conclusions

Banking sector can be a beginning for e-Economy. However there are interrelated factors having negative effect on economic dimension as social as well as political. The discussions of economic development using ITs can not avoid and not touch social, political and technological aspects of Information Technologies. Shadow economy, poor legislation and insufficient government policy hampers the e-Economy development in Caucasus. Moreover, the level of cooperation in business sector is lacking while the business entities could accumulate their forces for developing and introduction of Information Technologies for their common needs. So

sometimes an outer initiators can facilitate this process like governmental bodies, non-governmental public organizations or business associations.

The next finding was that there were cases when external support helped the introduction of ITs in an economy like financial sector is.

Money likes freedom. And the freedom for money enables the money to be accumulated from individuals to corporations, latter to be saved for better management, and finally to become virtual in digital environment and act as a real cash.

Future Prospects

Within two years there will be huge changes in South Caucasus countries regarding economic development. These changes themselves will rise the level of realization of the importance and necessity of Information and Communication Technologies. And only those companies will survive in that competitive environment that would fully utilize the opportunities given by e-Economy.

Digital world does not recognize borders and in the case of Caucasian countries ITs could and would be a source for restoration of social and economic relations among countries.

While in many countries the digitization of economy raises unemployment by replacing traditional workers, the IT development in Armenia, Azerbaijan and Georgia are the source for employment as complementary to traditional jobs. And one of the peculiarities of 3 Caucasian countries is that all of them are rich in good specialists in ITs and have very strong scientific base.

In 2005 there is a possibility to see very different economic situations in Caucasus forced up mainly via Information Technologies. However, a lot of job still should be done.

Information Technology Prospects in the Caucasus
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(Switzerland)

Armenia: Electronic and Information Technology in the Banking Sector

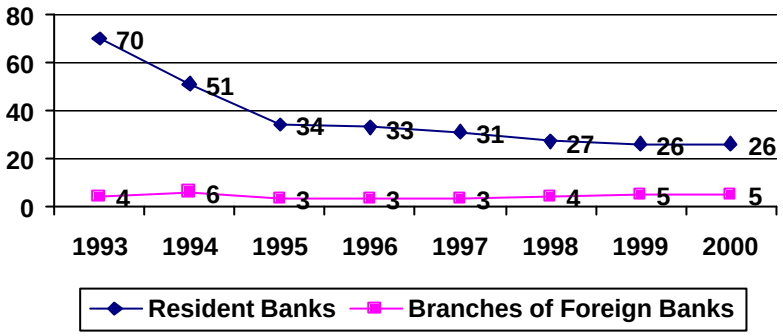
By Ashot Khurshudyan

After the dissolution of the Soviet Union and the gradual liberalization process of the Armenian economy, the number of banks was increased from only six (of which five were state owned) in 1991 to 74 at the end of 1993. However, these were small institutions and were established mainly for providing financial services such as credits and payment services to shareholders. The ensuing fragility of the banking system was further exacerbated by the collapse of the Armenian economy in 1992-94 in the wake of the breakdown of the former Soviet Union's (FSU's) trade and especially its payment system.

The first turning point came on 22 November 1993, when a national currency – the Armenian Dram – was introduced and prepared the ground for the introduction of new accounting standards. A program for bank reform and consolidation was also initiated. As part of the banking sector reform, the Central Bank of Armenia took action to close a large number of non-viable banks. Between 1994 and 1996, the Central Bank withdrew the licenses of 20 banks for noncompliance with prudential regulations; 12 banks returned their licenses either by way of self-liquidation or after a merger. As a result, the number of banks fell from 72 (58 domestic banks and 14 branches of foreign banks) in early 1994 to 36 (33 domestic and three foreign branches) by the end of 1996, and has leveled off at around 30 since (see fig.1).

It should be noted that during this time, the reduction of the number of banks was associated with an increasing number of branches and growing capitalization of the general banking sector. Currently, 219 branches and 62 operational offices operate in Armenia. Between 1995 and 2000, bank assets increased four-fold in real terms, from the

Figure 1. Armenia: Number of Banks, 1993 - 2000



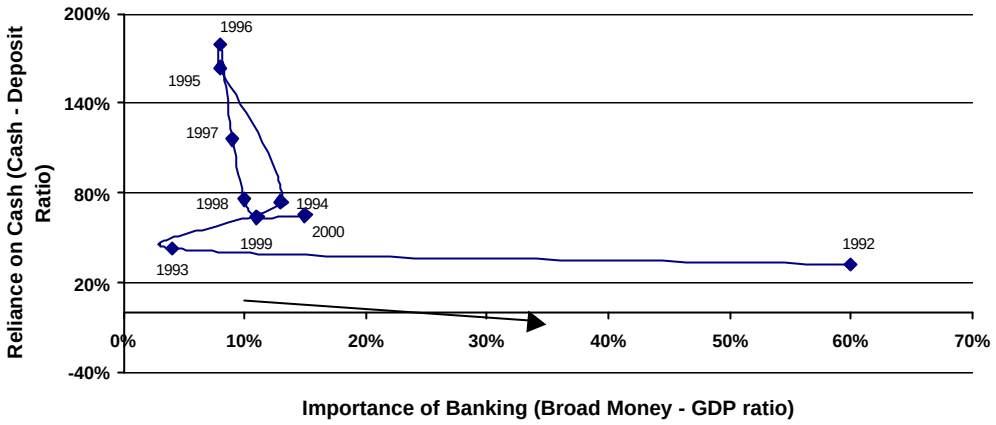
equivalent of US$105 million in 1995 to US$418 million by 1 April 2001. Over the same period, the aggregate capital of the banking system tripled. All these facts contributed to give the banking system an increased role as intermediaries to foster the growth of the Armenian economy.

However, the Armenian financial sector remains at a fairly rudimentary level of development despite the progress made in recent years. In seeking to improve the financial sector's services, two related issues need to be addressed.

The first is the general lack of depth in the financial sector.

The second is the lack of diversification of financial instruments and products that is impeding the development of Small and Medium-sized Enterprises (SMEs) and micro-enterprises, which should be the engine of growth in the private sector.

Figure 2. Financial Sector Depth



The banking system plays a relatively small role in the administration of savings in the Armenian economy.

Figure 2 combines two basic indicators of the financial sector to produce a summary representation of the financial deepening process; specifically, it combines:

- The ratio of bank deposits to GDP on the horizontal axis,
- The ratio of cash in circulation to bank deposits on the vertical axis.

Comparison across different transition economies suggests that Armenia has now reached the end of the first stage of deepening. After the Dram had been established as a viable currency in the mid-1990s, the last three years have seen Armenian banks steadily develop their business. Indeed, compared to most CIS States (apart from Russia), Armenia now has a relatively low cash to deposit ratio, and the speed with which the ratio has fallen has been the fastest of any CIS State. However, there has not been much progress in attracting new savings, which is a feature of the second stage of deepening that the Baltic States and some South-Central European transition economies have reached. The third stage, which the stronger Central European transition economies are now passing through, sees almost all growth in bank deposits coming from new savings.

There are several explanations for why this is the case:

- The prevalence of non-payment mechanisms which undermine the development of a formalized financial sector
- The failure of the banking system to consolidate
- The existence of a gray market

The first and last constrains are the main obstacles undermining the development of banking systems payment mechanisms, especially through electronic payment systems. Payments using electronic transfer, mainly using B2C solutions, make the flows of money more transparent and can help prevent money laundering, for which mainly cash transfers are used.

However, the continuing prevalence of cash transfers will not prevent the introduction of modern information technologies in the banking system or the development of e-commerce in Armenia. Experience shows that the banking sector in Armenia continues to develop such systems and is preparing for the introduction of further new instruments and for an increase in the volume of transactions.

The Central Bank of Armenia has played the role of a traditional central bank in the development of a payment and settlement system:

- Regulation and adjustment of payment and settlement relationship
- Establishment and improvement of payment and settlement systems
- Supervision of payment and settlement systems' activity
- Provision of payment and settlement systems' services, and, based on reality another functions like education, consolidation of banks' resources to realize Inter-bank projects (SWIFT, National Inter-bank Cards' System)

An Inter-Bank Committee on Payment System Development in Armenia was established in April 1994 with the participation of official representatives of the Central Bank of Armenia (CBA) and commercial banks.

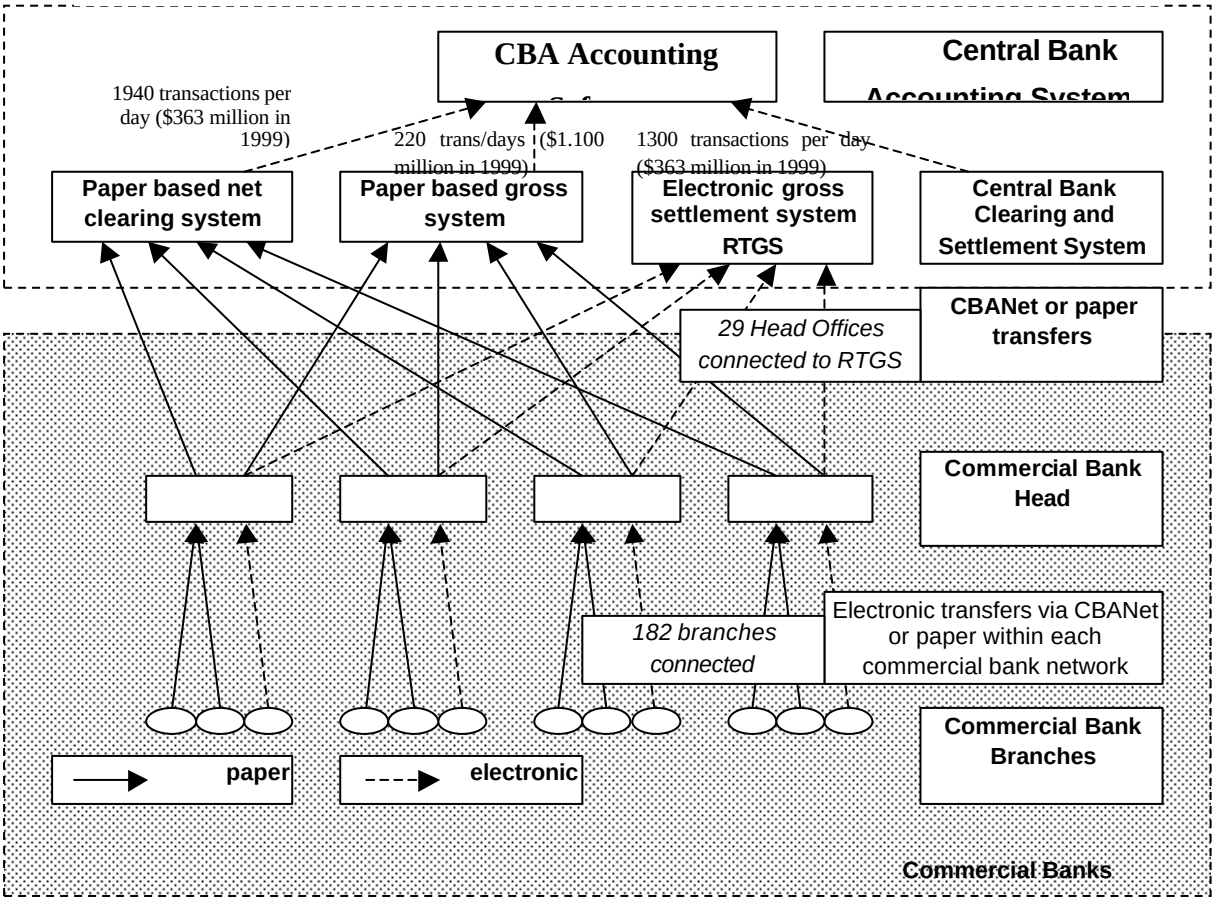
It was decided to approach the development of the Payment System of the Republic of Armenia in three stages of short-term, mid-term and long-term projects. The development of the Domestic Payments System has been accomplished in the following phases, reflecting the concentration of payment activity in Yerevan and difficulties in physical and electronic delivery at the inter-regional level:

- The implementation of new payment procedures in Yerevan
- The implementation of new payment procedures for intra-regional payments
- The implementation of new payment procedures for inter-regional payments

- The special inter-bank organization (a courier delivery service) for inter-bank paper transfers was founded in Yerevan in April 1994 and introduced to other regions of Armenia in November 1994. In Yerevan, it delivers payment documents within a day and in regions twice per week
- The elaboration of an inter-bank clearing system in May 1994
- The establishment of an intra-regional [see below] payment system in February 1995
- The establishment of the CBANet inter-bank computer network and electronic real-time gross settlement system (electronic payment system - EPS) in 1997
- Since 1997, a SWIFT "base terminal" has been installed in the CBA to service foreign transactions using SWIFT
- The creation of a new joint stock company, Armenian Card (ArCa), by the CBA in June 2000 and 10 major banks to develop a single plastic card system
- A new securities and settlement system has been designed for processing transactions of government securities held by the CBA

The Armenian payment infrastructure is shown in Fig. 3.

Figure 3. Payment System Structure



Paper based clearing and settlement based on multilateral netting (1994). Payment instructions (in paper form) are sent physically in batches by each commercial bank to the CBA's clearing center. Batches, prepared by the remitting bank, regroup in separate envelopes individual paper transactions to be sent to one receiving bank (up to two envelopes per receiving bank). Then the total amount of each envelope is entered (usually manually, although entry of data into the system by diskette is also possible) by the CBA staff using the CBA's dedicated clearing software. At the end of a clearing session, the software calculates the multilateral balances that are due to be posted in the CBA's main accounting system in the corresponding settlement accounts of commercial banks involved in the process.

The CBA does not allow any overdraft: if a settlement account of a commercial bank on the CBA's books has insufficient funds to cover the debit balance, the settlement process is stopped. An "unwinding" process takes place: the latest batch (following the LIFO rule - Last In, First Out) presented by the failing bank is rejected (the latest batches are rejected until no debit position is incurred) and a new calculation of multilateral balances is processed. It is clear that this process is not efficient and may lead to a systemic risk.

Around 494'000 transactions (1'940 per day) were processed using this system in 1999, representing 196 billion dram ($363 million). The average amount per transaction is 400,000 dram (US$740).

Two clearing and settlement cycles are processed: one in the morning and the other in the afternoon, each in four phases: (a) submitting and entry phase, from 9:30 to 10:30 a.m. (and 11:30 a.m. to 2:00 p.m.), transactions are received and prepared for entry into the system; (b) entry completion phases, until 10:50 a.m. (and until 2:20 p.m.), pending transactions already received are entered into the system; (c) netting and settlement phase, until 11:00 a.m. (and until 2:30 p.m.), multilateral balances are calculated and settled if there is no liquidity problem; and (d) acknowledgment phase at 11:00 a.m. and 2:30 p.m., when clearing statements and batches are provided to clearing participants.

Recent statistics show that the activity of this system is decreasing rapidly and that commercial banks now prefer to use the real time gross settlement system (RTGS). However, processing numerous low value transactions individually on a gross basis is not very efficient and may cause an overload of the RTGS as described below. To address this issue, a project is presently underway to develop and install an Automated Clearing House (ACH) for clearing low value transactions submitted in electronic form.

A paper-based gross settlement system (1994). The banks physically send instructions on paper to the CBA, where they are entered manually one by one, by CBA staff, into debit and credit banks' corresponding settlement accounts using the CBA's accounting software.

The CBA does not allow any overdraft: if the settlement account of the commercial bank to be debited has insufficient funds to cover the debit, the transaction in question is rejected by the system and put on hold by CBA staff (on his desk) as well as the following transactions from the bank found to be illiquid. The CBA staff member in charge of the entries of the given bank waits until new funds are credited. If no new funds are available, all transactions are rejected and sent back to the commercial bank at the end of the day.

Around 55'500 transactions (220 per day) were processed by this system in 1999, representing 613 billion dram (US$1.1 billion). The average amount of each transaction is 11 million dram (US$20'300), a much higher amount than in the other systems. However, it should be noted that there is no minimum to the size of transactions that can be processed by this system.

The payment process is carried out in three distinct phases: (a) during the payment phase, from 9:00 a.m. to 4:00 p.m., transactions are received and entered into the system; (b) during the entry closing phase, from 4:00 to 17:20 p.m., remaining transactions received earlier are entered into the system but no new transactions are accepted; and (c) the closing phase, from 17:20 to 17:30 p.m., when end of day operations take place.

Statistics show that the activity of this system is decreasing rapidly and that commercial banks are shifting to the use of the real time gross settlement system.

Intra-regional payment system (1995). This system has been discontinued, and will therefore not be described.

An electronic real time gross settlement system - RTGS (1997). Transactions are received in electronic form through the telecommunications network (CBANet) installed by the CBA, and the following functions are processed automatically in real time (on a FIFO – First In, First Out - basis): (a) checking transaction format and content; (b) checking that the level of funds in the corresponding settlement account of the commercial bank to be debited in the CBA accounting system is sufficient to cover the debit amount; and (c) the simultaneous debit and credit of the accounts. The same CBA accounting software system is used as for the paper-based gross settlement system.

The following types of institutes participate in the Electronic Payment System:

- The Central Bank of Armenia
- Head offices of banks
- Branches of the banks
- The Central Treasury
- Field Treasuries

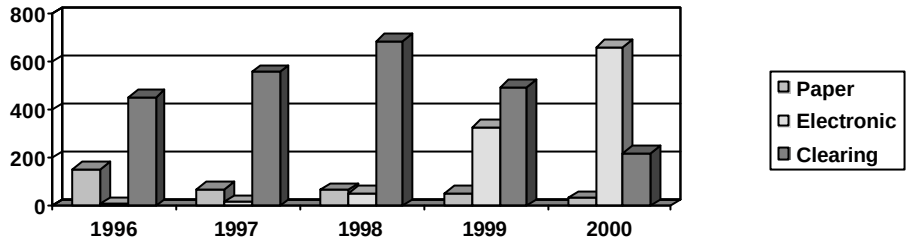
The requirements of the system are:

- Reliability (reliable certification level for data entries, automation testing of the system before operating each program, back-up features)
- Security (passwords, electronic signature, encryption)
- Correctness (rechecking, automatic confirmation)
- Efficiency / Rapidity (high capacity, real-time)
- Supervision (protocols, archives, black boxes, comparison of data at the end of the day)
- Finality

The CBA does not allow any overdraft and no queuing nor intra-day liquidity mechanism is available: if the settlement account of the commercial bank to be debited has insufficient funds to cover the debit, the transaction is rejected by the system and sent back to the commercial bank for resubmission before the end of the same day or the next day.

Around 330'000 transactions (1'300/day) were processed by this system in 1999 representing 300 billion dram (US$556 million). The average amount per transaction is 900'000 dram (US$ 1'670). This relatively low average amount is the result of a shift from both paper systems to the real time gross settlement system as shown on Figure 4.

Figure 4. Clearing and Settlement Activity in the CBA



The payment process is carried out in three distinct phases: (a) during the payment phase, from 9:00 am. to 4:30 p.m., transactions are received and entered into the system; (b) during the entry closing phase, from 4:30 to 17:20 p.m., the remaining transactions received earlier are entered into the system but no new transactions are accepted; and (c) closing phase, from 17:20 to 17:30 p.m., when end of day operations take place. The CBA claims that settlement in the RTGS is final. However, owing to delays in information transmission to the commercial banks, some uncertainty can occur during the period between the end of the settlement day and 11:00 a.m. next day before sending and receiving banks have been able to check and control the official statement of all transactions settled.

RTGS activity is growing rapidly, and this system can be considered among the most critical and systemically important in Armenia. It is of utmost importance that its reliability and performance remain as satisfactory as today. Some concern has been expressed regarding the future capacity of the RTGS, and measures have been planned to ensure good performance.

However, a major concern is that computers and servers processing payment systems and CBANet centralized functions are located in the same building block (albeit in different aisles). In the case of a major disaster, the whole payment system would be at risk. That is why the installation of a backup site outside Yerevan in 2001 is envisaged.

A SWIFT base terminal was installed by the CBA to service foreign transactions through a SWIFT network (service opened in 1997). At the end of 1999, sixteen banks were members of SWIFT. In order to decrease the cost of membership and connection to SWIFT for Armenian commercial banks, the CBA acts as a principal SWIFT member and has acquired the corresponding equipment (hardware and software). Eleven commercial banks are using the SWIFT network via the CBA's "hub". Other banks are connected directly to SWIFT.

The number of SWIFT transactions has decreased from around 180'000 since 1998 by 8.2% owing to the use of other channels. In particular, Western Union Services are used to transfer incoming funds (e.g., in one large local bank, this business has a volume of around US$1.5 million each month). Settlement of non-essential foreign transactions takes place using correspondent accounts in the foreign banks.

Armenian Card (ArCa), a new joint stock company. The importance of moving to non-cash payment in retail banking was emphasized in a paper named "Development Perspectives of the Payment and Settlement System of the Republic of Armenia" that was approved by the CBA board in early 1999. This paper states that the widespread use cash payments fosters much of the growth of the shadow economy in Armenia, and hence, drastically hampers the CBA's efforts to implement its monetary programs properly. Consequently, as a primary objective, the CBA highlights the importance of attracting cash payments into the banking system in order that payments related to benefits, pensions, and utilities may be performed within the banking system.

Cheque payment is rightly considered to be a product that should not be developed further and the emphasis is increasingly placed on electronic payment methods, among which feature debit, credit, domestic, international, cash, and payment cards.

Overall, card business has not yet reached a significant level in Armenia: around 5'600 cards had been circulated by June 2000, and their use in the first half of 2000 represented around 85'000 transactions valued at 5.3 billion dram (US$ 9.8 million). Cards represent less than 0.5% of the total amount of payment instruments issued in Armenia. The card infrastructure is still small and split into several independent bank networks. As of the end of June 2000, nine automated teller machines (ATMs) had been

installed, and 107 point of sale terminals (POS) were operational in banks (27), hotels (11), shops (32), and other places.

However, card use in Armenia has grown rapidly during the last two years: this growth is related to international cards like Visa and MasterCard (550 cards) and essentially to two debit card issuing banks (one local and one foreign bank). The domestic cards of all other banks represent less than 1'000 cards at end of June 2000. According to the report mentioned above, this is due to "a lack of relevant infrastructure and inadequate policies pursued by the issuing banks."

In order to boost the development of non-cash payment transactions in the retail market, the CBA has taken a major initiative. In 2000, the joint stock company ArCa was founded by the Central Bank and ten major commercial banks, with the objective of developing and managing a common Card Processing Center (CPC) in charge of the development of a "Unified Armenian Card." ArCa will have to cover four main activities:

(i) To define, market and promote the common card and the ArCa LOGO; (ii) to run the technical infrastructure for card payment, comprising a centralized processing center, a network of ATM and POS terminals, an authorization mechanism, and operations with international networks like Visa and MasterCard; (iii) to define and propose for approval by the institutions involved all regulations and standard contracts required to allow domestic and international card payment in Armenia, as well as to be able to accept foreign cards from international networks; and (iv) to represent Armenia in discussions and negotiations with international networks like Visa and Europay.

The direct involvement of the CBA is probably an essential factor for the future success of business using card payment in Armenia. However, the CBA carries a rather high responsibility and potential risk in the ArCa project.

A medium-term business plan should be finalized urgently to put in perspective the main issues to be addressed, namely business strategy, incomes and expenses regarding the processing center and commercial banks' customers, technical infrastructure, the task of the processing center, computer system specifications, and outsourcing policy. In the near future it appears essential that commercial banks take over the leadership, full

responsibility and ownership of the ArCa Company. CBA involvement should be then limited to an oversight role.

Currently, the first ArCa cards are being issued under a trial run to assess the system and measure the risks. A memorandum has also been signed with Europay as a first step towards further integration into international networks.

A new securities and settlement system is being developed by the CBA for government securities settlement, in compliance with delivery versus payment (DVP) rules, to supplement the securities accounting system. There are two separate depositories for securities issued in Armenia: the Central Depository for Government Securities established in 1995, and the Armenian Central Depository for Corporate Bonds and Equities established in 1996. The CBA is the Central Depositor for government securities and runs the government securities accounting system.

As in the case of the payment systems, the CBA owns, operates and oversees the system, which operates in national currency only.

Data entry takes place from 9:30 a.m. to 16:00 p.m. and end of day balances (depository and money) are available next day at 9:00 am.

A specific accounting securities system was developed by the CBA in 1995, but all transactions were entered manually and the payments system is not linked to the securities system. The new system enables transfers of ownership of securities and corresponding payments to be effected simultaneously: a fully compliant DVP mechanism is available for the primary market and will be extended in a second phase (2001) to the secondary market.

The Armenian Central Depository (CDA) progressively updates its electronic registry system regarding operations in stocks and equities. Around 300 Armenian companies (JSC) have been registered. The settlement of securities represents an average volume of 10 transactions per day. This process is fully manual but electronic computer software for depository functions is envisioned for implementation in 2001.

Risk Assessment

Efficient payment systems are critical to the effective functioning of the financial system. Robust payment systems resistant to systemic and credit risk are an essential requirement in maintaining and promoting financial stability. Furthermore, in developing countries, an efficient and reliable payment system infrastructure constitutes an essential factor in creating a dynamic market economy.

Efficiency of payment systems can be measured through four main factors: (i) the speed of the clearing and settlement process; (ii) the speed of transfers from customer to customer; (iii) the cost of the processing and fees paid by users; and (iv) the usability of the system.

(i) Speed of the settlement process

The design of the overall payment infrastructure allows electronic transfers to be made from each commercial branch to its head office and thence to the central bank. As of mid 2000, all commercial banks were connected to the CBANet and more than 90% of payment transactions could be transferred, cleared and settled within one day from any location in Armenia, which is a remarkable achievement.

(ii) Speed of money transfers to customers

The CBA has published regulations in which it is stated that customer-to-customer transfers of funds have to be executed within 2 days in Yerevan and within 3 days outside. Customers are aware of this rule and complaints can be lodged when banks fail to achieve this goal.

Thanks to the installation of CBANet, this result is a great achievement compared to many other countries. However, some commercial banks have not yet made the change to computer-aided operations, and exchanges between their branches and the head office are still performed through the physical transfer of paper.

(iii) Costs and Fees

(a) Fees paid by commercial banks: The clearing and settlement costs paid by commercial banks are rather low due to the fee policy of the CBA, which has developed, installed and is running almost all Armenia's payment systems. A one-time fee of

US$400 is charged for connection to CBANet; a monthly fee of $130 gives commercial banks unlimited use of CBANet not only for inter-bank payments, but also for intra-bank transactions, messages and data transfers. Furthermore, users' interface equipment dealing in particular with safety and security is provided by the CBA and is included in this cost. The gross settlement system (RTGS) is free of charge; the paper clearing system cost is 1'000 dram or 1'200 dram (morning or afternoon presentation) per packet; and the paper based gross system cost is 2'000 dram per payment order.

(b) Liquidity cost: the level of liquidity required in the payment settlement system is not presently a major issue in Armenia, as the reserve requirements are largely greater than what is actually needed for payment settlement. However, an eventual change in monetary policy leading to a sharp reduction in the level of reserves may introduce additional factors to be considered.

(iv) Ease of use

(a) The level and quality of automation has improved dramatically in the CBA's clearing and settlement systems. However, as mentioned above, several Armenian banks still process most of their payment operations by hand. Consequently, high costs and cumbersome procedures are having a direct effect on the quality and reliability of services offered to customers. It is essential that the modernization process that has been carried out at the inter-bank level be fully implemented in each bank and its network of branches in order to provide a better service to customers.

(b) In many cases, cash remains the easiest method of payment in the retail market. However, electronic payment is becoming an increasingly important part of offering better and more reliable banking services to the population and the industry. As shown above, much remains to be done in this field. Initiatives regarding card payment, direct debit, automatic credit of salaries, etc. have still to be extended to meet the needs of a modern economy and to strengthen the financial sector.

Most technical developments and investments in IT and payment infrastructure are funded by USAID under a very effective technical assistance program. The CBA's network of computers and other equipment for settlement of payment appears to have satisfactory back-up that follows good technical practices.

The statistical evidence indicates that electronic payment methods are taking over from traditional paper-based transfers:

- 95 % of the total volume of payments, and 72% of their overall value are transferred using the Electronic Payment System
- 2% of the overall volume of payments, and 0.3% of their value, are transferred using the Clearing system
- 2% of the total volume of payments and 22% of their value are transferred using the paper based Gross Settlement system
- 0.3% of the total volume of payments and 6% of their value are transferred using the Book-Entry system

However, many problems still exist that are due to poor cooperation among commercial banks; insufficient manpower with IT qualifications in commercial banks; insufficient equipment of commercial banks and insufficient reliable communication links; the historical absence of banking services and the sub-optimal structures of banks; lack of practice among the population in using banking services by people; lack of experience in the field of security and protection of information in banks; the large volume of cash circulating in the economy; the limited usage of payment instruments (99% of payments are made by payment order) among others.

Summing up recent developments related to the introduction of electronic payment mechanisms and information technology in the banking sector, we could say that the Central Bank sometimes has to carry out functions not traditionally associated with it. Experience shows that there are situations when the Central Bank has to take the initiative, as was the case during the implementation of the SWIFT, CBANet and EPS systems, because otherwise, as was the case with plastic cards, the banking sector saw no appreciable results. Therefore, banks turned to the Central Bank asking it to manage and coordinate the task.

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Sponsored by the
International Relations and Security Network (ISN)
(Switzerland)

Executive Summary

Social track

Introduction

Investment in the health of a nation is one of the key factors determining long-term economic and social progress. In Georgia, like in other South Caucasian states, such an investment is being made, as witnessed by the tremendous changes since the mid-1990s. One can see movement from the state-governed and state-budgeted healthcare system toward a more self-supporting one, from inpatient- toward outpatient-care, from a dependence on disease treatment to an emphasis on disease prevention. The establishment of both state and private health insurance sectors, the development of a health services market, the new appreciation of the importance of public health, and the transformation of the existing system of medical education provide further evidence of the systematic realization of the objectives of the National Health Reform Program. At the same time, nobody can deny that the reform has been quite painful for both patients and healthcare personnel due to the state's incisive budget cuts before the establishment of insurance systems, and also due to painful layoffs of surplus staff, leading to even more unemployment and social unrest.

Rapid change as currently seen in Georgia requires new information strategies and a new information environment. Information and communication technologies may seem to be expensive tools for a country with a devastated, post-Soviet economy. However, an integrated approach to

the development of a modern information society may represent the best way to achieve the task of system restructuring in the immediate future and help narrow the gap between the current realities in Georgia and conditions in developed countries.

The development of IT at the beginning of the new millennium represents a unique chance for tremendous advances and transformations in health and social care services. The establishment of new global networks both among doctors and patients groups, E-mail discussions and online video-teleconferencing, making patient information available via the web, creating electronic records for patients and smart service cards, the provision of megabytes of personal health information for each individual at any time or place, teleconsulting and telecare, the opportunity for patients to seek medical advice free of constraints of time and space, and remote education of medical staff – all these are unbelievable benefits and at the same time give rise to concerns that have never before been considered.
Thus there was ample reason to include a special Social Dimension track in the program of the 1st ISN Executive Conference in Tbilisi.

SD Presentations
Ten abstracts were initially submitted for the Social Dimension track. Two of these were subsequently rejected, two were relocated to other tracks (one to the Social Dimension, – and one to the Political Dimension), two were cancelled due to illness on behalf of the presenter, and the remaining four were presented at the conference as follows:

1. Vasil Tkeshelashvili, Levan Bakanidze, NACC (National Association for Cancer Control, Tbilisi)
NACC web-page – usage for networking and improvement of cancer control in Georgia

2. Dimitry Makhatadze and Maia Lagvilava, CDEM (Center for Disaster and Emergency Medicine, Tbilisi)
Emergency Medicine Teleconsultation Network (TelCoNet) Development in Georgia

3. Archil Kobaladze, Zviad Kirtava, David Sheshelidze et al., *Partners for Health* Foundation (Tbilisi) – Emory University (Atlanta, GA, USA), - IMP (N.Y., USA), - PIMS (Chantilly, VA, USA)
Still Image Off-Line Telemedicine and Interactive Distance Medical Education: Different Approaches for IT-Application in Healthcare Sector of Georgia

4. George Khabeishvili, HVC (Heart and Vascular Center, Tbilisi)
Telemedicine applications in Heart and Vascular Clinic

There were no presenters from Armenia or Azerbaijan in this track, which definitely limited the scope of discussions. Besides, we missed the combined 2-in-1 presentation from Kutaisi, which would have been devoted to social issues. Therefore, the track became more oriented towards Telemedicine, Distance Education and Web-based patient education.

Comments on SD presentations:
1. Excellent webpage of the NACC/UCCC presenting health promotion, disease prevention, and educational material mainly for the public at large, both in English and Georgian; wonderful networking with international organizations after only a limited time (<2 years), which resulted in two small grants being awarded; fear/interesting approach for banner advertisement. Suggestion: on-line donations!

2.TelCoNet – interesting and very ambitious project – excellent idea nicely presented. Extensive software development work performed at almost no cost. Currently in testing stage. Good, user-friendly interface, many options for attachig different file formats, login and password for each client (medical institutions), coding will enable usage in different language contexts.

3. Still image telemedicine and Interactive Distance Medical Education – two projects reflecting different approaches, simple, easy, cost-effective teleradiology for second

opinion in coronarography assessment; teledermatology for evaluation of skin lesions in case of Leishmaniosis) and valuable, impressive, on-line videoteleconferencing facilities involving streaming video and NetMeeting discussions with future prospects for expansion in region and among PfP member states; this could be the nucleus of a future virtual medical university. Both of these projects were also presented later at the 6th International Conference on Medical Aspects of Telemedicine (Uppsala, June 18-21, 2001).

4. The Heart and Vascular Center is a small private clinic in Tbilisi with 15 beds and wide experience of Telemedicine usage. The center uses an Agfa Deluxe Slide Scanner for teleradiology. The presentation also reviewed the transfer of phonocardiography, ECG and echocardiography video (.avi) files to medical centers in the US and Germany. It is important to emphasize that while most of the equipment was acquired thanks to grants and sponsorship, the operational cost of telemedicine is completely covered by income, which makes this center an example of cost-effective IT application in an SME environment.

IT – State of the art in brief

At present, only around 5%, or 12 of the medical institutions in Tbilisi offer at least one instance of IT application (e-mail consulting, still image telemedicine in radiology or dermatology, ECG transfer, web-based consultations/educational materials, on-line VTC, etc). In the more remote regions, only institutions in Batumi and Kutaisi apply IT in their work. However, the total number of IT-capable clinics in 1994 was zero, and only 4 in 1998. So significant progress has already been made.

Almost 25% of medical institutions in Tbilisi now have e-mail access (sometimes through a staff member's private e-mail). This number was less than 5% in 1998. Around 10% have access to the Internet (mostly by dial-up). Almost 10-20% have webpages (in 1998, that number was less than 2%).

IT Prospects in Georgia/South Caucasus

The digital divide hasn't disappeared with the introduction of an IT infrastructure, and the borderline between successful and unsuccessful medical institutions is still reflected in a number of factors.

Fiber-optic cable (as part of the TAE – Trans Asia Europe cable) would greatly increase the level of online applications, VTC and direct surgical observations for second opinion gathering.

Mobile Internet and satellite communication would enable doctors in remote locations to consult the center.

TelCoNet may become operational in 1-2 years.

Still image telemedicine will be accessible to most of the Tbilisi clinics and to around 20-50% of regional clinics.

Networking among doctors and nurses will be increased.

Information Technology Prospects in the Caucasus
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The Influence of New Technologies and Information on the System of Education in Georgia

By Dr Zurab Tchiaberashvili

To assess the influence of IT on Georgia's educational system, one needs to understand the concepts of education and technology in Georgian society. While contemporary educational systems around the world provide opportunities for life-long education, the Georgian perception of education still remains old-fashioned: once a person has graduated from university, they cease collecting new information, new knowledge, and new ideas. The educational system, on the other hand, is not designed to teach students how to learn independently, a crucial prerequisite for anybody if they are to continue gathering knowledge during their lifetime.

The pervasiveness of IT skills also merits special attention. The idea of people using IT in their everyday life (and not just within the system of education) presupposes that every citizen can be trained to use IT tools. An unconscious fear of technology still exists in Georgia: popular opinion has it that it is the prerogative of the "select few" to use computers or to be aware of the importance of new technologies and information.

The third misunderstanding is that technology is a tool to be used outside of education. In this view, education should remain "pure" while technology is restricted to industrial plants or factories. For most Georgian people, IT in the educational system is considered to be a dream realized in the western world but not in Georgia. These people cannot imagine the benefits of introducing IT to the educational sector.

The result of such misconceptions is a discrepancy between the knowledge provided by the Georgian educational system and the knowledge needed on the labor

market. New workplaces demand personnel skilled in IT, while the system of education is unable to prepare citizens for these jobs. Therefore, a “shadow” market in further education has emerged: computer centers provide an opportunity to learn IT skills, but these centers exist outside of the educational system. In short, a labor force with IT skills is the exception rather than the rule in Georgia because there is no systematic approach towards integrating IT into the educational system.

The educational system in Georgia is in a process of transformation. The state sector’s prerogative of training a certain contingent of specialists for its own needs has disappeared, but the system still trains students in specializations for which there is no demand on the market. Funds are allocated from the state budget and spent without any results to show for them. In the Soviet era, the system of education was an ideological tool in the hands of Communist Party. The system can be described as a vertical structure in which orders are passed down from above to teachers and pupils. During the transition period, the system of education lost its main function but did not adopt a new one. It acts in the same way it did when it was still an ideological tool, but now lacks the patronage of the state.

Information and communications technologies are valuable tools for learning. They can be used to support existing teaching, learning and administrative environments in schools, and/or to support their transformation. This transformation includes a comprehensive integration of IT into the curriculum (thereby changing both the content and teaching/learning processes), and into the full range of school activities and culture, plus changes in the school’s community relations.

It is clear that lifelong learning is increasingly necessary, both to maintain employability and for ongoing personal growth in a changing world. Therefore, the system of education in Georgia should improve access to quality learning opportunities to develop student skills and understanding for appropriate use of technology; and change education and training in fundamental ways to better meet the learners’ needs.

The new reality demands the development of a joint departmental/divisional/school strategy for initial and continuing professional development of technologies for current teachers, supported by targeted funding. This strategy must include methods of instilling in teachers an understanding of the value of technology, and skills in judging the appropriateness of technology applications in classrooms.

The old Soviet model of defining what a student has to learn and what a teacher

has to teach still remains. The older generation of teachers fears that the rules of the market will be brought to bear upon the faculties, and that students' demands for certain courses will define who will teach and who will not. Most of teachers teach the same course without updating it over a long period of time. In almost every subject, different lecturers teach identical courses.

Despite the misunderstandings mentioned above, more and more people feel the importance of IT. Computers and IT are transforming people's lives. Standard methods of communicating, transferring information, and doing business are being increasingly shifted to an electronic basis, and jobs in every sector and at every level are incorporating the use of computers. As these fundamental changes take place, corresponding changes are occurring in public expectations concerning our education and training system.

Every student that graduates from university confesses that she or he did not receive enough training of the kind needed on the labor market. It is clear that the education and training sector is now widely expected to integrate IT effectively to provide students with the essential computer literacy required in today's world. While the integration of IT into education provides exciting new opportunities, planning for this is also creating some very significant challenges for the system.

Students (and their parents) are justifiably concerned about their career futures and want assurance that school will prepare them for work or further study on their chosen path. The new goals for learning must be clear to parents and the community.

Today's students are aware of this new reality, while most of teachers from the Soviet generation do not feel (sometimes do not wish to feel) the demands of the changing times. The situation causes misunderstandings between generations. Students are more open-minded towards liberal ideas. They consider themselves to be part of the world community, while teachers remain bound as constituents of their closed communities.

IT can improve learning outcomes:

- technology has been shown to have a significant positive effect on student achievement in all major subject areas from school to higher education
- technology can have positive effects on students' attitudes towards learning and can contribute to self-motivation

- technology can make learning more student-centered, encourage cooperative learning, and stimulate student-teacher interaction

There are many examples of ways in which schools and school systems are supporting teachers in the adaptation process. Most students enrolled in education programs in Georgia neither routinely use technology during field experience nor work under teachers and supervisors who can advise them on the use of information technology. Few teachers have yet adapted their curriculum to integrate IT into both the syllabus and the learning processes.

Democracy and education go hand in hand; civil society and the cultivation of knowledge and judgment are contingent upon one another. The more freedom citizens have, the more a community is open and inclusive, the more democracy and the more learning, the more freedom and the more knowledge that community will enjoy. Educated women and men make good citizens of free communities.

Currently, schools operate largely in isolation from the rest of the world. Staff work long hours and have relatively little contact with other schools and school systems. Effective transformation requires leadership and vision to connect schools in a networked age, to expose teachers to the bigger picture with respect to IT, and to work collaboratively within and outside the school. That is, leadership is needed to make the school a place that mirrors the social environment students will enter, and which encourages and supports students and teachers to move beyond the physical boundaries of schools today.

The concept of 'school' is changing into something that is more closely integrated with the community and remains open throughout the year. The school continues to be a physical place where young people spend a significant proportion of their time (time that is reduced as they grow older and learning occurs elsewhere and intermingles with work). The key roles of primary and secondary schools continue to be the socialization of youth into society and their preparation for work and social life.

Young people must be prepared for different kinds of work and lives as consumers, critics and creators of knowledge in the 21st century. The nature of work has changed dramatically in recent years and will continue to do so. Information and technological literacy are now essential prerequisites to work in almost any career.

In the education system, leadership is a key factor for the successful transformation of schools to serve the needs of an information age. Leadership is vital in

helping all members of a school's community to adapt to change and develop a common vision of its future as a 21st century school. Like the teachers, heads of schools need to see themselves as lifelong learners for whom professional development is an integral part of the job. All education authorities acknowledge that professional training of leaders, teachers and all other staff in schools is one of the most important criteria for successful use of IT in making learning targets accessible for students.

Knowledge is in flux and changes constantly. The same applies to the way in which information is presented. This is not a new phenomenon, but the speed of change in IT has shortened the half-life of knowledge. The curriculum material they encounter online will have to reflect this state of flux. Printed learning packages are assumed to have a certain shelf life, and teachers add immediate relevance in the way in which they use the packages. Some of this capacity for change must be built into online materials at both the technical and the pedagogical levels.

New technologies and new information provide a huge plethora of choices for every pupil or teacher, student or professor. The future citizen, educated in such a system, will make his or her own decisions: the student independently determines his or her future education path (under the supervision of a tutor). And new technologies give them the possibility to pursue their goal. Universities and schools should act as a new "Agora", a free market for new ideas. To fulfill their new role in civil society, they need to prepare lecturers and students for new challenges. This means changing the form of education and changing the syllabus.

University or secondary school curricula in Georgia do not include IT education. What is more, other courses within the curricula do not require students to be proficient in IT. Teachers do not use IT in preparing their courses and, therefore, cannot provide recent information or recent results in their subject. On the one hand, everyone knows education is necessary for a society but, on the other hand, everyone feels that without IT, the educational system is incompetent when it comes to providing the sort of education that is required by the market.

The ability to use and manage IT is an increasingly important success factor, both for individuals and for communities. Almost half of the jobs currently available require the use of computers, and this number is growing steadily. Also, more and more post-secondary programs expect and require students to use IT as part of their learning.

To be successful in the international arena, it is important that our students be prepared for life as international citizens. This preparation includes not only language

training but also an in-depth understanding of other cultures and economies, and the development of personal ties across nations. IT can be used to reach this target at several levels:

- By seeking information directly from online sources in the country concerned, especially from the rich repositories of data in cultural, scientific and other sites

- By communicating with students in other countries – e.g. through electronic contacts, class discussions on issues of common interest, and exchanging information and ideas

- Through collaborative learning with class groups in other countries – in projects which are designed and carried out by the students and their teachers

- By communicating with experts and significant figures in other countries

The fact that the Georgian system of education does not have sufficient technical equipment is one of the main problems. Even under such circumstances, it is possible to change the form and content of education. But change requires new attitudes: emancipating students with regard to the learning process. Free choice is an incentive for students to seek out new information. Because universities cannot provide career opportunities, it will be difficult to retain the new generation of academics at the faculties. There are more attractive opportunities in other fields than in the Georgian educational system.

The main problem for Tbilisi State University is that it is full of deep uncertainty over its pedagogical purposes and its role in a free society. At times, the university establishment seems to know neither what a free society is nor what the educational prerequisites of freedom might be. It hesitates when faced with hard decisions, and prefers to follow rather than challenge the national mood. The system of higher education in Georgia has been changed from a 5-year system to a 4+2-year system. But no one can say exactly what the difference between these two systems is.

One of the major applications of IT has been as management tool. Technology is a tool with which education can be improved, enhanced, and changed. Unfortunately, the educational system in Georgia does not use IT in its administration. The results are as follows:

- a lack of common strategy for all levels of education

- redundant workloads - various parts of the system doing the same work
- a lack of contact between administrators, and teachers and students
- incompetence in evaluating the role of IT in the process of teaching and learning
- informative closeness
- isolation from the outside world
- the difficulty of monitoring and assessing the system of education

Technology is rapidly becoming integrated into all aspects of education - student learning, research and development, curriculum development and delivery, supportive and facilitative services, and administration. Managing this change, and ensuring that it is purposeful and positive in nature, requires careful planning and implementation at all levels.

The effective integration of IT requires significant adjustments in the human, administrative and capital infrastructures of the educational sector. The full extent of the planning and the costs involved is not always recognized. This can seriously impede implementation. The critical role of education and training in supporting Georgia's transformation into an information society is not well understood even by many education policymakers.

The nature of IT, and of the education sector, is such that initiatives undertaken in one area have a significant impact on others. It is important that IT planning for the education sector be done with as much co-ordination as possible, and, if possible, with a common vision. It is also important that communities, and business and industry, be actively involved in this co-ordination.

The Ministry of education and other state agencies are trying to maintain the centralized system of education with orders from above. The educational system should be decentralized but, at the same time, managed by IT and not by orders. Using IT makes it possible to overcome corruption during the entrance exams, a Soviet-style system of selecting students for a university. Computer-based testing is one solution.

IT gives us the opportunity to:

a) Make databases of

- Teachers - who teaches and where (this implies that teachers at higher institutes of learning be proficient in understanding and making

instructional use of technologies)

- Courses - what is taught and where (this increases the availability of courses and educational resources for students)
- Schools & universities - faculties, curricula, systems for secure, functional sharing of student records; funding policies and practices to ensure a supportive environment for learning
- Graduates - labor force on the market

Web-based resources can include:

- Simplified creation, distribution, and maintenance of educational materials
- Software tools for local curriculum development and distributed, collaborative projects
- Multiple channels for educational participation
- Multimedia presentation of content which the user can manipulate and transform into new forms of online resource
- Assessment strategies which may include templates for developing computer-assisted testing banks
- Links to other sites and materials

b) IT also allows us to manage a system that includes:

- Clear definitions of the technological skills and knowledge expected of administrators at various levels, which evolve with techno logical change
- Better data collection, analysis and sharing to support planning and accountability
- Less redundancy of administrative efforts
- Provision of new opportunities for improved administration, data collection and evaluation in the education system
- New challenges for the safe and appropriate management of information in the education system

c) IT can support the management of communication between and among students, teachers, administrators, decision-makers, parents and other educational stakeholders. This presupposes full access to technologies for all students, teachers, and administrators

d) IT favors collaboration and information sharing amongst teachers, curriculum developers, researchers, and a wide range of experts

The following recommendations for the establishment of a culture of information technology use at all levels can be derived from the above:

a) Concerning the system of education:

- Multi-year planning is required for all aspects of learning technologies
- IT courses in secondary schools need a profound review; both the form of teaching as well as the contents should be changed
- IT should become the main administrative tool for the educational sector
- Guidelines for partnerships between schools and the private sector or community organizations have to be developed
- Access to library services and information resources (e.g. online journals, online inter-library loan functions, etc) needs to be increased

b) Concerning international donor organizations:

- IT should become the main administrative tool for the educational sector
- Pilot projects in IT should be taught in secondary schools
- Training centers for teachers should be established

c) Regarding universities:

- Internet-clubs should be organized within universities: students could teach lecturers how to use IT. It is a waste of time and energy to provide technology training if teachers do not have the resources, opportunity and support to apply new knowledge and skills. The “train-the-trainers” model means more than providing a workshop for a few people and expecting them to train their colleagues on what they learned. A ‘one-shot’ injection

of ‘content’ is a poor learning model anyway. To be effective, on-going learning support of various kinds is required.

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NACC Web-Page Usage for Networking and Improvement Cancer Control in Georgia

V. Tkeshelashvili, L. Bakanidze, K. Stalinsky

About the project

A grant was awarded by the Educational and Cultural Affairs section of the US Department of State (ECA) and the International Research and Exchange Board (IREX) to set up the first Georgian Cancer Control Page. The result is the NACC website, which was created to make local information concerning cancer issues available on the Internet.

The NACC websitewill be of use to different population groups:
Clinical oncologists and cancer researchers -One of the aims of the NACC association is collecting and translating information about new approaches and innovations in cancer treatment, which are made available on the Internet in Georgian. Besides, the articles and abstracts of Georgian scientists will be placed on the NACC Website;
Doctors of general profile:

- The website can improve their knowledge of oncology, and
- provide them with information on how to refer patients to cancer specialists, andprovide them with recommendations about cancer prevention and early detection;

Nurses and other medical staff: Information concerning cancer patients:

- right care
- treatment
- psychological relief

Medical students and resident doctors:

- They will be able to gain a basic knowledge of oncology from the NACC website

- NACC has started preparing video material of traditional and innovative cancer surgery in Georgia, which will be placed on the website in the future and will be available to students and resident doctors

Cancer patients and their family members: NACC has translated, edited and prepared for publication information material, some of which is already available and some of which will be in the future

The Georgian population at large: The Georgian population is inadequately informed concerning exposure to carcinogenic agents and possibilities of reducing cancer risk by pursuing a healthy lifestyle. The NACC booklet "**What Can You Do To Protect Yourself Against Cancer"** would be very educational for the population. Besides the written version, the website also provides recommendations in audio format, created for an NACC educational project on "Radio Fortuna", and video clips concerning elements of a healthy lifestyle.

More recommendations will be placed on the website in the future so the population can access it, improving their awareness, raising their sense of oncological vigilance, encouraging them to pay attention to their health status and instilling in them a sense of the necessity and effectiveness of preventive examinations. 10'000 copies of these booklets were disseminated among the population, but this is not enough. Promulgation of a healthy lifestyle is much more cost-effective via the Internet than when accomplished through the publication of additional thousands of booklets.

The following booklets are not yet edited but are ready for publication on the NACC Website:

- What Can You Do To Protect Yourself Against Cancer Through a Healthy Lifestyle;
- 10 Steps for a Healthy Life Style For Cancer Risk Reduction;
- How to prevent skin cancer;
- How to prevent melanoma.

These materials could also be made available in Russian, Azeri and Armenian for other Caucasian and NIS countries. As a future development, the NACC website may provide space for the Cancer Information Service Center (generally a desired feature for many patients), similar to the National Cancer Institute (Bethesda) and the American Cancer Society's homepage;

- NACC is in touch by e-mail with its regional representatives and with the Regional Cancer Centers in Batumi and Kutaisi, which have Internet access and are able to receive information about all the above NACC activities

- Project realization will make it possible to present the NACC to leading international sister organizations that are looking into co-operation with cancer prevention organizations in Georgia and the Trans-Caucasian region (an English version of the NACC website is planned)
- Making the NACC website available not only in Georgian and English, but also in Russian, Azeri an and Armenian will promote the development of relationships between the NACC and other Caucasian and NIS Cancer Prevention NGOs and governmental organizations, opening up the possibility of bringing all cancer prevention information from the whole Caucasian region together on the NACC website
- Considering the fact that the NACC represents a non-commercial NGO, being mainly funded by grants, projects and charitable sponsoring, interested individuals or organizations will be

able to find information about the NACC's ongoing projects and grant requests on the NACC website.

About the NACC Website

Anti-corruption investigations are an important precondition for the success of the struggle against cancer, because implementing cancer prevention legislation will be impossible in an environment of endemic corruption. Therefore, the fight against corruption is considered one of the first goals of the NACC's anti-cancer measures.
The idea of conducting the NACC's activities in an open and transparent fashion is taken from George Soros's idea of an "Open Society."

When the NACC was established in 1999, this principle was taken into consideration and included among the NACC's aims. According to its statutes, the NACC will conduct its activities in the open, indicate all income, including the annual and projects budgets, state expenses on its website where they can be monitored controlled.
Due to the efforts mentioned above, we hope that the NACC will contribute to the creation of an Open Society, the defeat of corruption, and international integration and development.
This is why the website is also styled the "NACC OPEN Activities Declaration Site".
The index page of the site contains NACC news items, where among other information one can find out about the newly established Caucasian Union Against Cancer (UCCC, created by the NACC Initiative).

The Caucasus, which in geographical terms consists of the regions south and north of the Caucasian Crest and is situated between the Black and Caspian Seas, represents an entire, unique ecological body. The ecosystems of the Caucasian countries interact to a significant extent and are interdependent. Evidently, administrative boundaries have not been able to divide them. Natural as well as anthropogenic changes in any one of the Caucasian countries' ecosystems affect the population of this country as well as the ecosystems and the populations of neighboring countries as well. To avoid manmade cataclysms and the accompanying severe threats to the environment, the overall readiness of environmental and epidemiological control mechanisms are especially significant at the present time.

As a result, all Caucasian countries and their entire populations are interested in elaborating global environment protection policy and hygiene standards. The latter is a priority in the fight against cancer in terms of prevention. Considering the interstate trade and bartering of goods, establishing integrated policy and hygiene standards in manufacturing and trade ofdietary products and items for everyday use is very important.

According to a decision of the 1st congress of Trans-Caucasian Oncologists (Tbilisi, 1998), the following tasks were determined for advancing cancer prevention and treatment:

- Creation of an integrated cancer information and communication system between the Caucasian countries (connecting Tbilisi, Baku and Yerevan);

- Working out a regional policy and creating a Caucasian program for fighting cancer, including appropriate international legislation;

- Preparation of joint projects that could fund prioritized issues of fighting cancer.

Presently, because of the economic situation in the region where adequate financing of cancer programs is not possible, the 1st Congress of Trans-Caucasian Oncologists decided that the creation of non-governmental societies and unions was urgently required.

Besides, during the current cultural and economic globalization process, as the regional and international integration of the Caucasian countries becomes inevitable, the establishment of non-governmental professional associations is gaining drastically in importance; the same is true of joint efforts for intensifying the fight against cancer. The creation of a Caucasian professional union the above-mentioned issues.

To increase the effectiveness of cancer prevention in the Caucasus, the advantage of creating a non-governmental union cannot be overestimated, because it will be concerned with preparation of legislation, followed by lobbying activities among the relevant governmental departments.

All of the above verifies the necessity of creating a Caucasian Union Against Cancer (UCCC). Consequently, the non-governmental Union was organized on 7 May 2001 and registered on 10 May 2001 in Tbilisi under the name "Caucasian Union Against Cancer" (Union Caucasienne Contre le Cancer - UCCC).

The Union represents a non-governmental, non-political, non-religious, non-profit organization, with volunteer membership. Membership is open to representatives of different professions and organizations whose primary aim – is the promotion of social protection of the Caucasian population, promoting their health, cancer prevention, raising the average life expectancy, international intersectional integration, improvement of economic development, and the creation of an Open Society.

The aims of the Union are centered on elaborating policies, strategies and tactics for scientific and practical measures against cancer, which take into account organizational, methodological, scientific, preventive, educational, editorial, projective and constructive, legislative and mediative aspects of prevention.

The next item on the homepage is reserved for the NACC National Model Of Cancer Prevention: Conception, which aims at creating a legislative base for Cancer Control and establishing a favorable environment for security in Georgia by regulating exposure to carcinogenic agents .

This problem represents one of the important social evils in Georgia as well as globally. The placement of the National Model of Cancer Prevention on the NACC website will make it possible to introduce it to all interested parties and the public at large (state government, parliament, businessmen, manufacturers etc) and also will help form public opinion concerning this issue. The NACC relies on active participation and advisory assistance from leading international organizations. So the availability of the Prevention Model in English on the website will make it more rapidly accessible to them.

Numerous etiologic factors contributing to cancer have already been identified and primary cancer prevention is possible by preventing humans from being exposed to them.

There is enough intellectual potential in Georgia to resolve the problems mentioned above. Also, it should be taken into account that a significant evidence of a decrease of cancer incidence and of mortality will be only be demonstrated 30-50 years after the relevant laws and amendments have been adopted. Conversely, if the necessary prevention measures are not

implemented immediately and time is wasted, the country will experience a significant loss of population and huge economic damage in the first half of the 21st century. Unfortunately, only the issues, concerning the chances of extenuation of population loss and economic damage could be discussed at the present time.

The main measure advocated by the National Model of Cancer Prevention consists of avoiding exposure to all identified carcinogenic factors using all measures currently available, or at least regulating exposure limits on a legislative basis. Financial instruments such as fines and taxes on companies that spread a cancer risk could ensure effective regimentation of exposure to carcinogenic agents.

With the adoption of Cancer Control legislation and the imposing of fines and taxes on spreading cancer risk, it will be possible to improve the oncological protection of the population:

- Disease prevention, and especially cancer prevention, will be treated as an issue of State Strategic Policy
- In a far-flung strategy involving complex measures, cancer primary prevention will be performed by regimentation of exposure to carcinogenic agents; taxes and fines on spreading cancer risks will become an extra source of income for the state and the funds thus raised will be used for secondary preventive programs (mainly for cancer screening programs)
- Due to the improvement of primary and secondary cancer prevention, the incidence and mortality rates of cancer will fall significantly, and the average life expectancy will grow.

State policy and legislation for primary prevention will involve the following tasks:

- Primary disease prevention should be handled as a matter of State Strategic Policy and health promotion and disease prevention should be declared priorities for the healthcare system;
- It will be necessary to conduct activities aimed at creating a favorable environment for security, which means the protection of environment (including the ecosystems of Georgia and its border regions, preventing air pollution in the atmosphere and at the workplace, and safeguarding the preservation of the soil, the water, the Black Sea, flora, dietary products etc.) from pollution by chemical, radioactive and biological (viruses, bacteria etc) carcinogenic agents. Due to these measures, the limitation of exposure to carcinogenic agents, health promotion and cancer prevention will be realized and as a result, the average life expectancy will be raised, which will also have a significant economic effect;
- Promotion of a healthy lifestyle to the public at large,
- Adoption of legislative projects by parliament which will prohibit:
  1. Tobacco smoking at state and non-state organizations and public meeting places;
  2. Advertisement for tobacco products and strong alcoholic drinks;
  3. Advertisement for non-alcoholic drinks and other dietary products before they have been tested for carcinogenic agents and undergone appropriate certification;
  4. Manufacture, export and import of dietary products, non-alcoholic and alcoholic drinks and other consumer products without tests for carcinogenic agents or certification.

The National Model of Cancer Prevention also could be available in Russian, Azeri and Armenian, because the Georgian ecosystem is part of the Caucasian ecosystem. The conception of common

environmental protection measures should thus be an important issue for other Caucasian countries as well.

After the creation of the website, the NACC started presenting its activities to different governmental and NGO organizations; the website has been presented to the Public Health Department, to National Cancer Center officials, at the 1st International Relations and Security Network Executive Conference on Information Technology Prospects in the Caucasus and to the minister of labor, health and social defense.

The minister appreciated the presentation and an agreement was reached on carrying out joint efforts involving governmental and NGO bodies in the field of cancer prevention.

The minister mentioned that in order to seriously tackle primary cancer prevention, it is necessary to prepare a sound legislative basis that would be adopted in parliament. He added that NGO organizations, particularly the UCCC/NACC, should participate actively in this process. Also, screening programs for secondary cancer prevention need to be prepared.

The cooperation between governmental and NGO organizations should be intensified in the field of public education via the media.

The minister asked Vasil Tkeshelashvili to make a presentation on the NACC website to the scientific bard of the ministry of labor, health and social defense.

The next feature that can be found on the website provides full information on ongoing NACC projects, according to the NACC Open Activities philosophy. Particularly, NACC is currently engaged in the following projects:

1. "Conduction of Postgraduate Training Courses on Modern Methods of Epidemiological Cancer Research and Medical Statistics" in the Open Society – Georgia Foundation (OSGF) Public Health Competition on Learning of Modern Epidemiology and Medical Statistics;
2. American Cancer Society Seed Grant;
3. OSGF ongoing Internet grant "Wide Open World";
4. A joint project with the Public Health Department of the ministry of labor, health and social defense for population education on "Radio Fortuna" on issues of cancer prevention.

NACC has already placed and will provide all information about these projects, including budget, project realization etc.

The publications section is devoted to NACC educational booklets and books. The NACC homepage includes the following materials for the promotion of a healthy lifestyle and for the education of medical staff:

Educational Booklets:

1. How to Do Breast Self Examination;
2. Recommendations for Preventing Cancer of the Female Reproductive System and Early Detection;
3. What You Can Do To Protect Yourself Against Cancer By Observing a Correct Diet;
4. Quit Smoking Tobacco;
5. 10 steps to a healthier life style and reduced cancer risk.

In 2000, the NACC published the second edition of its recommendations: **10 Steps To a Healthier Life Style and Reduced Cancer Risk** - edited by the American Cancer Society (ACS) in 1985. The first edition was published in 1995 by the Epidemiology and Cancer Control Department of the National Cancer Center (Head-Vasil Tkeshelashvili), adapting the ACS recommendations to Georgian conditions, and was revived by Virginia Medical College and Health Care International Programs Director Dr. Stephan M. Ayers. Recommendations include:

1. Watch what you eat and adopt a healthy diet

2. Avoid animal products, especially animal fat, salt-cured, smoked, and nitrite-cured foods in your diet.

3. Include more fruit and vegetables in your diet.

4. Make sure your food has enough vitamins and minerals.

5. Control your weight.

6. Stop cigarette smoking.

7. A sexually promiscuous lifestyle can increase the risk of cervical cancer.

8. Go easy on alcohol.

9. Refuse narcotics

10. Respect the sun's rays.

For implementation of healthy life style in population, in nearest future, The NACC will also place the following recommendations on its website in the near future:

1."What you can do to protect yourself against cancer through a healthy life style",
2."How to prevent cancer",
3."How to prevent melanoma".

The Association also plans to create and edit booklets on disease prevention on all major websites dealing with cancer.

Books written and edited with the support of the NACC:

1. What Should You Know About the Chemotherapy;
2. Lung Cancer Epidemiology and Prevention;
3. Management of Hypercalcemia in Oncology Patients;
4. Breast cancer diagnoses and treatment;
5. Modern methods of treating malignant tumors in childhood.

The online version of the book ”Lung Cancer Epidemiology and Prevention” alsdescribes the authors’ experience with telemedicine and contains illustrations (x-rays, histograms etc). being sent between Central and Regional Cancer Clinics via the e-mail connection for conduction of tele-conferences.

For educational purposes, the NACC Site also contains a multimedia section containing audio clips to promote healthier lifestyles and a video advertisement clip for the Pharmacia & Upjohn tobacco withdrawal product Nicorette.

Another feature promoting public education is the following online collection of newspaper interviews with the NACC president:

1."In Georgia, even oncologists are violating the International Convention on Human Rights (Doctors are not always telling the patient their cancer diagnoses" ("Komsomolskaya Pravda", N 117, (22341), June 30-July 7 2000, p. 14-15).

2."Incurability: Say or Hide?" ("Kviris Palitra-Gza", N 11, August 2000, p. 16-18).

These are interspersed with Vasil Tkeshelashvili's statements concerning problematic issues in Cancer Control; among these are statements on the significance of public education and of cancer prevention through healthy lifestyles.

3. "Adeishvili became interested by telemedicine" ("Akhali Taoba", N 169 (1658), June 22, 2000, p. 6). This article relates the creation of the Georgian Telemedical Association (GTA), a governmental body, at a meeting attended by the Minister of Transport and Telecommunications, R. Adeishvili. The NACC was one of the founders of the GTA. NACC President Vasil Tkeshelashvili spoke about the significance of implementing and developing telemedicine in Georgia. He was reminded of his own experience in this field, particularly of the very first tele-radiological conference via e-mail between the National Cancer Center (Tbilisi) and the Adjarian Cancer Center (Batumi). It was conducted in 1995 and followed by the First Tele-Radiological and First Tele-Morphological Conferences in Tbilisi-Batumi in 1996 and 1997.

Unfortunately, the further development of the abovementioned activity failed because of a lack of necessary equipment. The NACC plans to prepare a project proposal on this issue.

Besides the news section, the website contains standard features such as a "Contact Us" –button leading to NACC contact information.

The "About" section provides information concerning the NACC's constitution, its aims and goals, strategic planning, history, structure, attributes, general principles, and the CVs of board members of the NACC/UCCC as well as its main partner organizations. This section also carries a statement to the effect that at the beginning of the 21st century, 10'000'000 cases of cancer are registered annually in the world, 6'000'000 of which are fatal. By the year 2020, 20'000'000 people will have contracted cancer and 10'000'000 of them will die. It should be mentioned that many patients contract cancer during the most important years of their professional and personal development, when they can make a maximum contribution at the workplace. In this way, cancer significantly jeopardizes the world economy and obstructs its development. The problem of cancer transcends the scope of healthcare and has an impact on many other aspects of social importance.

The "Activities" section describes completed NACC projects (NACC report on 1999-2000 activities), projects that were refused funding, ongoing projects and possible future projects.

A glossary is provided in order to help users find relevant information quickly. Explanations for technical terms can be accessed by clicking the appropriate letter or by searching for the term itself using the search function. The English version of the glossary is borrowed from ACS Web, and the Georgian one was created by the NACC.

As mentioned above, special space is provided on the NACC website for NACC multimedia presentations consisting of audio recommendations and video clips on healthy lifestyles and other issues. This information is provided in the "Information" section.

NACC membership is free for everyone and its activity is open to scrutiny. The NACC provides on-line registration forms on its site and will be pleased to accept new members and associated organizations. A list of the Association's Honorary and Active members is also provided.

Considering that the activities of the NACC as a non-profit NGO are funded through grants and donations, and that the quality of service is directly correlated to the amount of available funding, the website provides information for potential donors along with an on-line donation form. In order to quickly expand the NACC's areas of activity and its capacity for solving numerous current problems, the NACC needs donations from individuals and institutions.

NACC is grateful for any person or organization that is interested in the NACC's profile, orientation and motivation, and would like to help promote its activities with donations such as:

1. Feedback and recommendations,
2. Gifts,
3. Money.

Donations can be made in honor of someone or something, as a memorial to a deceased family member or friend and in the form of banner advertisements.

In the first two cases, the NACC can send a card to the person honored acknowledging someone's thoughtful donation. This donation could be used according to the donors' wishes.

Information on supporting the NACC through advertisements explains the NACC's advertisement policy and benefits in terms of educational efforts.

The NACC refuses any advertisement from companies conducting business jeopardizing human health (e.g., tobacco companies, purveyors of alcoholic beverages and environmental polluters).

Under the above-mentioned conditions, the NACC will be pleased to advertise throughout the Caucasus any products promoting human health (e.g., the above-mentioned Nicorette product). Besides, taking into consideration the results of recent international studies on the positive effect of small amounts of wine for human health, and particularly its contribution to the prevention of cardiovascular diseases, the NACC may consider carrying advertisement for wine. Also considering the significance of minerals and Vitamin C diet supplements for cancer prevention, the NACC will carry advertisement for companies producing mineral water and natural juices. Taking into account the fact that the prevalence of terminal patients among cancer patients is very high in the Caucasus, and that they do not get adequate relief for pain and other associated symptoms, the NACC will cooperate with pharmaceutical companies manufacturing appropriate medication.

NACC fully acknowledges the correlation between Sexually Transmitted Diseases (STD) and hormonal imbalance and cancer. The NACC/UCCC is very interested in carrying advertisement for products that can help prevent STD and hormonal imbalance.

The NACC will consider endorsing products only if they have been tested for carcinogenic agents, and after it has been certified that they are in accordance with international hygienic standards and carry no cancer risk. Along with the advertisement of possible products of different companies, NACC can ensure the educational activity to public at large concerning the preferable ways of use of them and provide the population with appropriate recommendations. Particularly, in conjunction with above-mentioned, FE NACC may consider the carrying out the explanation activity on how the acceptable quantities of consumption of high quality natural vines should be estimated personally, NACC could ensure the delivering of correct information and recommendations to population on consumption of mineral waters and natural juices.

Advertisement could be conducted through various media, particularly through

- ? NACC educational booklets for the population in Georgian, Azeri, Armenian and Russian,
- ? Audio radio clips in Georgian, Azeri, Armenian and Russian ,
- ? TV clips in Georgian, Azeri, Armenian and Russian ,

? Internet (placement of company logos and information material on the NACC website free of charge).

Currently, sponsors are invited to support the edition of the following booklets

1. 10 Steps to a Healthier Life Style and Reduced Cancer Risk
2. What you can do to protect yourself against cancer by healthy life style
3. How to prevent cancer
4. How to prevent melanoma

Donations are also requested for the edition of three books already prepared for publishing by the NACC:

1. Modern Methods of Epidemiology and Medical Statistics;
2. Manual for Cancer Registration Methods and Techniques;
3. Modern Methods of Childhood Cancer Treatment.

Possible types of gifts are:

1. Literature,
2. Web promotion,
3. Technical supplies and equipment,
4. Medication and medical supplies,
5. Equipment for carcinogenic agents (including nicotine and tobacco tar) testing in air, water, soil, dietary products etc,
6. Cars and other means of transport,
7. other.

"Partnership" information can also be found on the site, describing the NACC partners and their joint activities with the NACC. Potential partners are invited for cooperation.

NACC thinks that setting up the website has been a very important step for its development and hopes that the site will contribute to preventing cancer in the region.

Cancer occurrence in Georgia is in excess of 30’000 cases, incidence is more than 7’000 and mortality more than 5’500.

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Still Image Off-LineTelemedicine and Interactive Distance Medical Education: Different Approaches For IT Application In Healthcare Sector of Georgia

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Introduction:

Georgia's strategic location has placed the country at the center of efforts to revitalize the historic "Silk Road." As the economies of the Caucasus, Caspian Basin and Central Asian regions grow, as Japan, China, India and Europe intensify their economic relations, and as resources in the region are further developed, trade over the path of the ancient Silk Road is bound to expand. To make this vision a reality, sizeable and sustained new investments in transportation and telecommunication networks through Georgia and beyond will be needed (1).

Georgia actively strives to harness and harmonize the efforts of its international partners to promote the development of this strategic transportation corridor. These efforts are focused on the following three fields: the Transport Corridor Europe-Caucasus-Asia (TRACECA), a Trans-Caucasian strategic energy corridor, and a South Caucasian telecommunications network that will become part of the Trans Asia Europe (TAE) fiber-optic cable.

Healthcare as a major factor determining the state's stability

One of the key issues of social development is how to protect and improve nation's health. As healthcare has an impact on productivity, infant mortality, growth and the education of the next generation, on the development of healthy family and community ties, and finally –on the general morbidity and mortality rates, it is obvious that without a well-organized, manageable and accessible healthcare system the ambitious goals for social progress look unlikely to succeed. Although investments in health do not necessarily result in rapid revenues, they are indeed the key factors in determining long-term goals of economic and social progress.

The healthcare systems of the NIS countries have experienced tremendous change since the mid-1990s. One can see (using Georgia as an example) a movement from the state-governed/state-budgeted system toward a more self-supporting one, from inpatient-directed care toward outpatient care-orientation and disease prevention, and working towards the establishment of both state and private health insurance sectors, the development of a health services market, a new understanding of the importance of public health, the transformation of the existing system of medical training in order to decrease the quantity and increase the quality of staff in support of the *National Health Policy* (1999) objectives (2). At the same time, the healthcare system reform is proceeding quite painfully both for the population and for healthcare institutions, as 87 per cent of the total healthcare expenditures are financed through out-of-pocket payments and almost 50 per cent of medical institutions need to be optimized, severely worsening the already dire straits of the population in a country whose economy remains nearly stagnant (2-5). Excess staff and facilities represent a heavy burden for the weak economy: the number of physicians exceeds 20'000, while it is suggested that only 8'000 are actually needed. Similarly, 65 medical facilities would be enough to take over the work of the 265 badly maintained existing ones (5).

We need to change the way health professionals and the public at large acquire and use information resources, Evidence Based Medicine and Health Technology Assessment toolkits and approaches to improve the healthcare staff members' understanding of preventative methodologies, criteria of a healthy lifestyle and hazardous risk factors (smoking, alcohol, drugs, unhealthy food, hypertension, a sexually promiscuous lifestyle,

etc). We need comprehensive psychological care for tens of thousands of families that became impoverished and displaced in the aftermath of the totalitarian regime.

All these changes require not only new strategies, but a new environment as well. IT may seem to be an expensive tool for a country with a devastated post-Soviet economy. However, an integrated approach to the development of modern information technologies (IT) may represent the only way out of the present confusion and isolation and towards international cooperation in order to narrow the gap between everyday life in Georgia and in developed countries. Bill Gates recently said it was hard to think about IT and PCs in an environment, where people have an income of less than US$1 per day (6-7). In view of the situation in the poorest countries, his words have raised some doubts about the justification of IT development in all developing states. Surely, the argument goes, we need to save lives from TB and infections first. But ensuring the survival of the nation should transcend mere existence. Without IT, we will not be able to overcome certain hardships, will never become empowered for independence. Quite to the contrary, Georgia will always depend on foreign humanitarian support. And whilst we thank the Gates Foundation sincerely for its outstanding humanitarian support to the poorest countries, we do not wish to be recipients forever. We do need empowering knowledge – "how to learn fishing," and this necessity is of no less urgency than that of humanitarian aid.

IT and distance learning would help achieve social equality, a factor that could aid the internal stabilization of a highly fragile and fragmented society, promote civil cooperation in the fields of health and education between the center and peripheral regions, and which could, with the help of maximum regional and international cooperation, become a new element of stability and security at the dawn of the new millennium.

IT and Medical Informatics - Development in Georgia

The first telecopiers (faxes) appeared in Georgia in the early 1980s, followed in the late 1980s by very few and expensive telex machines. During most of that era, high technology had been the prerogative of big institutions and was subject to licensing. Although the telephone network was rather developed in Georgian cities, the communications lines and nodes had become very obsolete and unreliable since the 1970s. Its decay took on

disastrous proportions with the disintegration of the Soviet Union in the early 1990s. However, the poor quality of the telephone network became a factor encouraging the rapid development of GSM technology in Tbilisi - cell phone sales have flourished (in spite of the low GNP per capita) to almost 200'000 mobile phones in just the four years from 1997 to 2000.

The first traces of the Internet could be found in Tbilisi in the mid1990s, as almost 100 e-mail addresses linked Georgia to the outer world. Even with a speed of 2.4 kb/s, this was really seen as a "Window to the West" a new experience for many individuals, and no licensing was required.

Today, there are at least four major commercial (SaNet, Georgia Online, Caucasus Network, Global Erty) and one non-commercial (GRENA/OSGF/HEPI) Internet Service Providers. In at least six major cities (Tbilisi, Kutaisi, Rustavi, Poti, Zugdidi, Batumi) one can access the Internet, which is also available by wireless means in some departments of Eastern Georgia (Kakheti). There are more than 50'000 regular Internet users in Tbilisi, which indicates a significant (20- or 30fold) increase during the last three years.

At the same time, the availability of medical informatics resources has decreased dramatically. During the period 1990-1995, the number of medical journals available to Georgian doctors through libraries diminished from 200 Russian and 40 English publications to almost none at all. There were no updated textbooks or reference guidelines. Most of medical libraries were abandoned due to lack of financing and the local medical publishing business almost dried up.

NILC – New Type of Learning Resource Center

The NILC was established in 1996 by the Ministry of Health thanks to financial and technical support from the American International Health Alliance (AIHA), the US Agency for International Development (US AID) and the Open Society - Georgia Foundation (OSGF). The Health Science Center at Emory University (Atlanta, GA, USA), under the auspices of its Director Carol Burns, MLS, was the principal partner for the NILC, assisting in designing policy and regulations, service forms, as well as setting up the network,

training staff and fund-raising. It was decided to establish a new modern center for electronic resources, which would not replace existing traditional libraries, but would provide new, multimedia-type resources instead of print format. Since its inception, the NILC has carried out significant work, providing the Georgian biomedical community with ready access to worldwide information resources and services. The NILC is a site where medical professionals can search the Internet, browse MEDLINE and other global medical information resources, and learn to use multimedia educational programs. Besides, the NILC also represents a node from which different health institutions can access the abovementioned databases through a dial-up/leased line connection (8-9).

Health Telematics - Telemedicine and Distance Learning: definition of terms

"*Health Telematics* is a composite term for health-related activities, services and systems, carried out over a distance by means of information and communication technologies, for the purposes of global health promotion, disease control and health care, as well as education, management, and research for health" (10).

Telemedicine (from the Greek – "medicine from a distance") is about bringing specialist knowledge to a patient from afar by the use of communications technology (11).

"***Distributed (also referred to as "distance") learning*** is structured learning that takes place without the physical presence of the instructor. Distributed learning is enhanced with technology. It may draw upon resources which are physically distant from the location where learning is taking place and may include the use of one or more of the following media -- correspondence course materials, audio/videotapes, CD ROMs, audio/videoteletraining, interactive television, and video conferencing - to provide *right-time, right-place* learning" (12).

"***Advanced distributed learning*** leverages the full power of computer, information, and communication technologies through the use of common standards in order to provide learning that can be tailored to individual needs and delivered *anytime-anywhere*. Advanced distributed learning also includes establishing an interoperable "computer-managed instruction" environment that supports the needs of developers, learners, instructors,

administrators, managers, and family. Advanced distributed learning encompasses all the methodologies mentioned above, and in addition, includes ongoing and expected improvements in learning methodologies." www.arng.ngb.army.mil/tng/Strategic%20Plan.pdf]

Health Telematics (Telemedicine and Distance Learning) - Why Is It a Priority for Georgia?

For Georgia, the development of Health Telematics is a clear priority due to the following reasons:

- The country needs continuous training, as well as re-training of a large number of physicians (including GPs, healthcare managers, healthcare economists, healthcare lawyers, etc)
- The need to achieve equality in the provision of healthcare service in the capital and the periphery
- The difficulty of providing medical care in mountainous regions, especially during snowy winters
- The need for rapid response capabilities in disaster management and emergency rescue
- The strategic importance of the South Caucasian region and the prospect of large infrastructure development alongside various pipeline projects

Summary

We have decided to highlight two IT-projects and compare their usefulness and cost-effectiveness.

Still Image Teleconsulting for Interventional Cardiology in Georgia

More than 800 coronary arteriography contrast x-ray diagnostic examinations have been performed at Tbilisi's Emergency Cardiology Center (ECC) since 1998, when the CathLab began working with its GE ADVENTX LCV+ angiography machine. More than 120

coronary intervention procedures (PTCA with or without stenting) have been successfully performed without surgical backup since 1999. NILC cooperates with the ECC to gather second opinions from qualified western specialists – the ECC's angiography files are sent as scanned (HP Scanjet 5P) or digital photo images (Olympus D-620L digital camera) via e-mail to the ECC's foreign partners - Prof. Helmut Roskamm (Bad Krozingen Heart Center, BKHC, Germany) or to Dr. Ismeth Dindar (Kosuyolu Heart and Research Hospital, KHRH, Istanbul, Turkey). During two years (1999-2001), the angiograms of 62 patients (4-12 images per patient) have been sent for teleconsultation. In the cases of 47 patients, the initial diagnosis was confirmed and the optimal intervention (PTCA/stenting) to be performed was suggested to the ECC; 14 patients were advised to apply to BKHZ or KHRH for a more serious bypass intervention (CABG). Still-image teleconsultancy in coronarography assessment is a proven and cost-effective examination method for the new interventional cardiology center. In cases when the bypass operation is performed in a western clinic, telemedicine usage makes the referral process more time- and cost-effective.

We had a different experience with still-image teleconsulting (11). In this case, Georgian doctors served as consultants. UK military personnel have provided photos of skin lesions and blood histology files from the tropical forest regions of Belize (Central America). Leishmaniosis and malaria have been diagnosed by Georgian specialists from the Institute of Tropical Diseases and Parasitology, Tbilisi. Still image teleconsulting using radiology (especially CT or MRI) files has also proven to be a highly efficient method of teleconsulting.

Interactive Distance Medical Education Program for Georgia

PIMS's wireless high bandwidth network, which has been installed in Tbilisi since 2000, supports military and emergency medical services and medical information resources for civilian and military doctors **(Fig. 1)**.

IMP has developed content for distance learning in medical training in cooperation with NILC, CDEM and PfHF. The PIMS satellite dish on the roof of the NILC building is pointed at Eutelsat W3. Until February 2001, it was linked by a partial T1 line through PIMS to IMP (Albany, N.Y.), providing 256 kbps shared out-route and 1.5 mbps in-route

connection for streaming video and NetMeeting. But as most videolectures have been pre-downloaded to the NILC server to avoid transmission problems, the existing line was very expensive to maintain (around US$12-15'000 per month). Since April 2001, NILC has established a dedicated 128 kbps synchronous connection to a local ISP, SANet Ltd., which sharply reduced the operational cost (to US$1,000 per month). Four programs - Acute Coronary Syndromes; Tuberculosis; Emergency Medicine; Radiation Hazards - have been developed by US experts in accordance with the priorities established by their Georgian counterparts. Courses were held on 3 consecutive days at the NILC/CDEM auditorium, equipped with a Dell Precision 220 workstation with loudspeakers and microphone, an InFocus LP770 projector and a remotely controlled Cannon VC-C3 video camera. During the first three sessions, word-by-word text translation in Georgian accompanied the lecture on screen, with subtitles. During the last session, considering the high rate of non-English speakers in the audience, simultaneous audio-narration was provided in Georgian, which certainly improved comprehensibility). Georgian Voice was synchronized with video clips via SMILE (Synchronized Multimedia Integration Language). The following software was used for editing clips: Adobe Premier, Real Producer, and Gold Wave. In the future, we plan to upgrade the existing processor and be able to add voice track directly to the clip. Each 10-15-minute video lecture will be followed by 5-15 minutes of discussion using NetMeeting, with a moderator translating audience questions. The first day of the conference was dedicated to more theoretical subjects, while the second dealt with procedural elements, and the third featured an interactive expert panel.

There were three presentations by Georgian doctors, which were attended by US expert panels: Dr. Alex Aladashvili spoke about the "Development of interventional cardiology in Georgia – first results and challenges," Dr. George Khechinashvili gave a lecture on TB control and the implementation of the DOTS strategy in Georgia; Dr. Klara Gelashvili read a paper on Radiation safety and current problems in Georgia, and made suggestions as to how to improve this situation.

In total 424 –medical professionals, including professors, clinicians, resident doctors, army surgeons, nurses and students attended the first four courses. More than 85 per cent of these ranked the agenda as being highly useful and innovative.

	Cardiology session	TB	EMS	Radiation

Doctors	73	82	68	63
Nurses	6	12	15	5
Students/Residents	30	16	28	16
Army medics	8	5	9	14
Total	117	106	103	98

A questionnaire was distributed to assess participant satisfaction. The results are briefly given in the following chart (**Fig. 2**).

Most of the problems were of a technological nature. The major challenges were the following:

Problems	Solutions
connection failure	pre-download of video material on the NILC server
slow/distracted motion	use of telephone instead of NetMeeting audio signal and saving bandwidth for video signal
jam of audio signals	telephone or chat as a backup
language barriers	translation of the text given as handouts and also visible on the screen and as simultaneous audio translation
late delivery of handouts for interactive panel	copying of handouts with included handwritten Georgian translation
power shortages	40 kwt Cummins-Onan generator
terminology	glossary distributed before sessions
evaluation	questionnaire designed and distributed

Discussion

The following were identified as essential elements of the telemedicine system (11, *modified by authors*):

1. Agreement and detailed action plan between the partners/members of the network
2. Availability of advice from more experienced specialists – with adequate authentication process
3. Referrals from different remote sites, containing clinical images and text (elements of full-scale electronic patient record)

4. Hardware and software – compatible with each other, with needs and also easily replaceable/upgradeable if required
5. Training of doctors involved in the program – the easier the training is, the better for the application
6. Money – to run the minimal operational cost

In our case we fulfilled all the essential requirements. Hardware was providing an opportunity for easy training. The most common software (Olympus Camedia, Microsoft Photo Editor, Outlook Express E-mail) was used. Western colleagues provided their expertise free of charge as they are members of a well-established network including Georgian doctors. That kept the cost of the project very low – approximately US$1200 total or less than US$20 per patient.

There are some possible benefits of distance education (14): a) Expertise is more evenly distributed; b) better utilisation of specialists; c) prevention of professional isolation. Whilst the two former are factors that apply world-wide, the latter is especially important for Central and Eastern European countries and even more for the Newly Independent States (NIS), like Georgia. These countries have been part of a far-flung network of scientific and educational activities in the past (although limited mostly to a Russian-language environment), and they exchanged students and scientific data. Since the mid-1990s, those networks have been disrupted and both educational activities and scientific research have become very isolated phenomena. The political "Iron Curtain" that used to prevent contacts with the West has been replaced by a "Golden Curtain" of economics, still severely limiting the ability of developing countries to enter into exchange programs with Western countries involving their student body, faculty and researchers. In this sense, distance education is almost without a feasible alternative (15, 16).

We found that the so-called "Combination Model" of Distance Education (14) –combining traditional education, on-line (videoconferencing, tele-exams) and off-line (web-based) courses – is better than an approach involving just one of those methods of education.

Technical failures of video and audio transfer remain the most important cause for disappointment with distance learning courses (14,15, 17), but with new advances in the technology and infrastructure developments in developing countries, they can be minimized. Another problem was related to the lack of human contact during distance

learning sessions, but this aspect can be diminished over a time and a well-organized network has something equally priceless to offer to the audience (17-19).

Future benefits expected from distance education (14):

More doctors trained using decentralized education

- Better and more cost-effective opportunities for education for Health Care personnel on all levels, by using decentralized education
- Better utilization of the teaching staff
- Better collaboration among the health care services
- Greater availability of information about education opportunities

Distance learning is the most effective way of providing equal opportunities for anybody seeking knowledge and education, regardless of distance, borders, socio-economic formation, status, and regardless even of their income.

The cost-effectiveness of interactive online applications for low-bandwidth environments in countries whose IT infrastructure is still fragile is a matter of controversial debate. On the other hand, still image telemedicine is clearly a timely approach to medical care in South Caucasian countries. The World Health Organization's (WHO's) vision of a future world stipulates that the benefits of science and technology be equally available to all countries and peoples, in accordance with the goals and values of the "Health for All" policy. Health Telematics technology should be appropriate for this purpose, in that it employs practical, effective, scientifically sound and socially and culturally acceptable methods and technology that can be made available at cost to the country, community or individual– in short, in that it aims at sustainability. (10)

Conclusion: At the present stage, still image teleconsultation represents the most cost-effective and practical diagnostic method for Georgia, although the current lack of Internet connectivity in peripheral regions represents a problem in spreading that method. However, the on-going and future projects for satellite-based and fiber-optic communication for the Caucasus region, alongside with a trend towards decreasing costs of communication,

represent a good basis for the implementation of a still image telemedicine network at the present stage, as well as the introduction of interactive distance learning in the near future.

Considering the major educational benefit to be derived from Internet-based distance education and the need for large-scale training/retraining of human resources, Advanced Distributed Learning is thought to become very important for countries' healthcare as soon as the technical developments can provide a sufficiently stable and affordable technological basis.

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