

The Impact of Electronic Publishing on the Academic Community

Session 4: Social and cultural issues

The impact of information technologies on research and development activities in Georgia

P.J. Kervalishvili

12 Chanturia St, 380004 Tbilisi, Georgia

©Portland Press Ltd., 1997.

[Copyright Information](#)

The information society

The world information society has entered a new era. Information technology has invaded almost all spheres of human activity. Beginning with industry it has also entered such sectors as public health, education, transport, etc. People look for new ways to increase efficiency and to raise the quality and level of services by means of information technologies.

Information and communication technologies represent a motive force which will foster the integration of nations into a worldwide entity. These technologies permit the introduction of new efficient methods in business and entrepreneurial activities, the reduction of environmental pollution and the waste of natural resources, the creation of new products and services and the promotion of innovation processes by effectively gathering the necessary information.

The socio-political situation in Georgia

Georgia, which after the collapse of the Soviet Union was added to the list of developing countries, cannot remain outside current global processes. From a politico-economical standpoint, the situation can be considered from two points of view: first, the demolition of the Soviet Union was accompanied by the interruption of co-operation between former Soviet republics, which resulted in a destruction of industry, an energy crisis, a sharp decrease of living standards, increased unemployment, etc; and second, Georgia, like other republics, expanded its range of contacts beyond the isolation created by intra-Soviet co-operation. In such a situation, it is critically important that Georgia should maintain a worthy place in the global information society, using its own intellectual potential. Without these efforts Georgia is doomed to remain a

developing country, which would result in the dispersion of its scientific and human resources; the beginning of a process already observed. In the 1990s it became more perceptible, as highly skilled specialists left the country because of poor salaries and unsatisfactory working conditions (energy shortages, obsolete equipment, lack of information facilities).

The creation of a Georgian information society under such conditions requires the implementation of an 'information culture', and this process must be completed by the end of the current century which is already called the 'information technologies century'. Otherwise any efforts to transform Georgia into a developed country will fail.

Georgia is today making its first steps towards the market economy. To overcome the crisis of transition, up-to-date management and production methods must be introduced. The global advance in the information sphere is having a great impact on social and cultural matters and ultimately will lead to the so-called 'knowledge-based' economy. The current global progress in telecommunications not only plays an important role in industrial development, but also promotes the upgrading of an infrastructure which is indispensable for other domains of human activity, such as trade, transport and other services. Modern telecommunication systems provide previously unattainable standards, low costs and good ergonomics. However, there is a danger that the high-level production and services achievable with modern telecommunications and information technologies will never become competitive, and the country will remain a supplier of raw materials and low-level manufacture.

To avoid this very real danger, Georgia must establish an information infrastructure which is a motive force for the development of the information society. The new information structure requires a service and facilities which would enable any Georgian citizen or businessman to obtain the necessary information at any time and at any place. Such an information infrastructure will handle the processing, retrieval, saving and transmission of the information. The successful implementation of the new information infrastructure within the framework of the state's development strategy strongly depends on how soon Georgia will develop a stable economy for the whole of industry as well as in the area of information technology.

Research and development in Georgia

Georgian research and development potential underlies the establishment of the information society. The strengthening of this potential is directly linked with the development of information technologies based upon scientific research.

Georgian science and its creative development have ancient traditions deeply rooted in the remote past. Our history provides evidence of ancient centres of learning and science: the Philosophy--Rhetoric School in Kolkheti (4th century); and the Academies in Gelati, West Georgia, and Ikalto, East Georgia (11th--12th century), which at that time performed the role of universities.

Since the 19th century, Georgian scientists have been educated at Western and Russian scientific centres. This to a large degree determined the principal trends for the development of Georgian science. Important scientific centres of importance were established in the Caucasian region at

Tbilisi (with botanical gardens, Caucasian Museum, Magnetic/Meteorological Observatory, etc.), which eventually took the form of the large-scale scientific organizations which are still functioning.

The availability of highly-skilled staff in Tbilisi University (established in 1918) provided the high level of pedagogical activity, the training of scientific personnel and the creation of a great number of educational institutions. Under the aegis of the university, scientific research institutes of mathematics, physiology, geology, physics, psychology, literature, etc. were established.

The scientific potential of Georgia is concentrated in more than 200 research institutions, including 19 state higher educational organizations, and institutes carrying out fundamental and applied investigations. Tens of thousands of people are engaged in careers in science and scientific facilities. A strong engineering potential is available. There are about 1\500 doctors and 12\000 doctoral candidates of science.

The role of government in relation to science and technology

In December 1994 the Parliament of the Republic of Georgia passed a law relating to science, technology and their development. The law lays down the legislative basis for state policy in the fields of science and technology. An activity in the sphere of scientific and technological development may include fundamental and applied investigations, implementation of their results, renewal of existing technologies and engineering to increase production standards and to raise competitiveness.

The law envisages a democratic management of research and development, its de-monopolization, the promotion of self-regulating conditions in the innovation sphere, the liberty of creative scientific activity and the participation of the scientific community in the elaboration of the state's research and development policy.

According to the law, the Department for Science and Technology of Georgia is a central interdepartmental body of the executive power which guides scientific research and the development. Its main roles are: (i) evaluation of the quality of research and the state of technological development. Elaboration of scientific and technological programmes with due regard for the state's priorities; (ii) elaboration of proposals to develop experimental facilities needed for the realization of governmental functions; (iii) financing of research and development, and assistance for innovative activity; (iv) realization of governmental policy in the field of protection of intellectual and industrial property; (v) preparation and realization of agreements concerning scientific and technical collaboration with international organizations and other countries; (vi) realization of governmental policy in the field of the 'informatization' of society, the creation of databases and the transfer of technology; (vii) carrying out exhibitions, congresses, symposia and conferences; and (viii) creation of interdepartmental co-ordination and scientist--expert councils.

One of the main functions of the department is the elaboration of relevant programmes and the co-ordination of their realization. The principal role in this activity will be by custom-made

scientific--expert councils which include highly skilled specialists and which will permanently evaluate priorities and scientific expertise.

The law also envisages the existence of public entities co-ordinating scientific activity. Firstly there is the Academy of Sciences of the Republic of Georgia which manages the sphere of fundamental research but there are also the Academies of Agricultural Sciences, Medicine and Engineering.

The scientific potential of Georgia

The scientific capability of Georgia is demonstrated in many fields. World-standard fundamental investigations have been carried out in the fields of mathematics, physics, chemistry and biology. Applied results are being utilized in mining, organic and inorganic chemistry, metallurgy and materials science, medicine and agriculture. The scientific potential of Georgia might also be efficiently utilized in the study and solution of wider problems related to the environment and the rational utilization of resources, especially in the Black Sea/Caucasus region. Amongst particularly successful recent research has been the production and utilization of light isotopes, the production of high purity monoisotope crystals for microelectronics, the study of liquid--metallic heat-transfer circuits from monocrystalline alloys, thermal pipes, thermo-emissive converters, super-conductive super-high-frequency resonators and metallic mirrors. Significant results have also been achieved in the fields of ionic implantation technology and metaloceramics.

Innovation policy requires particular attention in Georgia. The former Soviet Union implemented a cumbersome and sluggish system for the introduction of new technologies into industry. In the new market economy, the country faces an acute necessity to renew its industry and to raise its competitiveness up to world standards. This process is unimaginable without the implementation of modern information technologies, and for this purpose Georgia has established the Foundation for the Introduction of Scientific Results into Industry. This Foundation has to underpin technology transfer activity in Georgia and it would be greatly assisted in this task by the active participation of international structures and appropriate investment.

Due to the considerable changes taking place during the last few years, Georgia is experiencing serious difficulties accompanying the current political and economical reforms. This restructuring process has a particularly negative impact on the scientific/technical sector of society.

Research and technological development, traditionally priority spheres for government action in Georgia, face the danger of losing their accumulated potential, and its rehabilitation may become an insoluble problem.

The Georgian Government is making efforts to protect and develop the scientific and technical potential of the country. Besides the above-mentioned law, the Ministry of Industry and the Committee for Science and Technology were introduced into the structure of the Ministry of Economy so as to facilitate and intensify innovative activity. Regrettably, however, against the background of urgent needs regarding energy, food supply, transport problems, etc., the

government is unable to give substantial financial assistance to the research and development sector.

International collaboration in research and development

One of the efficient measures available to prevent lasting damage to our research and development potential is a close scientific and technical collaboration with developed countries and intensive integration into the world scientific and technical community. Georgian scientists actively participate in European Union programmes (INTAS, INCO-COPERNICUS, ESPRIT, etc.) as well as in other national and international initiatives. All these programmes envisage joint projects with European scientists. It is worth mentioning that one of the 'bottlenecks' in this process is the identification and attraction of Western partners to co-operative activity. Governmental bodies responsible for research and development sectors should facilitate and promote the establishment of the necessary links between science and technology communities.

To establish in Georgia a highly developed information society, the strategic problems must be solved without delay. In this respect the national centres and particularly the European Union Regional Contact Points (CPs) must collaborate closely with different directorates and divisions of the European Union and in this way promote strategically important projects. For instance, the European Union's Fourth Framework Programme, which envisages in some main actions such as technological research, development and demonstration, collaboration with third countries and international organizations, provides the possibility for Georgian scientific institutions to participate jointly with European partners in elaborating and implementing modern technologies.

In this respect the national CP must keep constant contact with the Directorate General III of the European Commission in order to receive from them and disseminate among the Georgian scientific community all information pertaining to programmes, participation conditions and other organizational issues. At the same time it is very advisable to organize workshops and so called 'information days' dedicated to the importance of European programmes for the scientific and technological sector. In addition, the CP should publish a newsletter to be distributed not only in Georgia, but in the whole Caucasian region. This would deal with issues concerning theoretical and practical aspects of up-to-date information technologies. The CP should establish, as soon as possible, a Web home page which would help all interested persons and organizations to obtain the necessary information by means of the Internet.

The CP should also disseminate the valuable experience of successful information technology projects published by the European Union programme ESPRIT. This would give an incentive to Georgian scientists to multiply their efforts and to collaborate more actively with the European information technology community to create in Georgia an information society.

Besides organizational issues the national CP must focus its activity on the creation of the necessary scientific basis of the Georgian information society, for instance for its 'information consciousness'. This would require an automated computer system which would enable a Georgian-speaking customer to read multilingual texts in his native language and vice versa. It would be necessary to elaborate, under the CP's guidance and with suitable financial assistance, a multilingual database of technical terms (in English, German, French and Georgian). This

dictionary has to be created with the assistance of and in accordance with the International Standards Organisation (ISO) and the International Information Centre for Terminology (INFOTERM). Such a dictionary will serve as a base for the multilingual Information Retrieval System which ultimately will be transformed into a machine translation system for the Georgian-European languages. This system should be based on the Advanced Language Engineering Platform (ALEP) officially adopted by the European Union. If the necessary financial support were available, the national CP could restore the former scientific contacts which Georgian researchers had with European scientific centres when they collaborated within the framework of the European Union machine translation project EUROTRA. This project envisaged the creation of a machine translation system for all official languages of European Union member countries.

It is hoped that such joint efforts and close collaboration with the European Union will establish in the near future a Georgian information society which will permit an efficient partnership with Europe in the research, production and implementation of information technologies. This will contribute to the irreversibility of the development of education, research and development, and industry in neighbouring countries and their integration into the international community.

©Portland Press Ltd., 1997.

[Copyright Information](#)