

Concept

On Reforms in Science Sector in the Republic of Armenia

Present concept is a system of propositions underlining the role and significance of science, exposing current problems in the sector and determining the ways of settling them.

Scientific, technological and innovation activities are considered as main factors of social and economic growth in modern world. Science serves as cornerstone for paving the way toward a competitive economy in the shortest possible period of time. Science-based production is the factual and rapidly developing sector which greatly influences other branches of production.

In the 21st century social welfare and development in Armenia can be reached due to science. Settlement of social and economic problems, civil consensus and establishment of democratic society can be achieved through the increase of intellectual property which, in its turn, depends on development of science and education.

Considering development of science and technological progress of special strategic significance, it is essential to foster effectiveness of state policy directed to the sector. Economic rise in Armenia can be sustained in case of successful implementation of scientific and scientific-technical research results.

1. State of Affairs in Science

Science in Armenia has traditionally enjoyed state attention as an essential factor of national security, economic growth, on the one hand, and educational, cultural and social progress, on the other hand. Scientific potential in the Republic of Armenia constitutes nearly 20.000 people. Almost 7000 scientists and researchers are enrolled in topics supported by state budget. During the years of Independence scientific potential has been maintained to some extent, there have been established non-governmental scientific organizations and funds, government funded research program and project system has been implemented, the independence of scientific institutions has extended and there have been established linkages with international scientific community. Legislative base has improved to a certain extent. The principles of state policy in science are formulated in “On Scientific and Scientific-technical Activity” (adopted in December, 2000) and in the Conception of Science Development (approved by the Government of the Republic of Armenia in April, 2001).

Despite the mentioned promising activities the process of fundamental improvements in science was delayed which entailed numerous problems demanding urgent settlement.

Disintegration of scientific institutions (ministry-run scientific organization, Academy institutions and centers, and Universities) combined with the absence of a joint state governing body are hurdles that impede the development and effective realization of state policy. Non-productive state governing system is a result of such factors as Departmental interest and human element.

Existing scientific infrastructure resources fail to provide effective utilization of scientific potential.

The lack of independent scientific expertise system, unfocused state policy in the sector, insufficient level of commercialization of scientific results, poor conditions for innovation activities are those obstacles that inhibit development of the sector.

Unfocused state policy toward the growth of scientific potential results in low level of rejuvenation of scientific potential in scientific organizations and Universities. One of the burning issues is the prevention of exodus of young specialists. Insufficient level of educational curricula and exodus of young specialists endanger maintenance and development of scientific schools as well as maintenance of scientific personnel.

International collaboration in science and technology is inadequately organized. Government fails in developing a focused and more reasonable policy toward integrating with international standards of science development priorities. Scientist's copyright is not firmly defended. The level of commercialization and export of scientific products leaves much to be desired.

The lack of joint scientific information system and scientific-technical base combined with slow process of integration of science and education are also among the negative factors.

One of the main reasons for present situation is the insufficient level of government funding (it constitutes 0.3 percent of gross domestic product). Moreover, state resources do not completely meet state demands.

Present situation urges creation of efficient and modern system of science and education in Armenia. Improvement strategy demands a systematic and constructive activity on the part of each government body. Failure may endanger the future of the country.

2. Urgent Settlement of Existing Problems

The primary objective of reforms in science is the creation of knowledge-based economy and in this process strong State leadership is required.

On the one hand, reforms should be realized in parallel with the promotion of effective governance, modernization and improvement of scientific infrastructure, on the other, along with defining science and technology development priorities in Armenia and initiating activities of scientific institutions according to these priorities through focused training of scientific personnel and fostering their activities. Detailed schedule of measures and mechanisms for reforms should be substantiated by enhancing effective governance of the sector combined with application of specific approaches and enrollment of skilled personnel.

Primary steps are as follows:

1. establishment of a joint state science governing body,
2. increase of science funding, clarification of funding forms and mechanisms, enhancing productivity of funding,
3. enhancing scientific organizations effectiveness,
4. maintenance of focused and effective reproduction of scientific potential,
5. modernization and creation of new infrastructures, material and technical base,
6. introduction of independent scientific expertise system,
7. definition of science development priorities,
8. integration of science and education,
9. fostering commercialization of scientific results and exporting to domestic and foreign market.

1. Establishment of A Joint State Science Governing Body

Establishment of a joint state science governing body should be carried out through making precisions in overall governing levels.

In line with the above mentioned the status and competences of the authorized body should be considered. This body is to become a State Committee of Science, under the auspices of the Ministry of Education and Science, which will be authorized to develop and realize state policy in science. The Council of Science and Technology, which will be attached to the Prime Minister, will discuss and give approval to main principles of state policy in science and settle the integration problems in way of its realization.

2. Increase of Science Funding, Clarification of Funding Forms, Enhancement of Funding Effectiveness

Current issue firmly depends on realization of programs included in mid-term expenditure state programs that are envisaged by conceptual propositions. Increase of funding will be supported along with the improvements of science sector with essential and rapid growth of state budgetary resources directed to science. There should be created favorable conditions for attracting non-budgetary resources and foreign investments. In line with the above mentioned the principles of co-funding should be fixed in legislature which will enable integration and regulation of involvement of foreign resources. In this respect program and thematic projects should be realized on a competitive base by the Scientific Fund, which is to be established by the Government. International and regional projects on science development should be realized and Armenia will be encouraged to actively participate in them. It is also essential to come into close contact with scientific Diaspora, organize joint workshops and summer schools. Integration into the European Research Area is also one of the pressing issues. Hence, State faces serious problems in organizing new models of science governing, implementing new funding mechanisms, developing new organizational approaches toward institutions with same scientific interests.

There should be developed such funding mechanisms that funds will be directed to meet state needs. Multi-form type of funding should be preserved and it should be carried out on a competitive base. All the projects and proposals should be well-grounded. Hence, funding forms should be improved and the criteria and mechanisms should be defined more accurately.

- Funding on base principles is to be realized with the aim of sustaining and developing those scientific organizations (centers) and their infrastructures that are involved in fundamental and applied researches.
- Projects of strategic importance should be carried out under targeted funding in form of research projects. Majority of projects are to be of applied character and be proposed by corresponding Departments. The principles of targeted funding must be improved and made consistent with tasks set forth by State.
- Thematic (topic-based) funding should be transformed into a grant – donating system. Thematic funding is directed to separate researches in accord with science development

priorities that can bring about new scientific researches and scientific-technical developments.

3. Enhancing effectiveness of activities in scientific organizations

Enhancing effectiveness of various ministry-run organizations can be achieved by focusing their activities toward the above mentioned principles of science development. Organizations will realize their activities and get base funding in case of realizing focused activity. The primary step in enhancing effectiveness of activities is creating a base on their scientific and technical facilities, which will be followed by institutional reformations. Organizations of similar scientific orientation should be united and they should be turned into scientific centers with the status of a fund (maintaining financial and organizational independence of separate sectors, by implementing principles of contemporary management). Within the organizations director's and scientific council's duties and competences should be clarified by implementing principles of contemporary management and securing settlements and discussions on science issues from administrative infringements. Management of scientific council will be carried out under the leadership of a scientist representing the given scientific field.

University science sectors should have a clarified organizational and financial status, independence and in some cases maintain the status of juridical person. Science, technology and innovation type of institutions (techno-parks, business-incubators, technology transfer centers, etc.) can be founded on the basis of certain organizations. There should be established possibility centers that will provide juridical assistance to scientists and will contribute to the export of scientific products to domestic and foreign markets.

Organizational and juridical status and competences of the National Academy of Sciences of the Republic of Armenia will be formulated in the new law "On Scientific and Scientific-technical Activity". Herewith, Academy's competences imposed on the part of State will be clarified, the relationship between the Presidium and Academy institutions and centers will be regulated. Academy's role as a consultant will be firmly fixed. Academy will be authorized to carry out evaluation and review of certain scientific projects.

4. Reproduction of Scientific Potential

With the aim of creating favorable conditions for reproduction of scientific potential an analysis of scientific potential should be carried out and a careful evaluation of the demand for specialists must be made. In this respect creation of a National Bank is essential, which will include database on Armenian scientists, working abroad. A plan for development of scientific potential should be cultivated. It will be focused on rejuvenation of scientific personnel. Contractual basis should be created for renowned scientists and high salaries should be provided to them. Certain grant-donating and scholarship programs should be implemented for young scientists and for post-graduate students which will contribute to rejuvenation of scientific personnel and will decrease “brain-drain” to some extent. Prestige of a scientific worker should be enhanced and respectable living and working conditions should be created. Improvements in post-graduate system of education should be carried out, training of scientific personnel should be well-grounded and be realized according to state demand.

New type of two-level system of conferring scientific degrees will be introduced. This will demand clarification and modernization of mechanisms operating the system. The objective is the extension of sovereignty and independence of Universities and scientific organizations, in the meantime keeping control over the quality on the part of State. Existing Ph.D. curriculum will be enriched by educational component becoming consistent with the third-level degree conferred abroad. The student, who has successfully completed the curriculum and has defended the thesis, will be conferred doctor’s degree. After completing tasks set forth by post-doctorial curriculum, the scientist will be conferred the degree of Doctor of Sciences. The main peculiarity of the new system is that Universities and scientific organizations will be authorized to confer degrees. State body for control over quality will be responsible for quality and independent expertise.

5. Need for Modernizing Infrastructure Resources and Material- technical Base in Science

Current issue presupposes creation of database on expensive and exclusive equipments and facilities, scientific personnel. All the scientific organizations are to be certified. This process should be followed by realizing a targeted plan aimed at modernizing material-technical

base. Meantime, it is essential to create a joint fundamental library net by introducing new service technologies in them. Creation of complexes for scientific analysis, information and consulting will be a significant step forward. In this respect it is expedient to transform “Armenian Center for Scientific Technological Information” (under the auspices of the Ministry of Trade and Economic Development) into a state science governing body. Joint information net should be developed and it should be connected to the international net. Science publishing system should be reorganized maintaining criteria consistent with international standards and there should be provided a legislative base for electronic publication.

6. Establishment of Independent Scientific Expertise System

Establishment of a long-term productive system for scientific expertise is a primary issue to be settled. Foreign specialists should also be enrolled if it is necessary. In order to support effectiveness of the mentioned system it is expedient to develop, adopt and unconditionally implement corresponding criteria for evaluation of scientific and technological activities. International models may serve as a ground. Initially, this system will be supported by foreign funds.

7. Clarification of Science and Technology Development Priorities

There should be made certain precisions in scientific and technological priorities. It supposes development of a new list of science-oriented priorities. Armenian studies (Armenology) as a factor of national strategy should be counted among the ranks of leading priorities.

Definition of science development priorities should be realized in compliance with the following criteria:

- issues of state strategic significance,
- long-term international research problems,
- availability of scientific schools representing corresponding field or the possibility of founding them,
- problems conditioned by national security.

Definition of priorities should be clearly stated and it should proceed from the above mentioned criteria.

In the meantime, there should be developed projects and topics in accord with priorities.

New funding mechanisms for innovation projects are to be cultivated.

8. Integration of Science and Education

Integration of science and education is essential for a competitive education, for promoting scientific reproduction and sustainable economic growth.

There should be developed a special integration plan. This plan should be aimed at establishing University chairs and branches in centers of excellence, organizing Master's programs on contractual base and student training. Criteria for research institutions should be developed and implemented and several outstanding Universities should be transformed into research centers. Consequently, several scientific organizations should be attached to Universities.

9. Commercialization of Scientific Results and Their Export to Domestic and Foreign Markets

Commercialization of scientific results, establishment of national investment (innovation) system are also among the pressing issues. There should be launched efforts for exporting scientific results. With the aim of settling this problem the following steps should be undertaken:

- definition of commodity type of scientific results (including technologies), along with state establishments or those with state participation, coordinating their tasks, according to spheres, character and aspects,
- legislative amendments for protecting intellectual property in accord with international standards,
- establishment of a system for innovation activity and creation of productive implementing mechanisms of scientific results,
- support to the small and medium enterprise in scientific innovations sphere, establishment of loan-donating system,
- establishment of scientific innovation centers (techno- parks), as well as on the basis of state scientific-research organizations,

- encouragement of venture investments,
- insurance of innovation risk,
- enhancement of state activities for filing patents and selling them in foreign markets,
- transformation of a part of scientific organizations into innovation institutions with developed marketing and commercial base.

Overall process of improvements should be accompanied by corresponding legislative amendments. Alongside with the improvements, there is a strong need for launching Science Development Strategy Plan for the Republic of Armenia.