



## SCIENCE AND TECHNOLOGY IN ARMENIA: TOWARD A KNOWLEDGE-BASED ECONOMY (2004)

Armenia has a long tradition of excellence in science, technology, and education. During the Soviet era, Armenian capabilities were oriented to a significant degree toward supporting the Soviet military-industrial complex. With the disintegration of the Soviet Union, Armenia became isolated from many of its markets, and exports rapidly declined. As the economy spiraled downward, the budgets for research and education plummeted. A major exodus of technical talent began. Many research and education institutions and a few industrial facilities remain, and although their scientists have persevered and have achieved impressive results despite severe financial limitations, Armenia's science and technology (S & T) capabilities have eroded considerably.

Now more than ever, science and technology (S&T) are critically important to the future of Armenia. With few export sectors remaining from the Soviet era beyond foodstuffs, alcoholic beverages, and precious and non-precious stones, Armenia's scientific manpower has become one of the country's strongest assets. From the scientific, economic, and political points of view, this asset should be nurtured and promoted to the fullest extent possible. In view of this, in 2004 the National Research Council carried out an assessment of S & T in Armenia, at the request of the U.S. Embassy in Armenia and under funding by USAID.

A handful of successes to date and a long menu of areas of potential interest for the future are encouraging, as is the resourcefulness of Armenian scientists in establishing and maintaining linkages with the international scientific community despite enormous challenges. Yet there will continue to be great difficulty in developing an internationally competitive S&T base and commercially viable innovative businesses. Limited research funds are currently spread over too many institutes and too many programs, and those activities that are not making significant contributions to science or economic development should be abandoned. At the same time, steps must be taken to provide more opportunities for young scientists and engineers to assume responsible positions with adequate compensation within the universities and research institutes that command international respect. With reasonable funding and more focused and determined efforts in the areas highlighted in this report, Armenia should be able to move forward toward a viable knowledge-based economy.

### RECOMMENDATIONS

For Armenia to realize its science and technology potential, the following suggestions are offered:

- Strong Armenian government leadership is needed, including a long-term budgetary commitment, for upgrading the S&T base. Low levels of funding by the Armenian government have led to excessive dependence on foreign sources of funding for maintaining the nation's S&T capacity. Insistence by foreign funders on cost sharing by

the Armenian government should be considered as a means of encouraging it to fulfill its budget commitments.

- A government mechanism should be established and funded to jump-start small entrepreneurs interested in developing promising innovative ideas with good market potential. The U.S.'s Small Business Innovation Research (SBIR) programs might be used as a model.
- A limited number of centers of excellence should be established through a competitive process to serve as focal points for research and for science services, with financial support from both Armenian and international sources.
- The National Foundation of Science and Advanced Technologies (NFSAT) is a model institution for the support of peer-reviewed research funding in Armenia and deserves a several fold increase in its funding. Funding for new S&T programs should be administered through organizations with peer review processes.
- Armenian institutions of higher education should continue to modernize their structures and curricula and should make strong efforts to recruit young, foreign-educated faculty. A sustained program of visiting professorships and the upgrading of selected laboratories for use by faculty and students could help in this process.
- CANDLE (Center for the Advancement of Natural Discoveries using Light Emission) is an ambitious attempt to create a state-of-the art, next-generation facility with applications in a wide range of fields, from basic physics, chemistry, and biology to applied research in drug design, medical diagnostics, and environmental remediation. It should be supported through the next pre-construction phase of detailed engineering design and of testing the concept of manufacturing equipment in Armenia, which will require funding of up to \$4 million over a two-year period.
- Efforts should be launched to improve the overall intellectual property rights system in Armenia, particularly promoting better understanding among potential inventors of the importance of and procedures for protecting intellectual property rights. The intellectual property rights program of the International Science and Technology Center should be extended to serve Armenian institutes.

### **The Committee on Science and Technology in Armenia**

**John D. Baldeschwieler (Chair)**, California Institute of Technology

**Robert P. Anex**, Iowa State University

**Barry C. Barish**, California Institute of Technology

**John R. Filson**, U.S. Geological Survey

**Norman P. Neureiter**, American Association for the Advancement of Science

**Abigail Salyers**, University of Illinois at Urbana-Champaign

**Glenn Schweitzer**, Study Director

### **For More Information**

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