

Petition for the Support of Science and Technology in Greece

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Prime Minister Samaras, General Secretary Vasilakos, distinguished colleagues, ladies and gentlemen. I thank you for the opportunity to speak this evening and to address issues of concern to us all. As a signatory to the petition of 2012 for the Support of Science and Technology in Greece, I applaud the response from the Greek government and EU, which has helped to offset cutbacks in support. At the same time, I wish to advance ideas shared by many about the direction of future support. I will begin by explaining what is the source of progress in science in technology. I will discuss the specific example of biomedical science, which is my own area of expertise, although what I have to say is true for all of science.

If I were to ask what were the major advances in medical science of the past century, most of you would offer a similar response: X-rays, for both diagnosis and treatment; antibiotics, which have largely eradicated bacterial disease; noninvasive imaging, especially magnetic resonance imaging, or MRI, for early detection of cancer and other conditions; genetic engineering, the basis of most new medicines; genomics and the prospect of personalized medicine; and so forth. These medical advances have one thing in common: they were all discoveries made in the pursuit of knowledge for its own sake, with no application in mind, no idea of curing disease. The lesson of the past is the opposite of what you might think: to solve a difficult problem in medical science, do not

study it directly, but rather pursue a curiosity about nature and the rest will follow. Do not seek short-term relief from disease. Invest in basic research and cure disease.

This lesson, although obvious from the past, is often forgotten. There is a tendency nowadays, in every country, to direct research toward specific problems. Such targeted research, using existing knowledge, is the work of industry. It cannot create new technologies, or solve very hard problems. Discoveries are required to open new fields and solve difficult problems, and discoveries are, by definition, unpredictable.

Discoveries cannot be directed. They come about by serendipity. They are the work of bright young minds, set free to explore the worlds of science and of their own imaginations.

Another lesson from the past relates to the support of basic research. Support has come from government rather than from industry. And for good reason. The timeline is very long – fundamental problems take decades to solve. Only the public, with a long range interest in the betterment of nations, will support such an undertaking. Industry, with a short term interest in the bottom line, can hardly be expected to do so. What CEO could report to his or her Board that a major investment has been made in research that may or may not become profitable in 10 or 20 years, or longer? Let me give you a specific example. Pharmaceutical companies developing anti-cancer therapies are regularly forced to choose between a drug that cures cancer with a single dose and one that must be administered weekly and which only prolongs life by a year or two. Management invariably makes the right decision on behalf of shareholders, and pursues the less

effective drug. This is not an isolated or rare event. It occurs on a weekly basis in the best companies. Government clearly has a special responsibility, a unique role to play, to ensure the proper balance between discovery and application.

You may ask why not wait for a large country like the US and its rich government to fund basic research, make discoveries, and publish new knowledge? Why shouldn't a smaller country like Greece concentrate on applications of particular economic, military, or other value? The answer is the importance of leadership. Those who create new knowledge lead in its application. Consider high tech and biotech. Both began near the universities in the San Francisco Bay Area where the fundamental discoveries were made. Others around the world have also joined in the rewards, but the leaders have been vastly more successful. Not only in the past, but also in the future. The reason is the people, the talent that drives the enterprise. The best and the brightest come to train in the Bay Area or elsewhere in the US and then remain. Many have come from Greece. They include Paul Alivisatos and Nikos Kyrpides at UC Berkeley, Andreas Baxevanis at the US NIH, Fotis Kafatos at Harvard, Babis Kalodemos at Rutgers, Evangelos Moudrianakis at Johns Hopkins University, K.C. Nikolaou at the Scripps Research institute, George Scangos CEO of Biogen Idec, and George Yancopoulos President of Regeneron. These are great Greek scientists in my field. There are many more in other fields. They are not just fine scientists and tech leaders; they are world leaders. Greece can take pride in their accomplishments. Of course if these great scientists had remained and done their work here, Greece would be among the best, perhaps even the leading country in Europe.

Rather than regard their work abroad as a loss, I urge Greece to view it as opportunity. There are three requirements for discovery and innovation: talented people; a scientific tradition; and governmental support. The talent pool in Greece is very large, especially if conditions are created for retention of the best and brightest young people. Scientific tradition is represented by the great Greek scientists I mentioned, as well as by fine scientists working in Greece today. Many of those working abroad would be glad to advise, to spend time in Greece, or even to return full time to Greece if conditions, such as those I will mention, were provided. Finally, governmental support should be possible because a relatively small amount is required to raise the level from the minimum required for maintenance to an amount sufficient for world-class research. As little as \$50 - 100 million per year, allocated on the basis of exceptional merit, to the most worthy individuals and to centers of excellence, will fund dozens of world-class laboratories. Not only is this a trivial amount in comparison with other national spending, but the return on such an investment will, in time, exceed that obtainable by any other means. It will lead to the creation of tech industries of all kinds. It will transform every aspect of national activity, from information to energy to industrial production to agriculture to biomedicine and more.

Science is not a luxury that can be stopped in times of need. It is a necessity for development and prosperity. Eliminating research does more than close laboratories. It breaks up research teams that take many years to form, and so it wastes all the years of investment that were made in their creation in the first place.

In brief, a modest increase in support for the best scientists and for centers of excellence in Greece is the natural next step in implementation of the Petition for Support of Science and Technology in Greece. It is critical for the future of Greece and her people.