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Closing plenary speech by H.E. Dr. Vaira Vike-Freiberga, President of Latvia, at the World Science Forum Budapest, 10 November 2003

Mr. President,
Mr. Prime Minister,
Professor Vizi,
Excellencies,
Ladies and gentlemen,

We have come to the end of a milestone international conference on Knowledge and Society, in which the challenges of the global Society of the 21st century have been addressed by a stellar assembly of distinguished scientists and scholars from around the world. I should like to extend my personal thanks to the Hungarian Academy of Sciences for organizing and hosting this remarkable event, to President Madl, and to Mr. Romano Prodi, President of the European Commission, for being its co-patrons and to the Hungarian Parliament who have lent these splendid halls as our venue. I am honoured, as President of Latvia, to be invited on this occasion, and would like to share with you some very general thoughts about science policy and the place of science in society. For I see science not just as advancing knowledge and creating ever more impressive technological innovations. I see it as an integral part of general secular, humanistic culture, with scientific thought having a close affinity and kinship with the spirit of democracy.

Reflections about the role of knowledge in creating a good society are as old as civilization. In our day and age, knowledge has more and more become identified with scientific knowledge, and the benefits to be derived from the practical, technological applications of such knowledge are clear and evident in economic, social and even political terms. This is why science policy and the support of both fundamental and applied research must have an important role to play in any country that has any hopes of surviving economically and remaining competitive in our fast-changing and globalized environment.

Yet support for science is obviously costly, requiring first of all very serious long-term investments in human resources: a solid basic education, followed by long years of professional training up to the doctoral level and beyond. State budgets, on the other hand, have a short 12-month rhythm, while the political life-span of any particular government is altogether unpredictable. It is therefore difficult to convince governments of the wisdom nay the necessity of making solid long-term commitments to education and science training as a fixed and pre-determined part of the GNP. This has been particularly difficult in many of the post-communist countries, including Latvia, which have had just a little over 10 years to carry out revolutionary even cataclysmic changes in their societies: to switch from communism to free market economies, to reinstate democratic governance after decades of totalitarian oppression and to re-establish full freedom of thought and enquiry. The sad fact remains that freedom of enquiry can become a freedom in name only if the enquiring mind has difficulties in obtaining a subsistence level of salary.

Furthermore, in addition to the investment in human resources, serious science requires a serious investment in infrastructure and in the operating costs of research projects. This is particularly true of the physical and life-sciences, where the costs can be so

prohibitive that a number of cutting-edge fields of research are already beyond the reach of all but the bigger and richer countries in the world. The result is a concentration of big science research activity in a few favoured localities and an increasingly widening gap in research capacity between smaller and bigger nations even within the developed world. As for third-world countries the growing size of this gap increasingly diminishes their chances of entering the field at all, at any sort of level.

Another effect of dramatic inequalities in the level of research grants and support is to create a chronic brain-drain that lures away many of the best talents from local or national scientific communities. One can hardly blame researchers for searching out greener pastures, for they are only looking for conditions that broaden the scope of their freedom of enquiry. Such a situation is certainly not ideal for the donor countries, but neither is it healthy for the development of science in the broadest sense of the word. The progress of science has always depended on the competition between alternative and often widely differing - methods, approaches, tactics and theories. Maintaining an adequate scientific capacity is thus not just in the national interest of the donor countries that experience the brain-drain phenomenon, it is also in the interest of international science as a whole.

Within the hard sciences, research has become so expensive in many fields that even the richest countries feel unable to support it only from the national budget. Partnerships with the private sector, especially the larger multinational corporations, have become the rule in recent decades. Such partnerships make eminent sense if we think of the enormous economic potential of the practical applications of research. Science then leads to technology, which leads to growth and prosperity and the benefit to the country as a whole is then absolutely astounding. In the life sciences, however, such partnerships are not without serious dangers. Think of the research sponsored by tobacco companies on the link between cigarettes and lung cancer. If he who pays the piper also calls the tune, then the independence and integrity of science can become seriously compromised.

In view of the increasing costs of scientific research, what are the chances for small and medium-sized countries to remain as serious players within the field? I believe that, first of all, their best strategy would be to support more heavily those fields in which they have their greatest strengths. Second, they should exploit to the fullest the possibilities of international cooperation by establishing sound networking between national centres of excellence in different countries. In this sense the current enlargement process of the European Union, for example, could potentially lead to a quantum jump in the collective research capacity of the European continent as a whole. But I do say potentially, for we still have a long way to go before the enormous scientific potential of the new member countries is fully integrated into a continent-wide hot-house of research advances.

On any continent and in any country, for science and technology to really thrive, each national government should allow a pre-determined minimum of the GDP for science and research. For a number of countries, including my own, this would require giving science funding a much higher priority than before. In the case of the enlarged European Union, I believe that the funds allotted from the Sixth Framework programmes should be more responsive to the different needs of local researchers.

I have spoken so far of the hard sciences and their needs because they are the most costly and also because those are the fields in which it is easiest to transcend national boundaries and to establish trans-border cooperation. I would now like to emphasize that the social sciences and the humanities are no less important. Indeed, for each country separately, they are even more important, precisely because they are much more context-bound and embedded into the local culture and society. Lack of research capability in any of those fields will seriously retard a country's progress.

In the humanities, there are fields the existence of which is not just of national interest but a national necessity, such as the study of a nation's language, culture and history. Any sovereign nation ignores their support at its cost. These are fields where each

nations government is first and foremost responsible for their survival and development. But each modern nation also needs at least a minimal capability in the fields of social science, where practical applications are becoming more and more widely evident as being of enormous benefit to society at large. There is hardly a social problem in the modern age which does not require input from the social sciences, be it in the process of establishing the nature and extent of a problem, or be it in the more difficult challenge of searching for viable practical solutions. The important thing to understand is that solutions to social problems cannot be imported piece-meal from another country, no more than you can transplant a palm tree to a northern climate or a birch tree to a southern one. They need to be made to measure within the social and historical matrix of local conditions, they need to be home-grown if they are truly to thrive.

Science has given us an unprecedented understanding of the world and a dizzying array of technological benefits that we all increasingly take for granted. But science has also given us a cognitive style and a basic way of thinking that have become for better and for worse an integral part of modern secular humanism, that have become a part of our general culture. The growth of science in the Western world has gone hand in hand with the growth of democracy. The spread of scientific literacy across the world thus takes on even more urgency than if it were concerned only with modernization in the sense of technological progress. There is a real sense in which a true understanding of the fundamental principles of scientific thinking can help to diminish prejudice, intolerance and extremism.

It is important to recall that science was certainly not born suddenly and full grown, like Athena springing from the brow of Zeus. Nor was it ever a unified, coherent system. Quite the contrary, its evolution has been a slow and sporadic process, stretching over centuries, in which now one thinker, now another, would take a turn. But there are certain fundamental principles which make of scientific thinking a revolutionary alternative to religion, ideology or philosophy. The most important of these is that science abandons preconceived truth and received authority in favour of empirical observation as a basis for the systematic verification of hypotheses. This openness to either confirmation or disconfirmation by observed facts is the crucial aspect of scientific knowledge which makes it an open-ended, rather than a closed system of knowledge.

The scientific method undermines any concept of Absolute Truth and replaces it with the more modest idea of partial and relative truths that hold only until a better partial truth comes along to replace them. (You would not guess it by looking at the tone of debate in certain famous scientific controversies (Galvani against Volta on animal electricity spring to mind), but that really is its essential nature). Science differs from religious fundamentalism and totalitarian ideology, which accept a certain corpus of received knowledge as absolute and completely beyond question. It does not matter whether this received knowledge consist of sacred scriptures or ideological compilations. The very idea of Absolute truth makes any deviation from it either a sin or a dangerous error. Accepting any truth as absolute then justifies attacking dissention or heresy by any means and at any cost. Where others cannot be made to accept The One correct version of The Truth by persuasion, it becomes acceptable and even necessary to impose it by force.

Science itself, of course, is not free from the dangers of authoritarianism. There is a phase in science education where the passive receiving, accepting and regurgitating of text-book knowledge is required. Without it, every new generation might have to reinvent the wheel. Yet the true spirit of science remains the active seeking, searching and reaching out for knowledge. It is the wish to venture forth, to chart unexplored territory, to enter the unknown. It is the desire to illuminate, to make the opaque transparent, to make the obscure clear. It is the commitment to labour hard in order to find out something new and to add it to a common pool of knowledge. Science is empowering, liberating and assertive. While it rests on intellectual elitism among its practitioners, its principles are profoundly democratic.

Ladies and gentlemen,

I have spoken of the need to support science because of the many benefits it brings to a nation. I would be remiss in not admitting that science is essentially a neutral tool, that it can be a two-edged sword, that it can be used intentionally for either good or evil, and that even its beneficial aspects can have unforeseen dangerous consequences. The advances of theoretical physics have led to atomic weapons and to horrifying dangers. The ozone layer of our planet is being destroyed by useful chemicals that we use in our daily lives. Antibiotics have saved many lives but have also bred super-germs impossible to control. Pesticides have increased crop yields but also created new strains of resistant pests that threaten anew to destroy them. Genetic engineering can help to feed the world but it can also irremediably damage the gene pools that have evolved over millennia of evolution. The list goes on and on.

Most of all it must be accepted that science does not and cannot be the arbiter of what is good and what is evil through its own methods. Questions of ethics remain the domain of religion and philosophy, but they do need a working consensus, both within science and within society at large. It would certainly help to have an overriding code of ethics for scientists, similar to the Hippocratic Oath that is pronounced by all new practitioners of medicine. It would be a great step forward if the world scientific community were united by the same collective ethical values.

The new global village that we are now creating requires our vision for formulating the aims that we must be reaching for. I believe that science has an important role to play in this process. Yet any change that we are contemplating will only come about if we muster the collective will to achieve it. It is my hope that we will have both vision and will enough to steer clear of major dangers and blunders. I have a naïve faith that humankind will continue to evolve, not just in reaching ever higher achievements of intellectual knowledge, but in achieving ever higher standards of ethics and integrity as well.