

**Third Science and Technology in Society Forum
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Keynote address**

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[The six speakers on the keynote panel were asked to address the question: "How can we ensure that our wisdom is efficiently used so that science and technology is optimally deployed for the benefit of humankind while guarding against the worst risks?"]

Cabinet Secretary Abe, legislator Omi, and distinguished participants:

The difficult issues that make forums like this necessary do not emerge from the practice or the discoveries of science, but from the social environment of the scientific enterprise. It is very surprising that science can thrive in a universally recognizable form in so many very different societies in today's world. Science, it appears, is something that nearly every culture can recognize and embrace.

This universality and cultural independence of science has proven to be exceptionally valuable for inter-cultural communication. Even in ancient times, the traveling scholar and seeker of knowledge was treated with hospitality and respect in nearly every part of the world. Today our nations encourage partnerships in science with other countries even when political or economic relationships have been obstructed by difficulties and misunderstandings. During the last half of the twentieth century those partnerships have grown from small and specialized ventures into a vast global enterprise of discovery. Despite their different cultural origins, the men and women engaged in this enterprise speak a common language, and share a common picture of the intricate machinery of nature. They are working collectively and with astonishing speed to provide all humankind with a foundation of knowledge upon which responses can be framed to the growing challenges of our times.

Among these challenges, of course, are the unexpected or inevitable side effects of the exploitation of science in technology. Technology falls exactly at the interface between science and society. It is the science-driven activity that has the greatest impact on society, and it is primarily to improve its technologies that societies today are willing to invest large resources in science. For most of human history technology existed apart from science, and science got more from technology (in its instrumentation and means of observation) than it gave. For about one hundred years that influence has been reversed, and science and technology have advanced hand in hand. The understanding of nature that science brings unveils phenomena that can be used in technologies, and the range of natural phenomena that science can explore is limited by technology. Today the two are strongly linked.

To a very great degree, cultures are formed and transformed by the technologies they adopt. Pre-historians speak of ages of stone, bronze, and steel, each associated with forms of commerce, trade, and warfare. Archeologists classify cultures by their tools, their pottery, their weapons. In our era the globalization of science has drawn each participating culture into the domain of its accompanying technologies, and consequently world history has for

more than a century been one of a gradual convergence and globalization of cultures. To many, this is a disturbing trend, but it is an inevitable one. Fortunately, culture entails more than technology, and each new phase of technical development tends to reduce the cultural limitations imposed by the previous ones. You could say that technology has become more culture-friendly as it has advanced. Today's applied scientists and engineers are struggling – I think successfully – with the challenge of cultural acceptability and applicability of the technologies they create. The concept of *appropriate* technology is particularly important in the crafting of technical infrastructure in developing countries.

With the widespread adoption of any technology comes a new set of problems associated with the increased impact of side effects. Impacts on environment and public health and safety that might be acceptable at smaller scales of implementation become serious problems when technologies are globally pervasive. It is no accident that the concept of *sustainability* has grown in importance along with increasing scale of adoption of new technologies – or even of old ones introduced in previously undeveloped regions.

The processes of innovation that each nation desires to perfect to advance its global competitiveness are increasingly constrained by these two demands for cultural appropriateness and sustainability. They add difficulty to the already daunting technical challenges of extending a high standard of living to all the peoples of the world.

No kind of human endeavor has greater power to overcome these difficulties than the pursuit of science itself, and that pursuit must be as widely shared among nations as the technical benefits we expect it to bring. The pursuit of science has its own intrinsic wisdom, based on the objective and relentless search for truth, confidence in the capability of human beings to discover and employ the subtle ways of nature, and most of all the sense of partnership in a common and worthy enterprise that binds us all together.

I believe the values of science itself and the wisdom it imparts are the most important avenues to the successful and beneficial implementation of technical solutions to the many problems that beset our evolving global society. Science is after all a human enterprise, and the objective understanding of human behavior and human needs, including cultural and spiritual needs, is part of science too.

These are among the values that have brought us together in the STS Forum, and I wish to thank our hosts, the distinguished participants, and especially legislator Omi for the energy and vision that made the Forum possible.

Thank you.