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Perspectives

We are adding a new column 'Perspectives' from this issue. This will be an invited contribution. We are pleased to inform that Dr.William G.Padolina, member of the Editorial Advisory Board, ABDR is the first contributor to this column

Harnessing Science and Technology for Development

William G. Padolina*

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In many developing countries, science and technology are increasingly being harnessed to aid governance and to help address the complexity of their development agenda. This is a realization of what C.P.Snow observed two decades ago that:

> "…science itself was the single greatest force for change. The scientists were themselves part of the deepest revolution in human affairs since the invention of agriculture. They could accept what was happening, while other intellectuals shrank away."

Thus, in response to the opening of the global market and the need to be competitive, there has been an increasing effort in developing countries to make the development agenda more science and technology explicit.

Every country has a unique combination of political, social and economic circumstances that will determine the context of development.

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*Prof. William Gonzales Padolina is (Deputy Director General for Operations at International Rice Research Institute (IRRI), Los Banos, Laguna, Philippines), is a distinguished scientist who has been involved in teaching, administration and policy making for more than three decades. He has been the Secretary (Minister) of the Department of Science and Technology, Government of Philippines and Vice-Chancellor for Academic Affairs University of the Philippines Los Baños. His contributions have been recognized widely in terms of awards like ASEAN Meritorious Service Award in Science and Technology and Merit Medal "For the cause of agriculture and rural development in Vietnam", awarded by the Socialist Republic of Vietnam.

Leaders of developing countries need to understand these conditions so that they can manage the forces of change effectively. In the past three decades, it has become clear that science and technology would be powerful tools to harness the creative forces of society. The revolution in ICT has spread like wildfire globally. Already, a number of developing countries are using biometrics for citizen identification. Machine-readable passports are now required for travel. Satellite images are used to explain weather conditions. Many aspects of the electoral process are being computerized. Extending quality health care through telemedicine is increasingly being adopted. Money transfers through wireless means have allowed the quick flow of funds almost anywhere in the world. Biotechnology has accelerated the production of new varieties of crops, livestock and fisheries; facilitated the development of new drugs and improved the methods for the diagnosis of diseases.

Although J. Robert Oppenheimer says that the value of science to society lies in "a power to achieve that which could not be achieved without knowledge" we must remember that survival, dignity and escape from poverty are overarching concerns, which cannot be addressed by science alone. Institutional partnerships are important especially in the area of governance. Political will is necessary to eliminate hunger and want.

Experience has shown that in order for society to enjoy the benefits of research and development, mechanisms must be established to allow access to the rapidly emerging scientific and technological developments. A systems approach is necessary in order to develop productivity conscious and innovative citizens who are equipped to solve problems and think strategically. The national system of innovation (NSI) is the integrating platform that will manage the different institutions and governance mechanisms in order to promote development with the application of science and technology. According to Edquist and Lundvall, "the national system of innovation is constituted by the institutions and economic structures affecting the rate and direction of technological change." The NSI includes not only the institutions directly involved in science and technological activities like schools and research laboratories but also the institutions and policies in the labour sector, the judiciary, the private sector engaged in industry, agriculture and the services, and the financial sector among others. More importantly, a functional NSI is able to identify opportunities to

market new products and provide inputs in determining the priorities in research and development. The vitality and robustness of the NSI is determined by the quality of the interaction of these institutions and economic units.

The Interaction of Technology with the Economic, Social and Political Structures

A technology that is handled in isolation may turn contentious and eventually dysfunctional especially if it threatens the existing power structures in society. For example, the computerization of the counting of votes in a national or regional election may become a contentious issue even during the planning stage and may face rough sailing when it is finally implemented. Thus, it is important that the national innovation system is able to respond effectively in a timely manner to guide and facilitate the process that will lead to the adoption of a particular technology. Also, gaining a reasonable level of public understanding about the technology is important to its acceptance. Being open and transparent about the positive and negative effects of such technologies will facilitate its adaptation to local circumstances.

The Interaction of a Technology with Other Technologies

The NSI must be prepared to provide support to the entry of a new technology in its sphere of influence. The final product of an invention consists of inputs from other disciplines and products. Thus, it is important to have in-house capacity to provide the support system that will monitor the deployment, efficiency and effectiveness of a technology In fact, even at the acquisition stage, the requirement of due diligence in assessing a technology will need the inputs of the sciences and other technologies. This is exemplified by the role that analytical or testing laboratories play in assessing product quality. Without local capacity to conduct these assessments with rigor, the evaluation of an offer of a technology package and its impact will be greatly compromised.

Developing the Social Capacity to Enjoy the Benefits of Innovation

The ability of science and technology to address the needs of society lies in the openness of its approach. The never-ending process of unlocking nature's secrets has been characterized by an abiding respect for facts and the uncompromising application of rigorous logic. Such approach has been able to bring to fore the emerging problems associated with development

and progress. It is to the credit of mankind that scientists have been allowed to participate actively in many of these debates to bring more light to the issues rather than allow the discussions to veer into the course of ignorant darkness. However, society must provide sustained support to this system because any disruption may cause undesirable and unintended effects. For example, setting laboratory standards by a competent authority would be a good step towards assuring quality results and safety in the workplace. There are also other larger concerns like the release of genetically modified organisms, the use of nuclear energy, and climate change among others. For developing countries, this social capacity is crucial to the transformation from a less innovative system to one that is dynamic and sustainable, able to deal with divergence and differences in performance levels on technologies. The impact of technologies must be monitored so that adjustments can be made within the technology itself or within institutions in the NSI in order to move to higher levels of technological sophistication.

It is a desirable that the benefits of technology must be broadly shared by all sectors because innovation generates job opportunities by creating new industries, new products and civil infrastructure improvements. Technology can also enhance environmental responsibility by providing ways to detect and correct environmental problems and to manage natural resources sustainably.

Towards a Learning Society

Many observers have noted that the more lasting approach to development is by learning and innovation, rather than other approaches that depend only on the inflow of capital and on trade. A well-functioning national system of Innovation (NSI) provides the opportunity to generate new knowledge that in turn can generate new wealth.