

# NATIONAL INNOVATION SYSTEM: PROSPECTS AND CHALLENGES

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## INTRODUCTION

Thank you for inviting me to this symposium. The cultural dimensions of science and technology are indeed very important and we really need to fully understand them in order to harness science and technology for the common good.

I also understand that the basic objective of this symposium is to provide a venue for natural scientists, technologists and social scientists to get together and examine the context of knowledge acquisition, creation and utilization in the country. While the results of this symposium will help set a working agenda for social scientists that are interested in the context, processes and meanings of science and technology in the Philippines, they are invaluable inputs to us in government to enhance our efforts in strengthening public awareness of science and technology.

## THE POLICY BIAS

The sociocultural aspects of science and technology have not been given adequate attention. This, I believe, can be traced to how policymakers view S&T (science and technology). Traditionally, the rationale for science and technology policies has largely been based on the economic concept of "market failures." Market failures occur when private firms

and individuals do not adequately invest in S&T development, particularly R&D (research and development). Underinvestment by private firms and individuals in science and technology development is attributed to many reasons. Private firms do not see worthwhile private gains from doing so. They consider such investments as substantially high and risky, and taking long gestation period. Thus, the market failure view justifies government interventions, primarily to ensure that scientific and technological outputs, often viewed as public goods and services, are made readily available to the general public. This economic rationale has dominated S&T policymaking processes and in a way, crowded out sociocultural considerations.

However, times are changing. A new thinking on S&T policies is emerging. From market failure, the rationale of S&T policies is now on systemic failure view. Systemic failures arise from the lack of coherence among the networks of institutions, resources, interactions and relationships, political mechanisms and instruments, and scientific and technological activities that define, promote, articulate and encourage the technological innovation and diffusion process.

The basic premise is that innovation and technology development are results of a complex set of relationships among various people, enterprises, universities, and research institutions as elements of a collective system of knowledge creation and technology use.

To improve S&T performance, therefore, the key is to have a good and clear understanding of the linkages and interactions among various actors in the National Innovation System. The actors involved in innovation include institutions such as private firms, universities, research institutes, government agencies, social, economic and political institutions, and the individuals within these institutions, even political leaders and local government officials. Their relationships and interactions take many forms such as joint researches, personnel exchanges, cross patenting, purchase of equipment, memorandum of agreements, professional affiliation, personal relationships, among others.

In this light, science, technology and innovation are considered outcomes of a social process or phenomenon conditioned by cultural values. The systemic failure rationale therefore accords sociocultural factors to be necessary considerations in S&T policy-making processes. In fact, culture is often recognized as an important key to innovation.

## **SOCIOCULTURAL CONSIDERATIONS**

Having said that, let me now focus on a number of sociocultural dimensions that we need to look into to promote innovation and science and technology

in the country.

Let me cite first the stigma that our society attaches to failure.

In our sociocultural milieu, we are generally averse to risk – and we fear failure. To overcome the shame that accompanies failure, we have to create a culture that encourages calculated risks. We can learn from the experiences of other countries. They have successfully done this culture change in specific geographical areas, often referred to as innovation areas where practices and traditions have been changed purposively through lectures and mentoring activities by successful entrepreneurs, and through formal and informal social gatherings where scientists, technologists, venture capitalists, patent lawyers, financial experts, and other innovation players meet and deepen their relationships to understand and appreciate that failure is a good learning experience, and thus, eventually overcome the stigma of failure.

Another deterrent to the advancement of science and technology development is our inability to work well together as a team. At this time, when many of the challenges that confront us require multidisciplinary perspectives and inputs, this is a shortcoming that we have to correct, if not in our generation, in the next generation of scientists. The discipline of teamwork will have to be inculcated in young people, perhaps through new learning approaches in our elementary and high schools. I have often marveled at how well different groups of scientists and engineers in Thailand have effectively collaborated to bring new products and services in the market.

A good understanding of the linkages and interactions among the actors in the

innovation system enables policymakers to come up with more appropriate policies and programs, pinpointing leverage points to correct mismatches both among institutions and government policies that thwart technological and innovative performance.

A linkage that we should actively promote is that between our local scientists and Filipino scientists residing and working abroad. In a meeting with Senator Ramon Magsaysay Jr., Dr. Pedro Jose, an immunologist based in Georgetown University and an active member of the Philippine American Academy of Scientists and Engineers, shared the information that he has been given substantial R&D grants by the US government enabling him to hire three Filipino Ph.D. degree-holders from the Philippines to find a cure for high blood pressure among Filipinos through biotechnology. They are about to patent their research outputs. We should identify more Dr. Jose's to help build up our R&D capacity.

The Bayh-Dole Law allows US universities to patent the results of publicly-funded research. I believe that the time has come for us to work for the enactment of a similar law to clarify IP (intellectual property) policies on publicly funded research outputs in the country. I am certain this will have significant positive effects on the utilization of research outputs and the commercialization of technologies generated by our academic and research institutions.

As I have said, we must increasingly network with Filipino scientists and engineers abroad. We must strengthen collaboration with a number of Filipino

networks that have already been established. The Science and Technology Advisory Councils (STACs) with active members in the United States and Japan have been sharing expertise with both government and private sectors in the country. The Brain Gain Network (BGN) provides a database of Filipino professionals abroad. The members of the Philippine-American Academy of Scientists and Engineers are now in town making a round of our national leaders advocating an increase in the public funding for science and technology.

## **CONCLUSION**

To jumpstart changes in our socio-cultural milieu that are necessary for the fast development of S&T in the country, we have to look to local science communities to provide the lead. An example is the very active repository of intellectual capital in the Diliman complex, which is made up of faculty members and researchers from UP. Diliman, Ateneo de Manila University, Miriam College, and agencies of the Department of Science and Technology (DOST) such as the Advanced Science and Technology Institute (ASTI), the Philippine Nuclear Research Institute (PNRI), and the Philippine Institute of Volcanology and Seismology (Phivolcs). If only the various groups in this community can show that they can work together to tackle a pressing national problem, I think this feat can be emulated in other places. To me, the most difficult hurdle that we should overcome is the inability of people in different disciplines to collaborate with one another. We must do something quickly to correct this deficiency.