ABSTRACTS

MOBILIZING SCIENCE & TECHNOLOGY FOR SUSTAINABLE DEVELOPMENT: THE ROLE OF S&T POLICIES

The importance and significance of science and technology as ever-growing and useful phenomena along with their central role in the development, growth, productivity and prosperity of the world is a globally accepted idea. Today, more than ever, science and its applications in the form of technology are indispensable for development. Science has contributed immeasurably to the development of modern society and the application of scientific knowledge continues to furnish powerful means for solving many of the challenges facing humanity.

The knowledge-divide has been perpetuated by the uneven, insufficient, or, at times, non-existent financial resources and a lack of sound technical and human capacity to support it. The work of scientists in developing countries is often obstructed by poor infrastructure, fewer opportunities for collaboration and prohibitive investments in research. Inadequate policy-frameworks are another contributing factor.

The capacity to mobilize and use science and technology (S&T) resources is increasingly being recognized as an essential component of strategic planning for sustainable development, and this much needed capacity comes from knowledge and information. Efforts to mobilize S&T for sustainability are more likely to be effective when they are directed to overcoming the boundaries set by the 'knowledge divide' and 'digital divide'.

SCIENTIFIC CULTURE: A PRE-REQUISITE FOR SUSTAINABLE DEVELOPMENT

Education in science is not just about learning the laws of nature and to be able to manipulate it, more importantly it should inculcate in us the scientific spirit. To be able to analyze, think objectively, act rationally, not to take anything on face-value, to doubt, to question and to challenge authority, are some of the hallmarks of a scientific culture that a quality education should inculcate. It is this lack of a scientific culture and not necessarily a lack of education that has turned us into a society that is a victim to blind dogmatism, debilitating traditionalism and irrational fanaticism, a society prone to emotional and irrational acts. In this chapter we discuss this lack of scientific culture and creative thinking in general in the Islamic World with particular focus on Pakistan. Some remedial measures are also presented. It is presumed that a society based on a scientific outlook will be inherently more dynamic, progressive, forward-looking and self-sustaining

"Hardly anyone can understand the importance of an idea: it is so remarkable. Except

that, possibly, some children catch on. And when a child catches on to an idea like that, we have a scientist. These ideas do filter down (in spite of all the conversation about TV replacing thinking), and lots of kids get the spirit - and when they have the spirit you have a scientist. It's too late for them to get the spirit when they are in our universities, so we must attempt to explain these ideas to children". (Richard P. Feynman 2001).

BUILDING INFORMATION-SOCIETIES IN THE DEVELOPING COUNTRIES TO MEET SOCIO-ECONOMIC CHALLENGES OF THE 21ST CENTURY: SOME POLICIES AND STRATEGIES

The emerging challenges of the 21st century facing the developing world in particular can be successfully confronted through the aegis of information and knowledge networking. Information and Communications Technologies (ICTs) provide effective means to build information-societies and knowledge-based economies for addressing our socio-economic issues of illiteracy, lack of awareness, health, population explosion, food insecurity, as well as a poorly developed industry and low gross national products (GNPs).

The three sets of activities, i.e., Infusion of knowledge in the societies, application of appropriate S&T to the development projects, as well as creation of sustainable information societies, provide the foundation for reasonably prosperous societies. Creation of sustainable information-societies is the need of the hour, which in fact gives impetus to development by channeling and appropriately directing the most on-time and up-to-date information to the decision-makers and executing agencies.

Building information-societies is not a rapid process, it is therefore necessary that sustained efforts must be made by governments and participation of private enterprises and other members of the society should be ensured. Also sound policies and planning should be made for building infrastructure for ICTs, training and educating human resources in this domain, as well as establishing knowledge centers and information-hubs to take the central roles through networking.

COLLABORATING FOR SUCCESS

Among the first to navigate across the newly flat globe have been groups or collaborations of basic scientists, most notably those requiring large investments in equipment and specialized teams. CERN, the noted center for nuclear and particle physics in Switzerland, led the way, with its development of electronic communication needed for research-collaborations making a key step towards the world we see today. As a scientist who has enjoyed and thrived in global collaborations of small to moderate sizes, This paper attempts to distill some of the lessons learned, with the goal of encouraging and mentoring a wider range of collaborative national, regional, or international efforts, with benefits to be sought in the more local and applied research topics needed for development of nations and communities lacking their own critical masses to solve important

problems.

SCIENCE AND TECHNOLOGY FOR ACHIEVING MILLENNIUM DEVELOPMENT-GOALS

This paper focuses on the role of science and technology in the achievement of Millennium Development Goals (MDGs). All eight MDGs are discussed one by one, with their particular relevance to science and technology. Possible policies and strategies have been suggested for the developing countries, to help them adopt S&T in accordance with their existing capacities, competencies and resources for achieving millennium development goals and to prioritize MDGs according to their specific national priorities. Such evaluation is primarily based on the available statistical data for the specific country. The example of Pakistan is used to illustrate this approach.

The role and importance of science and technology in the socio-economic uplift is also highlighted with examples, to show how science, technology and innovation are helpful, and how developing countries can achieve socio-economic development.

POLICIES AND STRATEGIES FOR SUCCESSFUL PROJECT-MANAGEMENT ATTRIBUTED TO SOCIO-ECONOMIC UPLIFT OF THE DEVELOPING COUNTRIES

It is well known that developing countries, as compared to the developed ones, usually lack competencies and capacities to even fully benefit from the S&T assistance and programmes offered by the donor organizations. Well-planned projects are generally the most practicable tools to implement the programmes successfully. Any set-backs in the implementation of the projects adversely affect the qualitative, as well as quantitative outputs of these programmes.

The success of project management largely depends upon policies and strategies devised on the basis of clear definitions and understanding of the various component activities involved. These policies and strategies should be sensible, flexible, practicable and transparent. Cumulative build-up of management experience leading to indigenization will help the countries' capabilities to acquire better opportunities of future international cooperation and this process can repeat itself with sustained efforts, adding incremental benefits for the management organizations of the developing countries.

IMPORTANCE OF S&T POLICIES AND STRATEGIES FOR DEVELOPING COUNTRIES

Science and technology have profoundly influenced the course of human civilization. Science has provided us remarkable insights into the world we live in and the scientific revolutions of the 20th century have led to many technologies, which promise to herald

wholly new eras in many fields. It should be ensured to the fullest that these developments are being utilized for the well being of nations.

The emphasis is on devising policies and long-term plans to justifiably reap the benefits offered by science and technology and to safeguard ourselves and the future generations from the insecurities expected and prevalent today, particularly in the form of poverty, hunger, illiteracy and poor economic growth. This calls for having indigenous National Science and Technology Policy-framework for socio-economic development, in particular for the developing countries. The need of the hour is to fully engage S&T with societal wants, so that all the stakeholders may be involved in a meaningful collaboration.

S&T POLICY AND INNOVATION LEADS TO SOCIO-ECONOMIC DEVELOPMENT AND KNOWLEDGE-ECONOMY: CASE STUDIES OF U.S.A., TURKEY AND S. KOREA

No one can deny that the West has achieved the socio-economic status through the acquisition and application of science and technology (S&T). Science is a big domain and technology is its tool. New technologies are only created through research and innovation. Research in any society is actually spearheaded by the academia, and the impetus to the academia (universities and institutes of higher learning) is provided by the industry in that country. The linkage of the academia with the industry cannot be emphasized enough, because it drives the university students forward into the scientific depths of research needed by the industry for improving processes and products.

The developing world must realize the immense value of S&T research and innovation for creating new knowledge and emerging technologies. The countries of the South have to revamp their existing structure of S&T and innovation so as to bring change in the economy and prosperity of the country.

This chapter presents three typical successful cases of National Innovation Systems (NISs) in a developed and two developing countries. USA represents the case of a developed country, while Turkey and South Korea, being good examples of innovation, amongst developing countries are discussed hereunder.

HEALTH AND ENVIRONMENTAL RISKS FROM POOR WATER-SUPPLY AND SANITATION IN DEVELOPING COUNTRIES - A CASE STUDY OF N.W.F.P., PAKISTAN

Poor quality of water-supply and lack of improved sanitation are serious issues in many developing countries, particularly Pakistan. The ongoing efforts of escalating water-supply and sanitation-coverage might reduce the disease-burden on some people, but usually at the cost of ground and surface-water contamination due to pour-flush-pit

latrines and flush-and-forget sanitation. This is evident from the fact that more than 95% of the wastewater in developing countries reaches to the surface or groundwater without any treatment.

A study was conducted by the authors that aimed to look into water-supply and sanitation issues from the perspective of relevant actors, local practices and personal observations. This Chapter highlights the learning made out of this study. Three villages in the rural North-West Frontier Province (N.W.F.P.) were selected for detail study. The study found that the so-called improved sanitation could not break the faecal-oral pathogen-cycle and there is an urgent need of innovation in the conventional sanitation systems. The water-supply and sanitation institutions are often weak and do not have the capability and intention to holistically address the issue. The policies and regulations are strong and fancy in papers, but could not match the ground realities. It is also not in line with the practices, perceptions, priorities and expectations of local people. There is a need that local people be heard and involved in devising water-supply and sanitation policies, and made solution together with them.