

Regional and Global Networking: Imperative for Successful Science and Technology Initiatives

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INTRODUCTION

- **Science and technology have led the world towards innovative solutions to today's multi-faceted challenges, i-e, providing the foundations for economic growth and social development, as well as safeguarding our ever degrading ecosystem and have enabled us to generate new knowledge and make discoveries for mass benefit**
- **Much of the improvement in human welfare over the past century can be accounted to advances in science and technology in areas of health, nutrition, and agriculture. These improvements have reduced mortality rates, increased life expectancy and much more**

Innovation and the Knowledge-based Economy

- **The term “knowledge-based economy” implying an economy which is directly based on the production, distribution and use of knowledge and information, derives from the ability of a society to mobilize its knowledge and resources with a variety of inputs to create new products, processes and services, thus innovating them**
- **Economies are increasingly based on knowledge and information. Emerging economies such as China and India have recognized the importance of innovation to economic growth, and are pouring resources into their scientific and technological infrastructure, rapidly building their innovation capacity and dramatically increasing their ability to compete with U.S. businesses on the world stage**

National Level Measures to Promote Science, Technology and Innovation

- **Envisage and formulate long term policy and plan for science, technology and innovation**
- **Build scientific and technological capacity of the national S&T institutions and organizations**
- **Prioritize the scientific domains and fields where urgent attention is required**
- **Establish and network the higher education institutions to produce quality human resources**

..... National Level Measures

- **Fortify the connections between academia, i-e, educational and research institutions and industry**
- **Governments should promote public and private partnerships**
- **Establish a balance between Basic and Applied Research, as well as encourage basic research**
- **Most importantly establish Centres of Excellence in various fields of Science and Technology**

Problems Faced by the South

- Population explosion
- Higher level of illiteracy
- Economically stressed
- Poor on scientific standing
- Limited industrial base
- Unskilled human resources
- Lack of access to educational and health resources
- Insufficient R&D infrastructure

South-South Collaboration: Solution to Many Problems of the South

- Over the years it was realized that within the group of developing countries, there were marked differences in terms of S&T excellence. This led to the realization for a cooperation arrangement among the developing countries themselves, thus giving rise to the concept of 'South-South cooperation'
- Such a collaborative arrangement is politically easy to reach, economically manageable, and socially acceptable
- It is imperative in the wake of receding interest of the developed countries to help the developing countries in the wake of their own national priorities.
- Being at the same stage of developmental cycle, the developing countries find it easy to forge resources and share experiences that are common for catalyzing their development.

Problems Faced During the South-South Collaboration

- **Political instability leading to lack of long term commitment on all fronts**
- **At times there are fewer common areas of collaboration, however focused may be maintained on the areas that are common**
- **Lack of critical combination since the leadership at the R&D institutions has high turn out due to brain-drain**
- **Vast communication gaps despite the era of information and communications technology**
- **Lack of basic financial support due to political instability**

Way Forward

- **Religious belief and commitment towards Science and Technology**
- **Make use of existing S&T infrastructure and resources, since new ones cannot be built instantly, which also requires huge sums**
- **Initiate sharing of facilities and knowledge**
- **Upgrade the existing S&T and R&D infrastructure that will enable collaboration with the North**
- **Sharing at regional level is imperative in anyway (Climate studies)**
- **North will only be encouraged and willing to contribute and fund the projects that are near critical to the countries of the South when a collaboration is already on-going**

Regional/ Global Partnerships: Science, Technology and Innovation

- **Innovation, science and technology are no more stand-alone phenomena, it now has even a greater focus and impact**
- **The present day challenges call for regional partnerships, especially in the context of research partnerships, collaborative research programs, regional developmental activities**
- **Primarily and justifiably the countries at the same level of development need to collaborate amongst each other for larger mutual benefits. This underscores and advocates the phenomenon of South-South Cooperation especially in the fields of science, technology and innovation**
- **Global partnerships, now a days implies firstly the shift towards knowledge-based economy, whereby now knowledge is a new and most precious 'Factor of Production'**

Regional / Global Networking and Knowledge-Sharing: The Key to Innovation

- **The developing countries mostly forming the emerging economies of today have realized that they can no longer rely only on their own resources, human or infrastructure, but will have to collaborate and network, form strategic alliances to develop and exploit new innovations and technologies**
- **New forms of communication technologies have made it possible to form global networks that connect scientists, engineers, and health professionals to people in all countries and occupations**

.....Regional/Global Networking and Knowledge-Sharing

- These networks have and can allow people to access and assess the scientific and technical knowledge that they need to solve local problems and enhance the quality of their lives, as well as to communicate and share their own knowledge, insights, and needs to others**
- International exchange of scientists and students to promote a productive, international scientific community and enhance global cooperation is vital. The talents of visiting scientists and students greatly enrich the local S&T enterprise**
- Transfer of technology through knowledge centers can provide the much needed interface between the domestic need of innovation and the solutions that may be adapted from the global knowledge stock, in this regard**

The Role of Centres of Excellence for Science, Technology and Innovation

- The South having silver lining of scientific and technological excellence through its R&D institutions, universities and industry, must rely on its indigenous strengths to benefit each other to catalyze the national and regional developmental objectives**
- To build up on silver lining and share the benefits with others, the countries of the South need to operate Centres of Excellence**
- The network of S&T Centres of Excellence should be entrusted the responsibility to generate knowledge and disseminate new and existing knowledge for knowledge transfer and diffusion across the board**

.....The Role of Centres of Excellence

The objectives of the network of Centres of Excellence should be to:

- **To assist the countries of the South to build and sustain a critical mass of world-class scientists and technologists in areas of frontier science and technology and environmental sciences, which are of critical importance to sustainable socio-economic development and North-South Cooperation**
- **To attract talent, reduce brain-drain, and induce competent Third World scientists and technologists working abroad to return to their countries**
- **To facilitate the transfer of technology and the supply of highly qualified technical personnel to industry**

.....The Role of Centres of Excellence

- **To assist in finding scientific solutions to complex developmental and environmental problems of the South**
- **To provide avenues for international cooperation in areas of science and technology of global concern, including those for environmentally sustainable development**
- **To provide a suitable framework for science and technology assessment and management**
- **To develop strong links between Members of the Network and production sectors**
- **To promote joint technological ventures amongst the Members of the Network**

Some Recommendation for the South for the Promotion of Science Technology & Innovation

- **Establish concrete S&T policies closely tied to overall national economic goals, inclusive of strategies for technological innovation**
- **Develop human resource through bilateral and multilateral**
- **Strengthen existing institutional capacities to gear for changes in socio-economic and political environment**
- **Focus on Centres of Excellence as platforms for South-South and North-South cooperation**
- **Tap new sources of funding especially from private sector**
- **Develop Venture Capital Mechanisms**
- **Concentrate on a need-driven policy of S&T**

... Some Recommendation for the South

- **Create mechanisms for evaluating and monitoring follow-up actions**
- **Involve all stakeholders of the society including, policy-makers, and beneficiaries to evoke political will**
- **Do not lose focus on the development of low-end technologies in pursuit of costly and difficult high-end technologies**
- **Strengthen the linkages between R&D centres and productive units**
- **Form an international “think tank” to advise policy-makers in areas of critical importance**
- **Devise an effective mechanism of partnerships with the North**

Example of a Network of Centres of Excellence

- **COMSATS is one such International, inter-Governmental Organization of the South, established in 1994 that is operating a Network of S&T Centers of Excellence, besides TWAS (i-e TWNSO) and a few more**
- **Thrust Areas: ICTs, Renewable energies, Telehealth, biotechnology, water resources,**
- **Headquartered in Islamabad, Pakistan**
- **Presently 21 member countries are signatories to the Commission agreement**
- **16 members to its International Network of S&T Centers of excellence**
- **Mission: to sensitize the countries of the South to the centrality of science and technology and to bring about socio-economic development through S&T led initiatives**

Some Achievements and Programs

- **COMSATS Institute of Information Technology (CIIT)**
- **COMSATS Internet Services (CIS)**
- **COMSATS-COMSTECH IT Center (Damascus)**
- **CERN-COMSATS-NCP Data-Grid Project (with CERN-Geneva)**
- **French-online Project (Pakistan & Sudan) with Alliance Francaise**
- **ICT4D Project with IDRC – Telehealth / Distance learning**
- **IIN with UNIDO & SMEDA**
- **Biogas Plant for Rural Areas**
- **South-South Technical Cooperation Program with UNESCO**
- **COMSATS-ISESCO collaborative programs**

“Rome Was Not Built in a Day”

- The North gradually built capacities in S&T without the threats of globalization and fierce competition
 - *Situation for Developing Countries is quite different now*
- Ideally speaking, every nation should be self-sufficient in S&T
- Given the realities of modern day challenges, it is impossible to build infrastructure for S&T in isolation
- COOPERATION FOR DEVELOPMENT IN S&T IS IMPERATIVE AND NOT AN OPTION

The Way Out

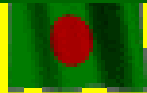
- South must build S&T capacity through
 - Converting “brain - contain” or “brain - limit” into “brain - share”
 - Giving necessary importance to basic and higher education
 - Common “priority - based” and “implementable” S&T planning
 - Networking of Centres of Excellence in specialized fields
 - Sharing facilities and experiences
 - Collaborating in scientific and technological research programmes
 - Devising and implementing regional and sub - regional programmes

The Order of the Day

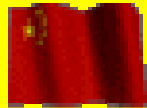
- Development is a product of the joint and complementary efforts of following three avenues listed priority-wise:

1. Independent national efforts
2. South-South cooperation, and
3. North-South cooperation

Commission on Science and Technology for Sustainable Development in the South



Bangladesh



China



Columbia



Egypt



Ghana



Iran



Jamaica



Jordan



Kazakhstan



Nigeria

Headquarters



Pakistan



North Korea

Philippines

Senegal

Sri Lanka

Sudan

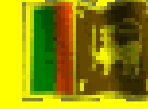
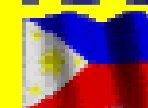
Syria

Tanzania

Tunisia

Uganda

Zimbabwe



International Network of S&T Centers in the South

1. **The Biosphere Reserve – Beni, Biology Station (BBS), Bolivia**
2. **National Research Centre for Agrobiology, Brazil**
3. **International Centre of Climate & Environmental Sciences (ICCES), China**
4. **Centro Internacional de Fisica Edificio, Colombia**
5. **National Research Centre (NRC), Egypt**
6. **Building and Road Research Institute, Ghana**
7. **International Centre for Environmental and Nuclear Sciences, Jamaica**
8. **Industrial Chemistry Centre, Jordan**
9. **National Mathematical Centre, Nigeria**
10. **HEJ Research Institute of Chemistry, Pakistan**
11. **Higher Institute for Applied Science and Technology (HIAST), Syria**
12. **Tanzania Industrial Research and Development Organisation, Tanzania**
13. **Marmara Research Centre (MRC), Turkey**
14. **Iranian Research Organization for Science and Technology (IROST), Iran**
15. **Industrial research and Consultancy Center (IRCC), Sudan**
16. **COMSATS Institute of Information Technology (CIIT), Pakistan**

Objectives of the Network

- South-South Co-operation
- Capacity Building
- Brain-drain Reduction
- Transfer of Technology among the Members
- International Cooperation
- S & T Assessment and Management
- Joint Ventures amongst Members

Cooperative Programmes...Contd.

• Expert Exchange Programmes

- Two Egyptian scientists from Cairo University trained in Grid Technologies at the National Centre for Physics (NCP), Islamabad in 2003
- Scientists and technologists from Centres have shared experiences at International conferences/events
 - *These included those coming from Egypt, Sudan, Syria, Uganda, China, Iran and many more*
- COMSATS has experienced participation of an average 5 member foreign specialists in more than 45 independent and jointly organized/sponsored events

COMSATS Linkages with other Networks

- Network of the European Organization for Nuclear Research (CERN) – the world's largest particle physics centre
 - Run by 20 European Member States
 - Scientists from 220 Institutes and Universities of non-Members and Observer States also use its facilities
 - Of the 28 non-member States, Pakistani scientists and students connect to the CERN Network through a state-of-the-art laboratory at COMSATS running Data-Grid Applications, which allows them to perform simulated experiments in the ‘CERN Environment’ and provides access to other networked resources

Problems in Efficient Networking

- Endowment fund available to the Network is little and is generated infrequently
- Projects receive little financial support
- Individual centre's agenda assume priority over Network's agenda
- Most of the CEO's are working in in different S&T domain, leaving a weak link in the network. Therefore:
 - *collaborative research around focused set of issues is difficult*
 - *mechanism for enabling inter-reporting and interoperability of generated content is absent*
- Working across the globe, language and communication mediums at times becomes a barrier to smooth networking

The Cairo Declaration

During the Coordinating Council Meeting and the Technical Advisory Committee Meetings held from 14-16 March, 2005 at Cairo-Egypt, following Recommendations for Strengthening the Network Came Forward

- Each cluster of centres should work towards identifying (in collaboration with the Network and Secretariat) and implementing clear objectives for short and long-term research
- Each centre of the cluster should act as coordinator of a nexus of sub-issues within the given research

The Cairo Declaration . . . Contd.

- **The Academy of Sciences for the Developing World (TWAS) should play the match-making role in bringing together the Centres of Excellence to collaborate on common areas of interest**
- **Collaborative Research Projects (CRPs) should be promoted at a regional level on competitive basis**
- **Linkage of the Secretariat and the CEOs to the policy makers should be made stronger through increased interaction and third-party support, so that they may be able to secure necessary monetary and political support**
- **The Centres should also make efforts to generate funds indigenously other than solely seeking external funding**

The Cairo Declaration . . . Contd.

- **Mechanism for independently assessing scientific activities of the Centres should be in place. In this regard, the role of TAC members is cardinal**
- **For the commercialization of R&D conducted within the network, the involvement of private sector, especially multi-nationals is integral. Efforts must be made to tap this resource**
- **A delegation of the highest level from COMSATS Headquarters should visit all the COEs to create awareness about COMSATS activities and register it with the respective governments so as to secure their support**
- **The heads/representatives of all COEs and COMSATS Secretariat should interact with focal points (Ministries) to motivate governments to commit funding for their respective COEs (Centers of Excellence).**

The Cairo Declaration . . . Contd.

- **Members of the Network, COMSATS, and TWAS, should focus on joint project proposal presentations to international organizations, which would enhance the opportunities to seek donor funding**
- **To tackle the issue of lack of coordination between the COEs, a liaison office should be set up at each Centre to facilitate coordination and communication. The members should also be encouraged to visit other Centres of Excellence to enhance coordination and better understanding of the work being done at different Centres.**
- **The concept of twinning of Centres should be encouraged, inter alia, to up - grade the existing capacities of the centres**
- **To sustain the Network, support of the North is vital. This can come from organizations such as UNIDO, UNSECO, IDRC, IDB etc**

HOW COMSATS & ISTIC CAN Benefit from Each other?

Capacity Building and Human Capital Development

- **Joint workshop/ conference**
- **Short-term regional and international training in accordance with need and demand of the South**
- **Post Graduate Study at COMSATS Institute of Information Technology (CIIT) and other COMSATS S&T Centres of Excellence in the South**
- **Exchange of Students and Faculty among universities of the South**
- **Potential Areas of Collaboration: Environment and Climate Change, Bio-technology, Renewable Energy, Micro-electronics, New Emerging Technologies: Nano-technologies, Genetic Engineering, etc**

... HOW COMSATS & ISTIC CAN COLLABORATE?

Collaborative Research Programme: (South-South and North-South Cooperation)

- **Joint Research Projects in common area of interest in S&T research institutions**
- **Brain Drain to be changed into Brain Gain:**
 - **Joint Research Programme**
 - **Visiting Faculty**
- **Exchange of Research Scientists**
- **University and Industry Linkage**
- **Establishment of Science Parks and Technology Incubators (Development of young entrepreneurship)**
- **Commercialization of Research**

Thank You