

ADB RETA – Final Report – India

Introduction

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1. Background

Technological innovation is the engine of economic growth and the countries excelling in continued technological innovations are most likely to be ahead in the world order in economic development. In the recent past, a select group of Asian developing countries, viz. China, India, Korea and Malaysia has set an example in this direction for other developing countries in the region. The experience of these '*relatively developed*' developing countries shows that by setting up proper institutional and infrastructural facilities and by adopting suitable policy measures supported by necessary resources, it is possible for the developing countries to build national capability for technological development and innovation that could lead to their sustained economic growth.

The Asian Development Bank (ADB) under its Long Term Strategic Framework (LTSF) 2020 recognised the need for bridging the technology and knowledge gap in the Developing Member Countries (DMCs) and the importance of their ability to produce higher value goods and services in order to improve their competitiveness. As such, it was recommended that the DMCs must develop capabilities in science, technology and innovation, and devise strategies for advancing their own technology and associated capabilities by providing incentives for creating higher demand for modern technology, building domestic capacity for knowledge absorption and creation; and supplying educated labour force through quality academic institutions.

2. The RETA Project

Considering the socio-cultural resemblance and relatively less technological gap amongst the two sets of countries as indicated above, the Asian Development Bank (ADB) initiated a Regional Technical Assistance (RETA) for Knowledge-Sharing Programme (KSP) using Good Asian Practices in Innovation and Development in December 2007. This project aims at formulating public policies through the organisation of workshops and training courses for public servants and professionals and thus creating an enabling environment for

technical development and innovation and improving the technological capacities of ADB's developing member countries (DMCs). Under the Project, (i) good development practices and policies on technology and innovation would be collected from China, India, Korea, and Malaysia, designated as Model Countries (MCs), and (ii) KSPs (2-week executive programme and one-month practitioner programme) would be organised based on the selected practices and reflecting the needs of DMCs such as Mongolia, Sri Lanka and Viet Nam.

The above project under the overall umbrella of the Regional and Sustainable Development Department (RSDD) of ADB is being implemented by the Graduate School of Pan-Pacific International Studies (GSP) of Kyung Hee University (KHU) in Korea, in association with Seoul National University and Korea Development Institute. The Project team has been working with ADB to identify good innovation policy practices and to tailor them to the needs of the three DMCs, and is developing the training modules in consultation with MCs and DMCs and is planning to undertake pilot training courses in the areas of technology and innovation policy using good Asian practices. The project is expected to culminate in training programmes for DMC public servants and professionals to be organized in Korea and is likely to be extended to other developing countries in Asia, and later possibly to the African region. As such the project has good long term potential and possibilities for all the stakeholders who are interested in promoting South-South Cooperation in science and technology for innovation and development.

3. New Delhi Workshop on ADB RETA Project

3.1 Four Model Country workshops were held from September 2008 to April 2009, respectively in Seoul, Beijing, Kuala Lumpur and New Delhi in order to collect detailed information and identify best practices in the respective MCs. The Centre for Science and Technology of the Non-Aligned and Other Developing Countries (NAM S&T Centre) organised the last workshop in this series in New Delhi, India during 17-18 April 2009. All these workshops mainly

covered five areas, namely, Economy Policy, Global Interface, Industrial and S&T Policy, ICT and Emerging Technologies, and Human Resource Development.

3.2 Indian Participants

The New Delhi ADB-RETA workshop was attended by 26 participants from 8 countries. Prof. K. L. Chopra, Former Director, Indian Institute of Technology (IIT), Kharagpur; Prof. P. B. Sharma, Director, Delhi College of Engineering, New Delhi; Dr. Parthasarathi Banerjee, Director, National Institute of Science, Technology and Development Studies (NISTADS), New Delhi; Dr. Ashok Jain, Fellow, National Academy of Sciences and former Director, NISTADS; Dr. (Mrs.) Malti Goel, Former Adviser, Department of Science & Technology, Government of India; Prof. Arun Kumar, Professor, Centre for Economic Studies and Planning, Jawaharlal Nehru University (JNU), New Delhi; and Prof. Prabhas Chandra Sinha, Consultant were the resource persons for the workshop and presented their papers. Mrs. Sadhana Relia, Adviser (International Relations), Department of Science & Technology, Government of India and Prof. P. K. Gupta, Secretary General, National Foundation of Indian Engineers (NAFEN) were invited as special guests to make their valuable interventions. From the NAM S&T Centre, Prof. Arun P. Kulshreshtha, Director; Mr. M. Bandyopadhyay, Senior Expert and Former Adviser (International Cooperation), Department of Science & Technology, Government of India and Dr. V. P. Kharbanda, Publication Advisor and former scientist and Head (Planning, Monitoring and Evaluation) in NISTADS made their presentations.

3.3 Foreign Participants

The other participating countries in the New Delhi ADB-RETA workshop were Malaysia [Prof. Ramayah Thurasamy, Associate Professor, School of Management, Universiti Sains Malaysia, Minden]; Mexico [Mr. Sergio Robles, Coordinator, Graduate School of Pan-Pacific International Studies, Kyung Hee University]; Mongolia [Mr. Arvinbayar Baatar, Executive Director, Mongolian

Biotechnology Association, Ulaanbaatar and Dr. Tumurpurev Namnan, Professor of Applied Mechanics, Mongolian University of Science and Technology (MUST), Ulaanbaatar]; South Korea [Dr. Jaesung Kwak, Associate Dean; Mr. Keukje Sung, Dean; and a scholar Ms. Jina Park from the Graduate School of Pan-Pacific International Studies, Kyung Hee University, Gyeonggi-Do]; Sri Lanka [Dr. Ranil D. Guneratne, Director and Dr. Sarath A.K. Abayawardana, Consultant at the National Science and Technology Commission (NASTEC), Colombo]; and Vietnam [Dr. Tran Ngoc Ca, Deputy Director / General Secretary, National Institute for S&T Policy and Strategy Studies (NISTPASS), Ministry of Science and Technology (MOST), Hanoi and Mr. Nguyen Xuan Hieu, Chief Administrative Officer & Vice Chairman, Hanoi ICT Association (HanICT) and Chairman of the Board of BPC-T Vietnam]. Ms. Hyunjung Lee, Economist / ICT Specialist represented the Asian Development Bank at Manila, the Philippines.

3.4 Papers and Presentations by Indian Resource Persons

A compilation of the papers authored by nine eminent Indian scholars in the respective areas to be covered in the workshop was submitted to the Task Manager of the RETA Project before the New Delhi Workshop and was tabled before the participants of the workshop.

During the one and a half days workshop, after the Welcome Note by Prof. Arun P. Kulshreshtha, Director, NAM S&T Centre and Introductory Remarks by Dr. Jaesung Kwak and Ms. Hyunjung Lee, the following presentations were made by the Indian resource persons in 6 sessions of the workshop:

- i) **‘Indian Economy since Independence’** by Prof. Arun Kumar – This presentation comprised the development path of the Indian economy since independence including the results of the liberalised economy since 1990s.
- ii) **‘A Brief on Science & Technology Governance in India’** by Prof. Arun P. Kulshreshtha – The presentation included a brief account of

the administrative structure for S&T Management in India and mandates of various scientific departments and ministries of the Government of India.

- iii) **'Globalization & Development of Science and Technology: India as a Role Model'** by Prof. P.C. Sinha – The issues on impact of globalization on India, export and import, India's emerging position etc. were discussed by the speaker.
- iv) **'Higher Technical Education in India – Profile of Growth and Future Perspectives'** by Prof. K.L. Chopra and Prof. P.B. Sharma – Prof. P.B. Sharma gave a comprehensive account of the growth of UG / PG and Doctoral Programmes, role of private and foreign institutions, regulatory mechanism, government support and national policies, promotion of research and industrial interaction, innovation and entrepreneurship, etc.
- v) **'Policies and Programmes for Industrial Development and Technological Innovation in India'** by Mr. M. Bandyopadhyay - The speaker reviewed the evolution of industrial policy and the complementary efforts made by various arms of the Government for modernization, transfer of technology and promotion of technological innovation in the Indian industry.
- vi) **'India's Science, Technology and Industry Trajectory'** by Dr. Ashok Jain - It has been shown that the Indian policies and strategies have evolved through five phases of development that is viewed as a process establishing a trajectory that over time interconnects S&T and industrial activities. In this framework, the speaker elaborated on India's policies and programmes for S&T and for Industry and the interrelationship between the two to draw a few lessons for integrated development of S&T and Industry.

- vii) **‘Regional Innovation Systems – Key to Technological Innovations in Small and Medium Enterprises in India’** by Dr. V. P. Kharbanda – The presentation included the barriers to the transfer of technologies and up-gradation for the survival of small enterprises and the policy measures and programmes, main actors in the technological innovation process and the role of clusters for SME development.
- viii) **‘Lessons from Indian Policies in the Areas of ICT and Emerging Technologies’** by Dr. Parthasarathi Banerjee – Policy structures, types and instruments, types of funding, nature of high technology trade, experience from Software, S&T Parks and also the pharmaceutical and biotechnology industry were some of the issues discussed by the speaker during his presentation.
- ix) **‘Emerging Environment Themes and Merging Technologies: Indian Perspectives’** by Dr. Malti Goel – This presentation comprised the issues on energy and environment nexus, global warming and climate change, concept of merging technologies, prospects in renewable energy technologies, and energy efficient technology in India.

As a case study, the Workshop was followed by a visit of the participants to the Central Electronics Limited (CEL), a public sector enterprise, at Sahibabad on the outskirts of Delhi. CEL is an example of the government supported industrial innovation in India and manufactures the photoelectric solar cells and panels. It has its own R&D to innovate new materials and techniques to enhance the efficiency of solar power conversion and its affordability in the developing countries. The Company has established a number of solar projects in various developing countries.

4. Indian Document focussed on Four Pillars of RETA Project

After the deliberations in the Concluding Session of the New Delhi Workshop and keeping in view the contents of the detailed papers and the presentations made by the Indian resource persons in the workshop as indicated above, it was decided that a consolidated, revised document would be prepared by the NAM S&T Centre comprising the requisite elements on Best practices of India pertaining to each of the four pillars of the ADB RETA, respectively, Global Interface, Industry and S&T Policy, ICT and Emerging Technologies and Human Resource Development, and the papers elaborating on these elements.

Thus the present report has the following chapters:

Chapter-I: Introduction, by Prof. Arun P. Kulshreshtha

Chapter-II: Pillar on ‘Global Interface’

Paper-1: Trade and Investment Promotion Policies in India, by Prof. S.P. Agarwal and Dr. R.Dayal.

Paper-2: India and Global Interface, by Prof. P. K. Gupta

Paper-3: India’s Global Interface: Trade and Investment, by Dr. P. C. Sinha

Chapter-III: Pillar on ‘Industry and S&T Policy’

Paper-1: India’s Science, Technology and Industry Trajectory, by Dr. Ashok Jain.

Paper-2: Policies and Programmes for Industrial Development and Technological Innovation in India, by Mr. M. Bandyopadhyay

Chapter-IV: Pillar on ‘ICT and Emerging Technologies’

ICT and Emerging Technologies: Lessons from Indian Policy and Success, by Dr. Parthasarathi Banerjee

Chapter-V: Pillar on ‘Human Resource Development’

Higher Technical Education in India – Profile of Growth and Future Perspectives, by Prof. K.L. Chopra and Prof. P.B. Sharma

5. Best Indian Practices on Innovation and Development

After a review of various papers submitted under the four Pillars and elaborate discussions with numerous Indian experts, the following best Indian practices are suggested:-

I. GLOBAL INTERFACE

- Increased FDI due to liberalization and deregulation:
 - Gradual and calibrated liberalisation of FDI inflows in various sectors increasing to about US\$30 billion per year from less than US\$1 billion (in early 1990s).
 - Regulatory agencies and Department of Industrial Policy and Planning, with an FDI approval committee, facilitated investments.
 - FDI outflows encouraged through gradual liberalisation of foreign exchange control and limits of investments by Indian companies.
 - Simplified procedures, encouraging MNCs in new areas, WTO compatibility of policies, IPR laws, skills etc. also facilitated FDI flows.
- Export Promotion:
 - Accelerated growth in exports due to new foreign trade policy on 5-years basis, envisaging subsidised inputs, easier loans,

simplification of procedures and custom laws, reduced import duties, increased IT applications and e-governance, and market support.

- Increased innovations, new business models, venture capital, growth of service sector, and improved infrastructure facilitated export.
- Easier access to technologies, taking advantage of world trade mechanisms, including WTO, FTAs/RTA.
- Safe regulations and controls leading to Indian stock markets withstand global economic slow down
- Close interactions with the Scientists and Technologists of Indian Origin (STIO) and other Non-Resident Indians (NRIs) with incentives to invest in India. A separate Ministry has been set up to look into the issues related to STIOs and NRIs. Engagement of NRI experts by industries and academic institutions encouraged and investment information flows stepped up.

II. INDUSTRY AND S&T POLICY

- Policies for development of MSMEs
- Science & Technology Parks and Technology Business Incubators for the promotion of knowledge-based industries and spin-off firms
- Fiscal incentives for increased private sector R&D investment
- Emphasis on pharmaceuticals and ICT industries
- Establishment of Technology Development Board (TDB)

III. ICT AND EMERGING TECHNOLOGIES

- Software Technology Parks.

- IT Enabled Services and BPO.
- Large investment and Policy support for promotion of Biotechnology and Renewable Energy industry.
- Public policy's non-interference with the private sector's business model in the area of software services.
- Infrastructure development especially on communication and real estate.
- Tax holidays and tax deductions on export.
- Most gains from intangibles available as social capital and human capital in India and abroad.

IV. HUMAN RESOURCE DEVELOPMENT

- Regular review of course contents and course curricula and introduction of courses in the emerging areas
- Promotion of research culture in technical institutions
- Industry sponsored projects, industrial consultancy by the teachers of engineering colleges, and Endowment Professorial Chairs
- Industry sponsored laboratories in institutions
- Technology incubation and techno-preneurship promotion and vocational education.