CSIR-National Institute of Science, Technology and Development Studies (NISTADS)

Effective S&T Interventions: HRD, Industry (MSME), Innovation and Rural Skill and Employment

Summary for Policy Makers:
Issues, Findings and Recommendations

A product under Indian S&T and Innovation Policy (ISTIP): Supra Institutional Project

Sujit Battacharya, Tabbasum Jamal, Sanjib Pohit, Yogesh Suman

Acknowledgment: ISTIP project team of scientists, technical staff and project fellows (www.nistads.res.in)

Contact:

Director

CSIR-National Institute of Science, Technology and Development Studies, Pusa Campus, Dr. KS Krishnan Marg, New Delhi- 110012; Email: director@nistads.res.in

December 2015
Executive Summary

The ISTIP-Indian S&T and innovation Policy project provides evidence based analysis of the nature and extent of research and innovation capacity and capability of the country. It examines in-depth the supply side of S&T and its impact on industry and rural development, draws attention to suitable S&T interventions in policy making so that India may reach the forefront of economic development. The informed policy advocacy is based on creating and collating long term data sets on various facets of science and technology capacity and capability in the country. S&T manpower of the country is mapped to show the gaps at different levels that have to be addressed including skills that need to be imparted. Science and technology matrices highlights scientific performance and impact of the development and deployment of new and emerging technologies. Enlarging role of S&T in industry is called for to enable Indian industry to face global challenges and become competitive. The summary draws attention to S&T capacity including skilling that has to be created for employment opportunities and incomes for rural workforce.

A. S&T and Human Resource for Skill Development and Capacity Building

Issues:

AI-1 Quality and affordability of education
AI-2 Skill mismatch between university graduates and job requirement

Observations/ Findings:

AO-1 Education cost has increased due to partial privatization of educational sector
AO-2 Limited acceptability of Indian qualification and certification courses in foreign countries
AO-3 Large mismatch observed between available workforce and industrial demand

Recommendations:

AR-1 Ceiling on education cost
AR-2 Make accreditation procedures more stringent
AR-3 Need for imparting required skills for workforce keeping in view industry requirement

Actions:

AC-1 Directive on upper-limit of education fee at primary and tertiary levels.
AC-2 Adoption of international ranking norms for university assessment.
AC-3 Creation of institutional framework for academia-industry interface

B. S&T for Industrial Development and MSME

Issues:

BI-1 Technology intervention for MSME
BI-2 Regulations and industrial development
BI-3 Jobless growth concomitant with low productivity in industry

Observations/ Findings:

BO-1 MSMEs' have become uncompetitive primarily due to lack of technological upgradation
BO-2 Regulation uncertainty and lack of regulatory awareness acting as major impediment for industrial growth
BO-3 Indian industries have undergone structural change in favor of capital. Negative impact on employment and no evidence of significant productivity improvement.

Recommendations:

BR-1 Liberal funding and technology support to be provided to MSMEs'
BR-2 Independent regulatory bodies to be promoted for each sector.
BR-3 Indian firms should adopt innovation driven strategy.

Actions:

BC-1 Provide preferential policies of tax reduction and exception for MSMEs' investing in R&D.
BC-2 Stakeholders comprising of experts from industry, academia, and public among others should be members of independent regulatory bodies for each sector.
BC-3 Fiscal and non-fiscal incentives to be provided for firms engaged in innovation driven approach.

C. S&T Outputs and Patent: for Creative India, Innovative India

Issues:

CI-1 Measures of innovation in Indian industry
CI-2 Standards in manufacturing sector
CI-3 Procurement policy

Observations/ Findings:

CO-1 Lack of collaboration between academia-industry in research papers and patents
CO-2 The 'war of standards' is no less important than 'strategic patenting' and is particularly becoming critical for innovation and commercialization.
CO-3 India's new procurement policy aims to promote competition between vendors and not between technologies or technical standards unlike the USA, EU countries, and China.

Recommendations:

CR-1 Creating institutional mechanisms for enhancing long-term collaboration between academia and industry
CR-2 Standard development and developing expertise in standard creation.
CR-3 India's Procurement Policy i.e. Procurement Bill 2012 requires corrective actions.

Actions:

CC-1 Dedicated funding in S&T programmes for enhancing public-private partnerships.
CC-2 Creating institutional mechanisms for strengthening linkages between Bureau of Indian Standards and with standard development research undertaken in different public institutions and private enterprises.
CC-3 Public procurement should be linked to firms developing innovative solutions.

D. Creating Opportunities for Rural India through S&T Skills and Employment

Issues:

DI-1 Skill and employment generation in rural area with value added opportunities
DI-2 S&T and management intervention for enhanced value added opportunities

Observations/ Findings:

DO-1 Employment and income generation in the rural service sector inhibited due to lack of formal institutions and S&T establishments.
DO-2 Presence of diverse rural production systems in agriculture and allied sectors
DO-3 Existence of massive informal unorganized workforce

DO-4 The centralized agricultural research system has not delivered desirable outputs in terms of generation of new skills and value-addition opportunities for the agricultural and rural work force.

Recommendations:

DR-1 Systematic identification of structural and institutional constraints that come in the way of building skill and employment opportunities for rural areas
DR-2 Ensure a decentralized state level engagement with S&T entities
DR-3 Need for more state level spending in local R&D problems
DR-4 Impact evaluation of programs and policies to develop roadmap for strengthening agriculture research ecosystem.

Actions:

DC-1 Framework for linking up with government's flagship programmes: Make in India, Inclusive Development, Skilling India, and Digital India.
DC-2 Institutionalised support system to create and adopt best practices for agriculture S&T system
DC-3 Decentralised and region specific focus for resource mobilisation, skill generation, entrepreneurship
DC-4 S&T support system at regional level for development and promotion of best practices for agriculture

Methods and Data

Qualitative (such as survey, case studies), quantitative (government statistics, bibliometric) as well as mixed mode methods combining both qualitative and quantitative approaches have been used in the studies. Close readings of various bills, regulations and policy documents have complemented/ supplemented the studies.
Data has been captured from published government statistics and reports, international reports from government and multilateral bodies, reports of industry associations, indexed bibliometric databases, etc.

Source References

1. CSIR-NISTADS, *India Science & Technology,* vol. 3, 2015, Cambridge University Press, New Delhi
2. CSIR-NISTADS, *India Science & Technology,* vol. 2, 2013, Cambridge University Press, New Delhi
3. CSIR-NISTADS, *India Science & Technology,* vol. 1, 2008, NISTADS, New Delhi

Indian S&T and Innovation Policy (ISTIP): First Study of its kind focusing on various dimensions of innovation activity in India; aiming at providing valuable inputs for S&T and Innovation decision making. The studies cover several facets of Indian S&T organised under four themes: (a) S&T Human Resources, (b) S&T and Industry, (c) S&T Outputs and (d) Rural India: S&T for Skills and Employment. The slant is towards evidence based studies with the intention to provide policy makers with strong rationale for undertaking corrective actions to strengthen science, technology and innovation ecosystem in the country.