Science, Technology and Innovation Policy of Gujarat

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Department of Science & Technology
Government of Gujarat

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Government of Gujarat
Science and Technology Department
Government Resolution No: GCT/10/2017/424915/BT
Sachivalaya, Gandhinagar
Date: 15ᵗʰ April, 2018

RESOLUTION

Read: GR of DST Dated 4th April, 2017, No : GST/10/2017/93026/BT

Preamble

1.1 Introduction

Technology has become an inevitable part of our day to day life. A day without technology is unimaginable. Technology unlike many other aspects is dynamic. It keeps on evolving with the changes happening in the economy and the society. Innovation is the core driver of Science and Technology. An efficient mix of Science, Technology and Innovation (STI) acts as a catalyst in the development of any country. This efficient mix helps to address emerging national, regional and global developmental challenges across many sectors. The spirit of remaining competitive on the international platform and meeting the demand for an inexpensive and nutrient food, affordable healthcare, smart infrastructure, clean and green environment, clean energy and more employment are the actual challenges to deal with. The Science, Technology and Innovation for antatvogatva (upto the last citizen) is the need of the hour. The regional demands sometimes do not have solutions in the global Innovations and hence one cannot blindly adopt the global innovations. Besides, there is an element of cost in acquisition of such STI solution. The need of the hour is, therefore, to explore, develop and design indigenous solutions which help us to meet the demands of our society.

Globally, Science, Technology and Innovation (STI) is emerging as one of the core driver of national development. Korea's development in transforming its country from a stagnant agrarian society into one of the most dynamic industrial economies of the world, which stands now as world's 13th largest economy with a GDP of 1.467 Trillion USD, is one of the best examples of what an STI led growth

model could deliver. Prioritizing R & D and innovation in industry, Korea has achieved a prominent position in technology sectors such as semi-conductors, LCD, telecommunication equipment, automobiles, shipbuilding etc.

India has declared 2010-20 as the "Decade of Innovation". The Govt of India has stressed the need to enunciate a policy to synergize science, technology and innovation. In 2013, Govt of India came up with Science, Technology & Innovation Policy to create robust innovation culture and ecosystem. The Government of India has also vowed to increase the expenditure in Innovation R&D to 2% of the GDP. In the new global economic scenario, the growth and development of economy will depend on its competitiveness in the global market which in turn will depend upon its ability to innovate and to utilize these innovations for achieving economic and social benefits. Thus, we need an ecosystem that would empower and enable the major stake holders, government, universities, public sector R&D organizations and industry, to be aware of their respective roles.

1.2 National Scenario

India has undoubtedly attained the status of one of the fastest growing major economy in the recent decades and continues to have a unique position among developing countries for its elaborate infrastructure of scientific research. During 2007-12, India's R&D/GDP ratio increased to 0.88 percent. R&D investments grew in India to around USD 66.5 billion in 2015 & are estimated to be at USD 71.5 billion in 2016. India's Patent filings have gone up from 28,940 during 2006–07 to 46,904 during 2015–16, representing an increase of 52.93 percent.

The government currently accounts for nearly 70 percent of total R&D expenditure in India (Report by National Institute of Science, Technology and Development Studies (NISTADS), CSIR, Govt of India; http://www.nistads.res.in/indiasnt2008/t4industry/t4ind4.htm). However, only six industries namely pharmaceuticals, automotive, electrical, electronics, chemicals and defence corner about two thirds of the total industrial R&D. The pharmaceutical industry alone accounts for about 20 percent of the total R&D expenditures. Since 2006, Govt of India has established six Indian Institutes of Science Education and Research (IISERs) with two more in the pipeline. Their mandate is to perform frontier research in the basic sciences as well as related higher education.

The group of the more engineering and applied sciences oriented Indian Institutes of Technology (IITs) has also expanded (from 16 until 2014 to 18 in 2015 and 22 in 2016). The largest numbers of R&D personnel are employed in public research institutions like the labs of the Council of Scientific and Industrial Research (CSIR) or the Ministries like the Department of Biotechnology (DBT), the Department of Atomic Energy (DAE), etc. Out of many universities that exist in our country, a few

prominent institutions like IISERs, the IITs, the Indian Institutes of Management (IIM), the All India Institutes of Medical Sciences (AIIMSs), the Indian Institute of Science (IISc), the Tata Institute of Fundamental Research (TIFR) etc. and few other central universities are putting in practice a balance between teaching and research activities. However, the remaining educational institutions are focusing more on teaching at the cost of research which acts as a major barrier in promotion of science, technology and innovation.

Added to this, the low R&D investment by Industries, low technological value addition across manufacturing sectors, lack of agility in product development space, and lack of focus on translational research coupled with inadequacy of research aptitude manpower constrains the country's ability to fully leverage the demographic dividend that it is bestowed with.

1.3 Need identification

The Science provides answers to issues of complex societal demands/ needs for its well-being and future progress. Technology provides special tools to solve the issues systematically. Innovation ensures its future growth by providing solutions for future societal needs. Gujarat is a leader in economy in India but for sustainability and growth, the prime areas should be identified and emphasized based on industrial and societal needs.

In consideration of the above emerging trends, it has become necessary to take up this policy to create an ecosystem among all stake holders to promote STI and boost Gujarat's economy. Accordingly, the Government of Gujarat has decided to come out with the "Gujarat State Science, Technology and Innovation Policy (STI)" as under:

2. STI Policy

2.1 Vision:

A self-reliant, innovative, healthy and prosperous society living in a clean, green and sustainable environment with adequate and nutritious food, clean water and other natural resources, valuing its own and globally available knowledge base by translating science and upgrading technology for faster, inclusive and sustainable development.

2.2 Mission

1. Identifying the major areas where STI interventions can provide solutions for enhancing the economic growth and quality of life of the society.

2. Enlightening the STI stake holders to the latest technologies, R&D areas, facilities, collaborations and knowledge sharing.

3. Establishing/ upgrading the educational and Scientific Institutions to world class standard for interdisciplinary scientific research.

4. Positioning Science and Research at the core of Academic curriculum.

5. Nurturing trans-disciplinary knowledge and innovation to build a highly creative, educated, skilled and technologically sound society.

6. Creating a research culture in institutions of higher learning and creating forward linkages to translate academic research into products and solutions.

7. Generating job opportunities and skill empowerment by public/private partnerships.

8. Positioning Gujarat in the forefront of Science, Technology and Innovation in India.

2.3 Aim

To provide Science, Technology and Innovation based solutions for fulfilling the needs of Society, Community and Industry for faster economic development.

2.4 Objectives

Investment in Science and Technology and assisted Innovation has the potential to solve many problems that the mankind or the economy faces in different sectors. To look at and to evaluate the need for having an STI policy and to set the objectives, it is necessary to look at gaps in different sectors that the STI policy should find solutions for sectoral goals in Agriculture, Horticulture, Industry, Education, Dairy, Animal Husbandry, Fisheries, Aquaculture, Innovation and Patenting. The objectives based on gaps identified and opportunities visualized through adoption of an effective STI policy are as follows:

1. To bring science and technology to the center of social, economic and developmental activities.
2. To encourage applied research along with basic research.
3. To convert academic research into innovation and then into products and services.
4. To channelize research efforts to find products and solutions for local needs.
5. To create strong pipe of talent pool with strong research aptitude.
6. To create scientific temper and sensitivity in young students.
7. To invest in human resource development and capacity building of existing professionals.
8. To create STI networks for collaboration and multi-sectoral co-ordination.
9. To connect STI in academics with social and economic development.
10. To focus in advanced areas of research and development.
11. To increase per acre productivity in agriculture.

12. To make the Agriculture, Dairy, Animal Husbandry, Fisheries and Aquaculture sectors profit efficient.

13. To provide low cost and quality health care for all citizens.

14. To promote entrepreneurship and Rapid Industrial Development.

15. To expand innovation and technology for developing new globally emerging industrial sectors.

16. To enhance patent creation and to build hub of incubators for innovators.

2.5 Approaches:

The STI policy aims to accomplish its objectives in two different approaches. In first one, cross sectoral general approach focusing on externality effects is chosen while, in the second one, sector specific approach is chosen.

2.5.1 General Approach:

1. Enhancement of the expenditure in Science, Technology and Innovations in special areas of societal and industrial needs will be taken to at least 1.0% of the GSDP by 2022. Towards this end, departments of the Government such as Health, Education, Agriculture, Animal Husbandry & Fisheries, Forest & Environment, and Climate Change will commit 1 % of their annual budgets to support Research and Innovation in state priorities.

2. The fund allotted for lab infrastructure will be increased by 20% every year in order to boost lab infrastructure in academics including in School, Higher and Technical education and R&D institutions.

3. The personnel dedicated to research and innovation will be increased to 20,000 by 2022.

4. An innovation friendly ecosystem facilitating through technology infrastructure, supporting services, investments and incentives will be created in the state.

5. The systems and mechanisms will be created for increasing the engagement of students, women and youth in to STI in order to promote R&D and entrepreneurship.

6. A mechanism will be devised for exchange of researchers and faculty amongst public S&T institutions, academia and private sector.

7. The bipartite (including Central/State Partnership) and multipartite models for R& D institutions will be promoted.

8. The investment will be increased in capacity building of the faculty and to acquaint them with recent advancement in technologies. In this direction, partnership opportunities with Government of India will be explored to set up Faculty Development Institutes in STEM and Bio-Medical education.

9. A dedicated STI fund will be created to support technology developments in the priority sectors.

10. A strong pool of scientific manpower with aptitude for research and innovation will be created by facilitating investments in translational research in emerging areas of STI.

11. Programmes of Government of India will be leveraged to support the existing institutions/universities to be developed as global standard organizations focusing on applied sciences.

12. Research and Innovation will be supported in state priority areas.

13. Investments will be facilitated in translational and trans-disciplinary research in emerging areas of STI for generating expert scientific manpower.

14. Research support will be enhanced in following emerging cutting-edge research and high potential technologies by a dedicated STI fund:

   - Artificial Intelligence and Robotics
   - Biotechnology
   - Polymers and specialty materials
   - Nano Technology
   - IoT Solutions
   - Energy Storage Solutions
   - Waste treatment and management solutions
   - Pollution abatement
   - Sustainable Habitat
   - Nutrition sensitive research

15. World class and shared R&D infrastructure will be established for gaining global leadership in above technologies (accessible to academia, researchers and professionals from private industry with different memberships)

16. Data banks will be created for public hospitals, educational institutions etc. as reference libraries for future research purposes.

17. Govt of India Schemes will be leveraged for Institutions and to Create Collaboration Models.

18. Science City and Regional Science Museums will be strengthened for dissemination of scientific ideas and emerging technologies.

19. A Gallery for demonstration of technologies and products developed by educational and scientific research institutions will be created to connect laboratory research with entrepreneurs.

2.5.2 Sectoral Approach:

Agriculture and Horticulture:

1. New varieties of Seeds for locally grown crops will be developed.

2. Research and innovation will be supported for developing low cost technologies to increase the Crop production, Storage capacity, Sorting, Processing etc.

3. R&D in Farm Mechanization and Management of Agri–Waste will be supported.

4. 1% of Agriculture Department's budget will be earmarked every year as R&D fund to support research efforts via the Agricultural Universities in following:

    - New and better seed varieties for Cotton, Groundnuts, Castor, Rice, Cumin, Fennel, Wheat, Jowar, Bajra, Maize, Tur, Mango and Tobacco.

    - Faster composting and organic manure creation technology.

    - Vertical Farming, Aeroponics, Aquaponics, Hydroponics, Agriculture Drone etc.

    - Tissue culture for the following species: Date Palm, Banana, Potato, Papaya, Teak, Sugarcane, Stevia, Budded Rose, Gerbera, Dahlia etc.

    - Automated platforms for farming support such as fertilizer, pesticides, herbicides, weedicides and pollination sprays etc.

    - Efficient storage, sorting, processing technologies etc.

Health:

1 Promotion of research and development of technologies will be done for:
    - Public health
    - Medical devices
    - Generic medicines

- Targeted delivery
- Application of biotech for prevention cure and support etc.

2. New technologies will be adopted such as:

   - Synthetic biology
   - Genetic Engineering
   - Nanotechnology
   - Nutraceuticals
   - Liquid Biopsy
   - Regenerative medicines
   - Biomedical Engineering

3. State level centralized repository of disease information & control will be created.

4. Inter-University Centre will be set up for accelerating trans-disciplinary research and development.

5. Mechanism will be devised for improving collaboration among academia, enterprise, research organization and healthcare systems to develop new healthcare technologies, products and services in addressing state priorities, public health, maternal and child health issues.

6. An enterprise wide platform will be developed by health department for medical service delivery to create reference data for validation, mining of disease patterns & trait database for deployment in Government health infrastructure.

7. Capital investment will be encouraged in HRD to manage and utilize heath infrastructure.

8. The academic faculty at Medical colleges will be incentivized/motivated by health department to pursue inter/multi/trans-disciplinary research.

9. A fund of 1% of the Health Department's annual budget will be earmarked every year for developing Scientific Human Capital and supporting research in the following areas:

   - Zoonotic and Infectious diseases in addition to antibiotic resistance
   - Epidemics and Non-communicable Diseases
   - Malnutrition, mother and child related health problems

- Health issues related to sanitation and hygiene
- Infectious diseases and antibiotic resistance
- Genetic disorders
- Life style diseases such as obesity, cardio-vascular, diabetes etc.
- Cancer
- Neurological diseases
- Personalized medicines and precise medicines
- Medical Devices
- Generic medicines

Education:

1. Spirit of scientific temper and sensitivity will be inculcated among students.

2. Basic science labs will be created for primary schools.

3. Tinkering Labs will be created for middle and higher secondary schools.

4. Health, hygiene and sex education will be inculcated among children.

5. Students will be encouraged towards STI through practice based learning.

6. Science labs of schools/ colleges/ universities will be improved based on Science, Technology, Engineering and Mathematics (STEM) model.

7. ITI curriculum will be redesigned for current technologies and skill sets.

8. Research in identified areas of state priorities/ products will be promoted.

9. Science & technology competition at the state level will be conducted for early identification of the talent.

10. STEM Olympiad will be organized by state government once every year.

11. Inter/Trans-disciplinary approach will be promoted in research & education.

12. Institution of academic excellence will be created which will be role model for other institutions, including Faculty Development Programs and shared Laboratory Infrastructure.

13. Disruptive innovation will be promoted.

14. Course curriculum will be realigned for technological development and the teaching methodology for experiential learning.

15. A fund of 1% of Education Department's will be earmarked every year by Education Department for capacity building and supporting research, development and innovation.

Industry:

1. R&D activities will be encouraged to develop tools, equipment and machinery for industries.

2. Institutional mechanism will be created for technology transfer and innovations by setting up of a gallery for technology or product prototype demonstration at science city.

3. Centers of excellence will be developed for the state priority technology areas

Dairy, Animal Husbandry, Fisheries and Aquaculture:

1. Biotechnology tools will be developed for trait selection, progeny development, enhancement of quality and higher yield.

2. Technologies will be developed for fishing area forecasting, storage, sorting and improvement of quality.

3. A fund of 1% of Dept's budget will be earmarked every year for startups, entrepreneur for supporting R&D and innovation in following areas:

   - Trait selection
   - Micro biome
   - Disease diagnostics
   - Vaccine development
   - Nutri-genomics
   - Infertility treatment and progeny enhancement
   - New Fish varieties, fish seedlings and processing, new technologies for optimizing aquatic collections.

3. Policy Implementation

1. The Department of Science and Technology (DST), Government of Gujarat will notify the STI Policy.

2. Concerned Departments will make respective schemes for their items, prepare detailed implementation guidelines and earmark necessary budget in order to achieve the goals and objectives of this Policy.

3. The DST will work with various ministries of Government of India for creation of shared infrastructure and Faculty Development Institute for STI stakeholders.

4. The Gujarat Council of Science and Technology (GUJCOST) will be the coordinating agency for operationalizing the policy.

4. Operation Period

This Policy shall come into force with effect from the date of issuance of Policy GR and shall remain in force for a period of five years or till the declaration of a new or revised Policy, whichever is earlier.

Interpretation:

Any interpretation or clarification under the scheme will be decided by the Department of Science and Technology and decision thereof would be final and binding to all.

These orders are issued in consultation with Education Department, Industries and Mines Department, Health and Family Welfare Department, Agriculture and Co-operation Department and with the concurrence of Finance Department vide its note dated 09/10/2017 on this department's file of even number.

By order and in the name of the Governor of Gujarat,

(Dhananjay Dwivedi)
Secretary to the Government of Gujarat
Department of Science and Technology

To

1. *Principal Secretary to Hon'ble Governor Shri, Raj Bhavan, Gandhinagar.
2. Chief Principal Secretary to Hon'ble Chief Minister.
3. Principal Secretary to Hon'ble Chief Minister.

4. Secretary to Hon'ble Chief Minister.
5. Personal Secretary to Hon'ble Deputy Chief Minister
6. Secretary to Hon'ble Ministers, Government of Gujarat.
7. *Personal Secretary to the Leader of Opposition Party in Gujarat Legislative Assembly, Gandhinagar.
8. *Personal Assistant to all Hon'ble Parliamentary Secretaries
9. Deputy Secretary to Chief Secretary, Government of Gujarat
10. *Registrar, Hon'ble Gujarat High Court, Ahmedabad.
11. *Secretary, Gujarat Vigilance Commission, Gandhinagar.
12. *Secretary, Gujarat Public Service Commission, Ahmedabad.
13. *Secretary, Gujarat Legislature Secretariat, Gandhinagar.
14. *Secretary, Gujarat Civil Service Tribunal, Gandhinagar.
15. Additional Chief Secretary, Finance Department, Sachivalaya, Government of Gujarat.
16. Additional Chief Secretary, Agriculture and Co-operation Department, Sachivalaya, Government of Gujarat.
17. Additional Chief Secretary, Health and Family Welfare Department, Sachivalaya, Government of Gujarat.
18. Principal Secretary, Education Department, Sachivalaya, Government of Gujarat.
19. Principal Secretary, Industries and Mines Department, Sachivalaya, Government of Gujarat.
20. All Secretaries of Administrative Departments of Sachivalaya, Gandhinagar
21. VC and MD, GIDC, Udyog Bhavan
22. Industries Commissioner, Government of Gujarat
23. All Heads of the organizations under DST
24. Pay & Account Offices, Ahmedabad/Gandhinagar
25. Account General (A&E) Gujarat, Post Box No. 2201, Rajkot.
26. Account General (A&E) Gujarat, Ahmedabad Branch, Ahmedabad.
27. Account General (Audit-1) Gujarat, MS Building, Ahmedabad.
28. Director, Account & Treasuries, Gujarat State, Gandhinagar
29. Resident Audit Officer, Ahmedabad/Gandhinagar
30. Select File.
    *By Letter

Note :

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