



GOVERNMENT OF GUJARAT

Innovation and R&D Sector Profile



ibrant
GUJARAT 10-13 Jan
2017

Connecting India to the World | **8th Global Summit**

Innovation and R&D: Global Scenario



The geographic footprint of innovation is changing dramatically as research and development programs become more global

- The combined Asian R&D investments are growing at a faster rate than elsewhere and their global R&D shares continue to increase at almost 1% per year
- United States leads the world by investing heavily in R&D and innovation
- China will become the world's top R&D spender by 2019
- In most countries, 10% to 20% of business R&D is funded with public money
- Switzerland, the United Kingdom, Sweden, the Netherlands, and the United States of America are the world's five most-innovative nations
- China, Malaysia, Vietnam, India, Jordan, Kenya, Uganda, and a group of other countries are outpacing their economic peers in 2015.

Share of Total Global R&D Spending			
	2014	2015	2016
North America	29.1%	28.5%	28.4%
U.S.	26.9%	26.4%	26.4%
Caribbean	0.1%	0.1%	0.1%
All North America	29.2%	28.5%	28.5%
Asia	40.2%	41.2%	41.8%
China	19.1%	19.8%	20.4%
Europe	21.5%	21.3%	21.0%
Russia/CIS	3.1%	2.9%	2.8%
South America	2.8%	2.6%	2.6%
Middle East	2.2%	2.3%	2.3%
Africa	1.0%	1.1%	1.1%
Total	100.0%	100.0%	100.0%

Innovation and R&D: Global Scenario

R&D Investments Continue to Grow, As Do Their Past Trends



Forecast Gross Expenditures on R&D



	2014 Actual			2015 Estimated			2016 Forecast		
	GDP PPP Bil, US\$	R&D as % GDP	GERD PPP Bil, US\$	GDP PPP Bil, US\$	R&D as % GDP	GERD PPP Bil, US\$	GDP PPP Bil, US\$	R&D as % GDP	GERD PPP Bil, US\$
1 United States	17,460.0	2.78%	485.39	18,001.3	2.76%	496.84	18,559.3	2.77%	514.00
2 China	17,630.0	1.95%	343.78	18,828.8	1.98%	372.81	20,015.0	1.98%	396.30
3 Japan	4,807.0	3.40%	163.44	4,855.1	3.39%	164.59	4,913.4	3.39%	166.60
4 Germany	3,621.0	2.85%	103.20	3,678.9	2.92%	107.42	3,741.4	2.92%	109.25
5 South Korea	1,786.0	3.60%	64.30	1,844.9	4.04%	74.53	1,909.5	4.04%	77.14
6 India	7,277.0	0.85%	61.85	7,822.8	0.85%	66.49	8,409.5	0.85%	71.48
7 France	2,587.0	2.25%	58.21	2,618.0	2.26%	59.17	2,657.3	2.26%	60.05
8 Russia	3,568.0	1.50%	53.52	3,432.4	1.50%	51.49	3,396.6	1.50%	50.95
9 United Kingdom	2,435.0	1.81%	44.07	2,500.7	1.78%	44.51	2,558.2	1.78%	45.54
10 Brazil	3,073.0	1.21%	37.18	3,042.3	1.21%	36.81	3,072.7	1.21%	37.18

Innovation and R&D: Global Scenario 2015: 10 Most innovative companies



Rank	Company	Geography	Industry	R&D Spend (USD bn)*
1	Apple	United States	Computing and electronics	6.0
2	Google	United States	Software and internet	9.8
3	Tesla Motors	United States	Automotive	0.5
4	Samsung	South Korea	Computing and electronics	14.1
5	Amazon	United States	Software and internet	9.3
6	3M	United States	Industrials	1.8
7	General Electric	United States	Industrials	4.2
8	Microsoft	United States	Software and internet	11.4
9	IBM	United States	Computing and electronics	5.4
10	Toyota	Japan	Automotive	9.2

* R&D spend data is based on the most recent full-year figures reported prior to July 1st
Source: Global Innovation 1000 Study

Innovation and R&D: India Scenario

The background features a series of overlapping, wavy bands in shades of yellow, orange, and purple, creating a dynamic, flowing effect. The top portion of the image is a solid yellow color, which transitions into the wavy bands. The bottom portion is white.

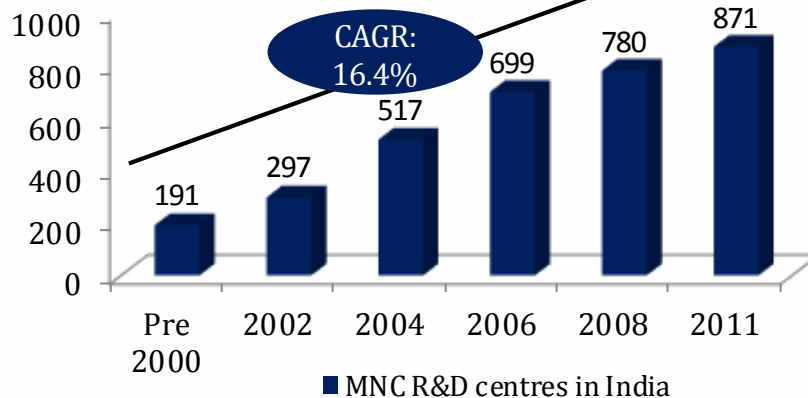
Innovation and R&D: India Scenario

India is the 6th largest investor in R&D across globe by spending around USD 66 billion in 2015 and accounted for 2.7% of global expenditure

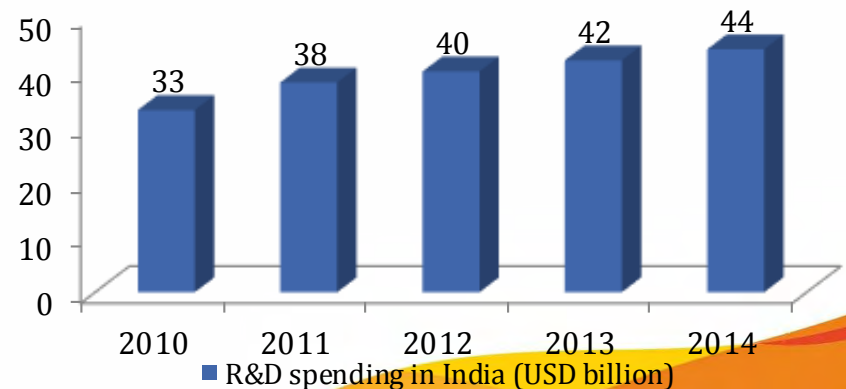
- Current government spending on R&D is 0.85% of the GDP . It is expected to reach 2% of the GDP by 2017, which would further increase and reach 2.4 per cent by 2034
- Recognizing the need for growth in competitiveness, employment and economy, the Government has declared 2010-2020 as 'decade of innovation' giving impetus to R&D
- Cumulative overseas direct investments increased to USD265 billion in FY16* from USD21 billion in FY08 leading to significant amount of technology transfer through industrial acquisitions



MNC R&D centres in India



R&D spending in India (USD billion)



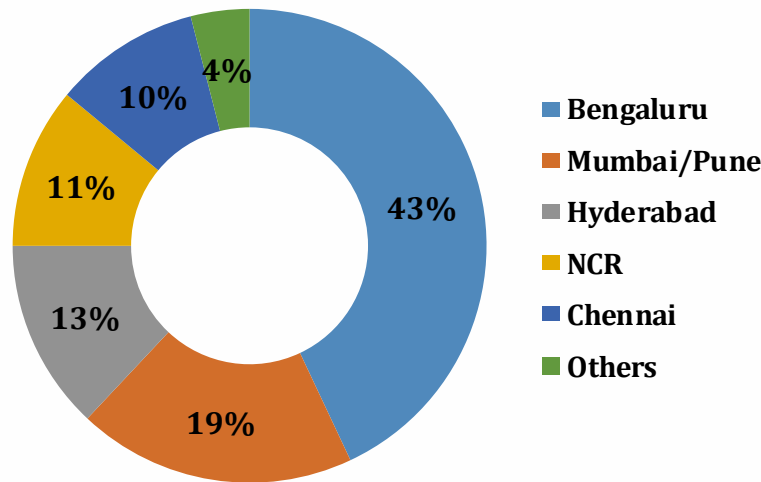
Innovation and R&D: India Scenario

Focus Area and Expertise & Growth Drivers

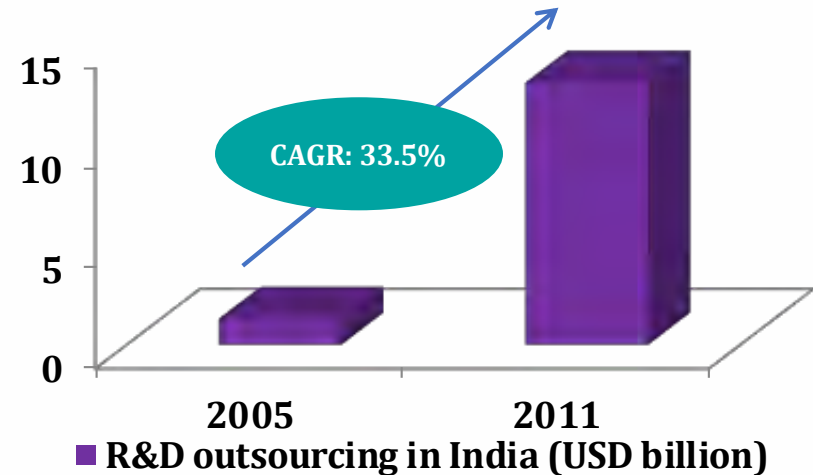


Recognizing the need for growth in competitiveness, employment and economy, the Government has declared 2010-2020 as 'decade of innovation' giving impetus to R&D

MNC R&D centres distribution in India



R&D outsourcing in India (USD billion)



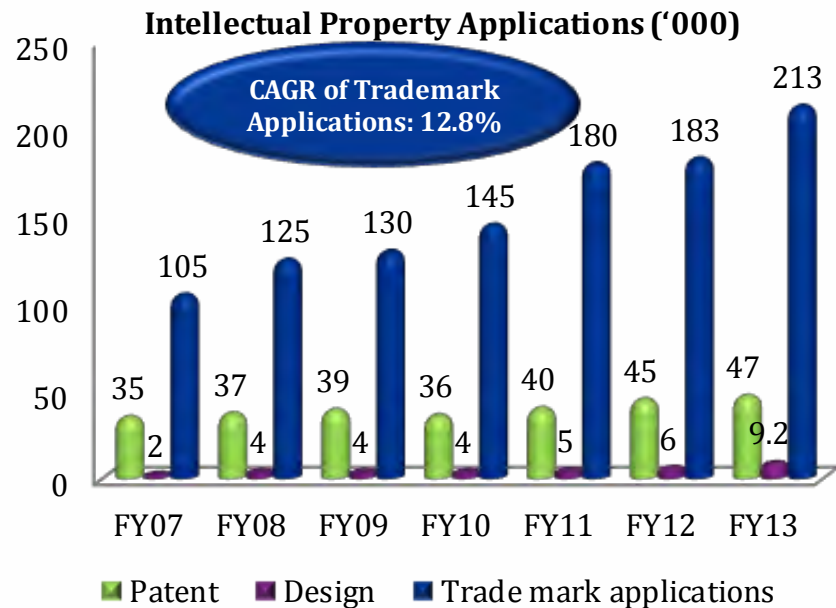
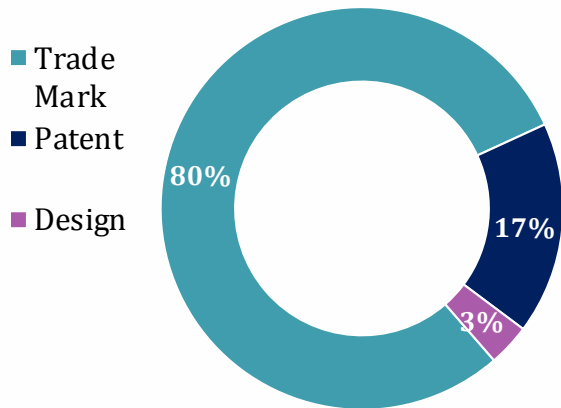
- In engineering offshore R&D, India is the most preferred location across the globe
- R&D work related to product engineering worth around **USD 42 billion** to be outsourced to India by 2020
- Post 2005, MNC's started to expand their presence in Tier II cities in addition to Tier I cities due to higher catchment area, lower attrition and cost arbitrage

Innovation and R&D: India Scenario Intellectual Property Rights (IPR)



Intellectual Property Rights (IPR) have increased from 137,900 in 2006-07 to 269,500 in 2012-13

Break-up of Intellectual Property Rights (IPR) applications (FY14)



- During FY14, the total Intellectual Property Rights(IPR) stood at 251,564
- Trademark applications accounted for the largest share (79.51 per cent) of total applications at 2,00,005 in FY14
- Patent and design applications accounted for 17.07 per cent (42,951 applications) and 3.39 per cent (8,533) share, respectively

Innovation and R&D: India Scenario

Focus Area and Expertise & Growth Drivers

Areas of focus and expertise for R&D
Psychology
Engineering
Physics
Computer Science
Material Science



- Establishment of CoEs, NMITLI initiative
- Providing support to global projects from India
- Increasing corporate R&D investments

- PPP in R&D
- Strengthening educational infrastructure
- Amendments to the Patents Act & Setting up of NIC

- Evolving consumer lifestyles
- Liberalization and increasing competition
- Proximity to future growth markets

Innovation and R&D: Gujarat Scenario

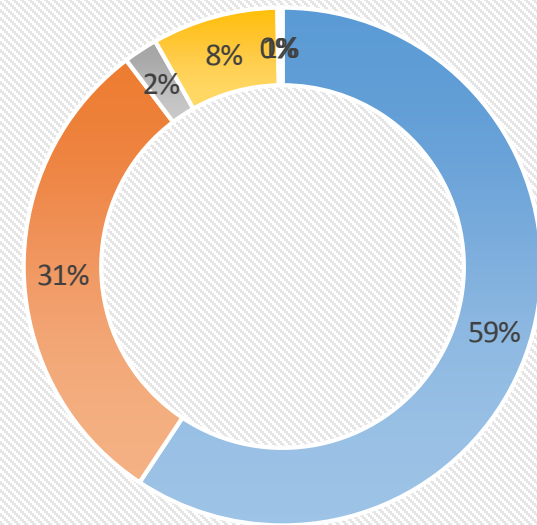
The background features a vibrant orange-to-yellow gradient at the top, transitioning into a series of overlapping, wavy bands in shades of orange, red, and purple that sweep across the lower half of the image. The bottom right corner is a plain white space.

Innovation and R&D Gujarat Scenario: Overview



- Gujarat accounted for over 10% of the total R&D spending of India in 2010-11
- The state has attracted maximum foreign technology transfer agreements from 1991 to 2011, giving further boost to research and development
- The state has over 35 R&D and specialized institutions, focusing on applied research for major manufacturing sectors including pharmaceuticals & biotechnology, chemicals & petrochemicals, auto & engineering, renewable energy, etc
- **Key sectors - Pharmaceuticals and Biotechnology.** The state has 40% of the Contract Research Organizations in the country. Key R&D segments include clinical research, genetic engineering, drug research and development

Foreign Technology Agreements in Gujarat during 1991 to 2011



- Engineering
- Chemicals & Petrochemicals
- Pharmaceutical
- Textile
- Others

Gujarat Scenario: Government Initiatives



In 2011-12, Gujarat was seeded as one of the 7 Cluster Innovation Centres (CICs) for Pharmaceutical sector by National Informatics Centre (NIC)

- The CIC has around 450 drugs and pharmaceuticals manufacturing units in Ahmedabad, Vadodara and nearby areas constituting of 7 big, 20-25 medium-sized and the rest being the small firms
- Major products include – pharmaceuticals and medical disposable products
- The development of CIC has been actively supported by various technical training institutions, industry associations and Government agencies



Gujarat Mineral Research & Development Society



- Cluster approach based Innovation promotion initiatives have resulted in institutionalization of a one year, partially self funded Techno-Biopreneur program for mentoring aspiring life science technology based entrepreneurs among Entrepreneurship Development Institute (EDI), Gujarat State Biotechnology Mission (GSBTM) and Foundation for MSME clusters
- Also, a physical facility for preservation of new chemical molecules at Rajkot University has been strengthened through this project

Gujarat Scenario: Government Initiatives



Support to Research & Development Institutions Scheme

• Operative period – February 2009 to February 2014

• For support to R&D Institutions:

- Up-gradation of facilities and setting up of new R&D institutions, testing facilities, incubation centers, etc

• For assistance to contract/sponsored research work:

- R&D Institutions, including those established by Government and Private sector institutions recognized by Department of Scientific and Industrial Research (DSIR), Government of India and engaged in sponsored R&D work
- AICTE approved professional colleges including autonomous as well as those affiliated to Universities, taking up sponsored R&D work from industry

• Eligible institutions:

- Specific R&D Project proposals from R&D Institutions, including those established by Government and Private Sector institutions, recognized by DSIR, Government of India and engaged in sponsored R&D work
- Proposals from AICTE approved professional colleges, including autonomous, as well as those affiliated to Universities, taking up sponsored R&D work from industry
- Assistance for Contract/ Sponsored research work from any industrial unit / Industry Association to recognized R&D Institution/ technical colleges approved by AICTE
- Sponsored R&D Project proposals from Industries Associations or individual industrial units

For support to R&D Institutions, assistance of up to 60% of the project cost is provided (excluding cost of land and building)

For assistance to contract/sponsored research work, assistance of up to 50% of the project cost is provided (excluding cost of land and building) subject to a maximum of USD 100,000

Gujarat Scenario: Government Initiatives

International Centre for Entrepreneurship & Technology (iCREATE)

- iCreate – Gujarat government’s initiative to **promote innovation**
- A world class innovation centre to be developed on a sprawling 34-acre campus aimed to provide the best environment to young entrepreneurs to innovate and create businesses which in turn will result in prosperity of the state as well as India



Innovation and R&D: Gujarat Scenario



“Gujarat is a Vibrant state with fast paced development and ties between Gujarat and Yunnan will bring mutual cooperation for investment and industrial development” – Mr. Li Chon, Deputy Director, Yunnan Development Research Centre

Gunnebo Security Group

- Gunnebo Security Group, a global security solutions provider, will be putting up a global R&D center at its **Halol facility in Gujarat** and will also invest **USD 4.92 million** for capacity addition to meet export demand
- The R&D centre will provide ample opportunities to the country's unmatched engineering talent and substantially reduce speed to market for introducing newer innovative solutions

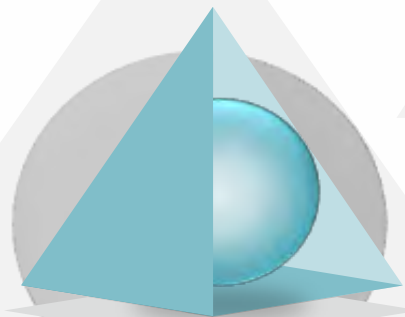
Yunnan Development Research Centre

In January 2012, Industrial Extension Bureau (iNDEXTb) and Yunnan's Development Research Centre signed a memorandum of understanding (MoU) for cooperation to invest in technical and research and development (R&D)

Swedish Chamber of Commerce and Industries

- In April 2012, Swedish Chamber of Commerce and Industries entered into MoU with Government of Gujarat (GoG), iNDEXTb and International Centre for Entrepreneurship and Technology (iCREATE) in presence of Ambassador of Sweden to India Mr. Lars-Olof Lindgren and the then Hon'ble Chief Minister of Gujarat, Shri Narendra Modi
- The delegation evinced keen interest in mutual co-operation in trade and commerce and human resources development, R&D, high-tech agro business and technology

Gujarat Scenario: Gujarat State Innovation Council



Vision

To realize and harness the potential of innovation which will act as a catalyst for the multi-faceted balanced development and inclusive growth in the State



Major Thrust Areas

Governance	Science & Technology	Education and Research	Industry	Information Technology
Land, Climate and Environment	Health and Nutrition	Finance	Energy	Infrastructure
Markets	Skill Development	Entrepreneurship	Public Service Delivery	Global Competitiveness



Physical Research Laboratory (PRL), Ahmedabad



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भौतिक अनुसंधान प्रयोगशाला
Physical Research Laboratory

- Known as the *cradle* of Space Sciences in India, the Physical Research Laboratory (PRL) was founded in 1947 by Dr. Vikram Sarabhai
- As a unit of the Department of Space, Government of India, PRL carries out fundamental research in selected areas of Physics, Space & Atmospheric Sciences, Astronomy, Astrophysics & Solar Physics, and Planetary & Geosciences

Research Areas

- Astronomy and Astrophysics
- Gravitation & Cosmology
- Solar Physics
- Particle Physics
- Space & Atmospheric Sciences
- Nuclear, Atomic & Molecular Physics
- Earth Sciences
- Nonlinear Dynamics
- Planetary Sciences & Exploration
- Quantum Optics & Quantum Information

Source: www.prl.res.in

Research facilities at PRL



India's first multidisciplinary, post graduate Research Institute



A non-profit organization, PERD Centre acts as a supportive partner to the pharmaceutical industry and academia, providing the facilities and resources to undertake the latest in R&D

As an industry-academia-government collaboration, PERD offers

- Well equipped laboratories and research facilities
- Expert services of scientific and technical personnel
- A well stocked, spacious library
- Regular education, training and developmental activities

Drug Delivery Systems

Nanocarriers

Solid Lipid Nanoparticles

Controlled release formulations

Floating bioadhesive

Liposomes

Niosomes

Micro-emulsions

Mouth dissolving films

Departments

- Department Of Analytical
- Department Of Biostatistics
- Department Of Cell And Molecular Biology
- Department Of Medicinal Chemistry
- Department Of Microbiology
- Department Of Pharmacognosy And Phytochemistry
- Department Of Pharmacology And Toxicology
- Department Of Pharmaceutics

Research at PERD

Gujarat Scenario: Institute of Seismic Research (ISR), Gandhinagar



1 Geophysical Surveys

- Study Of Deep Crustal And Lithospheric Structures
- 2D AND 3D Seismic Surveys For Petroleum Exploration And Mapping Of Basement Structures
- 3D Magnetotelluric Survey

2 Seismic Hazard Assessment

- Seismic Microzonation
- Tsunami Modeling
- Global Earthquake Model
- Seismic & Tsunami hazard using EU – India e-Infrastructure with Italy

3 Seismic Hazard Assessment, Project Specific

- GIFT City
- Sardar Patel Statue of Unity
- LNG Terminal (Mundra)
- Nuclear Power Plants

1 Geophysical Surveys

4 Laboratories

2 Seismic Hazard Assessment

5 Help to Industry

3 Seismic Hazard Assessment, Project Specific

6 New Plans of ISR

4 Laboratories

- Seismic Data Analysis Centre
- Geotechnical Lab
- Global Positioning System Lab
- Engineering Seismology & Geophysics Labs
- Gravity & Magnetics Lab
- Electrical And Eletromagnetic Lab

5 Help to Industry

- Investigation of faults crossing the petroleum pipelines
- seismic hazard to new solar parks and railway stations

6 New Plans Of ISR

- Earthquake Early Warning
- Gis-based Intelligent Shake Maps
- Preparation Of Geotechnical Atlas Of Gujarat

Gujarat Scenario: Anand Agricultural University (AAU)



**Bidi Tobacco
Research
Station, Anand**

**Agricultural
Research
Station, Dahod**

**North Coat Cattle
Breeding Farm,
Chharodi**

**Regional Cotton
Research
Station,
Viramgam**

**Agricultural
Research
Station,
Dhandhuka**

**Pulse Research
Station,
Vadodara**

**Paddy Research
Station, Dhaboi**

**Castor and Seed
Spices Research
Station, Sanand**

**Regional
Research
Station, Anand**

**Department of
Agricultural
Biotechnology,
Anand**

**Narmada
Irrigation
Research
station, Khandha**

**Regional
Research
Station, Arnej**

**Main Maize
Research
Station, Godhra**

**Main Forage
Research
Station, Anand**

Research Centres under AAU

**Reproductive
Biology
Research Unit,
Anand**

**Main Vegetable
Research
Station, Anand**

**Medicinal &
Aromatic Plant
Research, Anand**

**Agricultural
Product
Processing Unit,
Anand**

**Bio Control
Research
Laboratory,
Anand**

**Weed control
Project, Anand**

**Micro Nutrient
Project, Anand**

**Department of
Animal
Nutrition, Anand**

**Exotic Cattle
Breeding Farm,
Chharodi**

**Rice Research
Station,
Nawagam**

**Agricultural Research Station for
Irrigated Crops, Thasra**

**Directorate of
Research & Dean
PG Studies**

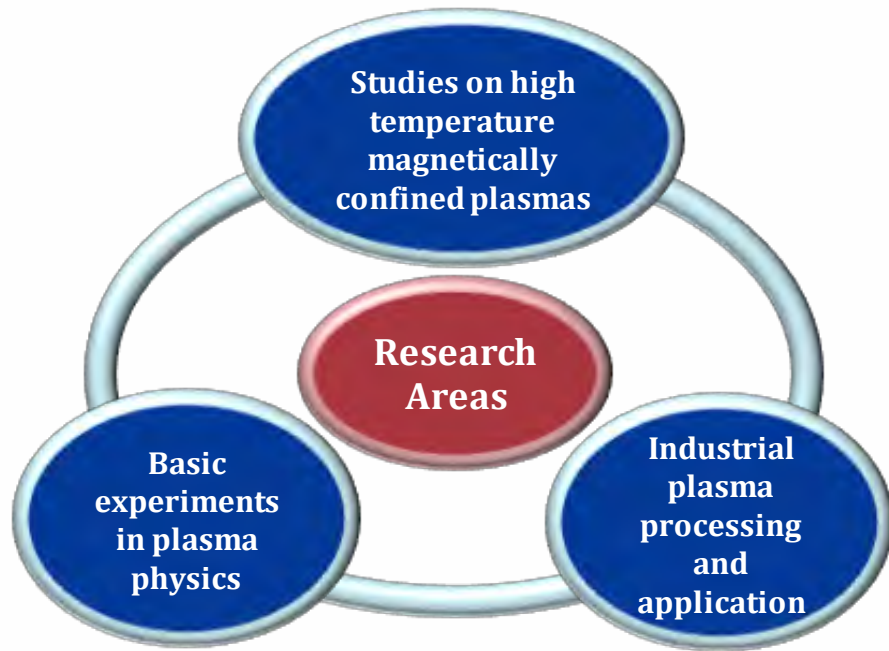
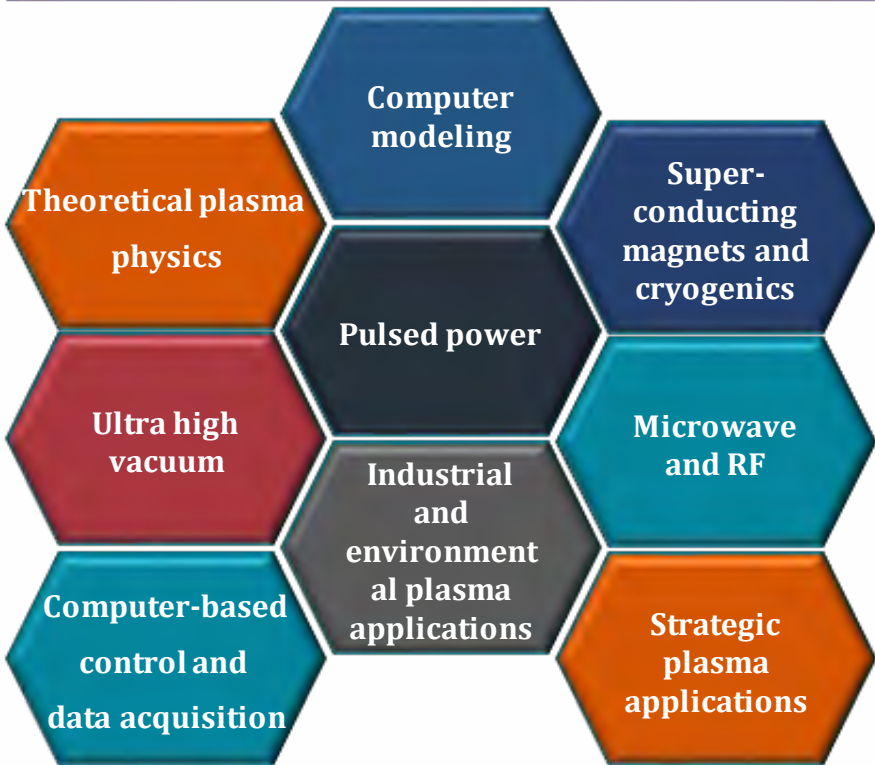
**Agricultural
Research
Station, Derol**

Gujarat Scenario: Institute of Plasma Research (IPR), Gandhinagar



Institute of Plasma Research (IPR) is an internationally recognized institution for its contributions to fundamental and applied research in plasma physics and associated technologies

IPR has a scientific and engineering manpower of 200 with core competency in below areas



Name of Institute	Number of Patents Filed	Number of Copyrights Filed
Parul Institute of Pharmacy	9	-
Parul Institute of Engineering and Technology	12	20
Total	21	20

Gujarat Scenario: Torrent R&D Centre



A team of over 600 scientists offer dedicated services in the specified areas

Discovery Research

- Torrent R&D Centre is committed to innovation by discovering novel molecules and formulating unique therapeutic approaches
- The focus is on understanding the pathophysiology of the target disease and finding ways to modulate the disease process
- Torrent R&D Centre is working on 6 discovery projects in the areas of diabetes and its related complications, metabolic syndrome, renal disease, neuropathic pain and cardiovascular disorders

Generic Drug Development

- A portfolio of more than 75 products for various markets: patent navigation, process development, scaling-up, tech transfer, manufacturing API and finished formulations, registrations and supply chain management
- Torrent's development arm has dedicated teams of highly qualified scientists working on development and registration of generic products with EU-CTD dossiers

New Drug Delivery Systems / Value Added Generics

- Torrent R&D Center is capable of developing new dosage forms by leveraging the proprietary technologies such as Dual Retard Inlay Technology, Compact Tablet Technology, Gastro Retentive System and Matrix Based SR/ Modified Release Formulations
- Some of the novel (first time in the world) solutions are Lamotrigine dispersible-OD formulation and Nicorandil OD formulation

- NIPER – Ahmedabad commenced from academic year 2007-08
- Located at B. V. Patel PERD Centre, a reputed institute in the Western part of the country that has been in the forefront of Pharmaceutical education and research for the past eighteen years



Objectives

To tone up the level of pharmaceutical education, research and management

To produce leaders in the field and provide opportunities for training of future teachers, research scientists and managers for the industry and the profession

To be a center for innovation in pharmaceutical sciences and technology

Research at NIPER - Departments

DEPARTMENT OF MEDICINAL
CHEMISTRY

DEPARTMENT OF
PHARMACEUTICS

DEPARTMENT OF NATURAL
PRODUCTS



DEPARTMENT OF
PHARMACOLOGY AND
TOXICOLOGY

DEPARTMENT OF
BIOTECHNOLOGY

DEPARTMENT OF MEDICAL
DEVICES

DEPARTMENT OF
PHARMACEUTICAL ANALYSIS

Gujarat Energy Research and Management Institute (GERMI)



GERMI is a centre of excellence in industry learning and has been set up to develop human resource assets to cater to the petroleum and allied energy sectors, improve knowledge base of policy makers and technologists and provide a competitive edge to leaders to compete in the global arena



GERMI has established a Research and Innovation Centre with **three major research wings** and various other research cells

Vision
Our values and beliefs lead us to **envision** that young professionals in energy sector ought to have an access to the opportunities for being more competent, efficient, highly knowledgeable and courageous to innovate and experiment in the global arena.



Electrical Research and Development Institute (ERDA)



Vision: An Internationally Renowned Laboratory and Center of Excellence in R&D for Electrical Industries

- Electrical Research and Development Association (ERDA) is a cooperative research institution created by the Indian Electrical Industry and Utilities with the support of Government of India and Government of Gujarat
- ERDA provides services in areas of Certification Testing, Calibration, Research & Development, Residual Life Assessment (RLA), Condition Monitoring, Energy Audits & Management, Third Party Inspection (TPI) & Power Systems to the Indian Electrical & Power Sector in particular, and the Industrial Sector in general



ERDA's R&D focus continues to be industry oriented projects and nationally relevant

Residual Life Assessment

On Line Short Circuit and High Voltage Test Facility

Testing and Evaluation of Electrical Materials and Products

Mobile Test Laboratory

Research and Development projects completed under ERDA are:

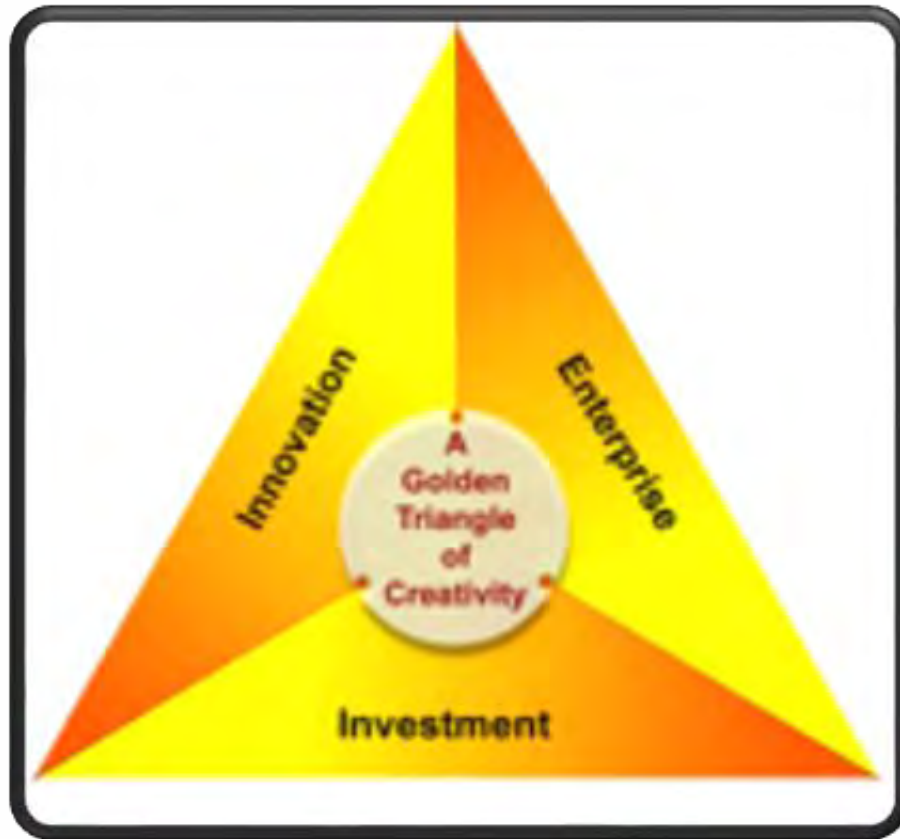
- Development of a Metal Hydride based Hydrogen Storage System for Stand – Alone Hydrogen Fuelled Gen–Set
- Corrosion Mapping of Structural Steels and RCC Concrete Structures of Thermal Power Stations Located Away from Coastal Areas & Near Coastal Areas

Gujarat Grassroot Innovation Augmentation Network (GIAN)



GIAN is India's first technology business incubator focused on incubating and commercializing grassroots

GIAN is helping unaided, unqualified, untrained individual innovator from the informal sector who has conceptualized/developed technological innovation and/or outstanding traditional knowledge practices



The objective of GIAN is to build the value chain around grassroots innovations with the end objective of making these available to the masses through the market mechanism or otherwise

Since its inception, a total of 113 projects have been supported under MVIF, which are at different stages of incubation

Major innovations recognized Under GIAN:

- Clay Cooker
- Sugarcane juice extractor
- Natural Water Cooler
- Motorized kite thread winder
- Stencil cutting device for hand embroidery

The Institute's R & D activities carried by its dedicated team of 360 staff members, with 150 S&T staff on its roll and around 250 research fellows and project assistants revolves around the following areas:

Salt and marine Chemicals

Inorganic Materials and Catalysis

Electro Membrane Processes

Marine Bio-technology and Ecology

Reverse Osmosis Engineering

Wasteland Research

Analytical Sciences

Some of the recent landmark technologies developed by the institute:

- Integrated process for the production of SOP, green bromine and high purity magnesia from concentrated natural brine
- Neat biodiesel from *Jatropha curcas*
- Development of hollow fiber (HF) ultra filtration membranes for efficient water purification with low rejection rate
- Production of high purity salt from natural brines
- Production of spherical shaped crystals of common salt from natural brine
- Production of low sodium salt from bitterns and vegetable salt from *Salicornia*
- Transgenic agricultural crops conferring salt tolerance through molecular biology and genetic engineering interventions



Central Glass and Ceramic Research Institute, Ahmedabad

Focus Areas Of Research

Technology development for the quality improvement of the traditional ceramic products like tiles, sanitary wares etc.

Utilization of industrial wastes for the production of traditional Ceramics

Development activity for the rural artisans and SMEs Sectors in traditional ceramics for societal benefits

Beneficiation of the raw materials

Development of energy efficient refractory

Futuristic research in application of Nano technology in traditional ceramics

Some major Technologies developed / underdevelopment by the institute:

- Patented Technology for Grinding of Ceramic Fired Scrap
- Development of Glazes and Engobes for Roofing Tiles
- Production of Bone China utilizing the china clays of Gujarat
- Optimizing process parameters and suggesting suitable remedy for improvement in productivity of stoneware products
- Synthesis of Mullite Grog by calcining china clay and other alumina containing precursor

Vision

The vision statement for groundnut is “Enhancing efficiency of groundnut based production system on a sustainable basis through appropriate cropping system, value addition and diversification of products so that the groundnut system as a whole becomes sustainable, remunerative and globally competitive”

The Directorate of Groundnut Research (DGR) came in to being as the first crop commodity research unit under the category of NRC's (National Research Centers) of the ICAR. Established to facilitate research to enhance productivity of groundnut in keeping with its importance among the oilseed crops of India

Varieties of Groundnuts Developed at the Research Centre:

Girnar-2

- A VB variety released in 2008 for cultivation in kharif in Punjab, UP and northern Rajasthan

Girnar-3

- An SB variety released in 2010 for cultivation in kharif in West Bengal, Orissa and Manipur

Animal Husbandry Research



College of Veterinary Science & Animal Husbandry, Anand

The College of Veterinary Science & Animal Husbandry, Anand is a reputed educational and research Institute in India dedicated for conduction of high quality research to enhance the economical productivity and to transfer the technology to the farmers apart from teaching the related subjects

Major Research Departments :

Reproductive Biology Research Unit

Exotic Cattle Breeding Farm

Livestock Research Station

Department Of Animal Nutrition, AAU

Vanbandhu College of Veterinary Science and Animal Husbandry, Navsari

Major Objective To carryout research in Veterinary and Animal Sciences as per location specific needs to evolve relevant package of practices.

Some Major Research Projects undertaken :

Livestock research Station	Strengthening of Livestock and Veterinary component
Establishment of elite herd of Surti buffaloes	AICRP on Goat Improvement (Surti Field Unit)
Establishment of nucleus herd of HFK crossbred	

Dairy Technology Research



Dairy Technology Department, AAU:

Recent Research work in this department is being carried out under the following research schemes:

ICAR Network project on “R&D support for process up- gradation of indigenous milk products for industrial application”

Application of membrane processing technology for selected indigenous and western dairy products

Study on Mozzarella cheese Analogue Preparation.

Department of Dairy Technology in collaboration with **Vidya Dairy** regularly conducts short courses for industry and actively helps the Dairy Industry as well as other departments of the university in carrying out need based specialized analytical work related to rheological and chemical-compositional analysis of milk, food and vegetable / agricultural products

Major Achievements of the Department:

Research Work	Numbers
Total Publications	453
Research findings in the Department of Dairy Technology	85
Research Recommendations	49
ICAR Net work project	2
Awards	14

Gujarat council on Science & Technology



Centre for Excellence

- To encourage researchers and scientists for research activities in emerging area of Science & Technology.
- To create the state of art facilities in Universities/Institutions for research activities.
- Collaboration with National and International R & D Institutions and Creating competitive research environment.



State Inspire Programme (Student Sci-Tech Project)

- To conduct and support Nanoscience and Nanotechnology awareness, education, research, development, design and engineering in nanotechnology, and transfer the technology to industrial sector in order to increase Gujarat's competitiveness, and improve the quality of life and the environment.

Gujarat Nano Mission

- To encourage the students and faculty members of science and technology institutes to use their talents and to make use of such projects for exploring innovative ideas.
- GUJCOST has provided financial assistance Student's Sci-Tech projects during the year.

Minor Research Project

- To nurture research activities and to promote research and development sector in the state, research projects
- To encourage research and innovation in areas by promoting close and productive interaction between private and public institution in Science and Technology.
- **Financial assistance is given to the researcher to carry out research work.**

Dr. Vikram Sarabhai Award

- With a view to promote and encourage research and developmental activities
- thereby accelerate the process of sustainable growth and development of the State, Gujarat Council on Science & Technology (GUJCOST)

Gujarat Innovation Society



- GIS is working towards creating and inculcating the culture of INNOVATION within Gujarat with a focus on Micro, Small and Medium Scale Industries (MSME), Students/Faculties, Public/Private /Social Administrator/s and any Individual with passion to Innovate.
- First step towards this movement, GIS is working to achieve minimum 1,00,000 individuals to JOIN and to take SELF OATH for ONE INNOVATION.



Innovation

A simple term that comes in our mind for innovation is Creativity. When all think alike, then no one is thinking."It should be something different than others.



Information

Information is the communication or reception of knowledge or intelligence. Media, Blogs, Books, Journals, Internet are the basic tools to get the information.



Inspiration

Inspiration is a motivating action or influence that results in creative works and productivity of all kinds. Experience is the child of thought, and thought is the child of action.

Indian Space research organization (ISRO)



ISRO Success Story 2016

PSLV-C34 Successfully Launches 20 Satellites in a Single Flight (June 22, 2016)

PSLV-C33 Successfully Launches India's Seventh Navigation Satellite IRNSS-1G (Apr 28, 2016)

India's Reusable Launch Vehicle-Technology Demonstrator (RLV-TD), Successfully Flight Tested (May 23, 2016)



PSLV-C32 Successfully Launches India's Sixth Navigation Satellite IRNSS-1F (Mar 10, 2016)

PSLV-C31 Successfully Launches India's Fifth Navigation Satellite IRNSS-1E (Jan 20, 2016)

Innovation and R&D: Investment Opportunities

The background features a series of overlapping, wavy bands in shades of yellow, orange, and purple, creating a dynamic, flowing effect. The top portion of the image is a solid yellow color, which transitions into the wavy bands. The bottom portion of the image is white.

Investment Opportunities



Increase in R&D through PPP model

- Increase in the number of R&D facilities
- PPP model to boost the R&D infrastructure in the state

Use of Technology

- The advanced technologies available should be highlighted / showcased to attract potential investors

Adequate state-of-the-art R&D centres / 'Centre for Excellences'

- Investment in State-of-the-art Centres for R&D and Centre for Excellences
- The government has established Gujarat Council of Science City and developed Gujarat Science City laid over 107 hectares of land and further 300 hectares under acquisition for future expansion of science city and related projects

Investment Opportunities



Space Technology
(Satellite)
manufacturing

Pharmaceuticals &
Biotechnology

Renewable energy

Auto & engineering

Specialty & fine
chemicals

Public private
partnership (PPP)

IT/ITES

New varieties of fibers
& yarn

Energy efficiency



FOR ADDITIONAL INFORMATION CONNECT US @

Gujarat State Innovation Council

<http://www.innovationcouncil.gov.in>

iNDEXTb -Industrial Extension Bureau

<http://www.indextb.com>



THANK YOU

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