



COOPERATE WITH INDIA

A GUIDE FOR EUROPEAN PLAYERS
ON INDIAN RESEARCH &
INNOVATION FUNDINGS



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Indiagate Project

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Indian Research & Innovation fundings

Table of contents

EXECUTIVE SUMMARY	9
1. THE INDIA GATE INITIATIVE	13
2. INDIA' SCIENCE, TECHNOLOGY AND INNOVATION SYSTEM	17
2.1 Indian Science & Technology system	17
2.2 Indian Innovation system	25
2.3 Clusters: existence and cooperation	41
2.3.1 Innovation Clusters	41
2.3.2 Innovation opportunities in Industry sectors	46
3. OPPORTUNITIES FOR EUROPEANS IN INDIA	70
3.1 Indian Science & Technology Programmes	70
3.2 Bilateral Agreements and Arrangements	101
4. MAKING RESEARCH TOGETHER	163
4.1 European Union and India cooperation in Innovation	163
4.2 Indian participation in the 7th European Programme of Research & Innovation	167
4.3 European industrial presence in India	176
4.4 Obstacles for European participation in Indian Science & Technology programmes	184
4.5 Business culture in Research & Innovation environment: Europe and India face-to-face	189
4.6 EU-COOP initiatives: the Internet window and the info days	192
APPENDIXES	
APPENDIX 1 - List of the documents downloadable from the INDIA GATE website	197
APPENDIX 2 - List of key institutions' websites	198

Foreword

India and the European Union (EU) are committed to an equal and dynamic dialogue on all areas of mutual interest and concern as major actors in their own regions, and as emerging global players on the world's stage.

Science and Technology (S&T) plays an important role in the EU-India Strategic Partnership. The solid partnership between the EU and India, their great traditions in Science and Technology as well as the recent political impetus provided by the EU-India Ministerial Science Conference, are now being translated into ambitious, high quality and mutually beneficial co-operative programmes, projects and dialogues.

It is recognized that cooperation with the EU at large needs to be more reciprocity and the development of symmetric programmes - with equal advantages on topics of mutual interest and priority - be encouraged and pursued. For this purpose it is crucial to enhance the knowledge about the Indian Research & Innovation system and the existing opportunities for the Europeans. Effective circulation of information has become a priority.

The European Union, through the Seventh Framework Programme 2007–13 (FP7) has funded actions to support international S&T cooperation policies and reinforce scientific relations with Third Countries. Scientists from Europe and other regions of the world have been encouraged to build new partnerships benefiting from the support of FP7 and Third-Countries' programmes.

At this purpose a unique instrument has been created by the European Union – the ACCESS4EU International Cooperation initiatives – which aims at increasing European researchers' awareness about Third Countries' funding opportunities for international research projects. The INDIA GATE initiative is positioned among EU framework policy and it aims at contributing at the cooperation process among the European and Indian scientific communities by creating a 'one-stop shop' for funding opportunities that are available in India for European organisations.

This publication intends to offer a picture of the Science & Innovation frame in India, its opportunities for European researchers and its industrial system. Obstacles for European participation in Indian S&I programmes and a reconnaissance of the cultural differences to take into account when Europeans and Indians do business together complete the portrait.



Diassina Di Maggio
Director of APRE

Executive summary

The INDIA GATE initiative's primary goal is to increase the Science & Technology cooperation between India and the European Union (EU) by creating a "one-stop shop" for funding opportunities that are available in India for European organisations.


Research cooperation between EU and India started in mid 80's and it was reinforced with the signing of Science & Technology agreements – in 2001 and 2009 – which recognizes the mutual benefit of access to respective funding programmes. INDIA GATE aims to support European organisations who wants to benefit from RTD funding sources from India, thus bringing EU-India scientific cooperation forward by an increased participation of European organisations in Indian funding programmes and contributing to an increased mutual understanding of EU-India respective research systems.

At this purpose INDIA GATE realised mapping, surveys and reports describing the Indian Innovation system, opportunities for scholars and private companies, the agreements existing between India and EU Member States, the areas with more opportunities of investments or of scientific collaborations.

The **Indian S&T system** is mainly dominated by the government owned research centres which operates under the umbrella of Ministries' Agencies. The major Agencies (denominated Department) are described along with the opportunities they offer to European players. According to the latest available data (2012), India spends 0,8% of its GDP on R&D activities and the 20% of it is paid by the private sectors. Foreign corporations R&D centres play a very important role in Research and Innovation activities in India. They are estimated to be 851 as of 2010.

India government is strongly committed to feed the **innovation** process in the Country and it declared 2010-2020 the "Decade of Innovation". Actions have been undertaken to sustain the innovation culture and system in the State such as the establishment of the National Innovation Council (NIC) in 2010 which include well-known people from corporate and social sectors and the Academia. The aim of NIC is to redefine innovation looking beyond the Research and Development to new and creative solutions for inclusive growth through five initiatives: the India Inclusive Innovation Fund, the Sectorial Innovation Councils, the State Innovation Councils, the Industry Innovation Clusters & Cluster Innovation Centres, the Innovation in Education & University Clusters.

An approach to innovation that has emerged as a distinctive strength of the Indian innovation system, and one that is increasingly relevant to policymakers and businesses around the world is the "Frugal innovation" which responds to limitations in resources, whether financial, material or institutional, and turns these constraints into an advantage. Through minimising the use of resources in development, production and delivery, or by leveraging them in new ways, frugal innovation results in dramatically lower-cost products and services. Successful frugal innovations are not only lower in cost, but outperform the alternative, and can be made available at large scale. Often, but not always, frugal innovations have an explicitly social mission. Six examples of frugal innovation in India are presented in the Paragraph 2.2.




Recognizing the critical role played by the **cluster** in fostering and sustaining innovation, the National Innovation Council is actively pursuing the development of the Cluster Innovation Centres (CIC) with the responsibility of promoting collaboration by bringing together various stakeholders, including the government agencies, research institutions, industry, academia, professional service organizations and local players. As a matter of fact NIC seeded 7 CICs in different parts of the country covering different industry segments in the financial year 2011-12. A graphic representation is provided in the paragraph 2.3.1.

Turning on the innovation opportunities in the **industry sector**, India as one of the fastest growing economies in the world and a large internal market across all income scales offers a tremendous opportunity for both public and private organizations from EU Member States. In the paragraph 2.3.2 some key sectors is depicted with their market trends, major developments and investments, government initiatives. The industry sectors – Automotive, Aerospace, Pharmaceuticals, Transportation, Energy, Water and Wastewater Management – have been selected because of their importance in sustaining India's growth. For example, providing clean and potable water to hundreds of millions of India's at low cost; efficient management of water and wastewater treatment for sustainability; offering green energy and efficient public as well as private transportation at an affordable cost. Similarly, delivery of drugs and health care to millions who lack and require care at reasonable costs needs social and inclusive innovation approach to arrive at solutions. The Automotive sector is included here as a success story of deregulation and liberalization because of which the entire industry has transformed leading to explosive growth in last decade. The Aerospace on the other hand represents one of the most regulated, especially the space sector. However, indigenous and innovative India's Space sector provides example of India's capability to achieve global recognition and standards. In some of these sectors clusters are present and they will be highlighted.

In the third Chapter a portfolio of **funding opportunities** in India for European researchers is presented. The nine major Governmental agencies have been examined and six categories of cooperation initiatives emerged:

- Bilateral Programmes, which have been set up between India and EU Member States;
- Activities with EU, agreements between India and the European Union;
- Fellowship programme, grants available to researchers to gain experience and to complete their training;
- "Visiting Scientist from Abroad" Programme (VSAP);
- Specific programmes defined by organisations according to their own specificities and needs;
- New Indigo Programme, launched by European Union Member States and India, has a successful Networking Pilot Programme (NPP).

Besides the funding opportunities, the existing **Bilateral Agreements** between India and the 27 Member States of the EU have been mapped and reported in the paragraph 3.1. Most EU-Member states have S&T collaboration with India through active S&T cooperation agreements as in the case of Germany, Italy, UK, France, Poland, Romania, Slovenia, and moderately active agreements with Austria, Finland, Denmark





and Hungary. Many Member States work with India on the basis of Memorandum of Understanding/ Programme of cooperation or other agreements between institutions of their Countries and institutions of India. The sectors which counts many agreements are the life sciences & biotechnology, ICT and Energy. The life science & biotechnology is a sector with which India has a cooperation agreement with as many as 18 EU MS. ICT stands next in line with 12 MS having agreements with India. Interesting is the number of Joint R&D projects supported for the period 2011-12: about 450. The major partners were France, Italy, Germany and Portugal. Science and Technology bilateral cooperation opened doors for Indian participation in collaborative research with Europe in its largest research-funding programme for Science and Technology development: the Framework Programme of Research & Innovation. India has become the fifth largest international partner for the EU under FP7. In FP7, EU cooperation with India has increased compared to FP6, not only because of the full opening of the Programme but also through targeted actions, including coordinated co-funded calls, SICA projects, etc.

An analysis of the Indian participation to the Seventh Framework Programme showed that Indian organisations joined 926 proposals, even though only 149 of them were partners in successful projects and therefore get funded by the EU. The major participation was registered in the collaborative projects in the Health domain (28%), KBBE (16%) and ICT (15%).


The participants, both European and Indian, of the above mentioned FP7 projects were interviewed by the INDIA GATE partners to assess the main advantages and obstacles in the EU-INDIA cooperation. The results are presented in the fourth chapter.

This publication also addresses Industry, proposing an analysis of the framework in establishing EU company in India, focussing both on the main reasons and on the occurred obstacles. A comparative analysis is available in Chapter 4.3.

The last part of the publication tells a successful cooperation experience: the EU INDIA S&T coop days, an initiative which builds on the positive experience of cooperation between European and Indian stakeholders developed in the 2009 for organizing the first EU-India S&T Cooperation Days in New Delhi. The EU – INDIA S&T Coop days were organized in order to promote and enhance EU-India Scientific Cooperation, to discover the funding opportunities, to learn the rules of participation and to contribute to the definition of future research topics of mutual interest for the EU and India.

The success of the first event inspired to the involved organisations to continue the experience and offering to European and Indian players information, documents and services to facilitate and enhance their cooperation. The EU-India Cooperation Initiative became the single entry point to all available support measures for the promotion of EU India Science & Technology Cooperation.

Nine projects active in EU-INDIA cooperation, included INDIA GATE, are so far included in this initiative.



1. INDIA GATE: a bridge to India for European research

The INDIA GATE initiative's primary goal is to increase the Science & Technology cooperation between India and the European Union (EU from now on) by creating a "one-stop shop" for funding opportunities that are available in India for European organisations.

The Science & Technology agreement between India and EU recognizes the mutual benefit of access to respective funding programmes. As a matter of fact several initiatives exist to support Indian organisations' participation in the Seventh Framework Programme. INDIA GATE aims to play a similar role for European organisations who wants to benefit from RTD funding sources from India, thus bringing EU-India scientific cooperation forward by an increased participation of European organisations in Indian funding programmes and contributing to an increased mutual understanding of EU-India respective research systems.

The INDIA GATE team, through a 3-years-work, drew a holistic picture of the Indian Science & Technology & Innovation landscape by mapping the Indian research and innovation funding programmes and system, identifying the reasons for establishing operations in India or the obstacles that inhibit European researchers and



COORDINATOR



Agency for the Promotion of European Research

The Agency for the Promotion of European Research (APRE), is a non-profit research organisation that provides information, assistance and training on research and technological development programmes of the European Union. Within its 20 years of experience APRE has developed a sound international network and cooperation all over the world.
www.apre.it



PARTNER



HELP-FORWARD

HELP-FORWARD is the strategic alliance of the Research and the Industrial world in Greece. Since 1991, HELP-FORWARD offers technology transfer brokerage services to Greek companies and research institutions. In addition, it hosts the Greek International Cooperation National Contact Point for the 6th and 7th Framework Programme since 2002, and coordinates the official project (INCONTACT one-world) of the 100 INCO NCPs around the world and in cooperation with the European Commission.
<http://www.help-forward.gr/>

organisations from taking part in the identified opportunities, making the information available in a user-friendly manner to stimulate, encourage and facilitate participation. As result several reports were written and published on the INDIA GATE website and are reflected in this publication which presents the main output resulting from the reports and surveys.

The Indian industrial system has been examined also since it is recognised that industry plays an important role in shaping Research & innovation landscape. The cluster existence has been investigated and some success stories illustrated.

The team was very committed to raise awareness of Indian organisations, Indian Research Managers and Programme owners about the mutual benefit of collaboration and the importance of being open to Europe for some Indian programmes. With this aim several events and networking meetings were organised along with informal contacts which were also part of this strategy leading to a side effect: the recognition of the need of reciprocity of the EU-India Science & Technology agreement from the Indian stakeholders/ Science & Technology players too.



PARTNER



Europa Media Non-Profit Ltd

Europa Media Non-Profit Ltd. is an independent, non-profit company providing and presenting dispersed and highly technical information regarding EU policies, funding opportunities and programmes in a streamlined and simplified manner to potential stakeholders in Europe and worldwide. <http://www.europamedia.org/>



PARTNER



Council of Scientific and Industrial Research

Council of Scientific and Industrial Research (CSIR) is a premier industrial research and development organisation in India with a network of 37 laboratories spread throughout the country which cover a wide spectrum of S&T: from aeronautics, instrumentation, mining, environmental engineering and computer software to oceanography, geophysics and biotechnology. www.csir.res.in

1. INDIA GATE: a bridge to India for European research



PARTNER



EIRC Consulting Private Limited

EIRC Consulting Private Limited (EIRC), popularly known as Euro-India Research Centre is a research and management consulting firm based in Bangalore. EIRC's main activity is to assist European and India collaboration and partnerships in research and technological development on Framework programmes, national programmes and regional programmes. <http://www.euroindiaresearch.org/>



PARTNER



Indian Institute of Foreign Trade

Indian Institute of Foreign Trade (IIFT) is an autonomous organization set up in 1963 by the Government of India to help professionalize the country's foreign trade management and increase exports by developing human resources, generating, analyzing and disseminating data, and conducting policy research. <http://www.iift.edu/new/>



The strategic objectives of INDIA GATE

The objectives of INDIA GATE is to improve the understanding of the Indian Research & Innovation system from different perspective: economic, social and statistics. Each objective generated a report - which is downloadable from the INDIA GATE website – or an event as in the case of raising awareness.

This final publication aims at wide spreading the information and analysis the INDIA GATE team collected as far and as a one-stop-shop publication.

- ☞ Map and identify funding opportunities open for European organisations in India with a focus on their reciprocity character, rules of participation and funding rates
- ☞ Analyse the obstacles for participation with focus on their reciprocity conditions
- ☞ Review the bilateral agreements between EU Member States and India
- ☞ Improve the flow of information on programmes and funding opportunities (Initiatives of the Government of India, Bilateral Programmes) designed to support scientific and technological cooperation between the EU and India
- ☞ Enhance know how on cultural differences in business conduct and working style via an user friendly e-training
- ☞ Identify and demonstrate mutual understanding, interest and benefit in S&T cooperation between the EU and India
- ☞ Increase the mutual understanding of respective research systems

Each of the above objective forms a specific report which provided the basis for the present publication. The complete list of reports developed within the India Gate project is available on the website.

- ☞ List of the Ministries and the funding Agencies in India
- ☞ List of opportunities
- ☞ Database on funding providing organisations
- ☞ Report on Innovation landscape and motives for establishing operations in India
- ☞ Report on status on opening up funding programmes in India
- ☞ Report on Cluster existence and cooperation
- ☞ EU Industry in India
- ☞ Report on bilateral agreement
- ☞ Report on obstacles facing EU organisations
- ☞ Report on conclusions, best practices and recommendations



Resources

INDIAGATE website
www.access4.eu/india/index.php

2. INDIA'S SCIENCE, TECHNOLOGY AND INNOVATION SYSTEM

2.1 Indian Science & Technology system

Science & Technology (S&T) has always been an integral part of the Indian culture and it received a strong state support after country's independence in 1947. Since then, the Government of India has spared no effort to establish a modern S&T organisation in the country.

The overall structure of the research system of the country is constituted by four main actors:

- ☞ Public research system under government and public enterprises;
- ☞ Academic research system and universities;
- ☞ Private research laboratories under business enterprises;
- ☞ Non-governmental research institutions aided by both public and private sources.

So wide is the S&T infrastructure in India today that it encompasses S&T organisations under the Central Government (under the Ministries, Central Departments and Research and Development (R&D) Agencies) or under State Government as well as public and private sectors working in areas as diverse as agriculture and healthcare on one hand and nuclear and space research on the other. Significant contributors are the large number of institutes/undertakings functioning under the Central Government S&T departments which are: Department of Science and Technology (DST), Department of Scientific &



S&T SYSTEM IN INDIA

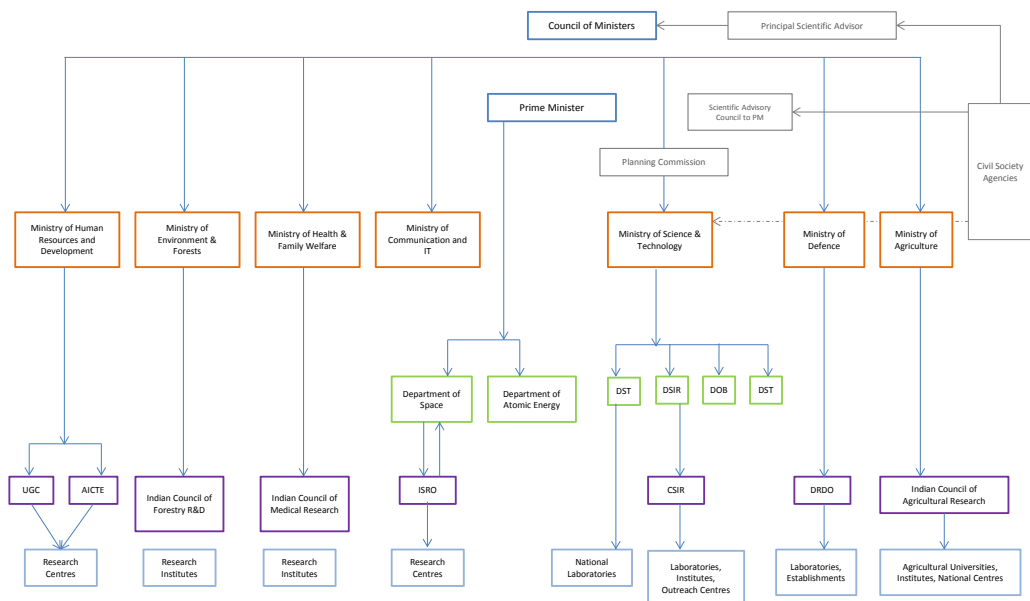
- ☞ Central Government S&T Department
- ☞ Independent Research Institute
- ☞ In-House R&D in Private industry
- ☞ S&T in Non-Government Organisations (NGOs)
- ☞ State Government S&T Department
- ☞ Central Socio-Economic & Other Ministries

Industrial Research (DSIR), Department of Atomic Energy (DAE), Department of Space (DoS), Department of Biotechnology (DBT) and Department of Ocean Development (DOD).

Among the S&T organisation associated with other Central Government Ministries, Defence Research & Development Organisation (DRDO) under the Ministry of Defence, Indian Council of Agricultural Research (ICAR) under the Ministry of Agriculture and Indian Council of Medical Research (ICMR) under the Ministry of Health & Family Welfare have large R&D infrastructure.

In addition to R&D establishments, the other major body pursuing S&T activities in India is the country's vast University system comprising 162 universities, 32 institutions deemed to be universities and 10 institutes of national importance.

A more detailed description of the main research institute is available in the paragraph 3.1. "Indian Science & Technology programmes.



Source: Department of Science & Technology - DST, 2010

1 Source: <http://dst.gov.in/stsysindia/about-sys.htm>

Research and Development expenditure

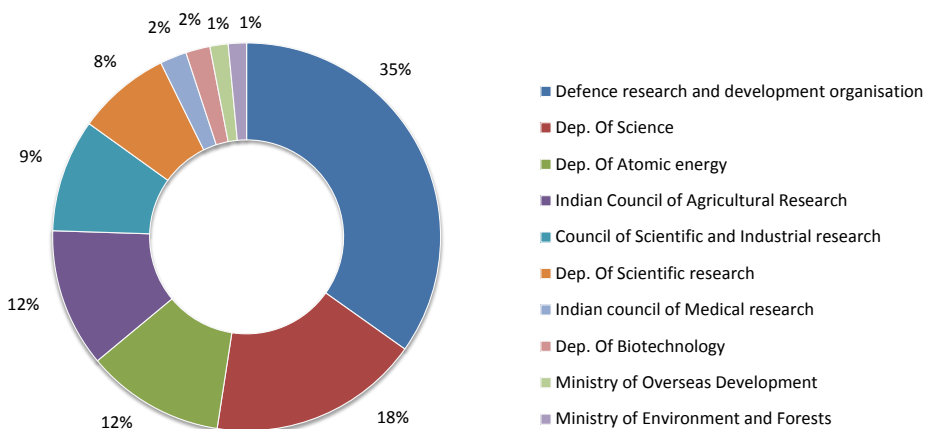
Since independence in 1947 until trade liberalization of 1990's the only source of financial support for innovative activities under the rubric of R&D was government of India. The government still continues to contribute a lion's share of R&D expenditures. The central and State governments and government owned entities public sector industry combined contributed nearly 75% of the money spent of R&D activities. The higher education expenditures on R&D activities was minimal at 4.4%.

According to the World Bank the percentage of Gross domestic expenditure on R&D of India was 0.8 in 2012. The contribution of Government was about 81,1 % and the industry contributed with the 16, 1%.to the R&D expenditure (source: United States Census Bureau).

All government investments in R&D activities are channeled through government agencies such as Council for Scientific and Industrial Research (CSIR), Indian Council for Agricultural Research (ICAR), Indian Council for Medical Research, Department of Science & Technology, Indian Space Research Organization, Department of Atomic Energy and others.

The following graphic illustrates the percentage of R&D expenditures through different government agencies. It is interesting to note where the R&D money is being spent.

Applied Research receives highest amount at 36.3%, followed by, Experimental Development 31.8% and Basic Research receives 26% of the R&D money.



% of R&D expenditures through different government agencies

Source: Department of Science and technology, 2009, R&D Statistics, cited S Mani 2010

The Private Sector Expenditures on R&D

The private sector expenditures on R&D accounts for 20% of total R&D expenditures. Although a small sum compared to government spending, it is substantial compared to earlier periods. Most of the private R&D expenditure is incurred in the pharmaceutical industry, which saw a fivefold increase from 2000 to 2005. This is followed by automotive industry, which increased the R&D spends from under 500 million Rupees to over a Billion Rupees.

Multinational Corporations (MNC) Role in R&D Activities

Foreign corporations R&D centres play a very important role in research and innovation activities in India. Establishment of MNC R&D centres started with Texas Instruments, which opened its R&D centre in Bangalore in 1984. Since then there has been an explosion of R&D activities by the multinational corporations. There are estimated to be 851 foreign R&D centres as of 2010. The expenditures incurred by foreign R&D centres has increased from Rs. 286 million in 2002-03 to Rs 28830 million in 2009-10.

The most active MNC in the R&D activities in India are from the US. Investments by the US MNC in R&D centres have increased sharply from 2004 onwards.

The foreign R&D centres have been extremely active in patenting the work done in their Indian R&D centres. In total 1969 patents were granted by the US patent office to foreign companies with active R&D in India. Vast majority of the patents are in ICT and unsurprisingly most of the companies who received patents are of US origin.

Foreign MNC are also active in patenting in India. Between the patenting figures of US patenting office and Indian patenting office, it is interesting to note that most of the patents granted in the US are in ICT and majority of patents granted in India are in electronics.

NAME OF FOREIGN COMPANY	INDUSTRY	NUMBER OF PATENTS GRANTED IN 2009-10
Qualcomm	ICT	230
Samsung Electronics	Electronics	79
BASF	Chemicals	66
Siemens	Electronics	65
Thomson Licensing	Service	62
Motorola	Electronics	52
Philips	Electronics	49
LG Electronics	Electronics	49
Honda Motor	Automotive	47
LM Ericsson	ICT	41

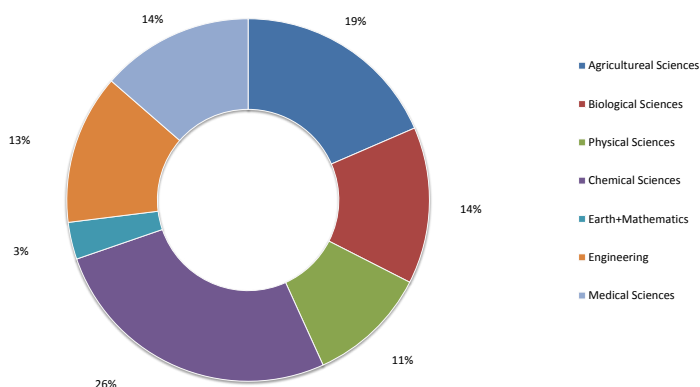
Source: Controller General of Patents, Design and Trademark (2010)

Research and Development Output

Normally the R&D Output is measured in terms of peer-reviewed publications in scientific journals and patent applications and patents granted. Along with the R&D expenditures there has been tremendous growth in the number of research publications which increased from close to 60 thousand in 2001 to 90 thousand in 2006. The maximum numbers of publications were in Chemical Sciences followed by Agricultural Sciences and Biological Sciences. Least number of publications were in Mathematics and Earth sciences.

Following graph illustrates subject wise distribution of published papers.

Number of patent applications increased from about 8000 in 2001 to nearly 30 thousand 2006. Number of patents granted too has increased.



Distribution of Papers by Subject areas (2005)

The Indian patents system

The Indian patents system is governed by the Patents Act (1970) which affords protection to patents for inventions (including patents of addition). After India became Trade-Related Intellectual Property Rights (TRIPS) compliant in 2005, the total number of patents filed in India has been significantly increasing, indicating an environment conducive for innovation throughout the country. In the decade the number of patent application increased of about 250% (Source: Intellectual Property India, Annual report 2009-10).

However, interestingly the patents granted to foreign nationals are three times higher than the ones granted to Indian nationals.

India's Educational Structure

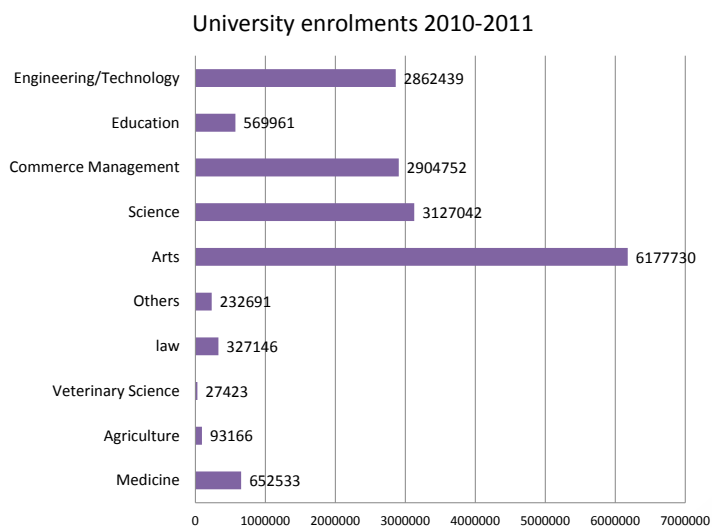
Universities and university-level institutions in India include 20 Central Universities, 215 State Universities, 100 Deemed Universities, 5 institutions established under State Act and 13 institutes of national importance apart from around 17,000 colleges including 1800 women's colleges.

In the last decade, there has been a significant rise in enrollment at all levels. As per a 2012 summary report on higher education in India released by the University Grants Commission (UGC), the number of universities rose to 634, and affiliated colleges rose to over 33,000. By 2010, gross enrollment in the university system had reached almost 17 million (not including students enrolled in technical diploma institutes and other informal vocational institutes where overall annual intake has crossed 1 million.). Engineering enrollment was roughly 2.8 million in 2010 although first year engineering enrollment touched a million in 2012. 38% of students were enrolled in different branches of science, engineering, medicine and agriculture.

In the academic year 2010-2011, 86% of students who passed out of secondary education level enrolled for undergraduate courses. However, at the postgraduate level, the enrolments saw a sharp decline at just 12%. They reduced even further, to a meager 1% for research and PhD courses. Vast job opportunity for degree holders with lucrative salaries offered by private industries and MNCs could be one of the reasons why students take up jobs soon after college.

72% of the total enrolment has been in the three faculties of Arts, Sciences and Commerce & management, while the remaining 28% in the professional courses with engineering and technology recording the highest percentage (close to 3 million enrolments), followed by medical courses. However, agriculture, which is one of the main occupations in the country, saw minuscule enrolments at 0.5 % (See figure below).

The Faculty of Arts records the highest number of Ph.D degrees at 34%, followed by the faculty of Science at 31% in 2010-2011. These two faculties together account for 65% of the total number of research degrees awarded. In the professional faculties, the faculty of Engineering & Technology has topped with as many as 1007 Ph.D. degrees, followed by Agriculture, education and medicine faculties at 573, 469 and 337.



R&D Workforce in India

As of 2005 there were over 150 thousand people engaged in R&D activities in India. Of these roughly 63% were working in the institutions, academia as well as publicly supported R&D organizations and 31% in the private sector. Over 50% of those working on R&D activities have post-graduate or higher degree and the 30% graduate degree. Remaining are diploma holders. Of the total R&D the public institutions employed 76% of the PhD and 50% of post-graduates.

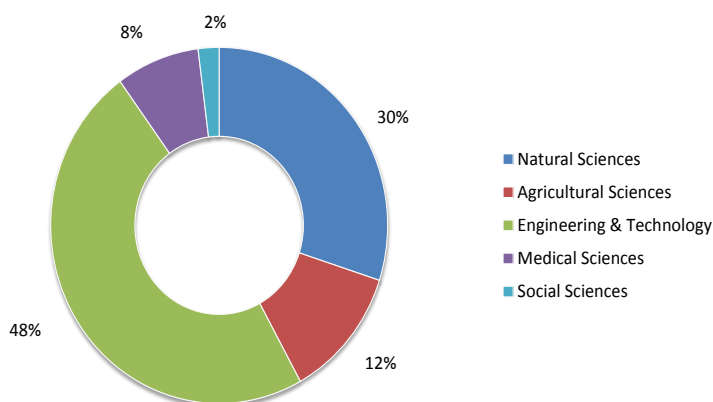
It is interesting to observe the subject and sector wise distribution of R&D personnel in India, because it correlates with industry sectors with most active innovation activities. Engineering and Technology has the majority share with 47.6% of the total personnel in R&D followed by Natural Sciences 29.8% and Agriculture 12.1%. The industrial sector employed 53% with Engineering & Technology specialization and 27.5% with advanced degrees in Natural Sciences. The R&D institutions, on the other hand, employed 32% of R&D personnel with Natural Sciences specialization and 19.6% with Agricultural Sciences degrees.

Despite a large number of well-educated Indians, the number of people engaged in R&D activities is small.



INDIA'S EDUCATIONAL STRUCTURE

Education structure in India is multi-tier. The first twelve years of education is split in 4 levels - primary, upper primary, secondary and senior secondary. While the primary education is 5 years long, the upper primary is 3 years. Secondary and senior secondary schools are each 2 years long. Following that the students have the option of either entering into 3 years long under graduate courses in science (basic science, home science, computer science, etc), arts(humanities, social sciences, languages, etc) or commerce, or they can opt for professional/technical education (engineering or medicine) which run for 4 and 5 years respectively. Upon completion of UG program, the students have the option to get into Post Graduation courses (2 years), followed by PhD.



R&D Manpower by field of Specialization



Conclusions

Overall India Innovation Landscape is an uneven and rugged terrain. There are peaks of success and valleys of depression. Although there have been remarkable innovations of quality and low cost their mass impact is yet to be visible, especially given that India possesses huge population. In economic terms, India has had impressive growth story, but this growth has been uneven and has not reached all sections of the population. In terms of innovation inputs such as infrastructure, investments and others India continues to lag behind China and western nations. The innovation output is also not remarkable, however India is a very good in Innovation Efficiency. Despite the challenges, India continues to be a preferred destinations for MNC R&D centres, which are utilizing local talent to support their research activities.



Resources



Study report “Innovation & Research & Development Activities of European companies in India”, published by the European Business Group (EBG), 2012

The European Business Group (EBG) established in 1997 was a joint initiative of the European Commission and the European Business Community in India and has since been recognised by the Government of India and the European Commission as the industry lobby representing the interest of European companies in India.

<http://www.europeanbusinessgroupindia.com>

2.2 Indian Innovation system

In India, the usage of expression Innovation is fairly recent and quickly occupied a prominent position in public discourse. It entered the official policy vocabulary only 2007 with the publication of National Knowledge Commission study on innovation in India. Since the declaration of 2010-20 as the “Decade of Innovation” it has become a major policy objective with the view of reaching the benefits to more than half of India’s population, which remains in the margins of economic growth. Although the word innovation to mean new products, services and process to resolve commercial and social problems is a recent phenomenon, India had been actively producing innovative solutions, within constraints, to address the unmet needs, the so called “Frugal innovation”: an approach to innovation that has emerged as a distinctive strength of the Indian innovation system, and one that is increasingly relevant to policymakers and businesses around the world².

Frugal innovation


Frugal innovation responds to limitations in resources, whether financial, material or institutional, and turns these constraints into an advantage. Through minimising the use of resources in development, production and delivery, or by leveraging them in new ways, frugal innovation results in dramatically lower-cost products and services. Successful frugal innovations are not only lower in cost, but outperform the alternative, and can be made available at large scale. Often, but not always, frugal innovations have an explicitly social mission.

India bears extreme economic conditions and gaps in the provision of services. Most of the rural population lack services in healthcare, drinking water, and sanitation facilities. This stimulates the need for frugal innovation in providing low cost solutions to basic human necessities. A growing consumer base that is extremely price-sensitive is also pushing innovation in affordable necessities.

Such resource efficient and customer centric , disruptive solutions that look at efficient utilisation of resources across the value chain not only suit the needs of emerging economies and the bottom of the pyramid consumers, but also find a market in developed economies, a phenomenon called by many epithets including ‘reverse innovation’, disruptive innovation, and bricolage, among others. This reflects the belief that heterogeneous, multi-layered markets like India aren’t just meant to consume the stripped-down, end-of-life products from the western firms, but could emerge as beachheads for new forms of innovations³.

² Source “Our Frugal Future: Lessons from India’s Innovation System”, Kirsten Bound and Ian Thornton by Nesta, July 2012 <http://www.nesta.org.uk/library/documents/OurFrugFuture.pdf>

³ “Innovation and R&D Activities of European Companies in India: A Study Report”, published by EBG – The European business Group, 2012



Frugal innovation is also a mind-set suggesting openness to improvisation and outside ideas in a search for the simplest route to solving a complex problem.

Why has frugal innovation emerged as a distinctive strength of the Indian innovation system?

While frugal innovation is not the preserve of India, and a growing community of analysts are tracking the development of the phenomenon worldwide, a number of factors have aligned to create the conditions for high-impact frugal innovation in India.

1. A culture of 'jugaad', or creative improvisation, means the unusual skillset and mindset required for frugal innovation are abundant
2. A huge market with a growing, aspirational middle class creates the perfect conditions for frugal innovation.
3. Not only is the Indian consumer base growing, but it is also extremely price sensitive and willing to experiment, sustaining demand for frugal innovation.
4. Extreme conditions and major gaps in service provision stimulates demand for low- cost services in health, education and energy.
5. Strengths in service and business model innovation create an advantage in creative remodelling of product-service ecosystems.
6. New sources of social finance are lowering the cost of investing in frugal innovations.
7. An increasingly 'inclusive' innovation policy is developing the institutional conditions that could drive high-impact frugal innovations.
8. Some of the most prominent and innovative solutions to have emerged from India are presented following. They try to address the most pressing problems that a vast majority of Indians face: health, water and electricity, with solutions that are affordable.

Six cases of frugal innovation in India are presented in the following boxes. Each case addresses a basic need of the Indian society which have been satisfied through a reduction of costs or size.

Frugal Innovations in India

The Selco solar lamps



SELCO India is one of the best examples of inclusive innovation. SELCO has played an unparalleled role in providing energy access to millions of underserved and inaccessible households in remote villages across India.

Close to 50% of the Indian population, mostly in rural areas, lacks electricity; and in most of these areas the supply is unreliable. SELCO India, a solar electric lamp company and a social enterprise based in Bangalore, has pioneered the art of "social innovation" in the sustainable, renewable energy sector. SELCO India has installed solar light systems in 125,000 houses and aims to reach over 200,000 households by 2014. SELCO's products range from solar energy based interventions like solar lamps, solar thermal heaters and solar inverters, to low smoke cook stoves.

Founded in 1995 by a social entrepreneur Dr. Harish Hande, with a seed fund of 15,000 rupees, from the co-founder Mr. Neville Williams, SELCO now operates through 28 service centres in Karnataka and Gujarat. While more than 135,000 home lighting systems have been installed, one of SELCO's greatest achievements include installation of the largest solar water heating system, with an approximate capacity of 400,000 liters for a client in India.

A typical SELCO system that uses 35 Wp PV Module to supply four 7W compact fluorescent lights costs about US\$300. Local SELCO service centres cater to customer demand, provide surveys, installation, after-sales service and spare parts. Local banks or microfinance organizations are looped in to provide affordable loans for purchase, usually requiring a small down payment and monthly installments over five years. The Solar system replaces about 8.5 million liters/year of kerosene (around 120 liters per year is used by a family for lighting), and the emission of about 22,000 tones/year of CO₂. The improved biomass cook stove is approximately 40% more fuel efficient, emits 70%-80% less smoke (from traditional cook stoves) and is designed to meet the cooking requirements of rural households.

In recognition of their service, SELCO India was awarded the prestigious Ashden Awards, also known as the Green Oscars, in years 2005 and 2007. SELCO was recognized not only for its innovation in developing sustainable energy products, but also in building links with end-user finance institutions that enable people to buy them.

Frugal Innovations in India

The Jaipur Foot

One of the best and world famous frugal innovations from India is the Jaipur Foot, an artificial limb named after the locality of the inventor - Jaipur. The foot was developed by an orthopedic surgeon Dr P K Sethi, in 1968. However, it was Dr D R Mehta, whose philanthropic ideals, to fix the foot free of cost, to the physically challenged, that enabled the innovation to reach millions of people. Dr Mehta rendered this great service through his charitable trust, Bhagawan Mahaveer Vikalang Sahayata Samiti (BMVSS), Jaipur. In 34 years time, Jaipur foot has provided limbs to 360,000 people, and around 600,000 got calipers, crutches and tricycles across the world. On account of this large turnover of BMVSS, it has been the largest organization in the world. BMVSS does the charitable work in India and abroad. BMVSS's devices are low cost, locally produced prosthetic devices.

Jaipur foot's uniqueness lies in its novel technology which comes in an unbelievably low price – real frugal innovation! It is light and one can run, climb trees, pedal bicycle while it is on and with all these features included, it is priced as low as 3 US dollars which in US, will cost 2500 US dollars. Limb made with this technology are closest to a normal human limb which has got the same range of movements which a normal human foot has. Its dorsiflexion inversion, eversion and axial rotation facilities allow amputees not only to walk comfortably but also squat (sitting on hunches), kneel, crouch, sit cross legged, walk on undulated terrain, run, climb a tree and also drive an automobile making it an all functional, all terrain limb.

Jaipur foot and BMVSS can also be quoted as an example for “inclusive, process innovation”. In order to reach out to the poorest, BMVSS kept the administrative cost as low as 4%, while elsewhere it is 50 to 80% of the cost of limbs. Thus BMVSS was able to serve 70,192 patients in the year 2006-07. While in 1975, 59 artificial limbs were fitted in a single year, in 2009, after 35 years, every year BMVSS fits 17,000 to 20,000 artificial limbs adding up to around 350000 artificial limbs fitted in 35 years. Jaipur foot has reached to people outside India as well. In 22 countries, from Afghanistan to Zambia, 16,783 Jaipur feet have been fitted, maximum being 3,051 in Afghanistan.

Frugal Innovations in India

Narayana Hrudyalaya



India records higher cardiac diseases in a year than most countries and in addition, the cost of medical interventions/treatment is also very high. Narayana Hrudyalaya, founded by a renowned cardiac surgeon Dr Devi Shetty in 2000, has broken this cost barrier through internal process innovation. It boasts accessible and affordable open-heart surgeries, which makes it a good case study subject on frugal innovation. This Hospital located in Bangalore, made use of “economies of scale” to obtain the cost advantages due to expansion. In addition, it was able to contain cost by fine-tuning processes, driving hard bargains and negotiating creative partnership deals.

At Narayana Hrudyalaya patients are charged flat \$1500 for heart surgeries compared to \$4500 that other heart hospitals charge on average, and in the US, the costs go as high as \$45000! Added to that Narayana Hrudyalaya has an innovative medical insurance scheme under which people who can't afford to pay can be covered. This low price doesn't come with compromised quality; it has amazing 95% success rate in heart surgeries and has become one of the well renowned hospitals for pediatric cardiac care.

The hospital's super-specialization approach, by employing highly specialized cardiology doctors, who can perform a specific aspect in a much better and faster way than others with generic skills, sets it apart from popularly known 'multi specialty hospitals' treating variety of diseases. Besides, the hospital has recruited and trained women with high school education in taking echocardiograms of patients, which is generally carried out by trained doctors. This has brought more time for doctors to perform higher complex activities. With these innovations around internal processes, Narayana Hrudyalaya conducts around 30 cardiac surgeries per day compared with four to five in other major hospitals. This 'high volume' in turn has helped the business grow and charge 'low cost' for their patients.

Narayana Hrudyalaya's yet another innovative process is their telemedicine services. The hospital's partnership with Indian Space Research Organization (ISRO) has enabled its telemedicine services to reach even the remote areas of Tripura and Nagaland in addition to areas in south of Karnataka by connecting them using INSAT satellite. Now around 170 hospitals provide telemedicine network, thanks to the advanced technology and innovative ideas of Narayana Hrudyalaya which has made “affordable” healthcare a reality.

Frugal Innovations in India

Aravind Eyecare



Aravind Eye Care System in the southern state of Tamil Nadu has revolutionized the healthcare sector through its systematic and detailed process innovation. A brainchild of Dr G Venkataswamy, Aravind eye care came into existence in 1976, with the sole mission of eliminating unnecessary blindness, mainly through cataract, in Tamil Nadu, and across India.

India has 12 million blind people, more than any other country. Simple cataract surgery can restore vision to around 9 million blind people. Though providing treatment and surgery did not seem problematic, the cost associated with it came as a big hurdle. Treating cataracts in Indian hospitals cost around \$300 and in US around \$2500. For a country like India where the rural population earn less than \$2/day, such a cost made the treatment unreachable. Aravind Eye Care succeeded in removing this barrier. Through developments and refinements in the system, the average cost in Aravind Eye care system was brought down to \$25, with over 60% treated free. Today, the Aravind Eye Care System is the largest and most productive eye care facility in the world.

Aravind eye care's innovation includes 'standardization' and 'engineering' cataract surgery for high volume production. To ensure high volumes it went out to rural locations offering advice and diagnosis, feeding patients into the core hospitals where they are treated. High attention given on training ensured adequate supply of key skills. With focus on continuously improving and extending their system models, the Aravind Eye Hospitals gradually shifted to become the Aravind Eye Care System with a dedicated factory for producing lenses, a training centre to provide key skills, specialist ophthalmic research centres, and an international eye bank.

These detailed process innovations led to high productivity. In a conventional hospital an eye operation would typically take 30 minutes; yet the Aravind system needs only 10. Each surgeon works on two operating tables alternately, with 70% of activities carried out by a team of 4 nurses supporting the surgeon, enabling 200,000 plus cases per year, with each doctor carrying out around 2600 operations/year against an Indian average of around 400.

Aravind Eyecare System is now grown into a network of eye hospitals that have seen nearly 32 million patients in 36 years and performed nearly 4 million eye surgeries, majority of them being very cheap or free making it a landmark example world over, for frugal innovation.

Frugal Innovations in India

Swach: Tata Water Filter



Tata Chemicals' 'Swach' – meaning 'Clean' in Hindi, is an innovative water purifier made from rick husk ash, a natural material and one of India's most common waste products, and silver nano particle filter made out of cutting edge technology is an outstanding example for affordable innovation. Swach priced 50% cheaper than its nearest competitor was launched in Dec 2009. Priced 999 Indian Rupees, it is the cheapest water filter in the world with a benchmark cost of Rs 30 per month for a family of five.

Swach makes a good case study topic for frugal and inclusive innovation, and can be considered as an excellent example of how high quality engineering and design can transform an idea into a good, affordable consumer product. One of the prominent features of the filter is that it does not require electricity or running water to operate which gives it an added advantage of penetration to remote, economically disadvantaged villages where almost no household enjoys running water facility and suffer from shortfall of electricity most of the time. Besides, the cartridge that enables purification could be replaced easily by any householder without any technical assistance. All these conveniences, coupled with the fact that it is the world's cheapest water purifier, at 10 paise per litre, makes it a model example for frugal innovation.

Another important ground-breaking approach adopted includes collaboration of different kinds of organizations and internal resources for facilitating this innovation. Several Tata group of companies partnered in this novel effort. While the idea was originated in TCS, the product was created by a joint team of Tata Chemicals and TCS, and development of nano technology came from Tata Research Development and Design Centre, a subsidiary of TCS. Mass production of the product was handled by Titan industries, watches and precision equipment manufacturer, and after sales service and support was rendered by Tata Business Support Solutions and Tata Teleservices. With each partner lending their expertise to the Tata Swach, the product comes at a reasonable value to the customer.

Tata Swach has been voted the 'Product of the Year 2012' on the basis of a survey conducted by Nielsen with 30,000 consumers across 36 markets in the country. It won gold at Asian Innovations Award 2010, and several other accolades.

Frugal Innovations in India

GE MAC 400 Electrocardiogram



GE Medical Systems Group in 2008 launched an affordable, portable Electro Cardio Gram (ECG) machine - 'MAC 400' for rural India at one tenth the cost and one third the weight of previous units. MAC 400 priced at around \$800 delivers ECG reports for less than a dollar! The machine weighing 7 lb compares with a large 65 lb. machine which sells in the USA for over \$10,000. The machine uses just four buttons, unlike the usual dozen, and has an inbuilt tiny portable printer, which makes it small enough to fit in the physician's backpack. It runs on batteries for up to a week or 100 ECGs on a single charge enabling cardiac assessments even in rural areas, thus making it accessible to a larger section of society.

GE Healthcare engineers combined technology and creativity to develop the device appropriate for the Indian market. The engineers who worked on this challenging project had to squeeze the technology used in a 15 lb ECG machine costing 5.4 million dollars and which took 3 and a half years to develop, into a portable device that would weigh less than three pounds and can be held with one hand, to be developed in 18 months for just 60% of its wholesale cost.

The engineers adopted some natural cost advantages. The new device has lower material costs, uses less plastic and sports a smaller LCD screen. The labor cost was reduced considerably as eight of the nine engineers were based in India. For the machine's printer, the team adapted the one used in bus terminal kiosks in India. A commercially available chip was purchased at one-fourth the price instead of the conventional procedure followed - to customize processing chips which requires 18-week advance order.

Other in house products like portable ultrasound machine, semi-portable ECGs in the '90s with outdated technology were studied to understand low-cost source for technology and printer jamming problems. Plastic mold prototypes were cut far earlier in the process than usual, which enabled early feedback from doctors. Software algorithm was simplified to reduce the memory it was drawing and the battery was modified to prevent wear-out problems when stalled at distributor's outlets.

In addition to being an illustration for creativity and technology innovation, this compact device has now become a case study in reverse innovation; a strategy of innovating in developing markets, and selling them in developed world. This ECG machine, very successful in rural India, was launched as an improved version a year later in 2009 in US as MAC 800.

India on Innovation Indices

India has advanced in the world ranking lists on innovation over the last decades.

- ❧ In the Economist Intelligence Unit (EIU) rankings – which ranks the world's most innovative countries - India advanced from 58th position in 2002-06 to 54th position in the latest rankings for 2009-2013.
- ❧ In the innovation component of the World Economic Forum's Centre for Global Competitiveness Index that also measures innovativeness of a country India ranks 40th in 2011-2012 and 42th in 2010-11, which is a two point improvement in one year. However, in 2009-10 India was ranked 28th in Innovativeness and Sophistication that means India had dropped 14 positions between 2008-09 and 2010-11.
- ❧ Similar wild fluctuations in the rankings can be observed in the Global Innovation Index (GII) rankings as well, which positioned India at the 41st place in 2008-09. Over one decade India climbed to the top of the list occupying the 64th position in 2011-12.

Given that India's position keeps swinging like a pendulum on the innovation indices it is very difficult to know what truly India's position is in Innovation relative to other countries. However, a consistent picture emerges insofar as the innovation inputs and innovation efficiency are concerned. For example, India scores, across the board, very poorly on innovation inputs and innovation environment, which include R&D expenditures, infrastructure, transport, energy, government policy and other innovation enablers. Despite these low quality inputs and poor innovation environments India continues to be innovative, hence it receives high marks for innovation efficiency. In the GII Innovation efficiency Index 2012 India is ranked 2 in the world improving its position from previous year, which was 9th⁵.

In the Global Competitiveness Innovation Capacity Index India performs well on quality of research, patents, availability of qualified workforce etc, except on government procurement of advanced technology.

What can be concluded from these results is that the Indians are extremely good at overcoming the weakness of innovation inputs and producing quality innovation outputs. This leads us to believe that India's potential for innovation is yet to be fully harnessed and improvements in innovation inputs and innovation environment may probably result in an explosion of innovations.

⁵ There are several indices that measure innovativeness of countries and rank them accordingly. All the indices take the following into account for their measurements. (i) Direct innovation inputs: Research and Development (R&D) expenditures as a percentage of Gross Domestic Product (GDP), Company spending on R&D, quality of research infrastructure, educational levels & technical skills of the workforce, quality of IT & communication infrastructure, and broadband penetration. (ii) Direct Innovation outputs: Number of research and scientific publications and number of patents awarded. (iii) Innovation Environment: Political environment, market opportunities, government Policy towards free enterprise, competitiveness and foreign direct investment, foreign trade and exchange controls, tax policy, financing, labor market, Infrastructure and others.

COUNTRY	CAPACITY FOR INNOVATION		QUALITY OF SCIENTIFIC RESEARCH INSTITUTIONS		COMPANY SPENDING ON R&D		UNIVERSITY-INDUSTRY COLLABORATION IN R&D		GOVERNMENT PROCUREMENT ON ADVANCED TECHNOLOGY PRODUCTS		AVAILABILITY OF SCIENTISTS AND ENGINEERS		UTILITY PATENTS (PER MISSION OF PEOPLE)	
	Rank	Score	Rank	Score	Rank	Score	Rank	Score	Rank	Score	Rank	Score	Rank	Score
Brazil	31	3.8	42	4.1	30	3.8	38	4.2	52	3.9	91	3.8	60	0.9
China	23	4.2	38	4.3	23	4.2	29	4.5	16	4.4	33	4.6	46	2
India	35	3.6	34	4.5	33	3.7	50	3.8	78	3.5	21	4.9	59	0.9
Japan	1	5.8	11	5.5	1	5.9	16	5.1	32	4.1	2	5.8	2	352.9
Rep. of Korea	20	4.3	25	4.8	11	4.8	25	4.7	31	4.1	23	4.9	5	240.6
United Kingdom	13	4.8	3	6.1	12	4.7	2	5.8	49	3.9	14	5.1	20	69.5
United States	7	5.2	7	5.8	6	5.3	3	5.7	9	4.7	4	5.5	3	339.4

Note: Rank refers to the economy's global rank on each indicator among 142 economies. Scores range from 1, low to 7 highest, except for utility patent, where the score shows the number of patents per million people.

Source: World Economic Forum 2012

India's Uneven Economic Growth

India is one of the largest economies in the world. In 2012 data released by the International Monetary Fund (IMF) shows that India's gross domestic product in purchasing power parity (PPP) terms stood at \$4.46 trillion in 2011, marginally higher than Japan's \$4.44 trillion, making it the third-biggest economy after the United States and China.

From 1991, the year liberalization had begun; Indian economy has performed exceptionally well with an average growth of 7% a year since 2005. Marginally effected by the global economic crisis of 2007-2009 Indian economy recovered quickly to perform impressively until 2011. However, the growth has slowed down in 2012 owing largely to the policy paralysis of Indian central government, a coalition of Indian National Congress and several small regional parties with desperate agendas. The experts and the analysts have downgraded growth forecast for the financial year 2012-13 from 6-2-6.4% to 5.1-5.3%.

The economic growth does not present a uniform picture for whole of the nation. The Economist magazine rendering of India states and territories GDP map comparing to countries that match the GDP and population of countries presents a very interesting visualization of growth in India. There are regions such as state of Maharashtra where the financial capital of India Mumbai is located with GDP comparable to Singapore and other states like Tripura in North-Eastern part of India, which has a GDP equivalent to Somalia.



Resources

"Innovation and R&D Activities of European Companies in India: A Study Report"

EBG – The European business Group, 2012
<http://www.europeanbusinessgroupindia.com/>

"Our Frugal Future: Lessons from India's innovation System"

Kirsten Bound and Ian Thornton, July 2012, NESTA
This report explores the policies, institutions and industries that are driving research and innovation in India. It is downloadable at
<http://www.nesta.org.uk/library/documents/OurFrugFuture.pdf>



Future of Innovation: Policies & Initiatives

The Indian Government declared 2010-20 as “Decade of Innovation.” In order to realize the decade of innovation by defining and driving an ambitious agenda the government established the National Innovation Council (NIC) in 2010. The council members include well-known people from corporate and social sectors and the academia.

National Innovation Council: Inclusive Innovation

Innovation is often discussed and used as a tool for gaining competitive advantage for commercial enterprises. However, innovation cannot simple be an instrument of commercial advantage, especially in a nation like India where hundreds of millions of people live without the basic services such as food, water, housing, health and education. In this context innovation can be an important device to solve challenges and create sustainable growth. The NIC innovation approach intends to extend beyond R&D, products, patents and focus on inclusive innovation for the people at the bottom of the pyramid to find affordable, quality services & products and create mechanisms & platforms that can scale grassroots innovations to generate sustainable livelihood and employment.

As articulated above, the aim of NIC is to redefine innovation looking beyond the research and Development (R&D) to new and creative solutions for inclusive growth. With the view of realizing its vision NIC has undertaken major initiatives, which include:

- ❧ **India Inclusive Innovation Fund:** A billion dollar fund to invest in world-class enterprises engaged in developing products and solutions for the problems of poor.
- ❧ **Sectorial Innovation Councils:** Aligned to central government ministries to enable innovations within the sector.
- ❧ **State Innovation Councils:** For each of the states and union territories to create an innovation ecosystem in the state.
- ❧ **Industry Innovation Clusters & Cluster Innovation Centres:** To bring together different stakeholders for collaboration and promotion of innovation
- ❧ **Innovation in Education & University Clusters:** Enable innovation in creativity in education system and create university clusters as hubs of innovation.

They are deepen following.

India Inclusive Innovation Fund

One critical support required to translate innovative ideas into tangible products and services is finance. There is need for both private and public funding organizations and individuals who are willing to take risks fund the new enterprises. Most of the money for innovation in India comes from the government and is channeled through various government agencies. Despite recent spike in private industry investment in R&D government accounts for two thirds of the expenditure on R&D.

Availability of Venture Capital (VC) is relatively new for India. Only since 2005 there has been significant amount of VC funding flowing into the country. Although VC investments stand at 1.5 billion in 2011 it is a paltry sum compared to the investments by VCs in the US or other developed countries. Normally, VCs tend to look for high-growth and high-return opportunities to fund. As a result enterprise, which may have larger social impact, but with lower returns do not attract the VCs interest. In order to overcome this inherent lacuna in the financial dimension of innovation eco system the NIC has established a billion dollar India Inclusive Innovation Fund.

The fund is focused on investing in start-ups that provide solutions and products to meet the needs of the poor citizens at the bottom of the socioeconomic pyramid. Targeting mainly core sectors such as education, healthcare and agriculture, the India Inclusive Innovation Fund has 4 objectives:

- ❖ Focus on India's poor. Invest in companies and startups that are providing solutions to the problems of India's 500 million poor.
- ❖ Combine Social and Commercial returns: The fund will invest in for-profit entities with social impact so that there is a healthy return on investment.
- ❖ Drive Employment and Livelihood Generation: Fund enterprises that generate employment for the poor.
- ❖ Establish a Model for Wider Inclusive Innovation Funding: By investing in social focused commercial enterprises become models for other funds to follow.

The India Inclusive Innovation Fund structured as a autonomous and professionally managed entity has ten-year duration with 20% of the USD 1 billion contributed by the government and the remaining 80% from private sources, philanthropists, and bilateral and multilateral institutions.

The fund will source investment opportunities for direct investment in social enterprises through: open broadcast; seek early and mid-stage investment prospects through Angel and Venture capital networks; Community Organizations such as NGOs and non-profits as a source for entrepreneurs and enterprises with social impact focus; and invest through or co-invest with other funds that are concentrating on social enterprises.

The Ministry of Micro, Small and Medium Enterprises (MSME) and sanctioned 100 crores as seed money and the fund is expected to be fully operational by the end of financial year 2012-13. An active search is on for the CEO of the fund.



State and Sectorial Innovation Councils

With multiple regions, states, languages and multiple and overlapping administrative agencies, India is a very complex nation. Although a central driving force such as National Innovation Council is critical for driving an agenda as ambitious as innovation, the efforts need to be echoed throughout the system for them to have a meaningful impact. In order to amplify at every level its agenda, National Innovation Council is setting up State and Sectorial innovation councils. While the State council focus on innovation policy initiatives and creation of ecosystem in each state and Sectorial Council will be aligned to each central ministry.

The State Innovation Councils in each state are modeled after National Innovation Council. They will drive the innovation agenda in a state across different sections of the society by bringing together on a single platform. The State Councils will organize educational and awareness events on innovation, map innovation opportunities in the state, network local educational institutions, MSME, R&D institutions and local talent, and input into national Innovation Roadmap.

The **Sectorial Innovation Councils** will drive the innovation agenda within an industry sector. They are responsible for harnessing the core competencies, talent, resources and capabilities to create opportunities for innovation and provide input to Innovation Roadmap.

Both the State and Sectorial Innovation Councils are lean and flexible bodies with 7-11 members with representation from all stakeholders. Even though the councils are setup under the aegis of the government they are autonomous and have the mandate to incorporate voices from outside the government.

22 States and 24 Sectorial Councils have been constituted.

Innovation Clusters

Recognizing the critical role played by the cluster in fostering and sustaining innovation the NIC is actively pursuing the development of The Cluster Innovation Centres (CIC) with the responsibility of promoting collaboration by bringing together various stakeholders, including the government agencies, research institutions, industry, academia, professional service organizations and local players. The CICs exist in physical spaces or as virtual entities that are staffed by dedicated individuals who will be responsible for carrying out the activities of CICs.

The CICs are entrusted with critical roles:

- The Connector: Function as a hub for networking and sharing the internal units of the cluster as well as the external organizations of the industry
- The Innovator: Act as a catalyst for innovation and manage the day to day activities in the cluster
- The Channel: Facilitate resource delivery to innovation, including research and development, financial support, expertise and others.

In 2011-12 financial year NIC seeded 7 CICs in different parts of the country covering different industry segments. More details about the CICs and their activities are available in the paragraph 2.3 “Clusters: existence and cooperation”.

Innovation in Education and University Clusters

Recognizing the fundamental role of education in nurturing and fostering an ecosystem of innovation the National Innovation Council is engaged in a series of initiatives to encourage innovations in existing educational institutions – universities, colleges and schools, as well as promoting new educational models and innovative platforms for knowledge creation, dissemination and application.

National Innovation Scholarships

National Innovation 1000 Scholarships a year awarded to talented children at the High School and Secondary School level (Classes 9-12) who think creatively, laterally and innovatively on issues that they perceive as important.

Under this scheme 50% of the scholarships are earmarked for innovations by students in schools located in non-urban areas and at least 33% are earmarked for children from the field of liberal arts.

Innovation Centre in each DIET - District Institute of Education and Training

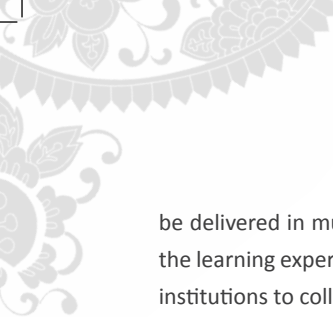
NInC has proposed creating an Innovation Centre in each DIET. A District level Innovation Centre will pool in the best teachers in Math, Science and Social Sciences to lead innovation in the schools of the district. They will develop modules for teacher education, talent spotting and improvise on curricula for activities that promote innovation and so on.

Mapping of Local History, Ecology and Cultural Heritage

Instead of learning in the classroom, once a week in a year, the students will learn from the society about their local economy, local ecology, local history and local cultural heritage. Students, assisted by a volunteer teacher, follow a structured format to undertake a tour of the village around the school. The purpose is to piece together local history, local ecology, map local bio-diversity, local culture, and heritage. The value of this exercise is to create societal engagement for students and give them an understanding of their rootedness in their local context.

A Meta University

Creating a Meta University, as a new model for a 21st Century University where a network of institutions riding on the National Knowledge Network come together to offer students a collaborative and multidisciplinary learning experience. The Meta University will reinterpret the concept of a University as not just a traditional, physical space of learning, but as a repository of knowledge and information that can



be delivered in multiple ways, and can be accessed from anywhere and anytime. It will seek to enhance the learning experience through new and innovative delivery models of education that allow students and institutions to collaborate in unprecedented ways.

20 Design Innovation Centres

Setting up twenty Design Innovation Centres co-located in institutes of national importance to ensure maximum convergence, optimum utilization of existing resources and infrastructure, and to leverage a context of academia-industry interaction.

Cluster Innovation Centres (CIC) at Universities

In order to make Universities hubs of innovation the Cluster Innovation Centres (CIC) will be created at universities/institutions of national repute. This will foster an ecosystem of innovation, and connect research with application for the benefit of society. The CIC will provide a platform for the university and its partners to forge linkages between various stakeholders from industry and academia, initiate and assist innovation activities, encourage innovations in curricula and act as a catalyst and facilitator. The CIC will provide a range of services and facilities including,

- ☞ Evaluation of ideas for their innovation potential
- ☞ Advice on technical and commercial viability
- ☞ Guidance on IPR issues
- ☞ Assistance on relevant financial schemes and grants
- ☞ Help innovators find partners and collaborators including funding, business development
- ☞ Market the products and processes to end-users.

Conclusions

The establishment of NIC is a move in right direction for government of India, especially given that 2010-20 has been declared as a “Decade of Innovation.” NIC indeed has a very ambitious agenda and an aggressive timeline. Since its inception, NICs track record in defining the roadmap, identifying the programs and get them started has been impressive. Nevertheless, there are several risks and extremely difficult challenges. To begin with, NIC, despite its enlightened leadership aggressive business approach, continues to be a government body and several of its initiatives need to work across multiple government departments and agencies, which tend to be bureaucratic and slow. The government initiatives with large financial outlays tend to attract sectarian interests, and lead to corruption. As a result, much needed financial resources may not reach the programs that would have greater impact. Even if NIC partially overcomes the challenges and succeeds in creating innovation mindset across India its efforts will transform India into an innovation powerhouse.

2.3 Clusters: existence and cooperation

2.3.1 Innovation Clusters

For innovative ideas to germinate and to grow into meaningful products and services there is need for an ecosystem of interconnected knowledge banks, financial institutions, industry, support systems and others that are located in geographical proximity. These innovation ecosystems are known as clusters.

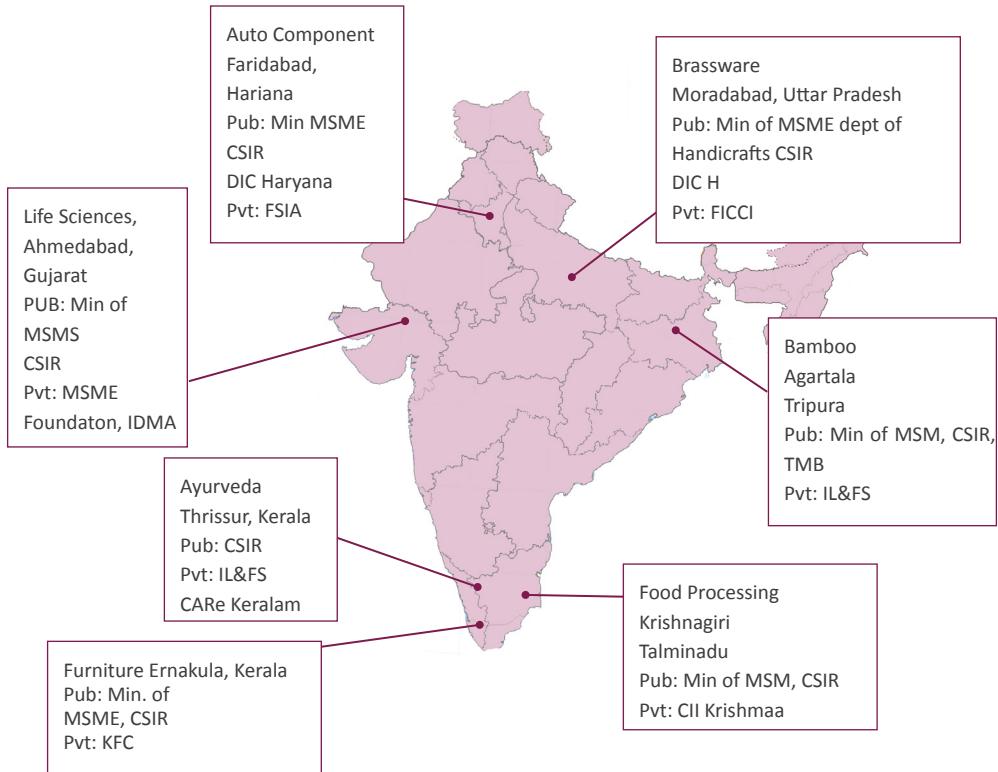
The most well known cluster of successful innovations in the world is the Silicon Valley in California. Clusters of similar nature have emerged in other parts of the world such as Cambridge cluster in UK, biotechnology clusters in Sweden and Switzerland.

In India, although there are concentrations of industry such as diamond cutting in Surat, there are no such clusters that act as hubs of continuous development of new products and services. In last 10-15 years cities such as Bangalore, Hyderabad and Chennai have emerged to function partly as clusters, but none can match the capability or productivity of Silicon Valley especially in the area of innovation.

In 2011-12 financial year NIC seeded 7 CICs in different parts of the country covering different industry segments. The following graphic illustrates the details of the pilot CICs and their activities.

Two examples of the intervention of the NIC are presented in the following pages. NIC intervened through raising awareness actions and campaign by coordinating activities or establishing Innovation related awards for entrepreneurs. A description of the other cluster is provided in the paragraph 2.3.2.





In 2011-12 the NIC seeded 7 Cluster Innovation Centres
in different parts of the country
covering different industry segments

Innovation Cluster in India

AutoComponent Cluster





Faridabad auto components cluster is located in Faridabad district of Haryana State. The cluster comprises of 2500 small and medium sized firms (SMEs) with around 10,000 workers. Major products of the cluster include sheet metal, rubber and plastic components, and major markets are Delhi, Haryana, Maharashtra, Tamil Nadu and Uttar Pradesh. Faridabad industries association and Bata Chowk are two large associations connected to the cluster. Technical institutions, R&D labs and testing labs associated with the cluster include DIC (District Innovation Centre), Faridabad, Government Industrial Training Institute, Faridabad, MSME-DI, Okhla, New Delhi and MSME-TC, Okhla, New Delhi.

With an annual turnover of 32,500 million rupees, the Faridabad cluster was chosen by the National Innovation Council as one of the Pilot clusters for promotion of innovation. NInC has allotted two public entities - Ministry of MSME, CSIR and DIC (District Innovation Centre), Haryana and a private entity, FSIA (Faridabad Small Industries Association) as collaborating partners for the Faridabad cluster.

A cluster Management Committee has been constituted under the chairmanship of Deputy Commissioner, Faridabad, to enable innovation around existing industries in Faridabad. A grant of Rs 1 crore per district as District Innovation Fund (DIF) will be released in two installments between 2011 and 2015.

NInC has proposed the following two innovation initiatives for the Auto component cluster

-  Information hub for SMEs in the region
-  Common design centre

Institutions like SIDBI (Small Industries Development Bank of India), TiE (The Indus Entrepreneurs) and CSIR will collaboratively implement these proposed initiatives during 2012-2013.

Innovation Cluster in India

Pharmaceutical Cluster



The evolution of the drugs and pharmaceutical cluster at Ahmedabad, Gujarat started off with the establishment of the first unit – Alembic Chemical Works Ltd at Vadodara way back in 1907. A phenomenal growth of small firms took place during the 1970s and 1980s. This phase was further strengthened as a result of growing exports to Russian and African countries. During this growth process, a few first generation entrepreneurs graduated from small to medium/large firms and some later entrants became sizeable medium enterprises. This growth phase in turn saw further entry of new entrepreneurs in the small scale sector.

There are now around 450 drugs and pharmaceutical manufacturing units in Ahmedabad, Vadodara and nearby areas. Seven firms in the clusters are big, around 20-25 medium-sized and the rest are small. The major products manufactured in the cluster include (a) pharmaceuticals—both allopathic and ayurvedic formulation, in different dosage forms (including tablets, liquid, capsules, externals and injectables) and (b) medical disposable products like IV sets. Around 50 manufacturing units produce medical disposables and the rest are in formulations including ayurvedic products.

The development of the Ahmedabad pharmaceutical cluster has been actively supported by various technical training institutions, industry associations and Government agencies. The presence of technical training institutions like the L M College of Pharmacy and the B V Patel Pharmaceutical Education and Research Development (PERD) Centre have ensured the consistent supply of skilled manpower essential for this knowledge-driven industry.

Cluster approach based Innovation promotion initiatives at Pharmaceutical cluster of Ahmedabad have resulted in institutionalization of a one year, partially self funded Techno-Bio-preneur program for mentoring aspiring life science technology based entrepreneurs. This is first such programme in the country among Entrepreneurship Development Institute of India, Gujarat State Bio Technology Mission and Foundation for MSME Clusters. The project has also strengthened a physical facility for preservation of new chemical molecules at Rajkot University. It has been connected to 10 universities and has collected 2500 indigenously made molecules of which 1500 have been screened and a select few already sold commercially leading it to sustainability.

Two innovators have got partial funding support and have been connected to other resource agencies. Besides, to promote and celebrate creativity & entrepreneurship in the cluster, innovation recognition awards like best M. Pharma Thesis Award (pan India) and Sushruta Innovation Award for medical devices have been conducted and institutionalized locally. Besides more than 100 proven ready to commercialize technologies from private and public technology sources have been identified and disseminated among innovation led entrepreneurship through road shows among various Pharma clusters. Training programs on Intellectual properties, new drug delivery systems (NDDS) etc. have been undertaken for awareness creation. These initiatives have also led to formation of interconnections among relevant stakeholders.

Cluster development: an EU-India strategy

Expertise for Cluster Development

EU nations have a long-standing experience and expertise in developing industry clusters as well as running successful academy-industry interactions for commercial purposes. Some of the EU initiatives that could be localized and replicated in India include:

Cluster-IP: The Cluster Innovation Platform

The Cluster-IP brings together cluster organizations from different countries willing to cooperate in working on the modernization of cluster support services in the EU. This includes the design and testing of new support tools, but also the experimentation with new forms of cluster cooperation. The Cluster-IP contributes to better support for innovative SMEs to internationalize and to access excellence available elsewhere. The specific needs of cluster firms as well as the potential role of clusters in addressing societal challenges and in fostering user-driven innovation need to be taken into account.

European Cluster Alliance

An open platform established to maintain a permanent policy dialogue at EU level among national and regional public authorities responsible for developing cluster policies and managing or funding cluster programmes in their countries or regions. This initiative responds to the needs and interests of many EU Member States and regions to share experiences in the field of cluster policies and initiatives. It will enable them to pool resources and address the problems they face, avoiding duplication of efforts and reducing fragmentation of cluster initiatives in Europe.

European Cluster Observatory

The European Cluster Observatory develops a flexible and user-friendly web platform for cluster organizations, firms and other users in Europe. Data about regions is collected through surveys and other sources. Activities include, among other things, web development, surveys, conferences, and reports.

Funding support

A funding support could be represented by the incentives offered by the Indian Government.

With the liberalization of trade and investment policies the government of India is offering various incentives for foreign corporations to invest in India. Although there aren't any specific incentives for Innovation activities the existing schemes can accommodate the investment for establishing R&D centres.

These financial incentives include:

- ☞ 100 per cent foreign direct investments (FDI) under the automatic route for R&D Services.
- ☞ Weighted deduction on expenditure incurred on in-house R&D is 200%
- ☞ Weighted deduction on payments made to national laboratories, research associations, colleges, universities and other institutions, for scientific research is 175%.

India Inclusive Innovation Fund

A billion dollar India Inclusive Innovation Fund started by the National Innovation Council in India represents significant opportunities for public organizations and for venture capital funds focused on social enterprises.

The fund is focused on investing in startups that provide solutions and products to meet the needs of the poor citizens at the bottom of the socioeconomic pyramid. Targeting mainly core sectors such as education, healthcare and agriculture, the India Inclusive Innovation Fund has 4 objectives:

1. Focus on India's poor: Invest in companies and startups that are providing solutions to the problems of India's 500 million poor.
2. Combine Social and Commercial returns: The fund will invest in for-profit entities with social impact so that there is a healthy return on investment.
3. Drive Employment and Livelihood Generation: Fund enterprises that generate employment for the poor.
4. Establish a Model for Wider Inclusive Innovation Funding: By investing in social focused commercial enterprises become models for other funds to follow.

The EU organizations both public and private that focus on funding social enterprises have an opportunity to participate in this fund as co-investors in the fund as well as beneficiaries of the funds.

2.3.2 Innovation opportunities in Industry sectors

India as one of the fastest growing economies in the world and a large internal market across all income scales offers a tremendous opportunity for both public and private organizations from EU nations. There are risks and challenges such as slow and inefficient government bureaucracy, lengthy and time consuming regulations and poor infrastructure.

However the risk out way the benefits, especially considering that in 10-15 year time frame all the investments in infrastructure, deregulations and liberalizations would have borne fruits.

Opportunities for both public and private EU organizations for establishing innovation/R&D centres, participate in the National Innovation Council initiatives and in selected industry sectors exist. The current status including market trends, major developments and investments, government initiatives pertaining to some key sectors will be depicted. The industry sectors selected are:

- Automotive
- Aerospace
- Pharmaceuticals
- Transportation
- Energy
- Water and Wastewater Management

2. India's Science, Technology and Innovation system

These sectors have been selected because of their importance in sustaining India's growth. The sectors included here represent an opportunity for innovation, especially the social and inclusive innovation agendas. For example, providing clean and potable water to hundreds of millions of India's at low cost; efficient management of water and wastewater treatment for sustainability; offering green energy and efficient public as well as private transportation at an affordable cost. Similarly, delivery of drugs and health care to millions who lack and require care at reasonable costs needs social and inclusive innovation approach to arrive at solutions.

The Automotive sector is included here as a success story of deregulation and liberalization because of which the entire industry has transformed leading to explosive growth in last decade.

The Aerospace on the other hand represents one of the most regulated, especially the space sector. However, indigenous and innovative India's Space sector provides example of India's capability to achieve global recognition and standards. In some of these sectors clusters are present and they will be highlighted.

Automotive Industry

Automotive industry is one of India's largest industries. It forms approximately 7% of India's GDP. The industry has shown a growth and stability over the past 20 years.

According to the recent data released by the Society of Indian Automobile Manufacturers (SIAM), the cumulative production for April-June 2012 registered a growth of 7.65 per cent over April-June 2011, manufacturing 1,700,675 vehicles in June 2012. While Passenger vehicle segment grew at 9.71 per cent during April-June 2012, overall commercial vehicle segment registered an expansion of 6.06 per cent year-on-year (y-o-y). Two Wheelers sales registered a growth of 10.51 per cent during April-June 2012.

MARKET TRENDS

Utility vehicles are a major success in Indian markets these days. Automakers are proactively bringing new models to attract consumers who are highly enthusiastic about multi-utility vehicles (MUVs). However, with large number of players and variants, the market for MUVs is getting competitive day-by-day.

Mahindra & Mahindra (M&M) is the market leader with 49.31 per cent of the share, followed by Toyota Kirloskar Motor India Pvt with 20.08 per cent, Maruti Suzuki India Ltd (MSIL) with 16.7 per cent and Tata Motors with 7.87 per cent at the end of May 2012.

MAJOR DEVELOPMENTS & INVESTMENTS

- ❖ Ford India has expanded its diesel engine production capacity at its plant in Maraimalainagar, near Chennai. The plant now has an annual capacity to produce 3.4 lakh engines - up from 2.5 lakh in 2010 - along with a production capacity to make 200,000 cars.
- ❖ The Volkswagen Group aims to increase output by 10-15 per cent on a €100-million investment at its production facilities in Aurangabad and Chakan in Maharashtra.
- ❖ Japanese auto firm Isuzu Motors Limited, is considering entering fast growing Indian small commercial vehicle and MUV segments.
- ❖ Just after four years of its debut in the two-wheeler segment, M&M Group has set a target of Rs 20,000 crore (US\$ 3.62 billion) in revenue by 2020.
- ❖ India's largest auto maker MSIL has agreed to merge group unit Suzuki Powertrain India Ltd with itself with a view to bring all diesel engine manufacturing facilities under a single management.

INNOVATION IN AUTOMOTIVE INDUSTRY

Innovation in the automotive industry is driven by two factors – legislative requirements and competitive requirements. More recently, India has seen establishments of several automotive R&D centres and they are well positioned for growth. Indian automotive industry started its pursuit of green technologies with CNG and LPG. The new products development in the automotive industry can be divided into – Designing, Development (engineering/detailing & production) and testing.

Automotive Innovation cluster

The state of Maharashtra and Tamil Nadu have been always been the hubs for Automobile industry in India. Currently, Pune is largest geographical concentrate for automotive industry in India. Also there are other regions which act as pockets for the automotive industry – Indore (MP), Kolkata-Jamshedpur belt (West Bengal). As per SIAM statistics, 81% of the total R&D expenditure of the country is made in the west zone.

The following India map shows Innovation clusters in automotive industry. Of these, the southern cluster acquires major share of the industry, which is followed by the western cluster and then followed by northern.



Pharmaceuticals Industry



Globally, Indian Pharmaceuticals industry stands third in terms of value and tenth in terms of volume. According to PricewaterhouseCoopers (PWC) in 2010, India joined among the league of top 10 global pharmaceuticals markets in terms of sales.

Indian pharma industry has been at the vanguard in a wide range of specialties relating to complex drugs manufacture, development and technology. According to a Barclays Capital Equity Research report on India Healthcare & Pharmaceuticals, the Indian pharma market is expected to grow at a CAGR (Compound Annual Growth Rate) of 15.3 per cent during 2011-12 to 2013-14. The India pharma revenues are estimated at USD28.4 billion during 2013 and expected to double in two years reaching USD36.7 billion by 2015.

The pharma exports from India have been steadily increasing till date and have forecasted to further increase to USD12.8 billion by 2015.

PROMOTING RESEARCH ACTIVITIES

Both the private sector and the public funded research institutes have been performing the research activities in India. Some chief government institutes such as Indian Council of Medical Research (ICMR), Department of Science & Technology (DST), Council of Scientific and Industrial Research (CSIR), Department of Biotechnology (DBT), Central Drug Research Institute (CDRI) have allocated certain amount of funds for promotion of research activities specific to the industry. Some of the well-known private organizations executing research activities are Dr. Reddy's Laboratories, Ranbaxy, Cadila Healthcare, Glenmark, Biocon, Panacea Biotech, Shantha Biotech, Serum Institute of India and others. Mutually public and private sector enterprises are increasing their focus on R&D activities.

MAJOR DEVELOPMENTS & INVESTMENTS

Indian drugs and pharmaceuticals sector has allowed 100% FDI under the automatic route. "Pharma Vision 2020" has been prepared by the Department of Pharmaceuticals for making India one of the leading destinations for end-to-end drug discovery and innovation. In next two years, the government plans to open 3000 Jan Aushadhi stores which sell unbranded generic drugs at heavy discounts to branded drugs. Indian pharma companies like Cipla, Ranbaxy, Dr. Reddy's Labs and Lupin may hastily be part of the government's motivated 'Jan Aushadhi' project.

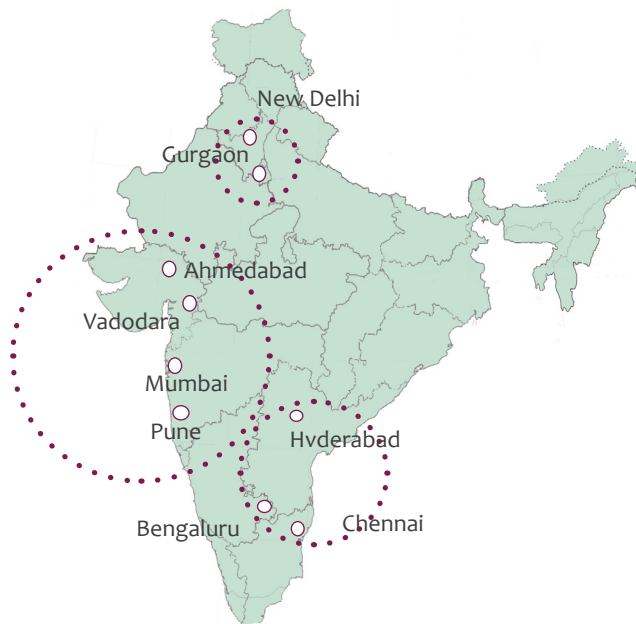
Pharmaceutical Innovation Clusters

In the pharmaceutical industry, the private sector is one of the key participants in innovation activities. Most of the top pharma companies such as Rnboxy, Dr. Reddy, Cadila and Wockhardt have been focusing and investing deeply in research & development activities.

In India, the key pharmaceutical and biotech innovation hubs can be segregated into three central clusters: western, southern and northern cluster. The northern cluster covering of NCR (Delhi, Gurgaon and Noida) is also an emerging location for pharmaceutical companies.

The following India map shows Innovation clusters. Of these, the western cluster acquires major share of the industry which is then followed by the southern cluster.

The western cluster with states of Gujarat and Maharashtra is the major hub for Pharmaceutical activities because of the government incentives & support, infrastructure and resource availability.



Recent Trends and Opportunities

Some of the recent trends and opportunities being exploited by the Indian and foreign pharmaceutical companies are the following

- Israel's Teva Pharmaceutical Industries and Procter & Gamble (P&G) plan to enter India through a joint venture (JV) by setting up their first manufacturing facility at Sanand, Gujarat, with an initial investment of Rs 250 crore.
- In 2006, Dr Reddy's acquired Betapharm, a generic-drug maker in Germany.
- Lithuania says it is open to Indian investments in the info-tech and pharmaceuticals sectors. According to Mickeviciene, Minister Counsellor, Republic of Lithuania "“We are developing Free Economic Zones especially to attract investments in sectors like IT, financial and business consulting and pharmaceuticals sectors. India should increase its share of trade with Lithuania,”.
- Bio-pharmaceutical and health science sector representatives from the UK are to explore and expand partnerships with Indian companies. UK-India Innovation and Leadership Meeting at IIM Bangalore held in March encouraged IP-protected research and innovation in health science, explore entrepreneurial opportunities.
- Indian healthcare major Piramal, which had taken over Bayer HealthCare's molecular-imaging pipeline, has been investing in German molecular imaging technology.
- As per a report by research firm Credit Suisse, the growth of Indian pharma companies will be driven by the fastest growing molecules in the diabetes, skincare and eye care segment. The market share of a drug company is directly related to the number of fast growing molecules in the company's pipeline.
- Government offers a number of tax incentives both for manufacturing and research activities of pharmaceutical companies.
- The government has also proposed to set up a venture capital fund amounting to INR 30000 million which will be used to promote drug discovery and also strengthen the Pharmaceutical infrastructure in India.
- Indian pharma and bio pharma industry moving towards conducting high end research projects, the need for such collaborations will keep increasing and open up huge opportunities for European agencies and companies.
- The Indian clinical trial market is estimated to be worth USD1.5 billion. According to various studies, India is among the leaders in the clinical trial market.

R&D: Joint partnership and Innovative licensing representation

In the recent years, many Indian companies such as Ranbaxy, Dr. Reddy's Sun Pharma, Glenmark and few others have made New Chemical Entity (NCE) research a vital part of their growth strategy & have scaled up operations in this sector. Even though Indian companies are equipped with extensive knowledge in chemistry, they lack experience & financial resources to conduct full-fledged activities in this area. Germany on the other hand, has excellent background and experience in R&D field, above all in areas such as cardiovascular diseases, oncology, inflammatory diseases, auto-immune deficiencies etc and there is good opportunity for German companies to invest in R&D operations in India either by introducing subsidiaries or through joint research and collaboration with Indian companies.

Key Players

Some EU Pharma organizations partnering with Indian organizations: Reckitt Benckiser, Fresenius, Research Institute for Development, Bayer, Wageningen University, Research Centre Jülich GMBH, Ministry of Health - Italy, Technical University of Denmark, University of Pavia, St George's Hospital Medical School, Institute Pasteur, Medical Research Council UK, University of Glasgow UK, Charité - University Medicine, AstraZeneca, Sanofi, GlaxoSmithKline, Novartis, Novo Nordisk, UCB, Merck KGaA and Roche etc

Aerospace Industry

Globally, the Indian aerospace industry is one of the rapidly growing markets with an expanding customer base comprising of airlines, businesses and high net worth individuals. The rapid growth of the aerospace industry has attracted major global aerospace companies to India. All the segments in aerospace industry like civil and military aviation and space are showing a significant level of growth. The growth has allowed a number of automobile manufacturers to exploit forward and backward linkages with the aerospace industry. Additionally, India is also expected to become a hub for maintenance, repair and overhauling (MRO). The MRO market in India was valued at \$970 million in 2008, and can absorb massive investments.

Hindustan Aeronautics Limited (HAL) is the leading aerospace company fully owned by the Government of India. HAL has played a major role in the defense aviation through design, manufacture and overhaul of fighters, trainers, helicopters, and transport aircraft, engines, avionics and system equipment. HAL is now ranked 34th in the list of world's top 100 defense companies. It is a major partner for the Space programs of Indian Space Research Organization (ISRO) and manufactures structures and assemblies for the launch vehicles and satellites at its dedicated Aerospace Division in Bangalore.

AVIATION SECTOR

According to Dr Nasim Zaidi, Secretary, Ministry of Civil Aviation, India is on the edge to come forward as the third largest aviation market in the world by the end of this decade. The aviation sector in India has been growing at a fast pace. As per data released by Department of Industrial Policy and Promotion (DIPP), air transport (including airfreight) has attracted FDI worth US\$ 433.42 million from April 2000 to March 2012. Passengers carried by domestic airlines during January-May 2012 have been recorded at 25.81 million as against 24.49 million during the corresponding period of previous year.

Between 2006-2011, India's exports have expanded at a CAGR of 13.3 per cent and imports have been registered a 14.2 per cent CAGR.

SPACE SECTOR

India Space industry, which is worth approximately USD 125 billion, has made giant strides in the past several years due to its notable achievements in the fields of broadcasting and telecommunications satellite technology and application of space technology for civilian uses. The increased encouragement for private company participation in the industry has widened

the opportunity of large international players looking to outsourcing manufacturing of critical components or to set up captive units in India. ISRO, a government agency, as the sole space industry player in India has always tried to balance its goal between becoming a leading commercial player in the global market and working toward bringing self-reliance to the nation.

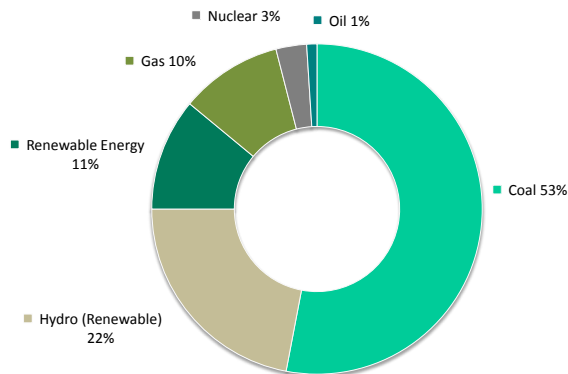
Government Initiatives

On the whole, the government encourages private investment in both the civil and defense aerospace sector with the purpose of encouraging technology transfers and achieving indigenization. The Indian Government has significantly liberalized the civil aviation sector. It promotes domestic private participation in manufacturing and R&D in the aerospace sector with 100% FDI allowed in most areas, the exceptions being air traffic services. The defense sector is limited to 100 % domestic private investment only.

Energy Industry

India stands in eleventh place in terms of production and in the sixth place in terms of consumption globally. With an installed power capacity of 164,835 MW, India has 4% of the global capacity. In the past, the Indian power sector has been driven by fossil fuel power, predominantly coal. Though fossil fuel based power plants are expected to be the dominant source over the next few years, the industry has also started focusing towards renewable and alternate energy sources. The graph summarizes energy production in India.

The energy sector comprises of two main segments namely renewable (wind, solar, biomass, small hydro and waste to energy) and non-renewable (coal, natural gas, oil, nuclear power) sources of energy with non-renewable segment occupying the major share of the current production. Renewable energy currently has been growing very rapidly in last 5 years especially in wind and solar power.



% Energy production distribution (2011)

According to an analysis by The Energy and Resources Institute (TERI), the annual primary energy and electricity growth rates are expected to be between 3.7-4.4% and 5.1-5.7% respectively. The energy demand is expected to grow to 5.2%, to keep up with the GDP growth rate of 8-10% in the coming years.

R&D ACTIVITIES

In India, state-owned enterprises are the most heavily involved in coordinating R&D activities, with the Ministry of Science & Technology (MST) in charge of R&D programs, along with the

Department of Science and Technology (DST) and the Department of Scientific and Industrial Research (DSIR).

The execution of India's energy policy and energy research and development activities (R&D) are undertaken by five different ministries: Ministry of Power (MOP) Ministry of Coal (MOC) Ministry of Petroleum and Natural Gas (MPNG) Ministry of New and Renewable Energy (MNRE) Department of Atomic Energy (DAE).

The energy industry is dominated by public sector enterprises, which constitute more than 82% of the installed capacity. However, with the 11th five year plan, the Indian government has been encouraging research and development activities for alternative sources of energy. The major government bodies funding research activities are MNRE, Department of Science & Technology, Department of Atomic Energy, Ministry of Power and Department of Bio-technology. As a result of these and other initiatives more than 600 patents were filed in the energy sector in India during the period 2000-2010, of which about 70% have been in the arena of energy transmission and distribution.

GOVERNMENT SUPPORT

Currently, Indian government plays a critical role in increasing the research activities. Supported by the government's policies and funds, premier research institutes like CSIR and BARC and academia like IITs and IISc have been leading the way. The government also launched an Accelerated Program on Energy Recovery from Urban Wastes, which aims to develop waste-to-energy technology through MNRE's financial support. The government has also been promoting grassroots innovations through NIF (National Innovation Foundation) and GIAN (Grassroots Innovations Augmentation Network). Moreover, the government is also making a lot of efforts to promote research activities in universities and other institutes. Along with the government bodies, the private sector is also ramping up its investment in the energy sector. A number of companies are now undertaking research projects to develop technologies for power sector.

Innovation Clusters in Energy sector

India, as a whole, possesses a relatively high abundance of solar radiation, moderate wind speeds, and hydro and biomass energy resources. Coupled with the presence of academia and government support, the innovation centres in India are evenly spread throughout the country. The following India map shows Innovation clusters in Energy sectors. The three main clusters are: northern, western and southern clusters.

The northern cluster includes NCR and Ludhiana, western cluster Mumbai and Pune, and the southern cluster includes Bengaluru and Chennai. These are considered as major hubs for energy related research activities.



EU-INDIA COOPERATION IN ENERGY SECTOR

- EU and India have jointly identified a scope for enhanced co-operation leading to better governance and policy-making, such as trade and industry, energy, environment and transport and these have to be further encouraged.
- EU-India has set up an – “Energy Panel for dialogue and cooperation on energy issues” and is interdependent particularly in terms of energy supply and the cooperation has to be further expanded in both regions.
- In FP7 Energy sector/theme, there are currently around 7 EU-India FP7 projects.
- EBTC European Business and Technology Centre (EBTC) plans to initiate a pilot project to demonstrate ‘smart city concept’ at the industrial town of Haldia in West Bengal. “The Copenhagen Cleantech Cluster and EBTC will together work to identify projects, undertake their execution, and facilitate research and innovation related to green technology initiatives in the energy and environment sectors” (Poul V Jensen, Director,).

Key Research Technology Development and Innovation (RTDI) Players

- Energy policy and energy research and development activities (R&D) activities take place in five different ministries: Ministry of Power (MOP) Ministry of Coal (MOC) Ministry of Petroleum and Natural Gas (MPNG) Ministry of New and Renewable Energy (MNRE) Department of Atomic Energy (DAE) and Indian Renewable Energy Development Agency (IREDA) and some Indian organizations involved innovation are: Indian Institute of Petroleum (IIP), Dehradun Mechanical Engineering Research & Development Organization (MERADO), Ludhiana The Solar Energy Centre (SEC), Gurgaon Central Salt & Marine Chemicals Research Institute (CSMCRI), Bhavnagar Central Mechanical Engineering Research Institute (CMERI), Durgapur.
- Some key players in power sector: National Thermal Power Corporation, Tata Power, Reliance Power, Community Energy Services Corporation and National Hydroelectric Power Corporation, Nuclear Power Corporation of India. Some key players in renewable energy sector: Suzlon Energy, Moser Baer, Tata Power and Orient Green Power.
- Indian research institutes with active EU-India collaboration include, The Energy and Resources Institute, Council of Scientific and Industrial Research, Foundation for Innovation and Technology Transfer Aquagri Processing Private Limited, IIT Delhi, IIT Kharagpur and Central Mine Planning & Design Institute Ltd.

- EU research institutes with active EU-India collaboration: Aerothermal Limited, Greenfinch Limited, Eco-Solids International Limited, University of Verona, University of Southampton, Technical University of Denmark, Cener-Ciemat, Acciona Energy S.A., Complutense University of Madrid.



Transport Industry

India has a large and diverse transport sector. Transport industry contributes considerably to the growth of gross domestic product (GDP), while creating opportunities for employment and investment. Over the last decade, there were several improvements in roads & highways, ports, railways and airports. Moreover, a better policy and regulatory framework has been implemented resulting in significantly increased investment in infrastructure.

RAILWAYS

Indian Railways is the world's fourth largest rail and the second largest organization under a single management in the world. With a network of 64,000 kilometres (km) of railway tracks and 7,000 stations, Indian Railways operate more than 18,000 trains every day.

Railway projects have usually been in the public sector domain. Private players have been involved in allied activities such as track laying and maintenance, maintenance of coaches and wagons, construction of bridges, stations, signalling and telecommunications works.

Government initiatives

The government is investing in heavily in construction of rail infrastructure. Under Adarsh station scheme, a total of 929 stations have been identified for development during 2009-10 to 2012-13 and so far, 550 stations have been developed.

ROADWAYS

In India, roads are the preferred mode of transportation. At present, India has the world's second largest road system with 4.1 million km of roads of which National Highway Authority of India's (NHAI) share is 71,722 km.

Government initiatives

- Priority has been accorded to 3,300 km of highways designed to guarantee smooth transportation of goods considered as the future backbone of India's economic activity.
- The government has set a goal of covering a length of 8,800 km under NHDP in 2013.
- In order to encourage public private partnerships in road construction projects, external commercial borrowings (ECBs) have been allowed, for capital expenditure.
- Full exclusion from import duty on equipment imported for road construction including, tunnel boring machinery and parts for assembly and maintenance.

URBAN TRANSPORTATION

India is experiencing rapid urbanization. According to a recent study, the population of Indian cities has increased significantly from 62 million in 1951 to 285 million in 2001 and is estimated to grow to around 540 million by the year 2021. This growth in populations has placed increased demand for urban mass transportation systems.

The first modern rapid transit in India was the Kolkata Metro, followed by Delhi Metro in the capital city of New Delhi, which was executed in 2002. The Namma Metro in Bengaluru is India's third operational rapid transit started operations in 2011. Currently several metro rail projects are underway to improve connectivity within the cities.

Activity and Opportunities in Transport Sector

Roadways and Railways represent 2 key verticals of infrastructure sector. India has embarked on ambitious projects to modernize existing road and rail infrastructure and build new roads. In this regard EU companies and public organizations have been quite active in taking advantage of the opportunities and position themselves for the future.

Railways

The Railways budget 2011-12 earmarks an outlay of US\$ 12 billion, the highest ever so far. The cumulative FDI inflow into the sector stood at US\$ 132.8 million during April 2000-March 2011.

- ❖ Indian Railways is soon to sign MoU with German Railways very soon for active participation by German companies in Indian Railways' to achieve the goals of Vision-2020 and some major activities to be undertaken by railways include safety, Train Protection and Warning System, high speed, speed upgradation on existing network, station development, dedicated freight corridors, logistics parks and Public Private Partnership.
- ❖ In June 2012, Texmaco Rail & Engineering has entered into 50:50 joint venture with a French group Touax Rail, for a new venture in freight car leasing business.
- ❖ French company "Thales" is bidding for upcoming metro and rail projects across the India especially major cities such as Mumbai, Hyderabad, Chennai either independently or as a consortium.
- ❖ Spain's Construcciones y Auxiliar de Ferrocarriles (CAF) plans to launch a manufacturing unit in India to tap the increasing demand for railway vehicles and equipment. due to its rising opportunities. It won Rs 780-crore order to manufacture 14 rakes (each rake consists of six coaches) for Kolkata Metro Railway Corporation Ltd (KMRCL). It is also bidding for all upcoming metro projects such as Jaipur, Hyderabad etc.

- By 2016, Indian Railways will roll out coaches using German technology. Four coach factories will replace the indigenously-designed carriages with 4,000 Linke Holfmann Bush (LHB) coaches.
- Fairwood, the company that is introducing the pod car in India in a tie-up with the UK-based Ultra, plans to set up a manufacturing factory in the National Capital Region in Noida, Greater Noida or Gurgaon over the next four or five months.
- Chennai Metro Rail Ltd has awarded contract for power supply and Overhead Equipments (OHE) to Siemens AG of Germany and its Indian arm Seimens Ltd India Consortium for Rs 305 crore.
- Germany-based multinational company, Bernard Engineers has won the consultancy contract for designing and preparing a detailed project report for three major road tunnels in Himachal Pradesh, according to officials.

Roadways

Currently, India has the world's second largest road system, with 4.1 million km of roads, of which National Highway Authority of India's (NHAI) share is 71,722 km.

- Ministry of Road Transport & Highways is encouraging international participation to expedite road projects in the country. British construction companies have formed the British India Roads Group (BRIG) to ensure the greater involvement of the UK highways construction industry in India's National Highways Development Project (NHDP).
- Policy Initiatives for attracting Private Investment: NHAI / Government of India (GoI) to provide capital grant up to 40 per cent of project cost to enhance viability on a case to case basis 100 per cent tax exemption for five years and 30 per cent relief for next five years, which may be availed of in 20 years & concession period allowed up to 30 years.
- More than 60 percent of the estimated investment requirement under NHDP is expected to be privately financed
- Duty free import of high capacity and modern road construction equipment
- The Government of India has approved 2,389 projects under the Integrated Action Plan (IAP) for construction of 9,070 kilometer (km) of roads in rural Bihar, at an estimated cost of Rs 3,387 crore (US\$ 614.12 million). The project has been approved in a phased manner.
- Maharashtra State Road Development Corporation (MSRDC) in India is modernising the state's border checkpoints with a new fully automatic border control system provided by Confidex, a Finnish supplier of specialty RFID Tags. The system marks the beginning of the modernisation of all border checkpoints across India, as

mandated by the government.

- ❖ India & Italy to Sign MoU for Greater Co-Operation in Road Infrastructure Sector: India and Italy have agreed to sign a Memorandum of Understanding for enhancing bilateral technical cooperation in road infrastructure sector and greater involvement of Italian Infrastructure companies in the highways sector in India.

EU-India cooperation in Transportation Sector

- ❖ In FP7 Transport sector/theme, there are currently around 6 EU-India FP7 projects.
- ❖ EU's "Innovation Union" and the Indian "Decade of Innovation" strategies for achieving inclusive, sustainable and affordable innovation, towards finding solutions to growing societal challenges include sustainable transport and mobility.
- ❖ EBTC working on EU-India cooperation in the following Transport area:
 - o Improving the efficiency of existing transport modes
 - o Introducing cleaner transport technology solutions to save energy
 - o Reduce space requirements for transport and diminish pollution
 - o IT services to the transport and logistics community like Intelligent Transport System, Port development, road networks, air cargo routes and railroad infrastructure opportunities.

Water and Waste-water management



India has 4% of water resources of the world whilst it has to support 16% of world population as a result India needs a comprehensive plan for water and wastewater management. Typically the water sector in India has been owned and operated by the government. Of late, the government is encouraging the private sector to participate and introduce regulatory reforms.

Water Availability: India receives a total rainfall of about 4000 Billion cubic meters (BCM). However, rainfall in India shows a very high degree of spatial and temporal variability.

GOVERNMENT INITIATIVES AND POLICIES

Government of India has recently approved National Water Mission's main objective of conserving water, minimizing wastage and ensuring more equitable distribution across the entire country through integrated water resources development and management. National Water Mission has set the following five goals:

- ❖ Comprehensive water data base in public domain and assessment of impact of climate change on water resources;
- ❖ Promotion of citizen and state action for water conservation, augmentation and Preservation;
- ❖ Focused attention to over-exploited areas;
- ❖ Increasing water use efficiency by 20%; and
- ❖ Promotion of basin level integrated water resources management.

At present, drinking water investments constitute about 3% of the national budget. Today 85% of the urban and 75% of the rural population has access to public water supplies. 48% of the urban population and 36% of the rural population has access to sanitation services. The water treatment industry in India is seeing immense expansion.

KEY DRIVERS FOR WATER INDUSTRY GROWTH

- ❖ Increased awareness about drinking water quality and health
- ❖ Decreasing water quality and users having to go for ground water
- ❖ Environmental pressures on wastewater discharge from govt. pollution control boards
- ❖ Reducing availability of water forcing users to go for reuse & recycling of water
- ❖ General Industrial and Economic Growth particularly in chemical, pharmaceutical, power plants, food and textile industry

Water Industry

- ❖ Large Players like VA Tech Wabag, Degremont, Hindustan Dorr-Oliver, Paramount, Ion Exchange, Thermax etc
- ❖ Medium Sized Players like Doshion, Aquatech, Fontus Water, Driplex, TEAM, Ions Hydro
- ❖ Small Players over 500 in number

Wastewater Treatment

Water and wastewater treatment will remain high potential business opportunity in India. The increase in population and hasty boost in urbanization have put demands on urban cities to cater to the increasing water needs of the people. With the increased demand on agriculture to meet the growing food demands of the nation, the agriculture consumption of water has increased. Moreover, the emergence of a new industry and manufacturing has put pressure on water requirements and water treatment.

The chief end users in the water market are the municipal authorities and the Public Health Departments. The major industries connected with the water sector include cement, chemicals, fertilizers, food & beverage, paper, pharmaceuticals, power, refineries, sugar, tanneries and textiles. End user commercial establishments comprise hospitals, hotels and housing development.

Given increased demands on water, wastewater treatment as source for industrial usage has increased. The following graph depicts Wastewater generated and treated levels domestically and industrially. In Indian nearly 78000 million litres of industrial water has been treated and 6000 million litres of domestic water is treated.

India is a growing market for water and wastewater treatment.

R&D ACTIVITIES

Many public and private institutions have been performing research and development activities in water area. Lot of joint research with international organizations has been witnessing since functioning of S&T cooperation agreements between India and other countries. The World Bank finances a number of projects in urban and rural areas that are fully or partly dedicated to water supply and sanitation. Some of the ministries like Ministry of Water Resource (MWR), Central Soil and Materials Research Station (CSMRS), Central Water Commission (CWC), Central Water and Power Research Station (CWPRS), National Water Development Agency (NWDA), Central Ground Water Board (CGWB), DST, DBT, CSIR etc have been sponsoring various research activities with regard to water, waste water and other water related topics. Some institutions like Indian Council of Agricultural Research, National Environmental Engineering Research Institute have been funded in water research activities.



KEY INNOVATION ACTIVITIES

Since 2001, number of innovative approaches to improve water supply and sanitation has been tested in India. Major innovative activity is developments in Public Private Partnerships (PPP) which can accelerate solutions and enhance operations and service:

- Provide access to utility infrastructure-improvement of living standards
- “Whole-project” funding available via appropriate finance packages – so no project delays
- Asset realization occurs at a fair price, delivery on time
- Optimal plant operation, skills & technology transfer
- Realistic tariffs and charge
- Recruiting the private sector in the water industry brings in capital and finance and reduces waste and lowers costs when supported by effective governance and transparency.

PRIVATE PUBLIC PARTNERSHIP IN WATER AND WASTE MANAGEMENT

The government of India has undertaken major policy initiatives to encourage private-Public participation (PPP) in water sector. The early PPPs in the Water Sector were marked by the private sector investing in setting up basic utilities and infrastructure. That appears to be changing since Year 2000, where the private sector is getting more involved in setting up Water Treatment Plants and Sewerage Treatment Plants and not just investments in basic water utilities. The trend for PPP in the water sector slowed down since some of the initial efforts using this approach failed to deliver desired outcome. However starting from 2005 there have been success stories.

The PPP projects mainly fall under four segments of the water value chain

- Bulk Water Generation,
- Treatment (Desalination, Wastewater),
- Distribution of Water
- Network Rehabilitation.

The model suggested by the government for PPP are the following:

River and River Development Projects

The government of India has recently undertaken some important river and river development projects focused cleaning up of river of pollutants, ensure clean water flows and better management of river water. Some of these projects include:

- Roadmap for the Pamba River
- Ganga Action Plan
- Yamuna Action Plan
- Mandovi River

More details on each project are contained on the “Report on Innovation landscape and motives for establishing operations in India” which is available on the Indiagate website.

INDIA AND EUROPE – JOINT WORK


In the recent years major concerns are water shortage and water quality hence the need to find innovative solutions to overcome the shortages. The government has given priority to the revival of groundwater tables through watershed management, the conservation of rainfall, and the development of low-cost sanitation. With experience in water sector, the EU has joined hands with the Government of India, state governments and NGOs with deep knowledge of local problems and local practices of sustainability to assist in the development of water policy and the promotion of field level projects.

The EU is partnering with the Government of Rajasthan in developing and implementing statewide water sector reforms leading to sustainable and integrated water resources management. Working with the EU, the Government of Rajasthan has produced a water sector policy and action plan, which has been adopted by the State. The EU's financial commitment of €80 mn (Rs.4800 mn.) comes in the form of budget support and technical assistance for the institutional development and capacity building of line departments, local governments or water user groups; implementation of community based management of water resources in selected blocks of 11 districts; increasing awareness for demand management; water campaigns; investing in water conservation and restoration of groundwater levels; and the creation of a state water regulatory authority.

WATER RELATED RESEARCH

In the EU's Seventh Framework Program, India is fourth largest international partner for science and technological development. In FP7 Environment sector/theme, there are around 18 EU-India projects of which four projects are focused on the water related topic:

- ❖ Highland aquatic resources conservation and sustainable development
- ❖ HighNoon: adaptation to changing water resources availability in northern India with Himalayan glacier retreat and changing monsoon pattern
- ❖ Coordinated Asia-European long-term observing system of qinghai tibet plateau hydro-meteorological processes and the asian-monsoon system with ground satellite image data and numerical simulations
- ❖ Enhancement of natural water systems and treatment methods for safe and sustainable water supply in India



The European Commission and the EU Member States together with the Indian Government have identified water-related challenges as the initial overarching theme offering real potential for mutually beneficial cooperation and have launched several coordinated call for proposals.

India-EU Partnership for a Strategic Roadmap in Research and Innovation: Several common problems faced both by EU and India in the supply of safe drinking water identified to address through collaborative R&D and educational and training activities. Additionally, the objective is to link with the private sector, including SMEs from Europe and India.

The Strategic Forum for International S&T Cooperation (SFIC) has chosen India as strategic partner country with which to start implementing its first pilot initiative focusing on water-related challenges.



Resources

INDIA GATE reports:
Report on Innovation landscape and motives for establishing operations in India,
Report on Cluster existence and cooperation

www.access4.eu/india



India has 4% of water resources of the world whilst it has to support 16% of world population. As a result India needs a comprehensive plan for water and waste-water management.

3. OPPORTUNITIES FOR EUROPEANS IN INDIA

3.1 Indian Science & Technology Programmes

In the era of rapid internationalization of science and technology, EU-India science and technology cooperation have considerably improved over a decade, with the signature of the EU-India Science and Technology Cooperation Agreement supported by regular revision and updating of joint S&T priorities. Research cooperation started in the mid-80s, and the first science and technology cooperation agreement was signed in 2001 and extended in 2006.

The INDIA GATE team mapped the funding opportunities open for European organisations in India with a focus on their reciprocity character, rules of participation and funding rates. The nine major governmental agencies (Department) have been examined and six categories of cooperation initiatives emerged.

1. Bilateral Programme have been set up between India and EU Member States
2. Activities with EU, including agreements between India and the European Union
3. Fellowship programme, grants available to researchers to gain experience and to complete their training
4. “Visiting Scientist from Abroad” Programme (VSAP)
5. Specific programmes
6. New Indigo Programme which aim is to establish a joint infrastructure for advanced research in biotechnology and health.

Detailed information about each initiative is available in the INDIA GATE reports (contact person, modalities for applying, funding rules, etc.).

The portfolio of cooperation initiatives and funding opportunities has been summarised and personalised with a colour in the table. The colours will guide the reader through the fiche developed per each governmental department and help her/him to identify the category of cooperation initiative. A brief description of each organisation precedes the list of cooperation activities.

3. Opportunities for Europeans in India



	BILATERAL PROGRAMME/ COLLABORATION WITH MEMBER STATES	ACTIVITIES WITH EU	FELLOWSHIP PROGRAMME	VISITING SCIENTIST FROM ABROAD PROGRAMME (VSAP)	NEW INDIGO PROGRAMME	SPECIFIC PROGRAMME
MINISTRY OF SCIENCE & TECHNOLOGY Department of Science & Technology (DST)	X	X	X		X	X
MINISTRY OF SCIENCE & TECHNOLOGY Department of Biotechnology (DBT)	X			X		X
COUNCIL OF SCIENTIFIC & INDUSTRIAL RESEARCH (CSIR)	X		X		X	X
MINISTRY OF COMMUNICATIONS AND INFORMATION TECHNOLOGY Department of Information Technology(DIT)	X	X				
MINISTRY OF HEALTH AND FAMILY WELFARE Indian Council of Medical Research (ICMR)	X	X				
MINISTRY OF HUMAN RESOURCE DEVELOPMENT UGC	X					X
MINISTRY OF AGRICULTURE AND CO- OPERATION Department of Agricultural Research and Education (DARE)	X					
MINISTRY OF ENVIRONMENT AND FORESTS	X					
MINISTRY OF NEW AND RENEWABLE ENERGY INDIAN INSTITUTE ON SCIENCE	X		X			X

Ministry of Science & Technology

Department of Science & Technology (DST)



The Department of Science and Technology (DST) is a department within the Ministry of Science and Technology in India. It was established in May 1971, with the objective of promoting new areas of Science and Technology and to play the role of a nodal department for organising, coordinating and promoting Scientific and Technological activities in the country. It gives funds to various approved scientific projects in India. It also supports various researchers in India to attend conferences abroad and to go for experimental works.

- Technology Information, Forecasting and Assessment Council (TIFAC)
- National Accreditation Board for Testing and Calibration Laboratories (NABL)
- National Centre for Medium Range Weather Forecasting (NCMRWF)
- National Atlas and Thematic Mapping Organisation (NATMO), Calcutta
- Survey of India, Dehradun
- India Meteorological Department (IMD)

BILATERAL PROGRAMME

Department of Science & Technology (DST) has bilateral programmes with the following countries:

Belarus	Germany	Northern Ireland	Slovak Republic
Bulgaria	Estonia	Poland	Slovenia
Croatia	Hungary	Portugal	Spain
Cyprus	Ice land	Russia	Switzerland
Czech Republic	Italy	Romania	Turkey
France	Kazakhstan	Serbia	Ukraine
			UK

The collaborations in selected areas of mutual interest with different countries/organisations are materialized through various modes of cooperation like:

- Exploratory missions of scientific delegations;
- Exchange visits of scientists for collaborative work and information exchange;
- Joint workshops;
- Fellowships / training / study visits for Indian scientists abroad and foreign scientists in India;

3. Opportunities for Europeans in India

- ❖ Development and implementation of joint R&D programmes, Joint projects and collaborative R&D programmes;
- ❖ Support to Indian scientists to access major international research facilities abroad; and
- ❖ Establishment of Joint Centres of Excellence.

In 2012 some calls have been launched in cooperation between DST and some of the abovementioned countries: the Netherlands, Germany, Austria.

Cooperation between India and the Netherlands

The Department of Science and Technology (DST), Government of India, and the Netherlands Organisation for Scientific Research (NWO) jointly open a call for proposals. The topic of this call is Functional Materials. This program offers funding opportunities for bilateral research cooperation between Dutch and Indian research groups. The aim of the call for proposals is to stimulate sustainable Indo-Dutch research collaboration by funding joint research projects on the topic Functional Materials. Both countries have a strong history in materials research. This programme will contribute to the further enhancement of bilateral innovative research on new, functional materials that are aimed at solutions for challenges we face regarding our current and future society. Projects should contribute and foster the collaboration between the best research institutes/groups in both countries.

In 2012 a call was launched aiming at funding collaboration projects which should:

- ❖ aim for solutions by materials research to the benefit of the future society;
- ❖ contain highly innovative chemical/physical-chemical research, aimed at novel materials;
- ❖ have a strong interdisciplinary character;
- ❖ contain highly qualitative scientific research and must be executed by researchers and institutes with excellent track records;
- ❖ be a cooperation between top institutes in both countries and include active involvement of at least two complementary institutes/groups in each country;
- ❖ aim at scientific collaboration lasting beyond the duration of the research project.

The call budget covers funding for maximum 3 joint bilateral projects, jointly funded by DST and NWO. A project allows for the application of four PhD / post-doc positions: two in India (duration and fellowship amount as per terms and conditions of DST) and two in the Netherlands (duration and fellowship amount as per terms and conditions of NWO).

This call for proposals is valid until the closing date 09-10-2012.



Cooperation between India and Germany

Call for Proposal / Application (2012) : Max Planck Society, Germany – DST, India Program Pursuant to the Memorandum of Understanding (MoU) signed in October 2004 between Max Planck Society (MPG) - Germany -and Department of Science & Technology (DST) – India - applications/proposals are invited for:

- (i) Max Planck Partner Group (PG) at Indian Partner Institutions (IPI)
- (ii) Max Planck - DST Visiting Fellowship

The program will be administered and implemented in India by the Indo-German Science & Technology Centre (IGSTC) on behalf of the Department of Science & Technology (DST).

Max Planck-DST Visiting Fellowships are awarded to scientifically outstanding, promising and talented young Indian scientists at the post-doc/young faculty level not older than 35 years as on 1st January 2013. Fellowship holders will receive from MPG/MPI a sum of 3,000 euro p.a. for up to four years. A minimum one month's visit per year is obligatory. Travel cost will be awarded for each visit to MPI by the Indian side. Details and application procedure available at www.igstc.org (Indo-German Science & Technology Centre – IGSTC) or www.dst.gov.in (Department of Science & Technology) – from 06th June 2012.

Application Deadline – 10th September 2012.

Cooperation between India and Austria

Call for Proposal / Application (2012) under Indo-Austrian (DST- BMWF) programme

The programme for Scientific and Technological Co-operation is supported by the Federal Ministry of Science and Research (BMWF) on the Austrian part and by the Indian Department of Science & Technology (DST) of Ministry of Science & Technology on the Indian part. The aim is to intensify the scientific co-operation between the two countries through promotion and support of mobility of scientists in the framework of bilateral scientific co-operation projects. Under the framework of this Programme, joint research project proposals between Indian and Austrian scientists / researchers, are invited by August 31, 2012.

All fields of natural / engineering sciences and technology (except social and behavioural sciences)

Duration of the Project: 2 years (March 1st, 2013 to February 28th, 2014)

Eligibility of Applicants:

India: The Principal Investigator (PI) and other investigators in India should be Scientists/ faculty members working in regular capacity in UGC recognized Universities/ Deemed Universities, Academic Institutes and National Research & Development Laboratories/ Institutes. The Indian PI should not be retiring or leaving the parent institute during the proposed duration of the project.

Austria: Researcher at universities, universities of applied sciences (Fachhochschulen) and other public scientific and research institutions within the scope of responsibility of the BMWF on the Austrian part.

3. Opportunities for Europeans in India

Priority is given to projects that fulfill the following criteria:

- ❖ Participation of young researchers (up to 35 years of age) on the Austrian part;
- ❖ Participation and/or application of female researchers on the Austrian part;
- ❖ Prospect of expanding the bilateral co-operation projects towards multilateral project co-operations (especially within the research programmes of the EU);
- ❖ New Co-operations who haven't been supported by now.

Project applicants will be notified about approvals or rejections after the meeting of the Austrian-Indian Joint Committee sometimes in 1st Quarter of 2013.

ACTIVITIES WITH EU

Bilateral collaboration with European Union (Joint calls)

There is a bilateral cooperation agreement between DST and European Union. Thematic areas are decided by the two sides and calls for proposals are given. The collaboration must have 2 organizations from two different countries of Europe and 2 organizations from two separate states of India. Each side spends around 5 million Euro a year. DST funds Indian partners while EC funds European partners. In 2008 thematic area was nano-materials, in 2009 it was renewable energy, in 2011 it was water and KBBE – Knowledge based BioEconomy.

NEW INDIGO PROGRAMME

Under the New INDIGO Partnership Programme supports Indian-European multilateral research and networking projects. So far, three calls have been launched:

- ❖ Networking projects in the field of Biotechnology and Health
13 projects funded
- ❖ Networking projects in the field of Water Related Challenges
9 projects funded

FELLOWSHIP PROGRAMME

The fellowship is meant for brilliant scientists and engineers from all over the world to take up scientific research positions in India, especially those scientists who want to return to India from abroad. The fellowships are scientist-specific and very selective. The Ramanujan Fellows could work in any of the scientific institutions and universities in the country and they would be eligible for receiving regular research grants through the extramural funding schemes of various S&T agencies of the Government of India.



Scope

All areas of science (in the broadest terms) will be covered by this fellowship.

Eligibility

- ❖ The fellowship is open to brilliant scientists and engineers from all over the world who are below the age of 60 years.
- ❖ The applicant should possess a higher degree or equivalent, such as Ph.D. in Science/Engineering, Masters in Engineering or Technology/MD in Medicine, etc. and have adequate professional experience.
- ❖ These Fellowships are very selective and only those who have a proven/outstanding track record as evident from their research publications and recognitions would be eligible.
- ❖ The candidate has to opt for either this fellowship or his present position / fellowship, if any.

Duration

The duration of the fellowship will be initially for five years.

Nature of support

- ❖ The value of the fellowship will be Rs. 75,000/- per month.
- ❖ Each Fellow will, in addition, receive a contingency of Rs. 5.00 lakh per annum for conferences and other expenses.
- ❖ The Ramanujan Fellows will be eligible for receiving regular research grants through the extramural
- ❖ funding schemes of various S&T agencies of the Government of India.

Methodology for selection

- ❖ The scientists can choose to work at any S&T institution including University Departments or other academic Institutions and National Laboratories in India, provided the Institution at which they wish to pursue research is willing to provide the necessary R&D, administrative and basic infrastructural support to facilitate research.
- ❖ The availability of Ramanujan Fellowships will be advertised by various academic and research Institutions on their websites in order to receive applications from interested scientists and technologists. The Institutions will subsequently submit their recommended nominations to the Department of Science & Technology. Institutions may consider setting up appropriate mechanisms to scrutinize and

3. Opportunities for Europeans in India

recommend the nominations.

- ❖ Individual scientists and technologists can also approach the institutions for hosting them for the Fellowship and forwarding their nominations to DST for the Fellowship.
- ❖ Selection of Ramanujan Fellows will be made periodically by an empowered Search-cum Selection Committee specially appointed for the purpose.
- ❖ The nominations of scientists and technologists by the Institutions would be received throughout the year. There is, thus, no last date for this scheme.

SPECIFIC PROGRAMME

Max Planck Partner Groups in Indian Institutions: A new DST-Max Planck Society MoU was concluded. The first mechanism to be supported under the MoU will be setting up of Max Planck Partner Groups in India around young scientists who have spent at least one year in a Max Planck Institute, jointly by DST and Max Planck Society for carrying out front line basic research of interest to Indian and Max Planck Institutions upto 5 years.

Lateral entry of European partners in Indian Scientific Agencies sponsored Indian Research Projects such as those in automotive sector have been identified for dissemination by the European Commission- Hydrogen propulsion (combustion) and electronic control of hydrogen IC engine; Tailor-welded blanks and hydroforming of auto components, Advanced electric hybrid vehicle technologies, Fuel cell hybrids, Technology for recycling automotive components, Inspection and maintenance of vehicles, Open standards for telematics platforms and e-toll collection.

Marie curie international outgoing fellowship: Outgoing International Fellowships are available to researchers from EU or Associated States with at least 4 years full-time research experience or a doctorate and willing to spend a mobility period working in a host institution located in a third country. These are individual fellowships that aim to reinforce the international dimension of the career of European researchers by giving them the opportunity to be trained in a world level third country research organisation (from 1 to 2 years), and then to apply the experience gained in a return host institution in a Member State or Associated State (typically half the duration of the first phase). The Fellowships also aim to respond to the researchers' needs in terms of complementing their training in inter/multi-disciplinary research, research management skills and intersectoral mobility. Proposals from all areas of scientific and technological research of interest to the European Community are accepted and there are no pre-defined priority areas.

Ministry of Science & Technology

Department of Biotechnology



The Department of Biotechnology (DBT) is an Indian government department, under the Ministry of Science and Technology responsible for administrating development and commercialization in the field of modern biology and biotechnology in India. The department has made significant achievements in the growth and application of biotechnology in the broad areas of agriculture, health care, animal sciences, environment, and industry. The proven technologies at the laboratory level have been scaled up and demonstrated in field.

<http://dbtindia.nic.in>

BILATERAL PROGRAMMES

The International Cooperation in DBT envisages fostering international linkages in Biotechnology in order to:

- Assist in implementation of national programmes through transfer of knowledge between various countries
- Open avenues for interaction in areas leading to acquisition of knowledge available within the country
- Building bridges to promote and strengthen bilateral ties through participation in joint R&D programmes
- Capacity building in high-tech areas through training and exchange programmes
- Share expertise in S&T and large scale facilities with developed and developing nations
- Understand the different cultural approaches to scientific research
- Add to the economic well being of the country

Currently, DBT has bilateral programmes with the following countries:

1. Denmark
2. Finland
3. Germany
4. Norway
5. Sweden
6. Switzerland

3. Opportunities for Europeans in India


Typically, the areas for calls for proposal are agreed by the two countries. The application in European country (say France) should be submitted to agency coordinating in European country. The Indian organizations submit application to DBT. Calls for proposal are opened and closed simultaneously in both the countries.

The costs of the European Institutions are met by European country and those for the Indian partner institutions are met by the DBT. The project must be a collaborative project and has to be selected by both countries for funding. Depending on the funds committed, the funds are given for all expenses like manpower, consumables, equipments, contingency and mobility. For mobility, sending country bears the cost of international travel while host country bears the cost of hospitality and per diem.

In the past, DBT had collaboration with the following countries: Belarus, Germany, Russia, Sweden, Switzerland, United Kingdom. More information on the areas of collaboration are available on the INDIAGATE report "Report on bilateral agreement".

VISITING SCIENTIST FROM ABROAD PROGRAMME (VSAP)

- ❖ Eminent scientists/ experts in the front line areas of Biotechnology from overseas institutions are invited for visits to research institutions in India for a period of three weeks to three months. However, shorter or longer visits may be considered on a case basis.
- ❖ The Scientist visiting under this programme spends the whole period of his stay in one institution. He may be associated with activities such as ongoing research programme, initiating new research projects and conducting advanced training programme in the field of the expertise. Visit of a scientist under the programme should not be utilized for merely giving lectures/seminars or discussions of general nature.
- ❖ The scientist visiting an Indian Institution under this programme may visit briefly one or two other institutions for the purpose of giving lectures, seminars or discussions.
- ❖ The host Indian Institutions should provide, if required, hostel/residential accommodation to the visiting scientist. Such as accommodation may be provided free of cost or a normal rent may be charged.
- ❖ A scientist invited under this programme is paid a stipend of Rs. 15,000/- per month through the host institution. In addition, the cost of air passage in economy class by Air India from the place of his stay abroad to India and back is borne by the Department of Biotechnology.
- ❖ A research contingency grant of Rs. 10,000/- per month would also be provided to the host institution in India. The contingency grant will be calculated proportionately



to the duration of visit. Not less than 50% of the contingency grant would be utilized by the host institution for purchase of items such as small equipment, chemicals, glassware etc in connection with research work or training programme undertaken by the visiting scientist. A maximum of 50% of the contingency grant may be utilized by the visiting scientist to meet expenses on internal travel to visit one or two laboratories in the area of specialization in the country or other items of a contingent nature.

- On completion of the visit, the scientist should send a detailed report to the Department of Biotechnology within a month.

SPECIFIC PROGRAMME

Welcome Trust-DBT Alliance

The Wellcome Trust/DBT India Alliance is an independent charity registered in India. The India Alliance provides funding opportunities for biomedical researchers at three key career stages.

About the fellowships

Fellowships are available for outstanding researchers across the full spectrum of biomedical science, from fundamental molecular and cellular studies through to clinical and public health research. This is also open for science graduates. The scheme is open for Indian as well as foreign researchers. There are 3 types of fellowships:

- Early Career Fellowships

For the most promising newly qualified postdoctoral researchers, to help them to make an early start in launching their independent research careers, working in the best laboratories in India and overseas.

- Intermediate Fellowships

For high-flying postdoctoral scientists to undertake high-quality research and establish themselves as independent research scientists. Candidates must have made intellectual contributions to their research field.

- Senior Fellowships

For outstanding biomedical scientists who have an excellent track record in their field, working in the best research institutions anywhere in the world, and who can demonstrate their ability to carry out independent research.

More information from www.wellcomedbt.org

Ministry of Science & Technology

Council of Scientific & Industrial Research (CSIR)



The Council of Scientific & Industrial Research (CSIR) --the premier industrial R&D organization in India was constituted in 1942 by a resolution of the then Central Legislative Assembly. It is an autonomous body registered under the Registration of Societies Act of 1860.CSIR aims to provide industrial competitiveness, social welfare, strong S&T base for strategic sectors and advancement of fundamental knowledge.

The Strategic Road Map designed for CSIR as it stepped into the new Millennium envisaged:

- ❖ Re-engineering the organisational structure;
- ❖ Linking research to marketspace;
- ❖ Mobilising and Optimising the resource base;
- ❖ Creating an enabling infrastructure; and
- ❖ Investing in high quality science that will be the harbinger of future technologies.

CSIR's 37 laboratories not only knit India into a giant network that impacts and add quality to the life of each and every Indian but CSIR is also party to the prestigious Global Research Alliance with the objective of applying global knowledge pool for global good through global funding. CSIR's R&D portfolio embraces areas as diverse as Aerospace, Biotechnology, Chemicals, etc. International Science & Technology Affairs Division(ISTAD) plays the role of a bridge between CSIR and the scientific affairs of the other countries.

www.csir.res.in

FELLOWSHIP PROGRAMME

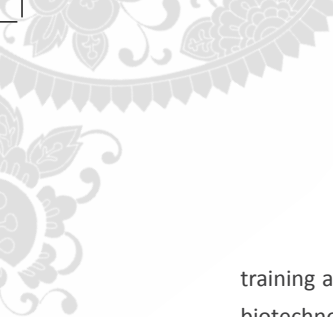
Post doctorate fellowship

CSIR provides fellowships to around 20 candidates for pursuing their Ph.D and post-doctorate in any of the CSIR labs. The scheme is open to all foreign nationals. The amount of fellowship is Rs. 20000 per month.

Internship Scheme for Foreign Students in CSIR Labs

In view of the rapidly escalating requests being received by the premier laboratories of the Council of Scientific & Industrial Research (CSIR), New Delhi to provide advanced training to foreign students in cutting edge areas of science and technology, CSIR has instituted an Internship Scheme for Foreign students in its labs in India.

Under this scheme, CSIR will facilitate foreign scholars, who are statutorily required to spend a few months at a research or educational institution in a foreign country, to receive hands on



training at its state of the art facilities in several frontier labs in such niche areas as biology and biotechnology, chemical science, material science, manufacturing, geosciences and electronics or any other emerging area of global significance. The internship is available in diverse disciplines of science and technology across all the CSIR labs in India to bright young researchers pursuing graduate and postgraduate programmes in their countries. Slots are also available for foreign doctoral students who wish to undergo training in highly specialized and advanced research techniques.

Number of Internships

50 internship awards have been instituted.

Duration of Internship

The duration of the internship is between 3 to 6 months. In exceptional cases, the period can be extended up to one year.

Who can Apply

Any foreign student pursuing a graduate / postgraduate / doctoral course at a recognized university / college in his / her country is eligible. The parent institution would be required to certify that the time spent by the student and work carried out during the internship is deemed as an essential component of the student's study programme.

Application Procedure

The student shall submit a brief proposal of the project proposed to be carried out during the period of the internship to the CSIR lab of his choice in India, duly forwarded by his college/ university so as to reach the Head, International S&T Affairs Division (ISTAD), CSIR, New Delhi at least six weeks prior to the commencement of the internship. There is no specific deadline for receiving the applications. The application should be accompanied by a detailed Curriculum Vitae of the candidate along with passport details (date and place of issue, passport number and date of expiry), Details of the research activities of CSIR are available at the website: www.csir.res.in

Tenable at

The internships are tenable at any laboratory / institute that is a constituent establishment of CSIR, New Delhi. It would be a necessary precondition that the lab / institute proposed for training should accept the student before the internship is offered or before the student arrives in India.

Internship Award

The internship award will provide the following:

- ❖ Free Guest house accommodation in the CSIR lab at the place of posting.
- ❖ A consolidated honorarium of Rs.5,000/- per month.

Internship for Foreign Students in CSIR labs (India)

Tripartite Agreement

This is to certify that Mr./Ms name , a student of name of educational institute is required to undergo training in the area of name of project for a period of days / months during date to date. A certificate regarding the work carried out by the student issued by name of the CSIR lab, specifying the length, description of the internship and evaluation of the student's, work is necessary for the successfully completion of the academic curriculum leading to the award of the name of degree degree to Mr /Ms name of student.

SPECIFIC PROGRAMME

CSIR Distinguished / Senior Foreign Scientist Award Scheme

To enhance international scientific and technological cooperation with its global partners, the Council of Scientific & Industrial Research (CSIR), India has launched the CSIR Distinguished / Senior Foreign Scientists Award Scheme.

Under this scheme, eminent and promising foreign scientists, nominated by established CSIR scientists, will be encouraged to visit CSIR labs to

- ❖ Carry out research projects of their own choice or participate in the host institution's research project without any claim on intellectual property rights (IPR).
- ❖ Interact and identify areas for cooperation and participate in workshops and conferences and
- ❖ Deliver series of lectures and seminars in the fields of biology and biotechnology, chemical science and technology, material science, manufacturing technology, geosciences and electronics or in any other emerging field of global significance.

CSIR DISTINGUISHED / SENIOR FOREIGN SCIENTISTS AWARD SCHEME

Prof Anthony D Costa,
Copenhagen Business School, Denmark
to NISTADS f 4 weeks - January, 2011
under the DFS, Award Scheme.

He delivered a series of lectures on topics of mutual interest such as political economy, India development and software industry.

Number of Awards

Up to 10 research awards for Distinguished Foreign Scientists (DFS) and 20 research awards for Senior Foreign Scientists (SFS) have been instituted to begin with. Depending on the response and need, the number of awards may be suitably enhanced.

Duration of Awards

The DFS award winners would be invited to spend a minimum of 2 weeks extending up to 3 months at any CSIR lab in India.

The SFS award winners would have an opportunity to stay for a minimum of 3 months extendable up to 6 months in any of the CSIR labs in India.

The duration of the awards may be enhanced suitably in future depending on the response to the scheme.

Eligibility

DFS Awards : Full professors and scholars of equivalent status engaged in basic or applied research having 15 years experience . The academic qualification of the scientist must be internationally recognized and documented by proven success in research such as positive responses to his / her published work.

SFS Award: Faculty members and senior researchers engaged in basic or applied research projects having a minimum of 8 years of experience.

The nomination forms can be obtained on request from Head ISTAD, CSIR, New Delhi or downloaded from the website: www.csirwebistad.org .

Selection Process

A Selection Committee at the CSIR Hq, New Delhi will meet twice a year in June and November. Nominations, complete in all respects, must be received at least 3 months prior to the selection committee meetings.

Tenable at

The award scheme is tenable at all the CSIR labs in India.

CSIR DISTINGUISHED / SENIOR FOREIGN SCIENTISTS AWARD SCHEME

Dr. Guido Cimino,

Scientist from the Institute of Biomolecular Chemistry, (CNR) Napoli to NIO, Goa
15th October to 30th November 2010
under DFS Scheme.

The aim of his visit was to interact with scientists/doctoral/postdoctoral students on some biosynthetic experiments on opisthobranch mollusks by feeding with stable isotopes.

CSIR DISTINGUISHED / SENIOR FOREIGN SCIENTISTS AWARD SCHEME

Prof Mihir Sen,

University of Notre Dame, USA to CMERI

11th November 2011 - 2nd December 2011

Under DFS, Award Scheme

He carried out research on different aspects of thermal engineering towards understanding processes of heat and mass transfer in air-conditioning and refrigeration systems and in improving their capabilities and energy usage.

Value of Award

CSIR would provide international travel and hospitality in India (details on the website).

BILATERAL PROGRAMME

CSIR has bilateral programmes with Germany, Hungary and Portugal.

 **Bilateral Co- operation with Germany:** CSIR-FzJ Cooperation Science Programme:

Under this programme five projects have been successfully completed. At present six joint projects in the areas of Electronic Science & Engineering, Chemical Sciences (NCL and IICT), Bioactive molecules, Earth Sciences (NGRI) are under implementation.

- CSIR-Humboldt Reciprocity Award
- CSIR-DAAD Exchange Programme
- DST-DAAD PPP Projects:

Three projects are ongoing under the DST's Project Based Exchange of Personnel Programme with DAAD.

 **Bilateral Co-operation with Portugal**

- Inter-governmental S&T cooperation with Portugal

 **Bilateral Co-operation with Hungary**

CSIR labs have a number of collaborative projects with their Hungarian counterparts under the Indo-Hungarian Inter-Governmental S&T cooperation.



NEW INDIGO PROGRAMME

CSIR is also partner in New Indigo programme.

Multilateral Co operation: Indo-EU S&T cooperation for targeted drugs for HIV, tuberculosis and malaria: cellular, molecular and biochemical studies in search of new targets and generation of novel lead molecules.



Ministry of Communication and Information Technology, Government of India

Department of Information Technology



The mission of the department is e-Development of India through multi pronged strategy of e-Infrastructure creation to facilitate and promote e-governance, promotion of Electronics & Information Technology- Information Technology Enabled Services (IT-ITeS) Industry, providing support for creation of Innovation / Research & Development (R&D), building Knowledge network and securing India's cyber space.

BILATERAL PROGRAMME


DIT has collaboration with France, Bulgaria, Sweden, Germany and Bosnia and Herzegovina. It has undertaken several projects with these countries. Autonomous institutions under DIT participate in FP-7 programmes of EU.

The EC's 7th Framework Programme (FP7) offers a prime opportunity to capitalize on Europe's immense reservoir of research resources and tools in information and communication technology (ICT), and to build on the strengths of India to help achieve key economic, societal and developmental goals. The Department of Information Technology is actively involved in bilateral cooperation with Europe and also has separate Joint Working Group (JWG) with Bulgaria, France and European Union (EU).

During the India-EU Summit held at Lisbon in June 2000, it was agreed that an Indo-EU Working Group (WG) on Information Society would be set up for promoting bilateral cooperation in all areas of ICT. The first meeting of the India-EU Working Group on Information Society was held in January 2001 in New Delhi.

Areas of Common Interest - The EU and India have agreed to:

- Enhance EU-India co-operation in the Seventh Framework Programme;
- Exchange views on a regular basis on - e-commerce, internet governance, universal service;
- Encourage India-EU joint research proposals and collaborative activities in 4G,

- 
- e-government, e-education and e-health;
- Exchange views on telecommunication spectrum management and on roaming and interoperability of telecommunication services; and
 - Work towards GEANT-ERANET connectivity.

ACTIVITIES WITH EU

Joint Working group with European Union

Department of Information Technology (DIT), Government of India is establishing Joint Working Group with European Commission to realize its goals of Joint Calls opportunities with co-investment of resources in different thematic areas of ICT for supporting, India-EU Research Projects for co-generation of new knowledge and innovative applications/products. The details of this opportunity will be known at a later stage.

Ministry of Health and Family Welfare

Indian Council of Medical Research (ICMR)



The Indian Council of Medical Research (ICMR), New Delhi, the apex body in India for the formulation, coordination and promotion of biomedical research, is one of the oldest medical research bodies in the world.

The Council's research priorities coincide with the National health priorities such as control and management of communicable diseases, fertility control, maternal and child health, control of nutritional disorders, developing alternative strategies for health care delivery, containment within safety limits of environmental and occupational health problems; research on major non-communicable diseases like cancer, cardiovascular diseases, blindness, diabetes and other metabolic and haematological disorders; mental health research and drug research (including traditional remedies). All these efforts are undertaken with a view to reduce the total burden of disease and to promote health and well-being of the population.

BILATERAL PROGRAMME

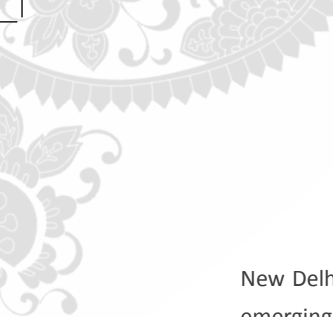
ICMR has bilateral Science & Technology (S&T) cooperation agreements with member states of EU to facilitate cooperation in the areas of biomedical research. Out of 27 countries in EU, ICMR has very good partnership with 5-6 countries. There are number of programmes running in ICMR, in which European scientists are very actively involved. The agreements with Germany, Sweden and France are very old and firmly footed. Nodal agencies in these countries are:

- ❖ German Federal Ministry of Education and Research (BMBF), Germany
- ❖ INSERM, France
- ❖ Karolinska Institute, Sweden

The application in European country should be submitted to agency coordinating in European country. The Indian organizations submit application to ICMR. Calls for proposal are opened and closed simultaneously in both the countries. The costs of the European Institutions are met by European country and those for the Indian partner institutions are met by the ICMR. The project must be a collaborative project and has to be selected by both countries for funding. Depending on the funds committed, the funds are given for all expenses like manpower, consumables, equipments, contingency and mobility. For mobility, sending country bears the cost of international travel while host country bears the cost of hospitality and per diem.

Collaboration with the United Kingdom

In February, 2010, ICMR and Medical Research Council, United Kingdom signed an MoU at



New Delhi to encourage joint research in a range of health areas including persistent, new and emerging infections; Chronic non-communicable diseases; Impacts of environmental change (including climate) on health.

Collaboration with Australia

An MoU between ICMR and George Institute for International Health, & Faculty of Medicine, University of Sydney, Australia was signed in November, 2007 at Hyderabad for collaboration in the areas of public health and clinical aspects of chronic diseases, HIV/AIDS, road traffic injuries as well as health systems. Subsequently in 2010, it was proposed by both Parties to include Maternal and Child Health as another area of mutual interest for collaboration. The collaboration is likely to be renewed further in 2012.

Collaboration with Germany

An MoU between ICMR and Helmholtz Association (HGF), Germany for cooperation in Medical Research was signed in April, 2006 at Hannover, Germany during the visit by Hon'ble Prime Minister of India to Germany. Under this MoU, a virtual Indo-German Science Centre for Infectious Diseases (IG-SCID) was inaugurated in April, 2007 which is located at the Council's Headquarters and slated to promote research in identified areas of infectious diseases through joint research projects with Indian and German funding. This Indo-German collaboration has been extended and pushed further in the area of infectious diseases especially in translational research by signing the renewed MOU between ICMR and HGF on May 31 2012. This MOU would provide the active translational efforts which combine basic and clinical research and thus advance the fight against infections in biomedical research with long term capacity building for researchers and scientists, in both the countries.

ACTIVITIES WITH EU

Letter of Intent (LoI) between ICMR and European Union for collaboration in cancer & neurodegenerative diseases was signed in March/April, 2011 at New Delhi/Brussels. A joint call for proposal was launched by ICMR in February, 2012.

ICMR has a joint working group with EU and their meetings are alternatively held in India & European countries every 18 months to identify new areas for joint research programmes and workshops etc. Call for proposals are invited by both India & EU.

India-EU workshop was held some times back, in which two areas namely Cancer and Neuroscience have been identified for joint research. Proposals are invited by Health Directorate of EC in EU and by ICMR in India. Agreement is yet to be signed which will be on the lines of bilateral programmes.

Ministry of Human Resources Development

University Grants Commission



The UGC has the unique distinction of being the only grant-giving agency in the country which has been vested with two responsibilities: that of providing funds and that of coordination, determination and maintenance of standards in institutions of higher education.

In order to ensure effective region-wise coverage throughout the country, the UGC has decentralised its operations by setting up six regional centres at Pune, Hyderabad, Kolkata, Bhopal, Guwahati and Bangalore. The head office of the UGC is located at Bahadur Shah Zafar Marg in New Delhi, with two additional bureaus operating from 35, Feroze Shah Road and the South Campus of University of Delhi as well.

The UGC's mandate includes:

- ❖ Promoting and coordinating university education.
- ❖ Determining and maintaining standards of teaching, examination and research in universities.
- ❖ Framing regulations on minimum standards of education.
- ❖ Monitoring developments in the field of collegiate and university education; disbursing grants to the universities and colleges.
- ❖ Serving as a vital link between the Union and state governments and institutions of higher learning.
- ❖ Advising the Central and State governments on the measures necessary for improvement of university education.

Web: <http://www.ugc.ac.in/>

FELLOWSHIP PROGRAMME

UGC offers Junior Research Fellowship (JRF) And Research Associateship (RA) for Foreign Nationals. The scheme was initiated keeping in view the political and cultural bilateral relations of India with other developing countries of Asia, Africa and Latin America. The scheme has opened new vistas for foreign students and teachers, enabling them to come to India and undertake advanced studies and research in sciences, humanities and social sciences in Indian Universities.

The objective of the scheme is to provide an opportunity to foreign students and teachers from developing countries to undertake advanced study and research leading to M.Phil/Ph.D. and postdoctoral research in sciences, humanities and social sciences at Indian Universities.

Ministry of Agriculture

Department of Agricultural Research and Education (DARE)



The Department of Agricultural Research And Education (DARE) has the following two autonomous bodies under its administrative control:

- Indian Council of Agricultural Research (ICAR)
- Central Agricultural University (CAU), Imphal

DARE coordinates and promotes agricultural research & education in the country. DARE provides the necessary government linkages for the Indian Council of Agricultural Research (ICAR), the premier research organisation with a scientific strength of about 25000 and a countrywide network of 49 Institutes including 4 deemed to be University status, 6 National Bureaux, 18 National Research Centres, 24 Project Directorates, 89 All India Coordinated Research Projects and 45 Agriculture Universities spread all over the country.

DARE is the nodal agency for International Cooperation in the area of agricultural research and education in India. The Department liaises with foreign governments, UN, CGIAR and other multilateral agencies for cooperation in various areas of agricultural research. DARE also coordinates admissions of foreign students in various Indian agriculture universities/ ICAR Institutes.

WEBSITE: <http://dare.nic.in/>

BILATERAL PROGRAMME

DARE has bilateral collaboration with France, Bulgaria and Hungary. The collaboration is similar to that of DBT and DST.

FELLOWSHIP PROGRAMME

DARE also coordinates admissions of foreign students in various Indian agriculture universities/ ICAR Institutes. As India offers quality education at a low cost, the number of foreign students in India studying agriculture and allied subject is growing at a very fast pace as well as shortterm training program for foreign nationals in SAU/ICAR, deemed Universities has been also organized by DARE.

Ministry of New and Renewable Energy



The Ministry of New and Renewable Energy (MNRE) is a Scientific Ministry which has been assigned the following subjects/business under the Allocation of Business Rules:

- ❖ Research and development of Biogas and programmes relating to Biogas units;
- ❖ Commission for Additional Sources of Energy (CASE);
- ❖ Solar Energy including Solar Photovoltaic devices and their development, production and applications;
- ❖ Programme relating to improved chulhas and research and development thereof;
- ❖ Indian Renewable Energy Development Agency (IREDA);
- ❖ All matters relating to small/mini/micro hydel projects of and below 25 MW capacity;
- ❖ Research and development of other non-conventional/renewable sources of energy and programmes relating thereto;
- ❖ Tidal energy;
- ❖ Integrated Rural Energy Programme (IREP);
- ❖ Geothermal Energy;
- ❖ Bio-fuels: (i) National Policy; (ii) research, development and demonstration on transport, stationary and other applications; (iii) setting up of a National Bio- fuels Development Board and strengthening the existing institutional mechanism; and(iv) overall coordination.


Web: <http://www.mnre.gov.in/>

BILATERAL PROGRAMME

The Indian Renewable Energy Programme has received increased recognition internationally in recent years. Many countries evinced interest in cooperation with India for promotion of new and renewable energy. The Ministry of New and Renewable Energy has been interacting with developed and developing countries for cooperation in New and Renewable Energy. The focus of the interaction for cooperation has been to explore opportunities for exchange of scientists to share experience and for taking up joint research, design, development, demonstration and manufacture of new and renewable energy systems/devices by R&D institutions/organizations of both countries and thereby establishing institutional linkages between institutions of India and other countries. Bilateral/multilateral cooperation frameworks have been established for cooperation.

The following MoUs have been signed with the countries of Europe:

- ❖ MoU on Indo-Denmark New and Renewable Energy Cooperation between Ministry of New and Renewable Energy, Government of the India and the Ministry of Climate



and Energy, Government of the Kingdom of the Denmark.

- MoU on Indo-Iceland Renewable Energy Cooperation between the Ministry of New and Renewable Energy, Government of India and the Ministry of Industry of the Republic of Iceland.
- MoU on Indo-Italian Renewable Energy Cooperation between the Ministry of New and Renewable Energy, Government of India and the Ministry for Environment, Land and Sea of Italy.

Ministry of Environment and Forests



The Ministry of Environment & Forests (MoEF) is the nodal agency in the administrative structure of the Central Government for the planning, promotion, co-ordination and overseeing the implementation of India's environmental and forestry policies and programmes.

The broad objectives of the Ministry are:

- ❖ Conservation and survey of flora, fauna, forests and wildlife
- ❖ Prevention and control of pollution
- ❖ Afforestation and regeneration of degraded areas
- ❖ Protection of the environment and
- ❖ Ensuring the welfare of animals

Web: <http://envfor.nic.in/>

BILATERAL PROGRAMME

Ministry has bilateral programmes with Denmark.

Memorandums of Understanding:

- ❖ MoU with the Kingdom of Denmark on Cooperation in Areas of Environment
- ❖ MoU with the Government of the Kingdom of Sweden on Cooperation in the Field of the Environment
- ❖ MoU with the Government of India and the Government of Finland on Cooperation in the Field of the Environment
- ❖ India-UK Statement of Cooperation between India and United Kingdom on Sustainable Transport

Ministry of Food Processing Industries



The Ministry of Food Processing Industries is the nodal Ministry of the Government of India for Food Processing Sector in India. In the era of economic liberalization where the private, public and co-operative sectors are to play their rightful role in development of food processing sector, the Ministry acts as a catalyst for bringing in greater investment into this sector, guiding and helping the industry in a proper direction, encouraging exports and creating a conducive environment for the healthy growth of the food processing industry. With this overall objective, the Ministry aims at:

- ❖ Better utilization and value addition of agricultural produce for enhancement of income of farmers.
- ❖ Minimizing wastage at all stages in the food processing chain by the development of infrastructure for storage, transportation and processing of agro-food produce.
- ❖ Induction of modern technology into the food processing industries from both domestic and external sources.
- ❖ To encourage R&D in food processing for product and process development and improved packaging.
- ❖ To provide policy support, promotional initiatives and physical facilities to promote value added exports.

BILATERAL PROGRAMME

The delegations from Holland, Poland and France have shown interest to collaborate with the ministry. So far, no MoU has been signed but the potential exists.

Indian Institute of Science, Bangalore



Indian Institute of Science (IISc) is a public institution for scientific and technological research and higher education located in Bangalore, India. It was established in 1909. It acquired the status of a Deemed University in 1958.

IISc collaborates with various government organizations like DRDO, ISRO, Bharat Electronics Limited, Aeronautical Development Agency, National Aerospace Laboratories, CSIR, Department of IT(Government of India). IISc also works in collaboration with private industry and research labs like Centre for Development of Advanced Computing, Google Inc, General Motors, Microsoft Research, IBM Research, Robert Bosch Foundation.

Web: <http://www.iisc.ernet.in>

BILATERAL PROGRAMME

Present MoU between India and European Union Countries:

- ❖ Australia
- ❖ Finland
- ❖ France
- ❖ Germany: Signed on: 15th February 2006 for a duration of 5 years & renewable for another 3 years. Purpose: To establish cooperation between the two institutions within any field related to science and technology of mutual interest and in particular for joint research programmes, student, faculty exchange and broadly areas in Electrical Engineering; Communication systems; Signal Processing; Control Systems; e-learning and Life Sciences. Extension to other areas will be made through further amendments to the present Memorandum of Understanding.
- ❖ Greece: Signed on 24th September 2007 for a duration of 5 years and renewable for another 5 years. To establish cooperation between the two institutions within any field related to science and technology of mutual interest and in particular Electrical Engineering Mechanical Engineering, Chemical Engineering and Applied Mathematics Physics. Extension to other areas will be made through further amendments to the present Memorandum of Understanding.
- ❖ Ireland
- ❖ Italy: Signed on: 28th April 2009 for a duration of 5 years and renewable for another 5 years. To establish cooperation between the two institutions within any field related to science and technology of mutual interest and in particular Biochemistry; Infectious Disease and Pathology; Immunology and Nanotechnology
- ❖ Japan

- Korea
- Spain: Signed on: 17th January 2009 for a duration of 3 years and may be extended on mutual consent. To establish cooperation between the two institutions within any field related to science and technology of mutual interest and in particular for joint research programmes, organization of workshops, meetings and discussion forums, student and faculty exchange.
- Sweden: Agreement signed on 21st June 2006 for a duration of 5 years and renewable for another 5 years. To establish cooperation between the two institutions within any field related to science and technology of mutual interest and in particular Sustainability Science, Biological Sciences, Mathematical Sciences, Automotive and Vehicle Engineering, Physics and Astronomy.
- UK: Signed on: 24th March 2011 for a duration of 3 years. To establish cooperation between the two institutions within any field related to science and technology of mutual interest and in particular in the field of biosciences for joint research programmes, student and faculty exchange. Signed on: 18th May 2010 for a duration of 3 years and may be extended on mutual interest. To establish cooperation between the two institutions within any field related to science and technology of mutual interest and in particular for Computational Mechanics, emphasizing mesh-free methods; Impact Dynamics; Penetration and Fragmentation Problems; Imaging and Inverse problems; High Performance Computing and Parallelization of Numerical Algorithms; Experiments on Impact

FELLOWSHIP PROGRAMME

IISc offers fellowships for international students admitted to Ph.D. or M.Sc (Engg) programmes.

SPECIFIC PROGRAMME: DST-IISc CENTENARY CHAIR PROFESSORSHIP

Department of Science and Technology has provided funding for ten DST-IISc Centenary Chair Professorships. The presence of these visiting professors will be used to initiate research in cutting edge areas and start productive collaborations at IISc and in the country. Appointees to these prestigious DST-IISc Centenary Chair Professorship positions must be outstanding persons who have distinguished themselves in academic or professional work in an appropriate field. Nomination for these Chairs can be made by any faculty members, alumni or any distinguished scientists or professionals. The scientists chosen for the award will have to spend a minimum of one month at the institute with no limits on the maximum time.

NEW INDIGO



New INDIGO is a consortium of European and Indian S&T organisations involved in promoting research cooperation between Europe and India. It is intended to strengthen the international dimension of the European Research Area (ERA) by providing a networking platform for Indian and European S&T organisations.


NEW INDIGO (Initiative for the development and integration of Indian and European research) is a Networking Pilot Programme (NPP) launched by European Union Member States and India. Its aim is to establish a joint infrastructure for advanced research in biotechnology and health.

Projects launched under NEW INDIGO shall be multilateral research cooperation projects involving at least two European and one Indian partner that should focus their activities on bioinformatics for health, biomarkers and diagnostics, and structural biology for health.

Since its start, New INDIGO has planned and implemented three multilateral calls to enable scientific and innovative cooperation of excellent researchers from Europe and India. These Networking Pilot Programme (NPP) initiatives are currently involving STI stakeholders in seven EU Member States and Associated Countries as well as the Indian DBT (Department for Biotechnology) and DST (Department for Science and Technology). By bringing together Indian and European researchers and innovation actors to jointly work on topics of mutual interest, NPP is paving the way to high quality collaborative research.

There are three main activities by which New INDIGO will attain this goal:

1. The identification of research hotspots in Europe and in India from the point of view of common scientific interest and complementary expertise. The setup of a large and effective database of institutions and research teams who are top ranked and have international recognition, and of existing bilateral and multilateral programmes will facilitate the networking and coordination of research activities in areas of common interest in both regions.
2. A call for research projects and their evaluation and follow-up by a committee of highly qualified scientists will pave the way to the structuration of high quality collaborative research.
3. Sharing experience with other geographic Era-Nets and comparing their respective outputs, thus contributing to the strengthening of national and international standards of S&T programming and programme management and therefore, it will contribute to the quality of coordinated research projects.



New INDIGO has launched its first call for funding of networking projects in the field of Biotechnology and Health. Funding is available for mobility and workshops in three topics:

1. Biomarkers and diagnostics
2. Bioinformatics for health
3. Structural biology for health

NEW INDIGO website: <http://www.newindigo.eu/>



Resources

INDIAGATE reports
List of the Ministries and the funding Agencies in India
List of opportunities
Database on funding providing organisations

www.access4.eu/india/index.php

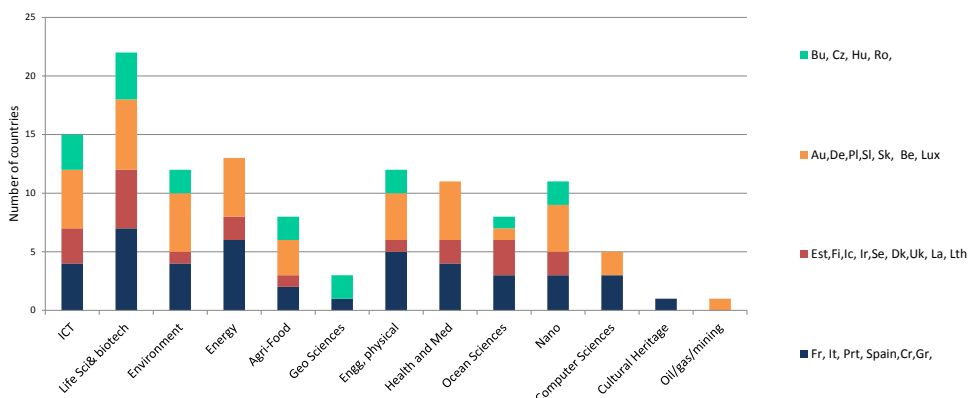
3.2 S&T Cooperation between India and EU 27 Member States

The existing bilateral co-funding opportunities between India and the 27 member states of the EU are important sources of funding and opportunities of joint or research activities. The INDIA GATE team have mapped and reported in this paragraph the past and present bilateral agreements which serves as a support material which enables the European and Indian players to comprehend the areas of cooperation EU and India hold.

The INDIAGATE team mapped also the S&T cooperation between India and EU -Associated countries (Croatia, Israel, Norway, Switzerland, Serbia and Montenegro, Turkey). A full report is available on the INDIA GATE “Report on bilateral agreement” downloadable on the website of the project.

Pictorial analysis of India and EU 27 Member States

The below chart depicts the Indo- EU bilateral cooperation in various S&T sectors with geographical categorization. The colors mark the different countries of the Europe and the vertical axis represents the number of countries representing cooperation agreements in the given sectors.

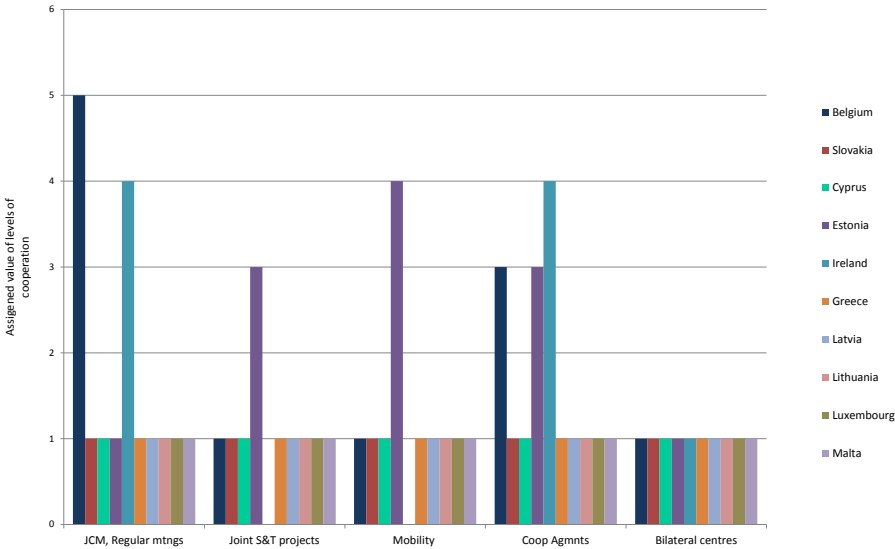


Bilateral Cooperation in different sectors with INDO-EU (MS)

India has S&T cooperation agreements with the 26 member states of EU, and the life sciences and biotechnology is a sector with which India has a cooperation agreement with as many as 18 EU MS. However it is to be noted that all the cooperation agreements have not been translated into call for proposals. ICT stands next in line with 12 MS having agreements with India. The spread of the agreements with the EU MS only emphasizes the common research priority between India and EU and gives a direction in which the cooperation can be mutually beneficially.

These agreements will come into full play only when all the activities in these agreements are enforced through regular proactive steering committee meetings, coupled with joint workshops, and better awareness of the agreements to the stakeholders.

The INDIA GATE team made an analysis of the level of bilateral cooperation taking into consideration the key drivers for the cooperation: Joint Committee Meetings, Regular meetings, Joint S&T projects, Mobility, Cooperation agreements and Bilateral Centres. The survey shows the level of bilateral cooperation between countries.



Key drivers of bilateral cooperation

The level of bilateral cooperation is low between Belgium, Slovakia, Cyprus, Estonia, Ireland and Greece, and India. It is observed by experts that the time lag between signing of the cooperation agreements and their follow-up meetings have been too long resulting in loss of time and opportunities between some of the member states like Belgium and Ireland. However there have not been any joint ministerial meetings so far between countries like Slovakia, Cyprus and Greece for the S&T cooperation to take a start in the first place. The reasons for the S&T cooperation not very active with these countries could be many including the absence of scientific attachés & inter-governmental meetings between the two regions, pointing towards the absence of political force to establish cooperation.

3.Opportunities for Europeans in India

More often than not cooperation agreements with periodic rigorous follow-up meetings from the governments generally are the starting point to chalk out the action plan for enhanced cooperation. Conducting of workshops to create interest between both the scientific communities and programs to stimulate the student, scholar, and scientist mobility are identified as the important drivers for S&T cooperation. The abovementioned countries are marked by little presence of these key drivers to demonstrate S&T cooperation. However other forms of cooperation such as trade, economic and commercial cooperation are active between India and countries like Belgium, Latvia, Luxembourg, Lithuania, Estonia and Malta.

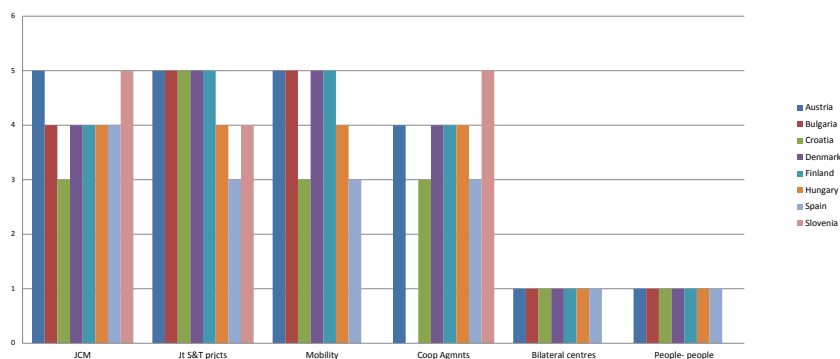


Chart 1 showing countries with moderate bilateral cooperation with India

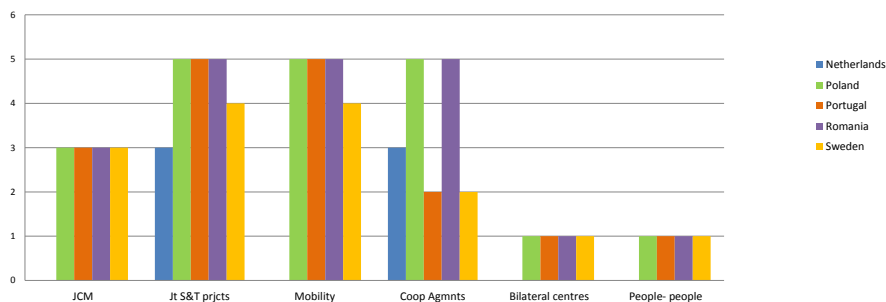
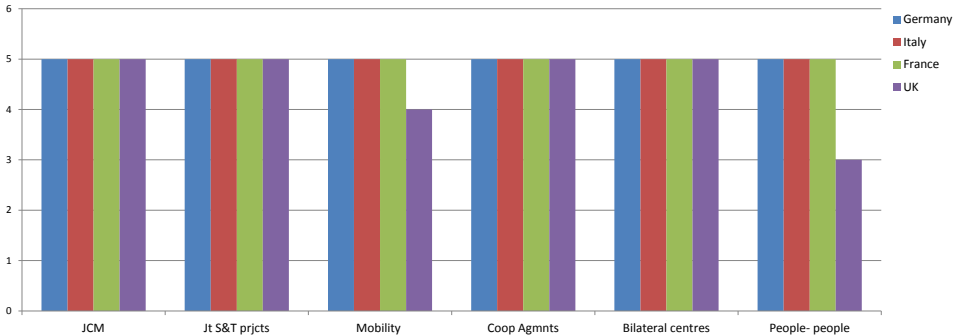


Chart 2 showing countries with moderate bilateral cooperation with India

Thirteen EU-member states can be categorized as having moderate level of S&T cooperation with India, based on the 5 key drivers identified. Portugal, Poland, Romania, and Sweden have reasonable cooperation in terms of mobility & joint research projects. It can be noted that the countries having regular ministerial meetings and active bilateral centers are able to have enhanced cooperation with India as opposed to those who have cooperation in terms of mobility and joint research projects only. Awareness as to the presence of agreements, perceptions of both the countries as to the administrative procedures, poor reciprocity especially relating to mobility of researchers to work in Indian system has been identified as few of the barriers for the existing level of cooperation with certain countries.

Most of the above countries have very good economic and commercial ties too, the reason for moderate level of S&T cooperation between India and the above mentioned countries could be the rate of opening up of joint funding programmes in research by India.

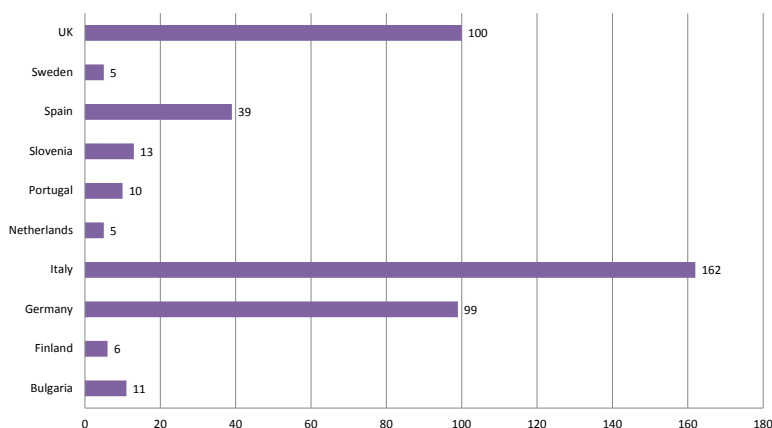


Countries which have Enhanced cooperation with India

Germany, France, Italy and UK can be categorized as countries having enhanced S&T cooperation levels with India due to historic, cultural and political involvements. The cooperation with these countries can be the benchmark for desired level of cooperation and hence the best practices followed administratively, operationally, and politically can be adopted by EU as a whole to increase the S&T cooperation between India and EU.

The following graph shows joint R&D projects. About 450 Joint R&D projects were supported for the period 2011-12.

3.Opportunities for Europeans in India



Joint research projects for the period 2011-2012

Some of the Industrial R&D Programs for the period 2011-12

Bilateral initiatives directed towards scaling and commercialization of R&D outputs by providing financial assistance as well as networking with appropriate R&D organizations and industry partners on bilateral level have been initiated with chosen partner countries like Israel, Germany, Switzerland for guaranteeing that R&D output is translated beyond the realms of the laboratories and the outcome reaches the market.

Department had signed an MOU with the Confederation of Indian Industries (CII) for setting up of the Global Innovation and Technological Alliance (GITA) as a non profit society in public-private partnership mode as a vehicle for implementing bilateral Industrial R&D programs with various partner countries.

Highlights and conclusion

S&T collaboration between India and EU-MS states:

- Most EU-Member states have S&T collaboration with India through **active S&T cooperation agreements** as in the case of Germany, Italy, UK, France, Poland, Romania, Slovenia, and **moderately active agreements** with Austria, Finland, Denmark and Hungary.
- Many Member States work with India on the basis of Memorandum of Understanding/ Programme of cooperation or other agreements between institutions of their countries and institutions of India.
- The countries which have exhibited enhanced cooperation are mainly due their long standing historic relationship with India, they also have substantial human and financial inputs with well established science counsellors, Science advisors, and attachés with well qualified scientists



attached to their embassies.

- ❧ Reciprocity between the member states is successful mainly because of the good professional and personal contacts between the science counselors/advisors/embassy and the Indian administration and Indian institutions
- ❧ It has been found by experts that there is no dependency of the S&T cooperation of the MS and India and the EU-India S&T agreement.

Points which can be considered

- ❧ The establishment of joint laboratories/ **EU centre and people to people** contact will be a very important step to enhance cooperation.
- ❧ The transition from participation to cooperation and partnership is going to be smoother through joint calls.
- ❧ Effective cooperation is possible through periodic **joint workshops** and meetings. Workshops cannot be necessarily translated into project proposals in short term but they should also be seen as a forum of reflection, vision and innovative ideas which may lead to future joint research funded either through the EC or through European Member States or other agencies in India or **jointly**
- ❧ **Complementarities and synergies** between EU-member states and Indian research priorities will provide greater impetus to the EU level S&T cooperation with India.
- ❧ Increasing the **awareness levels** of the agreements and initiatives to the tier-I, tier-II and tier-III institutions both in EU and India will help in better reception and increased participation in the programmes designed.

Bilateral agreements between India and EU 27 Members States



AUSTRIA



S&T Cooperation

In November 2007 the Austrian Minister of Science & Technology and the Indian Minister for Science & Technology and Earth Sciences signed a Memorandum of Understanding. The Agreement provides for exchange of scientific and technological information, documentation and publications, exchange of scientists and experts and implementation of bilateral-projects of mutual interest.

To strengthen the scientific co-operation between the two countries through promotion and support of mobility of scientists in the framework of bilateral scientific co-operation projects joint research project proposals between Indian and Austrian scientists / researchers, are invited. Exchange of scientists is encouraged.

Areas of Research Cooperation

Except social and behavioral sciences, all fields of natural sciences, engineering sciences and technology and pure sciences are open for research cooperation between the two nations.

The implementing agencies for this programme are the following in both countries:

- ❖ Department of Science & Technology-India
- ❖ Department of Biotechnology- India
- ❖ BMBF- Austria
- ❖ CSI- Austria

Funding

It is expected that basic funding for other expenditure (project manpower, equipment, consumables etc.) is already available with the project implementing Scientists/Institutions for both the countries. Only exchange visits of project team members are supported under this call as mentioned below.

- ❖ Funding for the exchange of scientists
- ❖ Travel costs of Indian scientists to Austria are covered by DST.
- ❖ Living expenses of Indian scientists visiting Austria will be covered by Austria.
- ❖ Travel costs of Austrian scientists are covered by Austria.

- ❖ The Austrian scientists visiting India within the framework of approved projects would be provided accommodation in a guest house or a hotel with reasonable facilities and transport for airport transfers. In addition they would be provided a per diem towards meals and out of pocket expenses : Rs. 1,000/- per day for short-term stays of up to 10 days and Rs. 20,000/- per month for stays of up to a 3 months.

Rates have been fixed as follows (including accommodation costs):

- ❖ Daily rate for Indian visiting researchers: EUR 73 per day for short trips to Austria up to 10 days
- ❖ Monthly rates for longer stays of up to 3 months: EUR 940 per month for students and graduates up to 30 years; EUR 1040 per month for graduates from 30 years to 35 years; EUR 1200 per month for researchers over 35 years.
- ❖ It is expected that basic funding for other expenditure (project manpower, equipment, consumables etc.) is already available with the project implementing Scientists/ Institutions from other sources. On Austrian side each project can apply for max. Eur 3000- per year.

Networking pilot projects-DBT-EU: Centre for Science and Innovation- Austria is one of the project partners of the New Indigo multilateral project which has launched a call for proposal under its Networking pilot programme. 13 projects are being currently funded under this programme wherein DBT is the funding body jointly with EU for this programme. The EC is the funding agency for this programme.


Other forms of cooperation -Trade cooperation

India and Austria have identified ways and means of stepping up bilateral trade between the two countries and furthering cooperation in the health and railway sectors. Draft agreements in these sectors are under negotiation, which are expected to be signed by the two sides in due course.

Recent S&T cooperation - 2011

India and Austria signed two Memoranda of Understanding (MoU), one on technology specific cooperation in the field of railways and the second on cooperation in science and technology, during the visit of President Pratibha Devisingh Patil in 2011.

The MoU on technology specific cooperation in the field of railways was signed between the Ministry of Railways (Government of India) and Federal Ministry for Transport, Innovation and Technology of the Republic of Austria. This will enable the extension of India's rail capacity,



extension of rail lines, modernization of infrastructure and rolling stock. The agreement also includes technical assistance by providing specialised professionals, technicians and training of railways staff. It also will lead to supply of railway equipment and railway material.

During end of 2011, Austrian Chancellor Werner Faymann, Indian President Patil stressed the importance of more cooperation in the energy sector. India wants to expand its proportion of renewable energy sources, and is interested in Austrian know-how in photovoltaic and wind energy technology.

To further continue the cooperation between the two nations, this agreement was signed. The MoU on cooperation in science and technology will be open to all fields of research of mutual interest.

BELGIUM

S&T cooperation

A Memorandum of Understanding on cooperation in space technology was signed between the two sides in November 1998. India is participating in the EU's Galileo Project where Belgian companies are also involved.

A framework agreement for cooperation in Science and Technology was signed in November 2006.

The two sides agreed to cooperate in the areas of Nano Science and Technology, Life Science, Health care and Agro Bio Tech, new energy resources and clear energy, astronomy and astrophysics, environment and global change, transfer of technology and innovations, mobility of researchers and innovators.

In June 2007 a federal agreement has been signed between DST and BELSPO of Belgium to support cooperation in

- ❖ Environment,
- ❖ Climate Change,
- ❖ Biotechnology,
- ❖ Health,
- ❖ Water related challenges.

Other forms of cooperation

Belgium has emerged as one of India's most important trading partners in the European Union (EU). Belgium is presently India's third most important European trading partner. Total bilateral exports between both the countries exceeded 8.8 billion Euros in 2008.

Ten agreements were signed between Belgium and Indian companies in New Delhi regarding the sectors of logistics and infrastructure, renewable energy, Transport and engineering.

Specific seminars in these sectors have also been organized for business people active in these sectors from both countries. The economic mission is multi-sector with clusters in automobile, aeronautics, transport infrastructure, clean technology and renewable energy, bio-pharma, audiovisual and diamonds.



Economic and Trade Relations

Belgium has emerged as one of India's important trading partners in the EU. Trade in gems and jewelry constitutes over 75% of the bilateral trade. India's IT sector is well represented in Belgium, with all the big IT companies having their establishments. Several Indian companies in the chemicals sector have also established offices/warehousing facilities in Belgium, particularly near the port city of Antwerp. Belgian business interests in India cover energy, ports, dredging, construction, banking and finance, electronics and software, chemicals and fertilizers, solar energy and biotechnology.

BULGARIA

Joint meetings

A meeting was held in 2009 of the Joint Science and Technology Committee meeting which signed the Programme of Cooperation (POC) in the field of Science & Technology for the period 2008-10. During the meeting, both sides approved a list of 13 new joint projects to be pursued jointly by the Indian and Bulgarian scientists in different areas of science along with 24 ongoing projects were renewed. 9 out of the 13 projects were approved for joint implementation.

S&T Co-operation

A Memorandum of Understanding for ICT was signed between the State Agency for IT and Communications of Bulgaria and the Ministry for Communications and IT of India, to actively promote facilitation of cooperation of for ICT research, establishment of Techno parks.

DST- MES (Bulgaria)

Department of Science and Technology (DST) of India and the Ministry of Education and Science (MES) of Bulgaria are the supporting agencies for joint research projects involving exchange of visits under the Indo-Bulgarian Bilateral Scientific Cooperation programme with special emphasis on further academic training and specialization of scientists/scholars in following areas of cooperation:

Information Technology	Alternate Renewable Energy Sources, including Solar Energy	Medicine (especially, Traditional Medicines based on herbs)
Metal Sciences and New Materials	Geophysical Instrumentation and Earthquake Engineering including its forecasting	Laser Science and Technology
Nano-materials	Food Technology	Astronomy
High Energy Physics	Biotechnology (including gene-biotechnology)	Ocean Science and Technology
Satellite Technology		



Funding Rules

Grants will be offered towards travel and living costs, (normally up to 2 visits per year from each side) within the framework of well-defined and approved Indo-Bulgarian research projects. The sending side shall cover the expenses on international travel (including overseas medical insurance) up to the capital city/city of arrival in the host side both ways. The receiving side shall arrange the in-country travel of the visiting scientists from the capital city/city of arrival to the place of the institute to be visited by appropriate means and living expenses. The local hospitality terms for visiting scientists in each others' host countries are as follows: For Indian scientists: an allowance up to Leva 900 per month or Leva 36 per day (if the stay is for less than 21 days). For Bulgarian scientists: an allowance of Rs.1,000/- per day in case of short term visit (up to 21 days) and Rs. 25,000/- per month in case of long term visit (more than 21 days) towards food and out of pocket allowances. The mutual visits of the scientists must be balanced in number (up to 6 visits from each side spread over entire duration of the 3 year project) and should in general, be only for a short duration of time. Each participant from either side would be allowed to avail only one visit per year of the project.

Other Bilateral agreements

In order to enhance trade and economic cooperation between both the countries, bilateral institutional arrangements like Joint Commission on Economic, Scientific and Technical Cooperation at Governmental level, Joint Business Council at non-governmental level and Working Groups on four different sectors have been set up and have been meeting regularly.

India

Cyprus



India and Cyprus have agreed to cooperate in the area of information technology and computer software including software development, hardware supplies etc. in view of the good prospects of cooperation in this area. The Cyprus delegation evinced keen interest in availing of India's professional skills in the field of IT, including specialized computer education facilities which noted Indian computer education institutes could offer.

The most substantive part of the business visit was the signing of a MoU between two Cyprus-based companies and Indian entity, CASE engineering, on solar energy cooperation which is expected to see an investment in India of 50 million Euros. Cyprus is recognized as a leader in the field of research and technology in the solar energy sector.

CZECH REPUBLIC



S&T cooperation

India and Czech Republic S&T cooperation is mainly in the fields of water technology collaboration. Czech invests and CSIR are collaborating in this area whereas collaboration through projects on bio-waste water treatment is happening between private companies like Voltas (India) and Ecofluid (Czech).

India has also made progress in cutting edge areas of science and technology. India is a space power and one of the four countries in the world with re-entry technology, having successfully launched and recovered a space capsule in 2007. The Indian success in software is now replicated in other fields as well. India has now emerged as a manufacturing hub in diverse sectors.

New Trade and Economic cooperation

The Bilateral Investment Protection and Promotion Agreement (BIPPA) are under negotiation. The two countries are also discussing a new trade and economic agreement, which will replace the existing trade agreement, signed in 1993. Both the countries have an Agreement on Scientific, Technical and Industrial Cooperation since 1973 and a new Programme of Cooperation is under negotiations and has been signed.

An Agreement on cooperation in the field of Health and Medical Science, Air Transport Agreement (1997) and Agreement on peaceful uses of Atomic Energy has been developed. Czech companies have contributed to India's industrialization. A number of Czech companies and experts have worked with Heavy Engineering Corporation.

DENMARK

S&T cooperation

India and Denmark have signed three pacts to enhance cooperation in trade, renewal energy and environmental issues.

A Memorandum of Understanding was signed between India and Denmark for cooperation in new and renewable energy technology.

DBT-Danish Council for Strategic Research

The Indian Department of Biotechnology (DBT) and The Danish Council for Strategic Research’s Programme Commission on Health, Food and Welfare (DCSR) calls for applications for funding of strategic research collaborations between Indian and Danish researchers within biotechnology. The applications should follow these guidelines. Indian and Danish partners must submit applications jointly.

The DBT and the DCSR have jointly allocated funding within research in biotechnology, see call text for themes. A total of approx. € 2 M is made available. Applicants are encouraged to apply for the full amount, i.e. a total project budget of € 2 M.

Added to the above cooperative efforts the partnership between Denmark and India will focus on six major areas:

Political dialogue	Research, science and technology	Education, cooperation between peoples and culture
Trade and investments	Energy, environment and climate	Attracting foreign work force

Plans to develop cooperation between Denmark and India in the areas of research, science and technology are already advanced – and they are in accordance with the plans that figure in a joint action plan for the strategic EU-India partnership. The EU and India have entered a cooperation agreement within science and technology, and India has high priority in the EU’s 7th framework programme for research (FP7).

Denmark has well-established and politically rooted research cooperation with India in the biotech area and will furthermore concentrate on building a partnership with India in information and communication technology (ICT). These are the two areas where India is strongest at present.

MoU between India and Denmark on Cooperation in Areas of Environment

MoU was signed on cooperation in environment areas during Sept 2009. Objective of this Memorandum of Understanding is to promote a mutually beneficial partnership between the parties in the field of environmental sustainability.

Areas financed:

1. Water pollution control; Air pollution control; Waste Management;
2. Biodiversity conservation including: Bio-safety, Survey of Bio-resources, Wetland management; Harmful chemicals management
3. Clean technologies including: clean water and air technologies; waste handling technologies; environmental monitoring technologies; technologies to support substitution of harmful chemicals in processes and products.

Important Bilateral Treaties and Agreements

- ❖ Technical Cooperation Agreement – 1970
- ❖ Bilateral Agreement on an Integrated Fisheries Project at Tadri, Karnataka - 1981
- ❖ Bilateral Investment Promotion and Protection Agreement (BIPA) 1995
- ❖ Protocol on Avoidance of Double Taxation (DTAA) - 1995
- ❖ MOU for cooperation between CII and Confederation of Danish Industries – 1995
- ❖ Protocol on Foreign Office Consultation - 1995
- ❖ Joint Business Council Agreement between FICCI and the Danish Industry (DI) – 2002
- ❖ MOU on Biotechnology for Bilateral Cooperation – 2004
- ❖ Agreement for establishment of a Bilateral Joint Commission for Cooperation – Feb 2008
- ❖ MOU for Cooperation in New and Renewable Energy – Feb 2008
- ❖ Arrangement on Gainful Employment for Family Members of the Diplomatic Mission or Consular Posts – Feb 2008
- ❖ MOU on Clean Development Mechanism – Oct 2008
- ❖ MOU on Cooperation in the area of Environment – September 2009
- ❖ MOU on Labour Mobility Partnership – September 2009 Social Security Agreement – February 2010

ESTONIA

S&T cooperation

Estonia and India have several agreements on co-operations on subjects varying from Science and Technology to Culture, Education, Science, Sports, Arts, Mass Media, Tourism and Youth Affairs. In 1999 India and Estonia signed a joint business council agreement to increase investment and trade between the two countries.

An Agreement on Co-operation in the Fields of Science and Technology came into force in 1999. The joint research projects recommended for implementation under the Programme of Cooperation in Science & Technology between the two countries were processed for clearances before their implementation. In short the cooperation is at a beginning stage.

Other agreements

- ❖ Declaration of Principles and Directions of Co-operation between the Republic of Estonia and the Republic of India which came into force October 15, 1993
- ❖ Agreement on Co-operation in the Spheres of Culture, Education, Science, Sports, Arts, Mass Media, Tourism and Youth Affairs which came into force November 11, 1999
- ❖ Agreement on Economic and Technical Co-operation which came into force March 13, 2000
- ❖ Agreement on Trade and Economic Co-operation which came into force August 24, 2004



IFCPAR/CEFIPRA

The Indo French Centre for the Promotion of Advanced Research (or CEFIPRA – le Centre Indo - Français Pour la Recherche Avancée) is a bilateral centre between India and France constituted for the promotion and financing of scientific collaboration between the two countries.

The centre is currently funded through an annual corpus of 3m €. India and France equally contribute 1.5m € each. The centre's objectives are as:

1. To promote cooperation between India and France in advanced areas of fundamental and applied scientific research.
2. To develop cooperation through identification of scientists and scientific institutions of the two countries likely to cooperate in a profitable manner.
3. To provide assistance in the form of grants and equipment as well as other appropriate means of support for the pursuit of advanced research.
4. To organize workshops/seminars and other types of fora on topics of mutual interest.

Since its inception it has evaluated over 1050 projects and has supported the creation of over 380 scientific collaborations. These, in turn, have resulted in over 1800 journal articles and over 2000 exchanges visits between Indian and French scientists.

India- France ICT cooperation

- ❖ MOU was signed in September 2000
- ❖ Areas of Common Interest identified as - Software development, IT enabled services, telemedicine, cyber education, electronic commerce, electronic governance, information security & cyber crime, human resource development, research, design and development and exploring third country markets
- ❖ Joint Working Group - The seventh meeting of the JWG was held in October 2009 at Paris and discussed issues like French experience in broadband and Wimax, Digital economy, Spectrum, Policy for innovation and competitiveness of SME/clusters and E-governance.
- ❖ C-DOT-Alcatel Research Centre was set up in Chennai in September 2005 to work in WiMax

People-people contacts

India and France agreed to intensify cooperation in the fields of education, culture, tourism & scientific research. It was agreed that efforts will be made for early establishment of an Indian Cultural Centre in Paris and that France will facilitate this task.

The two Sides decided to promote cooperation in the field of education, enhance linkages between their respective educational systems as also foster exchange of students. This, along with creation of joint international laboratories, cooperation on technologies for water management and the establishment of an Indo-French University Consortium, is expected to result in all round intensification of ties. To promote such wide ranging people-to-people contacts, both countries agreed to the reciprocal opening of Consulates in each other's territory and, in this context, welcomed the opening by France of two new Consulates in India, in Kolkata and Bangalore, in 2008. To enhance their strategic dialogue, both countries will hold regular consultations between high ranking officials of their respective Foreign Ministries on issues of mutual interest.

The two countries agree on the importance of an early, balanced and comprehensive outcome of the Doha Round of multilateral trade negotiations with focus on the development dimension. India and France are committed to environmental protection and in this context have issued a separate joint declaration.

Joint laboratories

Indo French Centre for Water Sciences	Indo French Institute for Mathematics IFIM
Indo French Centre for Ground Water Research - CEFIRES/IFCGR	International Associate Laboratory in Chemistry
Joint Laboratory for Sustainable Chemistry at Interfaces	Campus France
Indo French Centre on Waste Water Treatment	Joint Laboratory for Sustainable Chemistry at Interfaces (IICT – CNRS Rennes)
Indo French Centre for Bioprocesses and Environment	Joint laboratory in environmental chemistry and catalysis (NCL Pune – CNRS Lille)
Neurosciences-PROTECT	Joint laboratory in solid state structural chemistry (IISc – Crismat – CNRS)

The eight joint laboratories/centres are established with an objective to promote research in the priority areas identified by both the countries.

As the outcome of the Indo-French Seminar on innovation and the transfers of technology, that took place in September 2006 Sophia Antipolis, the Foundation Sophia Antipolis signed a cooperation agreement with Pune Technology Park (India). Recognizing the desire to promote innovation and bilateral cooperation, the French Senator Pierre Laffitte and President of the

Foundation Sophia Antipoli and Dr Rajendra Jagdale, General Director of the Pune Technology Parks decided to promote and further establish bilateral activities in terms of science and industry, and to develop relations between French competitiveness clusters especially the cluster of the Province Alpes-Côte d'Azur region, and the Indian clusters.

The agreement also anticipates the exchange of personnel between the two parks, the creation of a summer (winter) school, the organization of a seminar on management and innovation covering the topics of intellectual property, technology transfer, and the financing of young innovative companies.

Other bilateral cooperation

Both the nations have aimed to increase bilateral trade from

- 6.5 billion Euros to 12 billion euros by 2012;
- Trade expanded by 26% in 2007;
- France and India established a Consortium of Indo-French Universities to increase educational cooperation - approximately 1,300 Indian students study in France.
- India and France have also signed agreements on social security for Indians living in France
- Both the nations agreed for joint cooperation on space research and technology.

Mathematics: Creating an Indo-French International Joint Unit

An agreement in beginning of 2012 was signed for establishing the International Joint Unit (UMI) IFCAM (Indo-French Centre for Applied Mathematics). Based at the Indian Institute of Science Bangalore, IFCAM is created by the Ministry of Science and Technology of India and several French partners: CNRS (Centre National de Recherche Scientifique), Ecole Polytechnique, ENS (Ecole Normale Supérieure), INRIA (Institut Nationale de Recherche en Informatique et en Automatique), University of Nice Sophia-Antipolis and the University of Toulouse III-Paul Sabatier. The objective of this new CNRS Joint International Unit is to offer to mathematicians from both countries a platform to collaborate on projects involving partial differential equations, control theory, scientific computing, statistical physics, dynamical systems, biomathematics, and modeling of large networks. The UMI IFCAM will be a platform for collaborations extended to all over India, including the Tata Institute of Fundamental Research Bangalore, the Indian Institute of Technology Bombay and the Indian Institute of Technology Kanpur.

FINLAND

India and Finland signed three agreements to boost cooperation in science and technology, a move, which could enable the two countries, issue a joint call for research proposals, the latest one being in march 2008. The agreements were signed during the India-Finland Technology Partnership Forum meeting in Delhi.

DBT- Academy of Finland Research Council

In pursuance of the MOU signed between The Department of Biotechnology (DBT), Government of India and The Academy of Finland Research Council for Health, Government of Finland on co-operation in the areas of vaccine research, diagnostics and drug development signed in 2005, the Indian scientists are invited to submit joint research project proposals in collaboration with Finnish scientists.

The aim of the Call is to support systematic research cooperation especially to establish long-term research networks between Finland and India. The broad scientific areas mutually agreed will be pursued.

The Finnish research group will apply for funding from Academy of Finland according to their instructions. DBT and Academy of Finland will make the funding decisions in cooperation, so that both Finnish and Indian research groups will get funding from their own funding organisations, if successful.

Financial support for the Indian component would be provided by DBT and financial support of the Finish component would be provided through the Academy of Finland. Because this is a joint partnership between Finland and Indian Govt., involving both euros and rupee funding decisions, it is essential that

- ❖ Both Academy of Finland and DBT receive the identical Research Plan with all pertinent details and a description of the relative role of the Finland and Indian collaborators;
- ❖ Justification must be provided for the collaboration and must include all necessary supporting documents and signed agreements from respective institutions.

Researcher cooperation

The aim of this funding opportunity is to raise the standard of research and to promote the international mobility of researchers, particularly at the postdoctoral stage. The funding is awarded to support researchers' work in a foreign research organization outside Finland usually for a minimum of one semester and a maximum of one academic year. The funding is awarded as a personal grant for research.

The goal of this funding opportunity is to support the transfer of a maximum of one year by PhD-level researchers working within business and industry or public administration to work full-time at a university or research institute and vice versa. Funding may be provided to support the mobility of researchers across the sectors also between Finland and India.

Joint Research collaboration

Based on the bilateral agreement between the Academy of Finland and the Indian Department of Biotechnology (DBT), Finnish and Indian researchers can apply for funds for joint research projects in the field of biotechnology. The specific theme of each joint call is mutually agreed by the Academy and the DBT. The goal is to support long-term, systematic research collaboration as well as the establishing and strengthening of research collaboration networks between Finland and India.

The joint projects are funded for a maximum of three years.

Grants for research at Indian universities and research institutes in the following fields agreed with the Indian Department of Biotechnology (DBT):

- ❖ Advanced Biotechnology: Gene Therapy, Structural and Functional Biology with relation to Genomics and Proteomics
- ❖ Medical Biotechnology: Drug Development including vaccines, Diagnostics
- ❖ Food Biotechnology: Nutraceuticals
- ❖ Agriculture Biotechnology: Trans -genics and Agro biotechnics
- ❖ Environmental Biotechnology: Bioremediation

Application procedure

Finnish and Indian researchers shall draft a joint project application (incl. joint research plan and budget). Finnish partners apply for funding for their own research from the Academy, while Indian partners apply for funding for their own research from the DBT in accordance with DBT practices. The applications are reviewed using joint international peer review.

The funding is intended for researchers' salaries, for supporting researcher mobility and for acquiring material and research equipment, for other costs (e.g. arranging scientific meetings) and for overheads.

DBT/DST-Academy of Finland

Grants for research are funded together with the Indian Department of Science and Technology (DST) at Indian universities and research institutes. Grants are awarded for short visits to Finnish researchers who have completed a higher academic degree for preparation of joint research projects, centre of excellence cooperation and thematic research programmes. An invitation from the Indian host institution is required. The Academy of Finland covers travel expenses from Finland to the destination in India and back. The DBT/DST covers accommodation and per diem allowance.

Researcher mobility

Research grants to be applied for funding research projects in all scientific fields are the key funding opportunity of the Academy. The funding is mainly granted to Finnish research organizations and it may include funds for travel, grants for researcher training or research abroad or for work on the team by a foreign researcher for a maximum of one year.

Indo-Finland trilateral programme on diagnostics:

DBT, Academy of Finland (AoF) and Tekes, Finland announced a joint trilateral program with the three stakeholders officially signing the mutually agreed guidelines for the program aimed at promoting scientific and technological cooperation in the field of medical diagnostics.

20 proposals have been received under the recent call for proposals. The combined financial commitment of AoF and Tekes towards this call was 2.5 million Euros. Tekes maximal funding for research projects is 1 million euros. For company projects, Tekes' funding amount is flexible.

MoU with the Government of India and the Government of Finland on Cooperation in the Field of the Environment

Co-operation in the form of capacity building project between Central Pollution Control Board (CPCB), VIT Technical Research Centre of Finland and Finnish Meteorological Institute (FMI) has been signed in 2007. Co-operation will be carried out in different forms such as; study tours to Finland, courses in India (including site visits, audits for measurement campaigns, hands on training etc.) This co-operation provides also an excellent opportunity to present the innovative measurement technologies of Finnish high-tech companies for environmental monitoring.



Cooperation in science, research and technology between India and Germany dates back to the 1960s. Since 1971 and 1974 it is based on two governmental agreements. Subsequently several special agreements between German and Indian research organizations were signed aiming at initiating and implementing common research projects as well as the exchange of scientists.

Joint Meetings

The Indo German Science and Technology Committee meets every 18 months alternately once in Germany and once in India. The 8th Joint Committee meeting was organized on March 12, 2010, in New Delhi. Both sides were represented by the State Secretaries and their respective delegations comprising of officials and scientists. The meeting took stock of the progress on ongoing activities and those in the pipeline and decided on future areas of activities.

DST-BMBF Research cooperation

The Department of Science & Technology (DST), Government of India and the Federal Ministry for Education and Research (BMBF), Government of Germany are the nodal agencies for implementation of the bilateral Indo-German agreement on “Cooperation in Scientific Research and Technological Development”. At the implementation level DST on the Indian side and the International Bureau (IB) of the BMBF and the DLR on behalf of BMBF, coordinate and support the cooperative activities.

Areas of research cooperation:

- ❖ Nanotechnologies, intelligent materials and new production technology (new production processes) and other innovative physical and chemical technologies leading to wide technical and commercial utilization
- ❖ Information and communication technologies
- ❖ Environmental research and sustainability research
- ❖ Disaster and security research
- ❖ Other promising fields (depending on the total number of applications received)

Joint Research Projects

The programme is essentially designed to support the exchange of scientists, technical and academic personnel between the India and Germany. The sending side covers the travel costs

between the places of work in two countries and the receiving side covers the local stay costs. Both partners will contribute products and/or research results to the joint project on a comparable scientific / technological level.

On the Indian side, the basic infrastructure to implement the projects is expected to be available with the implementing institution and hence, equipment purchases will not be generally funded. However, in exceptional cases some support for equipment purchase could be considered (For example: in cases where the proposed research is being attempted for the first time in the country or addition of small piece of equipment will highly facilitate the project implementation). Some limited consumables/ contingency expenditure up to Rs 2 lac/year could be considered on a case-to-case basis.

On the German side, IB will provide only the exchange visit related funding to the German partners. However, IB funding is not available for equipment, manpower, consumables etc.

DST-DFG

In pursuance of the Memorandum of Understanding (MoU) signed in Oct 2004 and subsequently a Programme of Cooperation (POC) signed in Nov 2006 on Scientific and Technological Cooperation between the Department of Science & Technology, (DST) and the German Research Foundation (DFG) intends to invite new joint research proposals for support under Indo-German (DST-DFG) Programme.

INSA-DFG Exchange of scientists cooperation

In the year 1986 the DFG (German Research Foundation) – INSA (Indian National Science Academy) – Programme for further enhancement of academic exchange was set up.

The INSA-DFG Agreement allows the provision of funding for the following scientific activities: 1. exploratory visits, 2. Consultative visits, 3. Joint bilateral seminars

For all of the above categories financial support is restricted to travel and living expenses. The sending organization will cover the return travel costs from its country to the first host institute, while domestic transport as well as an adequate living allowance will be provided by the organization of the host country.

DST-DAAD

Young scientists are supported under a project based exchange programme by DAAD (German Academic Exchange Service) and DST (Department of Science and Technology). The DST-DAAD Project based Personnel Exchange Programme (PPP) was launched in 1998 through an MOU signed between DST and DAAD, and since then 20 projects are being supported each year in the following areas:

Agricultural, Veterinary and Forestry Sciences	Mathematics, Theoretical Computer Sciences and Informatics
Engineering Sciences	Medical, Life, Health and Nutritional Sciences
Geo Sciences	Physical, Material and Chemical Sciences

There is a special emphasis on academic training and specialization of young scholars/ researchers who are doing their PhD in Indian universities.

DST-Max Plank Society

In 2004 the Max-Planck-Society signed a fundamental agreement with DST covering joint research projects, joint seminars and the exchange of scientists. Following the Memorandum of Understanding (MoU) signed in Oct 2004, the Department of Science & Technology (Govt. of India) and Max Planck Society (Germany) invites applications/ proposals for – research projects between and MPS i.e Max Planck Partner Groups and Indian Partner Institutions (IPI). The society also constituted the Max-Planck India Fellowships.

In February 2010, the Indo-German Max Planck Centre for Computer Science was inaugurated by the former German President Horst Koehler, together with the then Indian Minister of Science & Technology, Prithviraj Chavan. Set up jointly by DST and the Max Planck Society, the centre will receive a total funding of around four million euros over the next five years.

Indo-German Science and Technology Centre

IGSTC was set up after a MoU was also signed during the visit of the German Chancellor Merkel to India in 2007 with both sides committing up to 2million Euros each year for a period of 5 years with a matching funding. The Centre aims to be a model for Public Private Partnership for Scientific and Industrial research.

Since 2010, it funds bilateral research projects in the applied sciences. A particular focus is the active involvement of industry companies on both sides. A first tranche of bilateral research projects in the fields of biotechnology and renewable energies started in 2010. A second call has been prepared.

BMBF-ICMR

Within the agreement of Indo-German cooperation in S&T of 1974 and the ICMR-GSF special arrangement of 1976 further renewed in 1990 with the addendum of ICMR-IB/BMBF at DLR in 2005, the Federal Ministry of Education and Research (BMBF), Germany and the Indian Council

of Medical Research (ICMR) support Research and Development projects in fields of common interest in the field of Health and medicine sectors.

The purpose of the funding is to stimulate new collaborations, e.g. the preparation of joint projects under national funding programmes. The programme facilitates bilateral cooperation between the scientific communities of India and Germany by way of joint research projects, bilateral workshops/seminar, exchange visits of scientist, scientific delegations and composite (scientific and industrial) delegation. Both sides will explore the possibility of funding from European Union research programmes.

The Indian Council of Medical Research (MoH & FW), Government of India, New Delhi and the International Bureau of the German Federal Ministry of Education and Research (IB-BMBF at DLR), Bonn are the nodal implementing agencies from the Indian and German sides respectively

Funding Rules

Scientists/faculty members working in regular capacity in Universities, national R&D Laboratories/ Institutes and private R&D institutes can apply under this programme.

Private Sector: Partners from all kind of private sectors are welcome, but financing is limited:

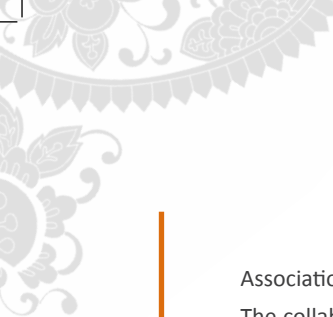
1. For Indian scientists from the private sector, only local hospitality in Germany as part of the exchange visit is available from the German side;
2. For German scientists from private sector, only travel costs are available for small and medium size enterprises as defined in SME ref. to 2003/361/EC) as well as local hospitality in India will be borne by themselves;
3. Project duration 2 years, extendable by one year.

Indo- German Centre on computer science

- ❖ An Indo-German Centre on Computer Science (IMPECS) was established with joint funding from DST and MPG with a total commitment of 12 crore rupees from Indian side and 2 million euros from Max Plank society.
- ❖ CSIR-FzJ Cooperation Science Programme: Under this programme 5 projects have been successfully completed. At present 6 joint projects in the areas of Electronic Science & Engineering, Chemical Sciences (NCL and IICT), Bioactive molecules, Earth Sciences (NGRI) are under implementation.

Indo-German Science Centre for Infectious Diseases (IG-SCID)

It is a unique collaborative exercise between two major players in biomedical and public health research domain i.e, the Indian Council of Medical Research (ICMR), India and Helmholtz



Association (HGF), Germany, at the behest of their respective Governments.

The collaboration between India and Germany in the health care sector has been in place since January 1974 under the Indo-FRG Agreement on Science & Technology in 1974 and subsequently Indian Council of Medical Research and German Ministry for Environment and Health (GSF, now taken over by DLR, BMBF) signing an Agreement in 1976. This alliance was strengthened by co-operation efforts renewed in May, 1990 and November, 2005. Working together towards the common goal both the countries formalised their long-term partnership in April 24, 2006 at Hannover by signing a Memorandum of Understanding (MoU) between ICMR and Helmholtz Association in presence of the Hon'ble Prime Minister of India, Dr. Manmohan Singh and Her Excellency, the Chancellor of Germany, Dr. Angela Merkel.

Research areas include: Genetic Susceptibility, Vaccines and Anti-Infectives, Viral Diseases and Zoonoses & Animal Models of Infectious Diseases.

Activities: To manage the Indo-German Science Centre for Infectious Diseases (IG-SCID), the Division of International Health, ICMR has taken up a project entitled "Managing the Indo-German (ICMR-HGF) Science Centre for Infectious Diseases (IG-SCID)" under the Principal Investigatorship of Dr. Mukesh Kumar, Deputy Director General/Scientist E, IHD, ICMR. Dr. Harpreet Sandhu, Scientist D, IHD, ICMR is the Co-Investigator. The project has been in operation since September, 2007. The major aim of the project is to promote Indo-German cooperation on infectious diseases and to oversee the effective execution of laid down procedures and protocols by the Joint Steering Committee (JSC) and the Scientific Advisory Board (SAB).

GREECE

S&T Cooperation

Diplomatic relations between Greece and India were established in May 1950. The new Greek Embassy building in New Delhi was inaugurated on 6 February 2001. In 1996, a Defence Attaches office was also opened at the Embassy.

In September 2006 the speaker of the Indian Parliament, Mr. Somnath Chatterjee, carried out an official visit to Greece, Also, the President of the Republic of India, Mr. APJ Abdul Kalam made an unofficial visit to Athens in April 2007. The harmonious relations between the two countries as well as their active cooperation have been confirmed, thus helping to forge close friendly ties. In January 2008, Prime Minister Kostas Karamanlis paid an official visit to India, during which, he met with his Indian counterpart Dr Man Mohan Singh, while promoting political, economic and technological cooperation between the two countries.

Deputy Foreign Minister Petros Doukas and Indian Ambassador Dilip Sinha signed a protocol of exchange of ratification instruments regarding the agreement of scientific and technological cooperation between Greece and India. The agreement forms the basis of trade in the field of research and technology between the two countries authorities.

Areas of cooperation

In particular, this cooperation relates to the following sectors:

Information Technology	Seismology	Energy and environment technologies
Nanotechnology	Geodynamics	Oceanography
Biotechnology		

It is based on the principle of mutual benefit and mutual opportunities for access to programmes and activities, according to each country’s current legislation and regulations. This agreement will enable the two countries to implement joint research programmes and projects on technological development. It will also help promote exchanges of scientists, researchers, and experts through the organization of meetings, congresses, seminars, conferences, and exhibitions.

The Department of Science & Technology, Government of India had signed an S&T Cooperation Agreement with the Hellenic Republic (Greece) on 26th April, 2007. Joint programmes and collaborative research projects however, are yet to take off under this umbrella agreement, between the two countries.

HUNGARY

Bilateral agreements

Seven Agreements/MoUs were signed between the two countries in 2008. These include:

- ❖ Memorandum of Understanding on Cooperation in the field of Health and Medicine;
- ❖ Agreement for Cooperation in Agriculture,
- ❖ Plant Quarantine and Protection and Animal Husbandry;
- ❖ Letter of Intent on the Establishment of an India-Hungary Strategic Research Fund;
- ❖ Memorandum of Understanding on Cooperation between ONGC and MOL.

S&T cooperation

Cooperation in the field of Science & Technology is active with regular exchange of visits; the 7th session of S&T JCM was held in New Delhi in Dec 06. S&T Co-operation is implemented through two Agreements - between the Indian National Science Academy (INSA) and the Hungarian Academy of Sciences (HAS), and between our Department of Science and Technology (DST) and the National Office for Research and Technology [NKTH] Hungarian Ministry of Economy and Transport. There is also an MoU between IIT (Mumbai) and the premier Hungarian University of Technology, the Budapest University of Technology and Economics (BUTE) under which joint research activities, exchange of academic staff and post-graduate students and organizations of various seminars and workshops are envisaged.

The two sides agreed that cooperation in Science and Technology, both at the bilateral level and within the EU framework, was a key priority. They noted that the 7th session of the India-Hungary S&T Committee Meeting in New Delhi on 4 December 2006 has identified 22 bilateral projects in the following areas given below:

Life sciences, biotechnology	ICT, health and agriculture	Biomedicine
Material science	Green Chemistry including catalysis	Optic & Electronics for Space applications
Nanotechnology		

The establishment of the India-Hungary Bilateral Strategic Research Fund of Euro 2 million, which would provide a strong impetus to joint S&T projects, was welcomed by all the members of the S&T committee. Both sides also agreed to identify successful bilateral projects that could be supported under the Seventh Framework Programme (2007-13) of the EU.

Exchange of Scientific personnel

Exchange of researchers with the following rules forms one of the important approaches of scientific cooperation.

General Rules for Scientific Exchanges under Indo-Hungarian Strategic Research Fund

The visiting side pays for the international travel from place of work in home country to the nearest international air-port of the place of work in host country and medical insurance to the visiting scientist.

The hosting side

- ❖ Pays for the accommodation and living expenses (per-diem) of the other party's exchanged or assigned personnel;
- ❖ Pays for the in-country travels of the other party's exchanged or assigned personnel provided that these travels are connected with the joint project.
- ❖ General rule: Not more than one visit of 30 days duration per year and per project collaborator.
- ❖ Expenses covered: India-Hungary return flight, economy class at the lowest available price.

Other forms of cooperation

India-Hungary bilateral Investment relations have been showing a marked increase. Several Indian companies set up branches in Hungary with more than 1000 people employed by Indian companies in the European country.

India has mounted a big diplomatic and economic push to strengthen bilateral ties with Hungary with an eye on further improving its ties with the European Union, its largest trading partner. Hungary is set to assume the presidency of the European Union in 2011.

A number of other agreements provide the overall institutional framework for economic cooperation with Hungary:

- ❖ Double Taxation Avoidance Agreement (DTAC) (signed in November, 2003)
- ❖ Bilateral Investment Protection and Promotion Agreement (BIPA) (Nov, 2003)
- ❖ MoU on IT Cooperation (Nov.2003)
- ❖ Agreement on Defence Cooperation (Nov.2003)
- ❖ Cultural Exchange Programme (Oct 2006)

S&T cooperation

Collaboration in the R&D field between Italy and India officially started in 1978. The Italian foreign minister and the Indian Science and Technology Minister, in consultation with their respective research institutions, universities and industries, signed a Scientific and Technological Collaboration Agreement. This agreement was then split into three yearly "Executive Programmes", to identify priority areas for the development of bilateral collaboration and to define norms for implementing these programs. The Executive Program (EP) in effect for the period 2008 - 2010 was signed in Delhi on 21 November 2008. A joint approval was given for 23 new research projects:

- 4 projects of national importance
- 3 on-going projects

Areas of cooperation	
Electronics, Telecommunications and Computer Sciences	Physics, Technology and Application of Accelerated Particles
Health, Food and Biotechnology	Transport Systems including Automotive Technologies
Design Engineering and Technology	Energy and Environment
Materials Science and Technology	Cultural Heritage Conservation and Restoration Technologies

Under the EP 2008 - 2010 seminars, conferences, specialized training and workshop-cum-exhibitions were organized which shall witness participation of eminent Italian and Indian personalities from the science and industrial field.

Measures taken to foster S&T

- New and more modern instruments (also financial) for collaboration identified;
- Participation in projects under the 6th and subsequent Program Framework of the EU;
- Regulations for issues related to protection of patents and utilization of results of such projects (IPR);
- New initiatives such as "creation of joint centres and research laboratories and joint centres of excellence" and "creation of a virtual network of laboratories and scientific research academies".

Joint research projects

27 Indo-Italian Research Projects have been approved for co-funding (including Indian scientist's access to Italian synchrotron facility– Elettra & Phase II of India- Trento Program for Advanced Scientific Research-ITPAR).

The Executive Programme of Scientific and Technological Cooperation between the Italian Republic and the Republic Of India for 2012-2014

Within the framework of the Agreement on Scientific and Technological Cooperation between the Italian Republic and the Republic of India, signed in New Delhi, on 28th November 2003 and entered into force on 3rd November 2009, the General Directorate for Country Promotion (Economy, Culture and Science) – Unit for Scientific and Technological Cooperation of the Italian Ministry of Foreign Affairs and the Department of Science and Technology, Ministry of Science & Technology, Government of India, (hereafter referred as to “the Parties”) initiate herewith the procedures for the drafting of the Executive Programme of Scientific and Technological Cooperation for the years 2012 – 2014. Priority research areas:

Agriculture and Food Science and Technology	Energy and Environment	Space and Physics
Design Engineering and Technology	Health, Biotechnology and Medicine	Technologies applied to Cultural and Natural Heritage
Electronics, Information Communication Technology	Nanotechnology and Advanced Materials	Transport Systems including Automotive technologies

MoU on Indo-Italian Renewable Energy Cooperation

Ministry of Renewable Energy, India and Ministry for Environment, Land and Sea Republic of Italy identified new and renewable energy as common area of interest and established cooperation between Indian and Italian entities with aim of developing new and renewable energy technologies and signed an agreement in 2007.

IRELAND



Areas of cooperation

Through a programme of cooperation in science and technology concluded in May 2009, areas like

Biotechnology	Chemical, Biochemical and Pharmaceuticals	Energy-efficient technologies
Food and agricultural sciences	Information and Communications Technologies etc.	Marine sciences
Medical and health sciences	Nano-sciences	Sustainable energy

These have been identified for joint research between India and Ireland. Researchers from both countries have evinced mutual interest in establishing research linkages between research institutions in both countries.

Ireland's future plans involving India

Ireland, which is the fastest growing economy in Europe and a hub for the pharma and biotech industries, envisages a big need for trained graduates in these fields. The government plans to launch a green-card system for skilled immigrants, which will allow international students, including those from India, to stay on in the country and work after they finish their courses in Ireland. A new law on green cards is likely to be passed by Easter this year.

Also the pledging to increase bilateral trade between the two countries during a trade mission to India in January, Irish Prime Minister Bertie Ahern pinpointed areas of software and education where Indo-Irish collaboration could be enhanced.

Agreements and upcoming opportunities

During the mission, India and Ireland signed three agreements - a cultural co-operation pact, an agreement on Scientific and Technological co-operation and an MoU between the Indian National Science Academy and the Science Foundation of Ireland.

LATVIA

Indo-Latvian Economic and Commercial Relation

The relations between India and Latvia are friendly and wide ranging. Latvia is envisaged as the nation that occupies a pivotal position as gateway to the opportune Baltic market. Latvian leadership at all levels is keen to strengthen relationship with India.

The Latvian government has identified India as a country of strategic importance and has concurrently accredited the Latvian Ambassador to Lithuania to New Delhi. The Latvian Government has appointed its Honorary Consuls in Delhi and Chennai. The Latvian Government has also authorized the Hungarian Embassy in Delhi as well as the Consulate of Netherlands in Mumbai to issue visas to Indian nationals for Latvia. The Indian Mission in Stockholm is concurrently accredited to Latvia.

Trade Relations

Indian exports to Latvia include tea, coffee, tools, pharmaceuticals, chemicals, garments, iron & steel etc. Indian imports include chemicals, fertilizers, iron & steel, machinery etc. There are around 42 registered Indian ventures in Latvia which range from production, marketing and software development. Indian investment in Latvia is about USD 1.7 million.

Important Bilateral Treaties and Agreements

- ❖ Declaration of Principles and Directions of Co-operation between India and Latvia was signed during the visit of MOS (EA) in September, 1995.
- ❖ Memorandum of Understanding for Cooperation in the fields of Culture, Arts, Education, Science, Mass-Media and Sports was signed in Sept 1995, during MOS (EA) visit to Latvia.
- ❖ Agreement on Economic and Technical Cooperation between Latvia and India signed in Sept 1995, during MOS (EA) visit to Latvia.
- ❖ Protocol on Foreign Office Consultations was signed in Riga in Sept 1995, during the visit of Minister of State, External Affairs.
- ❖ Air services Agreement was signed in October 1997 during the Latvian presidential visit to New Delhi.
- ❖ Agreement on Inter-Governmental Commission on Trade, Economic, Scientific, Technological and Cultural Cooperation was signed during the First Round of FOC in Riga, Latvia in June 2001.

LITHUANIA



In July, 1993 an Agreement on Trade and Economic Cooperation was signed between India and Lithuania. The major items imported from India include pharmaceuticals, paper, and textiles. Lithuania exports cement, metals, sulphur, and base metals.

Lithuanian – Indian Forum to be established

The Lithuanian – Indian forum will be established at the initiative of Lithuania’s Ministry of Foreign Affairs, with the aim to raise the interest of Lithuania’s institutions and public in economically booming India, also to find Lithuania’s circle of friends in India. The forum will have a goal to unite all, who take interest in India, have professional relations with India, all who want to share their experience of communication with India, to learn more about this country, its culture and modern life, to search for new forms and areas of cooperation with India. Any natural or juridical person will be able to sign the founding declaration of the Lithuanian – Indian forum and to become members of the forum. Members of the Lithuanian – Indian forum will be able to exchange information about their activities, projects, trips, sharing experiences and resources on the website <http://www.lithuania-india.com/>.

LUXEMBOURG

Economic relations

There is no record as to the S&T cooperation between the two countries however the economic and trade ties are strong. Foreign Direct Investment (FDI) from Luxembourg into India amounted to US \$ 321.76 million from April 2000 to April 2010 (Source: Department of Industrial Policy & Promotion). Luxembourg is the 25th largest investor in India worldwide and 10th largest within the EU. The total FDI into India from Luxembourg comprises only 0.14 percent of the total, much below the potential. Indian direct investment in joint ventures and wholly owned subsidiaries in Luxembourg was US\$ 18.25 million from April 1996 to February 2006 (Source: Website of Ministry of Finance).

Important Bilateral Treaties and Agreements with Luxembourg

- ❖ Bilateral Agreement on Health in April, 1996
- ❖ Cultural Agreement in September, 1996
- ❖ Bilateral Investment Protection Agreement (BIPPA) in November, 1997 with BLEU.
- ❖ Bilateral Air Services Agreement in January, 2001
- ❖ Agreement for the Avoidance of Double Taxation and the Prevention of Fiscal Evasion in June, 2008
- ❖ Bilateral Social Security Agreement in September, 2009

11th Economic Joint Commission Meeting

The 11th round of Economic JCM between India and Belgium- Luxembourg Economic Union (BLEU) took place in Brussels on May 4-5, 2009 after a gap of eight years. The two sides reviewed the ongoing cooperation and discussed possible cooperation in the fields of transport, iron and steel, diamonds trade, tourism, biotechnology and pharmaceuticals, ICT, aeronautics; investment and market access matters; financial sectors; science and technology; bilateral social security agreement; Consular matters etc. The meeting reviewed the present status of economic relationship and focussed on the future areas of bilateral cooperation. The next round of the JCM will take place in New Delhi in 2011.

MALTA



There has been no record of any S&T agreements so far between India and Malta. However there has been good trade and economic ties between the two countries. The Maltese government encourages Indian businesses to set up in their nation and has offered various incentives to Indian companies. Malta has also signed a bilateral trade agreement with the Indian government, for the avoidance of double taxation.

Bilateral trade between the two countries increased nine-folds during the first three years of the 21st century, reaching 97 million USD in 2003-04 and 122 million USD by 2005-06. The main exports from Malta are electronic goods, electrical machinery, and professional instruments, while the major export from India is petroleum goods.

Important Bilateral Treaties and Agreements

- ❖ Cultural Cooperation Agreement
- ❖ Economic, Scientific and Technical Cooperation Agreement
- ❖ A Civil Aviation Agreement finalised in 1994 is being reconsidered before implementation.

NETHERLANDS

Main Bilateral Treaties and Agreements

Various agreements, which together constitute a comprehensive framework for bilateral co-operation, are operational between India and the Netherlands. The most relevant to the S&T areas

- ❖ Economic and Technical Cooperation (February 1983),
- ❖ Cooperation in Agriculture and Animal Husbandry (June 1984, September 1990),
- ❖ MoU on Cultural Cooperation (October 2007),
- ❖ **Scientific Cooperation (July and November 1985 respectively), Telecommunication (September 1987), Environmental cooperation (January 1988),**
- ❖ Promotion and Protection of Investments (November 1995), and Investment Promotion (February 2004), Social Security Agreement (October 2009).

S&T Cooperation

Royal Netherlands Academy of Arts and Sciences has announced an International exchange programme with Eastern Europe, India and Australia. The Academy supports the international transfer of knowledge and science through funding. It awards grants for working visits and researcher exchange programmes. Most agreements specify a maximum number of days.

Exchange of scientific visits agreements have been signed with: Indian National Science Academy: India and the Netherlands signed a Memorandum of Understanding (MOU) for cooperation in Biotechnology in Oct 2005. The MoU aims at developing joint activities between investigators of Institutes of Higher Education of Government of Netherlands and universities and Laboratories of India. It also envisages setting up of 30-50 Ph.D. sandwich bursary projects for Indian researchers working in the Indian research institution.

The joint activities shall be aimed at developing tailor made biotechnology products, processes, techniques and policy matters based on local consultation and local needs involving joint research and development activities between India and Netherlands. The specific areas of cooperation include agriculture and food biotechnology and medical biotechnology as well as cross cutting biotechnology policy issues. Two joint workshops were organized in India on biomedical devices and health research. These workshops are followed by two separate call for proposals, one in life sciences and health and one in new instruments for health care.

Areas of cooperation

Projects will be developed in the areas of molecular biology, plant breeding, and food processing technology, food nutrition, bioorganic chemistry, microbiology, life-science developments, intellectual property rights, bio-safety and others. First round of project proposals selected based on peer-review and the recommendations of a Joint Action Committee were implemented from the financial year 2005-06 onwards.

Economic and trade cooperation

Both countries have a genuine political will to expand bilateral economic cooperation. The Netherlands has great expertise in agro-technology and floriculture; water management; environment and spatial management; logistics including ports and highways/inland water transportation.

The Dutch, on their part, view India as a growing market where they need to expand their traditional multilateral presence with the entry of small and medium enterprises with niche technologies in major areas of its expertise and capabilities. Besides trade and investment, they are also looking to India for knowledge workers to enhance Dutch competitiveness and innovation for economic regeneration. Both sides have taken significant steps to identify new areas of cooperation. They are currently working to develop a long term partnership in the new avenues for economic and commercial cooperation in the fields of ICT, biotechnology; agriculture and food processing, urban water and solid waste management, inland water transport; dredging; ship building; port development; infrastructure; environment; oil and gas etc.

MOU between ICSSR and NWO

In 2006, NWO signed a Memorandum of Understanding (MOU) with the Indian Council for Social Science Research (ICSSR). Two NWO divisions are involved: WOTRO and the NWO Division of Social Sciences (MaGW). WOTRO and ICSSR were already counterparts through the joint coordination of IDPAD (Indo-Dutch Programme on Alternatives in Development). The new collaboration is a sequel of IDPAD, and expresses the need to broaden social science cooperation and to include themes of general interest to the social sciences in both countries.

The future research collaboration will work along four lines: opportunities for individual researchers, to enhance scientific excellence on the following thematic research areas, linking science to society:

- ❖ changing life courses
- ❖ science, technology and society (STS)
- ❖ Global relationships
- ❖ poverty and inequality

3. Opportunities for Europeans in India

The instruments will include Exchange of information between councils, workshops, seminars, conferences, joint research proposals and projects, and visits of scholars. To facilitate the cooperation a Joint Advisory Committee of representatives from both organizations will be installed to develop a Memorandum of Agreement on mutual cooperation, with details for implementation. In 2007 further information will become available on the options for joint Indo-Dutch research.

POLAND

S&T cooperation

Relations between India and Poland have generally been close and friendly, characterized by understanding and cooperation on international front. Both countries have long-standing history of cooperation in science and technology. The first Indo-Polish Agreement on this cooperation was signed in March 1974; subsequently, a new agreement of (POC) in S&T was signed. The Council of Scientific and Industrial Research (CSIR) and the Indian National Science Academy (INSA) have ongoing scientific exchange programs with the Polish Academy of Sciences (PAS).

DST-MNISW

As a follow up of the agreement on Cooperation in science and technology signed on 12 January 1993, a programme of cooperation facilitating bilateral cooperation between the scientific communities of two countries by way of joint research projects, bilateral workshops/seminar, exploratory visits of scientists, scientific delegations and composite (scientific and industrial) delegation visits are ongoing. Proposals are invited from time to time. Department of Science & Technology (DST), Government of India, New Delhi and the Ministry for Scientific Research and Higher Education (MNII), Warsaw are the nodal enabling agencies from the Indian and Polish sides.

Areas of cooperation

The support is available to the broad gamut of scientific areas. Proposals submitted in national priority areas would be preferred. Scientists/faculty members working in regular capacity in Universities, national R&D Laboratories/ Institutes and private R&D institutes can apply under this programme.

Funding

Financial support is available from the respective nodal agency from the two sides for the exchange visit component only as per the financial terms given below:

- ☞ The sending side (DST or MNISW) shall cover the travel expenses of the visiting personnel up to the capital city of the host country.
- ☞ The receiving side shall meet the domestic inter-city travel expense in its own country, connected with the agreed programme of the visit and shall pay airport tax wherever necessary.

- ☞ In case of visit of Indian scientists to Poland up to 20 days, the Indian scientists shall be provided with a daily allowance @ Zloty 300 a day to cover lodging, boarding, pocket money expenses and local journey. When a visit is of longer duration, then allowance shall be paid in monthly installment at the beginning of each month @ Zloty 6000 a month. For visits periods between 21days to less than a month, the total allowance shall be limited to Zloty 6000/-.

In case of visit of the Polish scientists to India up to 20 days, the Polish scientists shall be provided with a daily allowance @ Rs 400/- a day to cover boarding, out- of- pocket money expenses and local journey. When a visit is of longer duration, the allowance shall be paid in monthly installments @ Rs 8000/- a month. For visit periods between 21days to a month, the allowance shall be restricted to Rs 8000/- only. The Polish scientists shall also be provided free accommodation in Guest House. (Source: DST Website)

Allowance for visits exceeding a month shall be paid on the basis of monthly allowance in proportion to the number of days beyond a man-month period. These are the broad extract of the general and financial terms agreed upon by the Indo-Polish Joint Science & Technology Committee and could be revised during its subsequent meeting. It is expected that participating institutes themselves support for equipment, manpower, consumables, etc. Further, for scientists belonging to the private sector, only local hospitality as part of exchange visit is available.

Other bilateral cooperation

The bilateral trade between two countries has grown about eleven times from 1992 to 2008. Bilateral trade, which totaled US\$ 675.73 million and US\$ 861.78 million in 2006 and 2007 respectively, crossed US\$ 1 billion in 2008 with US\$ 1274.77 million. During 2005, major Indian companies signed several agreements on investments that are expected to create more than 3,500 new jobs in Poland. India's major exports to Poland include Tea, Coffee, Spices, Textiles, Pharmaceuticals, machinery and instruments, auto parts and surgical items. India's imports from Poland include Machinery except electric and electronic appliances, artificial resins, plastic material, non-ferrous metals and machine tools. Confederation of Indian Industry (CII) has sent several delegations to Poland to explore economic opportunities in various sectors. Indian companies such as Tata Consultancy Services, Wipro Technologies, ZenSar and Videocon have already set up their bases in Poland. Indo-Polish Chamber of Commerce and Industry (IPCCI) was formed in 2008 to protect and represent the interests within the range of economic activity and to promote economic relations between India and Poland. Poland has also shown interest to establish direct flights between the two countries by 2009.



Important bilateral Agreements

- ❖ Agreement on Promotion and Protection of Investments (7 October 1996, Warsaw)
 - ❖ Agreement on Avoidance of Double Taxation (21 June 1981, Warsaw)
 - ❖ Protocol on Foreign Office Consultation (1996, Warsaw)
 - ❖ Agreement on Cultural Cooperation and subsequent Cultural Exchange Programmes (CEP): (27 March 1957, New Delhi)
 - ❖ Agreement on Cooperation in Combating Organized Crime and International Terrorism: (February 2003)
 - ❖ Agreement on Defence Cooperation (February 2003)
 - ❖ Extradition Treaty (February 2003)
 - ❖ Agreement on Economic Cooperation between India and Poland (19 May 2006, Warsaw)
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PORTUGAL

The Indo-Portuguese S&T Cooperation was initiated with the conclusion of the bilateral S&T Cooperation Agreement between two countries on 3rd December, 1998. This Agreement provides the basic framework for the S&T cooperation.

DST-Foundation for Science and Technology (FST)

A Programme of Cooperation (POC) identifying modes and areas of cooperation for a specified period is concluded as a follow up of the Agreement. The current POC covering the period 2007-09 provides for cooperation in the following fields of R&D.

Areas of cooperation


Computer Software and Applications	Material Science including Nano Technology	Chemical Sciences
Cellular and Molecular Biology	Health Sciences	Engineering Sciences
Biotechnology	Agricultural Sciences	Energy, Ecology and Environment

Joint Call inviting R&D projects in both the countries is under finalization. This call for projects would be placed on DST website shortly upon finalization by the two countries.

Projects may be submitted, based on the Call for Projects when announced, to the respective coordinating officers on both sides as per the prescribed format which will be indicated in the Call for Projects. These projects would be examined by the respective Expert Committees on each side. Projects recommended by both sides would then be finally examined by Joint Committee of the two countries, or through a separate mechanism, for a final decision.

The cooperation referred:

- Exchange of scientific and technological information and documentation, namely, through the linkage of scientific and academic communication networks;
- Exchange of scientists, researchers and technical personnel, in order to prepare joint research projects, namely in the framework of multilateral programmes supporting research and development (R&D);
- Establishing joint R&D projects;
- Promoting the organisation of joint conferences, seminars and other events on themes of common interest;

- 
- ❖ Realisation of reciprocal meetings on themes related to scientific and technological policy;
 - ❖ The Parties shall diffuse the scientific and technological results, developments and discoveries resulting from the cooperation activities developed under this Agreement;
 - ❖ Any other modality of scientific and technological cooperation required.

Workshops

Four workshops were organized in India and Portugal during the period 2007-09. The areas selected for the workshops are: Nano Sciences, Energy including Renewable Energy, Marine Science & Technology.

Post- Doctoral Fellowships

Five post-doctoral fellowships from each side are to be awarded during the period 2007-09. Applications for the fellowships would be called through a coordinated call in the call for proposals.

ROMANIA

S&T cooperation

Department of Science and Technology (DST) for the Government of the Republic of India and the National Authority of Scientific Research for the Government of the Republic of Romania are the supporting agencies who extend support for joint research projects involving exchange of visits under the Indo-Romanian Bilateral Scientific Cooperation programme with special emphasis on further academic training and specialization of scientists/scholars.

Areas for cooperation

Faculty, Scientists and Academicians belonging to Universities, Deemed Universities and Research Institutes having permanent positions can apply as Principal Investigator (PI). In order to qualify for such funding, investigators are required to have a concrete and sound research proposal on any of the following areas:

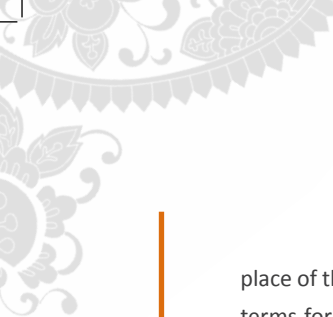
Information and Communication Technologies	Environment Protection and Energy	Chemical Sciences
Life Sciences & Biotechnology (including Pharmaceuticals)	Manufacturing	Engineering Sciences
New Materials	Oil, Gas, Mining and Metallurgy; and	Energy, Ecology and Environment
Food Safety	Nuclear energy and Safety	

The following types of proposals shall NOT be considered:

- ❖ Already existing collaborative projects where travel and living expenses are financed by some other source;
- ❖ Purely individual visits / training programme.

Funding

Grants will be offered towards travel and living costs (limited to a total of one short term visit and one long term visit of one month per year from each side) within the framework of well-defined and approved Indo-Romanian research projects normally of one to three year duration. The sending side shall cover the expenses on international travel (including overseas medical insurance) up to the capital city/city of arrival in the host side both ways. The receiving side shall arrange the in-country travel of the visiting scientists from the capital city/city of arrival to the



place of the institute to be visited by appropriate means and living expenses. The local hospitality terms for visiting scientists in each others' host country are as follows: For Indian scientists: 60 RON as daily allowance and separate accommodation in the guest house/hotel with reasonable amenities, covered by the receiving institution according to the legal provisions into force, regardless of short/long term visit.

For Romanian scientists: paid accommodation and a daily allowance of Rs.1,000/- per day in case of short term visit (up to 21 days) and Rs. 25,000/- per month in case of long term visit (more than 21 days) towards food and out of pocket allowance.

The mutual visits of the scientists must be balanced in number {limited to visit by two researchers during the year and the final result is 6 persons (or visits) from each side spread over entire duration of a project of 3 year duration} and should, in general, be for a short duration of time.

Each participant from either side would be allowed to avail only one visit per year of the project. According to the internal rules in force, besides the financial support towards the exchange of scientists mentioned above, the Parties may provide additional research funds to their respective project teams.

Project Duration: Support to the project will be granted for a maximum duration of 3 years. The sanctioned visits (i.e. maximum 6 from each side) will have to be completed within the duration of the 3 years. Request for extension of the project shall not be considered.

SLOVAKIA

Three bilateral agreements - Economic Cooperation Agreement, program of Cooperation in the field of Culture and Arts for the period 2004-2007 and Memorandum of Understanding between the National Small Industries Corporation Ltd. (NSIC) India, and the National Agency for Development of Small & Medium Enterprises (NADSME) - were signed. The President of Slovakia addressed a well-attended business forum jointly organized by the Federation of Indian Chambers of Commerce and Industry (FICCI) and the Confederation of Indian Industry (CII) to discuss various forms of business and S&T cooperation. It was concluded in 2007 to hold Joint S&T committee meetings to increase cooperation in S&T.

Important Bilateral treaties and Agreements

- ❖ Protocol on Scientific cooperation -Slovak Academy of Sciences and Council for Scientific and Industrial Research (1995)
- ❖ Agreement for formation of the Indo—Slovak JBC (1995)
- ❖ MOU on Defence Cooperation (1995)
- ❖ Air Services Agreement (1996)
- ❖ Agreement on Cooperation in Science & Technology (1996)
- ❖ Agreement on Scientific Cooperation between Indian National Science Academy & Slovak Academy of Sciences (2001)
- ❖ Economic Cooperation Agreement (2004)
- ❖ Programme of Cooperation in the field of Culture (2004)
- ❖ Bilateral Investment Promotion Agreement (2006)

SLOVENIA

S&T cooperation

Department of Science and Technology (DST) of India and the Ministry of Higher Education, Science and Technology (MHEST) and the Slovenian Research Agency extend support for joint research projects involving exchange of visits under the Indo-Slovenian Bilateral Scientific Cooperation program with special emphasis on further academic training and specialization of scientists/scholars.

Faculty, Scientists and Academicians belonging to Universities, Deemed Universities and Research Institutes having permanent positions can apply as Principal Investigator (PI). In order to qualify for such funding, investigators are required to have a concrete and sound research proposal on any of the following areas:

- ❖ Health and Biomedical science
- ❖ Metal Sciences and New Materials
- ❖ Polymer Chemistry
- ❖ Mathematics
- ❖ Electronics
- ❖ Alternate Renewable Energy Sources, including Solar Energy
- ❖ Food Technology

Joint Committee of Science and Technology cooperation was established through an agreement in 1993. India and Slovenia identified 18 projects each for implementation during 2010-2013. India Slovenia Joint Working Group on Science and Technology met in Ljubljana on 2 November 2010. In all 12 projects have been approved for implementation during 2011-2012. A Programme of cooperation was also signed during the JWG Meeting held in Ljubljana in November 2010.

Funding

Grants will be offered towards travel and living costs, (normally up to 2 visits per year from each side) within the framework of well-defined and approved Indo-Slovenian research projects. The sending side shall cover the expenses on international travel (including overseas medical insurance) up to the capital city/city of arrival in the host side both ways. The receiving side shall arrange the in-country travel of the visiting scientists from the capital city/city of arrival to the place of the institute to be visited by appropriate means and living expenses.

The local hospitality terms for visiting scientists in each others' host countries are as follows:

For Indian scientists: paid accommodation in the House of Postgraduates plus daily allowance in accordance with the Slovenian regulations on reimbursement of travel expenses regardless of short/long visit.

For Slovenian scientists: paid accommodation and an allowance of Rs.1,000/- per day in case of short term visit (up to 21 days) and Rs. 25,000/- per month in case of long term visit (more than 21 days) towards food and out of pocket allowances. The mutual visits of the scientists must be balanced in number (upto 6 visits from each side spread over entire duration of the 3 year project) and should in general, be only for a short duration of time. Each participant from either side would be allowed to avail only one visit per year of the project.


Project Duration: Support to the project will be granted for a maximum duration of 3 years. The sanctioned visits (i.e. maximum 6 from each side) will have to be completed within the duration of the 3 years. Request for extension of the project shall NOT be considered.)

Application Procedure: Joint research projects in the prescribed format, duly forwarded by the Head of the Institutions are to be submitted simultaneously by the Indian Project Leader to the Department of Science and Technology, New Delhi, and by the Slovenian Project Leader to the Slovenian Research Agency, Slovenia. Applications received by both the agencies with all necessary documents shall only be considered.

The project leaders are required to submit the identical project document to their respective Government organizations. The Slovenian project leaders would send 2 copies to the Slovenian Research Agency.

Agreements

- ❖ Agreement on Scientific and Technological Cooperation (1993)
- ❖ Agreement on setting up Joint Committee on Bilateral Trade and Cooperation (1993)
- ❖ Agreement between FICCI/ASSOCHAM and the Slovene Chamber of Commerce and Industry to set up Joint Business Council (1995)
- ❖ Protocol on Foreign Office Consultations (1996)
- ❖ Cultural Agreement for cooperation in the fields of culture, arts, education, sports and mass media (1996)
- ❖ National Centre for Trade Information, India (NCTI) – Chamber of Commerce of Slovenia (CCS) Agreement for reciprocal sharing of information (1997)
- ❖ Double Taxation Avoidance Agreement (2003)
- ❖ Export Credit Guarantee Corporation (ECGC) – Slovenian Export Corporation (SEC) Cooperation Framework Agreement (2003)
- ❖ Bilateral Air Services Agreement (2004)

- 
- ❖ MOU between ICCR and University of Ljubljana for establishment of Hindi Chair (2009)
 - ❖ Agreement on Mutual Promotion and Protection of Investments (2011)
 - ❖ MOU between the Bureau of Indian Standards and Slovenian Institute for Standardization (2011)
 - ❖ MOU between the Indian Institute of Science, Bengaluru and University of Nova Gorica for Cooperation in the Field of Research and Education (2011)
 - ❖ MOU for the establishment of Long Term Chair of Hindi at Faculty of Arts, University of Ljubljana (2011)
 - ❖ MOU between Air India, Aerodrom Ljubljana and Adria Airways (2011).
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SPAIN

Science & Technology Cooperation

The S&T cooperation between India-Spain is mainly driven by the Bilateral Technology Cooperation Programme which promotes joint technology cooperation projects between entities from India and Spain via technology transfer, industrial research, technology development and innovation in areas of mutual interest for the purpose of generating economic benefits for both India and Spain. Agreements and MoUs to aid enhanced S&T cooperation are under consideration in a number of areas such as social security, Information Technology, Film Production, Tourism and Environmental issues.

Basic Eligibility Criteria under the technology cooperation:

- ❖ Cooperation projects must involve at least one qualified partner from each country (Spain and India) in any technological area of mutual interest. After approval, both TDB and CDTI recognize officially that the cooperation project carried out by the consortia meet the eligibility criteria will be funded by TDB for the Indian partners and CDTI for the Spanish partners;
- ❖ Two bilateral projects were also approved under India Spain Innovating Program (ISIP) between CDTI, Spain and TDB to promote, assist and fund the development of joint technology cooperation/transfer projects and for supporting SME growth via technology transfer and innovation for the purpose of generating economic benefits to both the countries.

Funding

As for CDTI's (Centro para el Desarrollo Tecnológico Industrial) financing, preferential funding of projects can be awarded subject to the following conditions:

- ❖ Credit of up to 60 per cent at zero rate of interest, of the budget of the Spanish participation
- ❖ Period of amortization of up to 10 years with a grace period of 3 years
- ❖ Up to 25 per cent of the R&D related costs for the credit granted by CDTI may be non-reimbursable.

For the Indian companies with projects awarded with the India & Spain Innovation label, the TDB (Technology Development Board) will consider financial support to the project as long as these enterprises meet the TDB's eligibility criteria.

Research cooperation

Under the framework of the Indo-Spanish Joint Programme of Cooperation in Science and Technology, a call for proposal was launched in may 2009 and subsequently 25 new research projects were approved with the implementing key Institutions being Department of Science and Technology DST-India and Ministry of Science and Innovation (MICINN)- Spain.

The existing bilateral S&T agreements:

- MoU between Technology Development Board (TDB) and the Centre for Development of Industrial Technology (2006).
- MoU of cooperation in the field of S&T (2007)

Areas of research cooperation

- Renewable Energy
- Information Technology (including Computer Science)
- Health and Medical Research
- Life Science and Biotechnology (including Pharmaceuticals)
- Agriculture Technology and Food Processing
- Nanotechnology

Funding

Funding provided within this call is intended to enhance project participants' capacity to collaborate. The program is designed to support additional expenses related to cooperation with a Spanish counterpart for an Indian researcher or with an Indian counterpart for a Spanish researcher, such as personal expenses, consumables, small equipment and travel and visiting costs for exchange visits. Each host institution is expected to extend basic facilities to its researchers; the proposed activities shall also be supported by the applicants' use of their own available resources. Financial support for the exchange visits will be as follows: the sending party will provide round-trip economy-class airfare to the relevant entry city of the host country as well as medical insurance. The receiving side will arrange local hospitality (meals and lodging expenses) for the visitors. Host institutions must be informed in advance of planned visits in accordance with their specific regulations.

Non S&T cooperation

Trade between India and Spain has been growing in the last three years. Political and diplomatic relations have been cordial; Cultural Exchange Programme (CEP) implementation was less than satisfactory. Agreement on Trade and Economic Cooperation started in 1972, Agreement on Cultural Cooperation has started in 1982. To strengthen the trade ties India and Spain have

3.Opportunities for Europeans in India

entered into many agreements promoting trade cooperation.

Indo- Spain Programme of Cooperation

A Programme of Cooperation was signed between Ministry of New and Renewable Energy, Government of India and Centre for the Development of Industrial Technology (CDIT), Government of Spain on 23rd November, 2011.

SWEDEN

DST- VINNOVA

The Department of Science and Technology, Government of India (DST) and the Swedish Governmental Agency for Innovation Systems (VINNOVA) has agreed to launch a joint call for proposals during 2010 to promote Indo-Swedish research cooperation in the field of embedded systems. The call was closed on the 15th of July 2010. The approach is to establish and strengthen collaborative research networks between India and Sweden by funding joint research projects, exchange visits and technical missions.

Funding

Funding provided within this call is intended to enhance the project participants' capacities to collaborate. The program is designed to support additional expenses related to cooperation with a Swedish counterpart for an Indian researcher or with an Indian counterpart for a Swedish researcher. This includes funding to carry out the joint research, mobility of researchers with a main emphasis on leading-edge researchers, the dissemination of results etcetera. Different principles of eligible costs and cost calculations may apply on the Indian and Swedish sides, respectively. Participating companies should cover their own costs. Each host institution is expected to extend basic facilities to its researchers. The cooperative research period shall be 3 years in total, counting from start date of the project. There have been 4 research projects which have been executed in India in the field of water which are mainly funded by Swedish Research Links Grant.

DBT-Sweden S&T cooperation

DBT and Swedish Governmental Agency for Innovation Systems (VINNOVA), Sweden has agreed to support top level research co-operation between Indian and Swedish scientists in the field of "Biology, Diagnosis and Treatment of Tuberculosis". The programme is one of the first bilateral co-operations, based on joint funding, between the two countries. Under this scheme, VINNOVA will fund the Swedish research teams while DBT would support the Indian counterparts. From a total of 15 proposals received, four Indo-Swedish projects have been selected for support for the next three years. These are:

- Doctor's office diagnostic instrument for detection of M. tuberculosis under "in the field" conditions adapted for use by unskilled personnel.

- ∞ Mechanisms of protein synthesis and ribosome targeting antibiotic drugs in Mycobacteria.
- ∞ Biology of gene-deleted M. tuberculosis strains - immunological marker profiling.
- ∞ Structure-guided design of new antibacterial agents against dormant Mycobacterium tuberculosis.

This initiative is seen as major step in boosting Indo-Swedish scientific collaboration as highlighted by Sylvia Schwaag Serger, Director, International Collaboration & Networks, VINNOVA. This collaboration is seen as an important step to further strengthening the research and innovation collaboration between the countries.

Memorandum of Understanding between Ministry of Environment and Forests (MoEF), India and Ministry of Trade, Sweden

Ministry of Environment and Forests (MoEF), India and Ministry of Trade, Sweden are desirous of promoting the establishment and development of closer and long term cooperation between both countries in the field of protection and improvement of the environment.

The following areas have been identified by the Participants as high priority areas of cooperation:

- Dialogue and interaction between the two countries on global environmental issues, including Multilateral Environmental Agreements (MEAs) for their effective implementation.
- Exchange of knowledge, institutional cooperation including capacity building and commercial relations, regarding, inter alia:

Environmental governance in the areas of environmental legislation, regulation, monitoring, enforcement and planning	Cooperation in new and renewable energy
Sustainable urban development	Clean production and technology
integrated solid waste management	Environmental health
Air and water quality management	Other areas mutually agreed upon

- Climate change, including COM, research and development

Memorandum of Understanding between MNRE and MEEC

A Memorandum of Understanding (MoU) was signed on 19th April, 2010 by the Ministry of Renewable Energy (MNRE), India and Ministry with the Ministry of Enterprise, Energy and Communications of Sweden for cooperation in the field of Renewable Energy.

UNITED KINGDOM



The UK and India are planning wide-ranging agreements in science and technology to cement bilateral cooperation in medicine, R&D, ICT, energy and education to the benefit of both countries. The plans were unveiled in the southern Indian cities of Bangalore and Chennai. Prime Minister David Cameron led a major delegation to India in July 2010 consisting of UK Government ministers, including Business Secretary Dr. Vince Cable and Universities and Science Minister David Willetts. The delegation also includes businesspeople, academics and cultural figures. DFID reiterated their commitment to disburse 825 million pounds grant assistance to India for the ongoing projects during the period 2008-09 to 2010-11.

- ❖ UK and India research funders have committed up to £60 million worth of jointly-funded research into climate change, water and food security and disease prevention.
- ❖ British and Indian scientists will collaborate on £2 million worth of research that will help nuclear power stations to be safer, more efficient and produce less waste.
- ❖ And the Wellcome Trust has announced £45 million of research with the Indian Department of Biotechnology on affordable healthcare.
- ❖ Existing and new initiatives
- ❖ Extending the successful UK-India Education and Research Initiative (UKIERI).
- ❖ Encouraging the twinning of the UK's top universities with the fourteen new Innovation universities India plans to create. A new Rolls-Royce Science and Innovation Scholarship
- ❖ Enabling Innovation programme. This is a three-year programme of activities designed to deliver an increase in bilateral trade and investment between the UK and Indian ICT industries.

S&T cooperation

India and the UK see considerable potential for growth in Research, Science and Technology collaboration. They share the vision for further strengthening their partnership through new and existing initiatives and agree to widen discussion to all research funding bodies in both countries through the India-UK Science and Innovation Council mechanism. The UK's proposal to establish a Research Councils UK (RCUK) office in India is a welcome development that would lead to enhanced collaboration between the two countries. Underlining the importance for further


developing Research and S&T cooperation, India and the UK shall establish a Science Bridges Initiative to build institution to institution relationships on equal partnership with joint funding under the principle of parity.

RCUK will contribute £ 4 million with a matching grant from Department of Science and Technology (DST) India to promote this initiative. The UK and India also agree to support a further round of UKIERI awards designed to establish networking links between Indian and UK education and research institutions with the UK committing £ 2 million over 3 years and DST agreeing to match this funding on a parity basis. DST and the Engineering & Physical Sciences Research Council (EPSRC) UK also agreed to collaborate on the initial phase of development of major projects in select research areas.

Joint councils: India and UK have come together with different approaches of S&T cooperation such as the Indo - UK Science & Innovation Council; Indo-UK Joint Cooperation Fund (with allocation of equivalent of Pounds 8 Million for next five years).

1st Meeting of Indo-UK Science & Innovation Council (at London, June 26,2006) led by Shri. Kapil Sibal Hon'ble Minister for S&T, India and Lord David Sainsbury Minister for S&T, UK came up with new strategies for deepening Indo- UK cooperation in the area of science & innovation. Following decisions & shifts in programmatic focus emerged from the meeting:

- ❖ Earmarking of about Pounds 6.5 to 8 Million from each side sides for next five years for supporting joint science and innovation initiatives of the two Governments; Formation of "Joint Oversight Committee" for best deployment of science and innovation fund by developing guidelines and roadmap for cooperation in area of science and innovation;
- ❖ Adoption of bottom -up approaches for joint research projects between individual scientists and engineers;
- ❖ Adoption of top-down model for mounting mega projects under networked mode in five jointly agreed thrust areas, namely, (i) Stem cell research & animal biotechnology;(ii) Next generation Networks in telecommunications; (iii) Nano science and materials science;(iv) Weather science and climate change; (v) Energy technologies including hydrogen fuel;
- ❖ Support to grand challenge projects of importance to both nations
- ❖ Continuation of on-going modalities of cooperation, namely, Joint Thematic Workshops & Mobility of scientists & engineers as capacity building initiatives.



India-UK Statement of Cooperation between India and United Kingdom on Sustainable Transport

Consultations between India and the U.K. were held in New Delhi on 6 December, 1999 on issues related to the environment within the context of sustainable development with a view to promoting continuing cooperation between the two countries.

The two governments acknowledged each other's constructive role in protecting and improving the environment and noted the initiatives taken in the two countries for controlling and preventing pollution. Both sides appreciated each other's national environmental and sustainable development policies and programmes, which contribute to the protection of the global environment.

In this field, the areas identified for further consideration are: (a) transfer of technology, (b) development of air quality strategies and systems for monitoring vehicular pollution, (c) designing an inspection and maintenance system to control vehicular pollution and improve transport safety, (d) exchange of experiences about cleaner fuels and technologies, (e) promoting public transport, (t) awareness-building about sustainable transport issues.

4. MAKING RESEARCH TOGETHER

4.1 European Union and India cooperation in innovation

EU-India diplomatic relations dates back to 1960s, but research cooperation between two regions started in mid 80's and it was further reinforced with the signing of the first S&T Agreement in 2001, extended in 2009. Science and Technology bilateral cooperation opened doors for Indian participation in collaborative research with Europe in their largest research-funding programme for science and technology development: the Framework Programme of Research & Innovation (FP).

The solid partnership between the EU and India in science and technology is now being translated into high quality and mutually beneficial co-operative programmes, projects and dialogues. India is showing a growing degree of openness on identification of mechanisms and focus areas for co-funding joint or coordinated calls for proposals with the European Union (See chapter 2).

From EU side the Scientific & technological cooperation with India is coordinated by the Strategic Forum for International Science and Technology Cooperation (SFIC) which developed the India Pilot Initiative on water and bio-resources challenges, launched at the Delhi EU/MS-India Stakeholders conference in November 2010. As one of the components of the India pilot initiative, the Commission launched in July 2011 two water-related coordinated calls with India with a total budget of 32 M€ funded equally by the two sides. As a result, some MS/AC intensified their cooperation activities with India in the field of water and bio-resources.



SFIC - Strategic Forum for International Science and Technology Cooperation

The Strategic Forum for International S&T Cooperation (SFIC) – established in 2008 - aims at making Europe's international research policy towards non-EU countries more effective and coherent through enhanced dialogue and cooperation between the European Commission, EU member states and major partner countries outside Europe. The SFIC has chosen India as strategic partner country with which to start implementing its first pilot initiative.

<http://ec.europa.eu/research/iscp/index.cfm>



Five EU-India Coordinated Calls for Proposals have been launched from 2008-2011

The first such call, launched with the Department of Science and Technology, with co-funding of 5 million from each side, on computation materials science, attracted 25 proposals, of which six have been funded. The Second Coordinated Call, launched with the Department of Biotechnology, with co-funding of 3 million each on food, health and well being, again attracted 25 proposals, of which two have been funded. The third Coordinated Call for Proposals launched with the Department of Science and Technology, with co-funding of 5 million from each side, on solar energy systems, attracted 23 proposals, of which three will be funded. Two Coordinated calls for proposals on Water technology, research and innovation have been launched with the Department of Science and Technology, in July 2011 with a total budget of €32m funded equally by the two sides. One coordinated call was launched on Water Technology between European Commission and Department of Biotechnology in July 2011 with a total budget of €6m funded equally by two sides. Topics for future coordinated calls for proposals are being discussed at the moment.

Sectoral Dialogues and Exchanges

Joint Working Groups have been set up to facilitate exchanges on several subjects including Agriculture, Telecommunications and Information Technology, Pharmaceuticals and Biotechnology, Food Processing, and Environment. One of the most important cooperative programmes between India and Europe is Climate Change. The increased importance given to Climate Change mitigation and related cooperation activities was reflected when the 2008 Summit in Marseilles adopted a Joint Work Programme on Energy, Clean Development and Climate Change. Follow-up activities were confirmed at the Summit in November 2009, when the EU and India agreed to expedite cooperation activities on Climate Change mitigation, clean energy (clean coal technology, nuclear energy) energy efficiency and renewable energy (in particular solar energy).

In recent years, migration is becoming an increasingly important subject in the relationship and is covered through regular meetings in Delhi of the EU-India Working Group on Visa and Consular Issues. Ways to strengthen cooperation on migration related issues are being explored.

The future of EU-India cooperation

This policy development process received a boost at the EU-India Summit on 10 February 2012, when, at the initiative of the Indian side, a joint declaration on research and innovation was signed. The Joint Declaration aims at enhancing the scale, scope and impact of cooperation and at building an “Indo-European research and innovation partnership”, with a focus on common societal challenges and enhanced synergies between India and the EU.

The 12th EU-India Summit held on 10th February 2012 at New Delhi laid focused on bilateral, regional and global issues. The leaders emphasized the importance of the EU-India Strategic Partnership and endeavored to reinforce cooperation in security, in particular counter-terrorism, cyber security and counter-piracy, as well as trade, energy, research and innovation.

4. Making research together

Joint declarations were signed for

- 🌀 Enhanced cooperation on energy
- 🌀 Research and innovation cooperation and
- 🌀 Memorandum of Understanding on statistical cooperation

The EU-India cooperation, joint projects and bilateral cooperation are of vital importance for India and EU region as a whole. With India declaring 2010-20 as a decade of Innovation and associated policy initiatives (see previous chapter) and EU's emphasis on Innovation, especially social innovation there are many mutually beneficial opportunities to jointly develop and exploit innovative products, services and processes, especially in the areas of clean energy, water & waste management.

Current initiatives for EU - India cooperation

While both Europe and India are increasing their capacities to innovate in a world of keen competition, representatives from EU and from the Indian Minister for Science and Technology and Earth Sciences met in Brussels on 31 May 2012 to strengthen their commitment to the long-term Indo-European Research and Innovation Partnership involving India, the EU and its Member States.

The Indo-European partnership complements, supports and builds on bilateral Member States cooperation actions with India, where it brings added value, in particular where coordinated or joint actions of the EU and Member States enable to achieve the scale and scope necessary to produce sustainable impact in addressing major societal challenges of common interest.

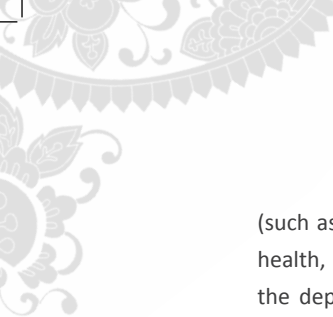
The Commissioner and the Ministers stressed the importance of the innovation-based growth strategies "Innovation Union" and "Decade of Innovation" in (i) creating the paths for mutual success, (ii) engaging with both public and private stakeholders in innovative cooperation actions, and (iii) leveraging complementary strengths of partnering entities from India and Europe.

Both India and Europe are aiming at accelerated sustainable inclusive growth wherein innovation plays an important role and win-win Indo-European collaborative actions can be engaged. This could imply mobilizing industrial partners – with particular attention to SMEs– in the Indo-European research and innovation cooperation, addressing improved framework conditions and ensuring a level playing field.

Stressing the importance of the Joint Declaration on Research and Innovation Cooperation signed at the 12th EU-India Summit of February 2012, the Commissioner and Ministers underlined the three pillars of the Indo-European Partnership: (i) larger scale, scope and impact, (ii) focus on common societal challenges and (iii) enhanced synergies between India, the European Union and its Member States.

They took note and considered the following steps to be important for developing this Partnership:

- 🌀 **Jointly define the scope and develop a Strategic Research & Innovation Agenda – a White Paper**
- on a medium to long term India-EU/Member States Partnership for accelerated sustainable and inclusive growth, and new pathways focusing on societal challenges of common interest



(such as sustainable environment and water, bio-economy, agriculture, energy and transport, health, ICT) as well as covering the whole innovation chain from research to development and the deployment of innovative and affordable solutions. This White Paper may also address improved framework conditions to facilitate and encourage bottom up cooperation between stakeholders on both sides with or without public funding, including mobility of researchers, as well as to ensure a level playing field (ownership and access to IPR in collaborative research activities, standards, regulations). It will build on the work done by the EU and Member States Strategic Forum for international S&T cooperation (SFIC), taking into account the outcomes and recommendations of the 31 May-1 June EU/MS-India Stakeholders' Conference, and further consultations with relevant Ministries and stakeholders.

-  **Establish a Group of Senior Officials (GSO) composed of officials from India,** the Member States and the European Commission with a view to streamline the governance of Indo-European cooperation in its bid to identify the most effective mechanisms to provide solutions to major societal challenges of common interest. The GSO could help guiding, coordinating and monitoring the implementation of the Indo-European partnership. The GSO may, where appropriate, make optimal use of available tools and resources of Member States, EU and Indian programmes and facilitate coordination of different funding mechanisms so as to reach optimal scale and scope in India-Europe cooperation.
-  **Support setting up an industry-driven India-Europe stakeholder group for research and innovation.** This group could ensure effective involvement of industry and other research actors in defining and implementing the Strategic Agenda. Particular attention may be given to promote cooperation between European and Indian SMEs notably for the co-development and for deployment of affordable and innovative products and services.
-  **Organize a Ministerial meeting in India in 2014.**

4.2 Indian participation in the 7th European Programme of Research & Innovation

Since the signature of the EU-India Agreement on Science and Technology Cooperation in 2001, India has become one of the major partners of the EU in the Framework Programs for Research and Innovation, the European Union's main instrument for funding research (2007-2013).

Since its inception there were seven Framework Programmes. India began participating from FP6 (2002-2006) onwards and has become the fifth largest international partner for the EU under FP7 (2007-2013). One of the salient achievements of FP7 is India's full partnership in the International Thermonuclear Experimental Reactor (ITER) nuclear fusion project.

In FP7, EU cooperation with India has increased compared to FP6, not only because of the bottom up opening of programs but also through targeted actions, including coordinated co-funded calls.

Mobility and training of researchers is another important area of development of ties between EU research institutions and India where, currently 300 Indian researchers participate in FP7 Marie Curie actions.

Between Jan 2007 and Jan 2011, Indian partners alone have received around 30M euros of EC funds, with a total EC contribution to proposals involving Indian partners amounting to around 350M euros. Of total 147 projects, 23% are in Health sector, and 13% each in environment, energy and ICT sectors. Space has received just 2 grants although space and aeronautics is one of the most innovative and promising sectors in India.

The INDIA GATE team conducted an analysis on the participation of Indian organisations at the 7th Framework Programme (FP7) on February 2012. The full report is available on the INDIA GATE website.

Following the conclusion of the first five years of calls for proposals,
240 Indian organisations are involved in 149 main listed projects.

METHODOLOGY

The analysis has been conducted on data from the database of the European Commission, update to the 06th of February 2012, on Framework Programmes. The database contains the major information on contracts and participants under FP7. Data concerning participation of India in FP7 have been made available to the INDIA GATE project by the DGRTD – D4 Unit - for the purposes of this study.

The above mentioned data contain information about proposals submitted, contracts under each programme/ priority/ activity, participant information and other relevant data.

Depending on data available, the following different features have been indicated for each Programme of FP7:

1. **COOPERATION and CAPACITIES**
 - Detailed data on Indian applications and results;
 - Thematic/ programme distribution of Indian participations;
 - Success rate of Indian applicants;
 - Types of Indian organisations involved;
 - Indian involvement by funding scheme;
 - Contribution to Indian partners.
2. **IDEAS**
 - Figures on Indian participation and success rate;
3. **PEOPLE**
 - Distribution of Indian participations by type of action;
 - Types of Indian organisations involved;
 - EC contribution to Indian partners.
4. **EURATOM**
 - Figures on Indian participation and success rate;
 - EC contribution to Indian partners.

4. Making research together

In the first five years a total of 926 proposals with at least one Indian participant in the consortium has been submitted, and a good number of proposals have been presented in almost each Specific Programme, demonstrating the high interest of Indian organisations to FP7.

As shown in the table 1, the number of proposals submitted by Indian participants under the Cooperation Programme is strictly related to the number of contracts signed by Indian applicants referring to projects under the Cooperation Programme. The Ideas and Euratom Programmes have a less encouraging results, with zero contract signed at February 2012.

PROGRAMMES	N°PROPOSALS	N°CONTRACTS
Cooperation	655	118
Ideas	6	0
People	205	15
Capacities	59	16
Euratom	1	0
TOTAL	926	149

The success rate of the Indian participation, calculated as the contract signed on the proposal presented, is really encouraging. The Cooperation programme shows a success rate around the 18%, Capacity programme is close to the 27% of success, Ideas programme slightly more the 7%, while in Ideas none proposals have been financed and Euratom programmes no show success rate, with no proposal funded.

Indian participation in the COOPERATION Programme

From January 2007 to February 2012 a total number of 1074 organisations has been included in the submission of 655 proposals under the Cooperation Programme.

Focusing the analysis to all the 123 mainlisted proposals (of which 118 with contract signed), the result is a success rate of 18%, with a total of 208 Indian mainlisted applicants. However, it is important to note that the above mentioned are aggregate data, and that there are differences among the ten thematic priorities of the Cooperation Programme. The Health theme is by now the most attractive for the Indian organisations (208 applicants in 126 proposals submitted). Other themes very attractive for the Indians are Environment (203 applicants in 101 proposals submitted) and ICT (182 applicants in 126 proposals submitted).



COOPERATION

The Specific Programme “Cooperation” supports all types of research activities carried out by different research bodies in trans-national cooperation and aims to gain or consolidate leadership in key scientific and technology areas. The Cooperation Programme is sub-divided into ten themes, reflecting the most important fields of knowledge and technology where research excellence is particularly important to improve Europe’s ability to address its social, economic, public health, environmental and industrial challenges of the future.

Which research theme do the Indians prefer?

From 2007 to 2011 a total number of 1.066 Indian applicants have submitted a proposal under the Cooperation Programme of FP7, and 118 contracts have been signed so far.

The highest number of proposals, involving at least one Indian partner, in absolute values has been submitted under the Health and ICT themes (126 proposals submitted each).

It is followed by SSH theme that includes a total number of 103 proposals submitted.

The Security and Space theme appear as the less attractive priorities under the Cooperation programme, and this is also confirmed by the very low number of proposals submitted (respectively 3 and 10).

As to the thematic distribution, the highest number of contracts signed refers to the Health theme (33 contracts); while 19 have been the contracts signed for projects in the KBBE sector.

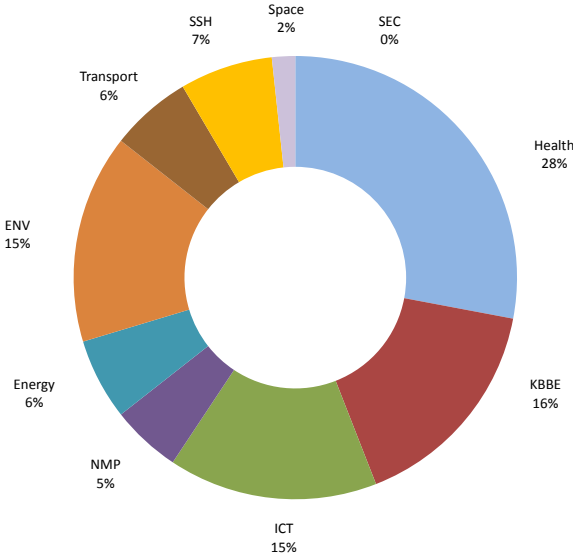


Figure 1 Number of contracts signed (involving at least of one Indian applicant) submitted under the Cooperation Programme

Type of participants

The Indian participation in the Cooperation Programme is dominated by Higher Education Institutions (HES) and Research centres (REC), both with a percentage share of 37%, and a total of 689 participants.

They are followed, with a significant gap, by the number of Privates (PRC), that only covers 14% of Indian applicants.

EC contribution

The total of EC contribution to Indian participants funded under the Cooperation Programme amounts to 31.673.920 €, under a total cost of 45.429.829 €.

Theme	Participant EC Contribution
Health	16.390.658
KBBE	2.868.480
ICT	2.280.256
NMP	671.765
Energy	2.691.528
Environment	4.517.612
Transport	777.667
SSH	1.245.604
Space	230.350
Sum	31.673.920

Table 6: EC contribution for Indian participants in Cooperation Programme for each theme

The EC contribution to Indian participants under the Cooperation Programme was higher in the Health theme with a participant EC contribution of 16.390.658 € and in the Environment theme with a contribution of 4.517.612€. The less attractive theme are Space, NMP and Transport with a total contribution lower than 1 million euro.

Indian participation in the IDEAS Programme

So far, the Ideas programme is the least successful Specific Programme of FP7 in terms of Indian participation. Even if 6 Indian Principal Investigator have been presented projects under this theme, no contract has been signed by researchers with Indian nationality under the call Starting and Advanced 2007-2011.

Indian participation in the PEOPLE Programme

From 2007 to 2011 a total of 226 Indian organisations have submitted 205 proposals under the People Programme.



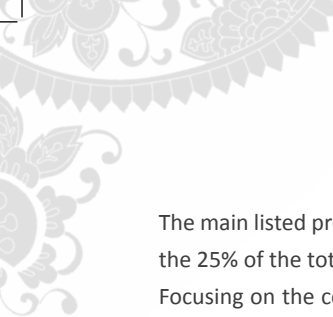
IDEAS

The objective of the Specific Programme 'Ideas' is to reinforce excellence, dynamism and creativity in European research and improve the attractiveness of Europe for the best researchers from both European and Third Countries, as well as for industrial research investment, by providing a Europe-wide competitive funding structure, in addition to and not replacing national funding, for 'frontier research' executed by individual teams.



PEOPLE

The 'Marie Curie Actions' have developed significantly in orientation over time, from a pure mobility fellowships programme to a programme dedicated to stimulating researchers' career development. In the Seventh Framework Programme, the 'Marie Curie Actions' have been regrouped and reinforced in the 'People' Specific Programme.



The main listed proposals, involving at least one Indian partner, are 45 (including 55 Indian organizations), the 25% of the total proposals submitted, while the rejected proposals are the 71% of the total.

Focusing on the contracts signed, the highest number of proposals (involving at least an Indian partner) funded refers also to the International Incoming Fellowships- IIFR. This scheme results the more attractive for Indiana researchers.

EC contribution

The total of EC contributions to projects involving Indian participants funded under the People Programme amounts to 709.497 €.

CAPACITIES

From January 2007 to February 2012 a total number of 97 Indian organisations has been included in the submission of 59 proposals.

Focusing the analysis to all the 18 mainlisted proposals, the result is a success rate of 31%, with a total of 38 Indian applicants mainlisted.

However, it is important to note that the above mentioned are aggregate data, and that there are differences among the thematic priorities of the Capacities Programme. The Research Infrastructures -RI- theme is at the same time the most attractive for the Indian organisations (38 applicants in 14 proposals submitted) and the most successful (success rate 47%). Also Science in Society and INCO themes are of interest for the Indian organisations (27 and 26 applicants each), with a success rate of 42% for INCO and 33% for SIS. The Research for the benefit of SMEs are indeed not of interest for the Indians (6 applicants in 6 proposals submitted) and also the success rate equal to 0% reflects it.



CAPACITIES

The Capacities programme aims to enhance research and innovation capacities throughout Europe and ensure their optimal use. Its specific goals are to:

- support the coherent development of policies;
- complement the Cooperation Programme;
- contribute to EU policies and initiatives in order to improve the coherence and impact of Member States policies;
- find synergies with regional and cohesion policies, the Structural Funds, education and training programmes and the Competitiveness and Innovation Programme (CIP).

4. Making research together

Based on a total amount of 59 proposals with at least an Indian participant submitted under the Capacities Programme of FP7, 16 contracts have been signed so far. The highest number of proposals involving at least a Indian partner have been contracted under the Science in Society (7) and Research Infrastructure theme.

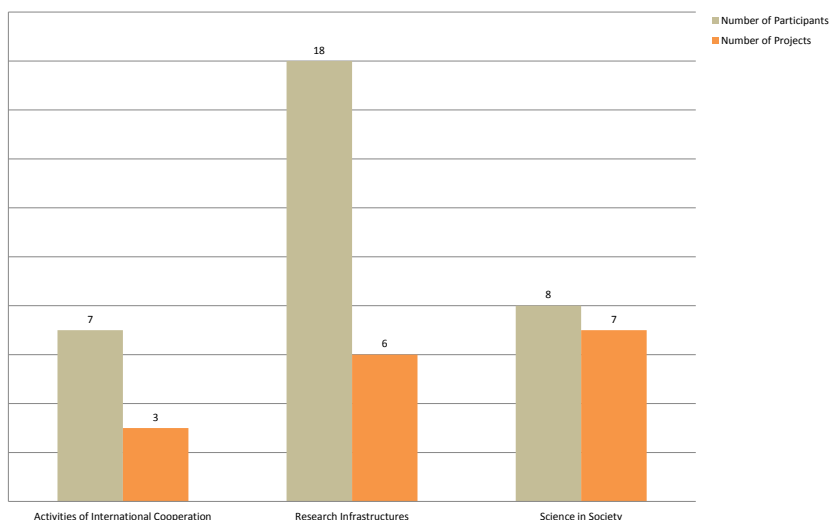


Figure 2 Number of contracts signed (involving at least of on Indian applicant) submitted under the Capacities Programme

Success rate

Indian participation in the FP7 from 2007 to 2011 shows a success rate of 33% for the whole Capacities Programme (analysis based on mainlisted projects/presented proposals). Top is the Research Infrastructure, 47%, INCO programme is the second in the score. 0% for Research for the SMEs.

EC contribution

The total of EC contributions to Indian participants funded under the Capacities Programme amounts to 2.183.476 €. On the other hand if we consider the projects with Indian participation under the Capacities Programme the amounts rise to 44.052.848,9 €.

Conclusions

As the result of the analysis of the Indian participation in the first five years of calls of FP7, we can make the following conclusions:

Firstly, the Cooperation Programme is characterized by the highest number of proposals submitted and contracts signed (respectively 655 and 123) compared to the results of other Programmes (see table below).

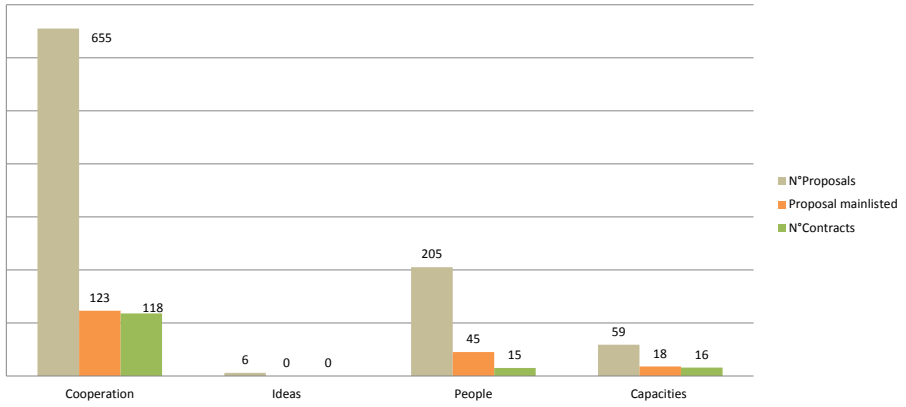
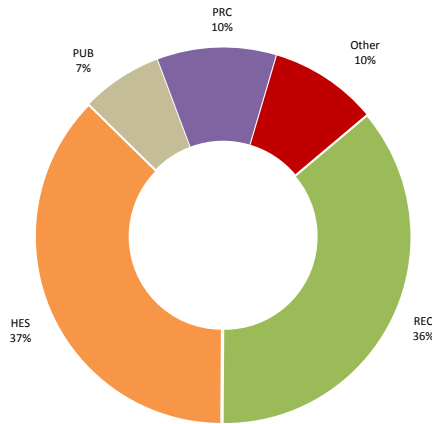


Figure 3 FP7 overview on proposals submitted, mainlisted, signed under each of Specific Programme FP7

Secondly, the Indian participation in the FP7 is dominated by Higher Education Institutions (HES) and Research centres (REC), with a percentage respectively of 37% and 36%.



Type of Indian participant organizations

4. Making research together

FP7	
REC Research organisations	109
HES - Higher or secondary education	112
PUB - Public body (excl. research and education)	21
PRC - Private for profit (excl. education)	31
Other	28

Table 1 Percentage and number of all type of applicants who have submitted proposals under Cooperation programme

Thirdly, Indian participants show a strong link with some European Countries: UK (218 proposals), Germany (181), Italy (136), France (126), Netherlands (99), and Spain (88). Outside Europe a notable link is with China (77), U.S.A (39), Russia (37) and South Afric (31).

The last remark is on the EC contribution for contracts signed.

Indian participants in Cooperation Programme have received the highest EC contribution (93%). 5% of the total EC contribution is under Capacities Programme and 2% under People Programme.

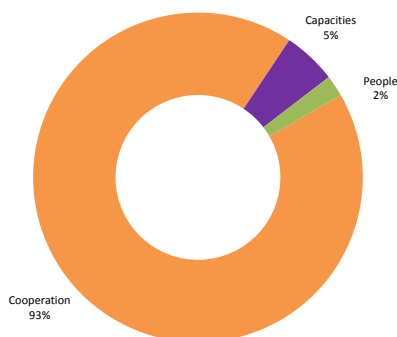


Figure 4 Percentage of EC contributions for each Specific Programme of FP7 (for Indian participant)

Programmes	Total
Cooperation	31.673.920 €
Capacities	1.794.272 €
People	709.497 €
Total	34.177.689 €

Table 2 EC Indian participants contributions in euros for each Specific Programme of FP7

4.3 European industrial presence in India

India-EU relations have developed substantially since the adoption of the 1993 Declaration. An extensive bilateral political dialogue has evolved, which includes regular annual summits, Troika Ministerial and Senior Official level meetings covering a wide range of issues. In the economic sphere, ties have expanded and India and the EU have worked closely together to strengthen the multilateral trading system and to pursue a constructive dialogue on trade and investment and economic cooperation. India and the EU, as the largest democracies in the world, share common values and beliefs that make them natural partners as well as factors of stability in the present world order. India and the EU share a common commitment to democracy, pluralism, human rights and the rule of law, to an independent judiciary and media. India and the EU also have much to contribute towards fostering a rule-based international order - be it through the United Nations (UN) or through the World Trade Organisation (WTO). India and the EU hold a common belief in the fundamental importance of multilateralism in accordance with the UN Charter and in the essential role of the UN for maintaining international peace and security, promoting the economic and social advancement of all peoples and meeting global threats and challenges.

India is an important trade partner for the EU and a growing global economic power. It combines a sizable and growing market of more than 1 billion people with a growth rate of between 8 and 10 % - one of the fastest growing economies in the world. Although it is far from the closed market that it was twenty years ago, India still also maintains substantial tariff and non-tariff barriers that hinder trade with the EU. The EU and India hope to increase their trade in both goods and services and investment through the Free Trade Agreement (FTA) negotiations that they launched in 2007.



EU-India trade and investment

Trade in goods

- EU goods exports to India 2010: €34.7 billion
- EU goods imports from India 2010: €33.2 billion

Trade in services

- EU services exports to India 2010: €9.8 billion
- EU services imports from India 2010: €8.1 billion

Foreign Direct Investment

- EU outward investment to India 2010: €3.0 billion
- Indian inward investment to EU 2010: €0.6 billion



European Business Group India (EBGI)

EBGI was launched in September 1997 at the initiative of European businessmen with the support of the Delegation of the European Commission to India. It is the representative body of European business interests in India and it aims to provide a stepping stone for European companies to assist them with all aspects of growing their business in India.

Website: <http://www.europeanbusinessgroupindia.com/>

Industrial Policy

Cooperation between India and the EU on industrial issues and understanding of the regulatory framework has been growing in recent years. Under the 'Joint Initiative to Enhance Trade and Investment', the two sides jointly carried out general as well as eight sector specific studies on trade and investment matters.

On the basis of the results of the studies, Indian and European business associations brought out a set of recommendations, which were placed before the 2001 and 2002 Summits.

Considering the potential for a further enhanced dialogue, both sides agree to:

- ❧ Establish a platform for the exchange of information and views on industrial policy and to enhance mutual understanding of regulatory frameworks;
- ❧ Continue and reinforce dialogue in existing and strengthened Working Groups and encourage discussion in various sectors;
- ❧ Exchange information on competition policy in areas of mutual interest, with a view to increasing cooperation;
- ❧ Develop a dialogue on best practices in the field of corporate governance;
- ❧ Establish a Working Group on Food Processing Industries.

Following the useful Joint Initiative studies, both sides also agree that a new initiative on enhancing bilateral Trade and Investment would be taken up.

The EU-India FTA

The parameters for an ambitious Free Trade Agreement were set out in the report of the EU-India High Level Trade Group in October 2006, which was tasked with assessing the viability of an FTA between the EU and India. Other studies have reinforced the economic potential of an FTA between the EU and India.

Negotiations for such FTA were launched in June 2007 and, so far, eleven negotiating rounds have been held. The last EU-India Summit took place on 10 December 2010 in Brussels.

EU technical and financial trade assistance to India

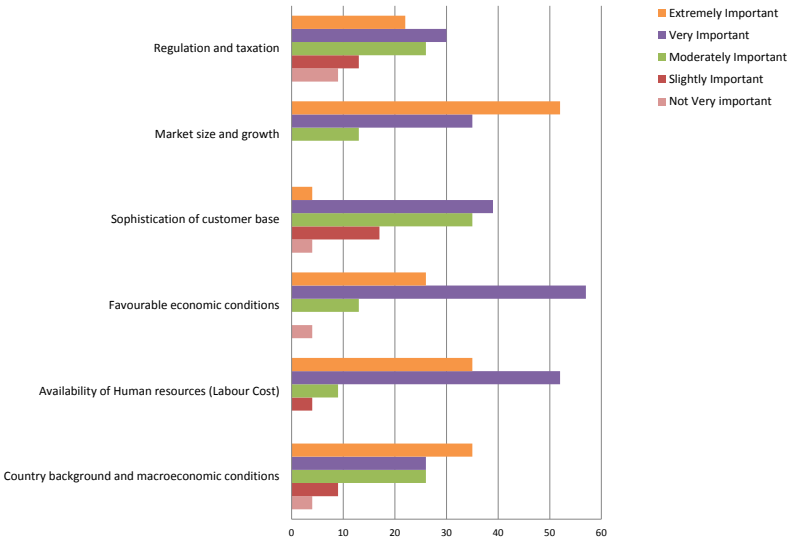
To assist India in continuing its efforts to better integrate into the world economy with a view to further enhancing bilateral trade and investment ties, the EU is providing trade related technical assistance to India. An amount of 13.4 M€ were allocated through the Trade and Investment Development Programme (TIDP)

funded from the Country Strategy Paper (CSP) 2002-2006. At present, the follow-up programme to the TIDP is being designed and will be funded by the Country Strategy Paper 2007-2013.

European industrial companies in India

Reasons for establishing EU companies in India

The INDIAGATE team made a survey on the EU companies which moved part of their business in India. There are multiple reasons which have motivated the companies to move to India. Seeking new markets is the major criteria of 83 per cent companies to move to India and resource seeking is another important issue for 67 per cent of the companies. Efficiency seeking, technology seeking and strategic asset seeking are the issues which were concerned by 29 per cent, 25 per cent and 21 per cent of the companies respectively for moving to India. We have studied the specific reasons behind the European Union companies’ movement to India and have also tried to measure the intensity of responses. The summary of these responses are depicted in the graphic below.



Reasons for moving to India

On the comparative analysis of the reasons which motivate the EU companies to come to India, it emerged that “Market size and growth” has been the key motivator for 30 per cent of the companies, whereas for 20 per cent companies consider “Country’s macroeconomic condition” and “Availability of human resources” as the major thrust for moving to India. “Favourable economic condition” and “Regulation and taxation” galvanize 15 per cent and 13 per cent companies respectively. Sophistication of Customer Base (2.5%) is the least important influencer.

4. Making research together

Only half of the surveyed companies responded that they receive government support for their business. Around 76 per cent companies are getting support from their national government as well as Indian government whereas Indian government supports 17 per cent of these companies and same percentage of the companies get support from their national government.

As regards type of cooperation, 40 per cent companies take it from local business in India followed by 30 per cent companies from academia. 17 per cent companies obtain the cooperation from Public-Private Partnership whereas 13 per cent companies obtain it from other sources.

Modalities and difficulties in establishing EU companies in India

Entry options: a general overview

Foreign companies can enter India through different options. The most important are: Liaison Offices, Branch Offices and Subsidiary Companies (*Source: Ernst & Young, India 2010*).

☞ Liason Offices

These offices act as a communication channel between the foreign corporations and Indian customers. A liaison office is permitted by the Reserve Bank of India (RBI) to undertake the following activities:

- ☞ Representing the parent company/group companies in India
- ☞ Promoting export/import from/to India
- ☞ Promoting technical/financial collaborations between parent/group companies and organisations in India
- ☞ Acting as a communication channel between the parent and Indian companies

☞ Branch offices

Foreign companies may open branch offices to conduct business in India and this process requires a specific approval from the RBI. In fact, a foreign corporation cannot undertake any activity in India that is not specifically permitted by the RBI. The following table summarizes the activities which are allowed to be undertaken by foreign companies in order to establish their businesses in India.

- ☞ Export/import of goods
- ☞ Rendering professional or consultancy services
- ☞ Carrying out research work in which the parent company is engaged
- ☞ Promoting technical or financial collaboration between Indian companies and the parent or overseas group company
- ☞ Representing the parent company in India and acting as a buying/selling agent in the country
- ☞ Providing IT services and developing software in India
- ☞ Tendering technical support for the products supplied by parent/group companies
- ☞ Undertaking activities for foreign airline/shipping companies.

It is worth noting that a branch office is not allowed to carry out trading, manufacturing activities (except within Special Economic Zones - SEZs) or processing activities in India. Typically, branch offices are allowed to be set up in SEZs to conduct manufacturing and service activities in India without any particular approval from RBI.

Subsidiary Companies

Foreign corporations can set up wholly owned subsidiary companies in India in the form of private companies. The subsidiary company, incorporated under the Indian laws, is treated as a domestic business for tax purposes.

The INDIA GATE report – whose results are presented here briefly – contains also a comparative summary among the 3 entry options, taking into considerations eight dimension:

Setting up requirements	Compliance requirements under Companies Act
Permitted activities	Compliance requirements under foreign exchange management regulations
Funding of local operations	Compliance requirements under IT Act
Limitation of liability	Permanent Establishment (PE)

As a part of the study, effort was made to assess the trading activities, business models and investment-related activities of European Union companies operated in India. Questions on these aspects were asked and around 90 per cent companies responded about the activities. After analysing the data, it was found that.

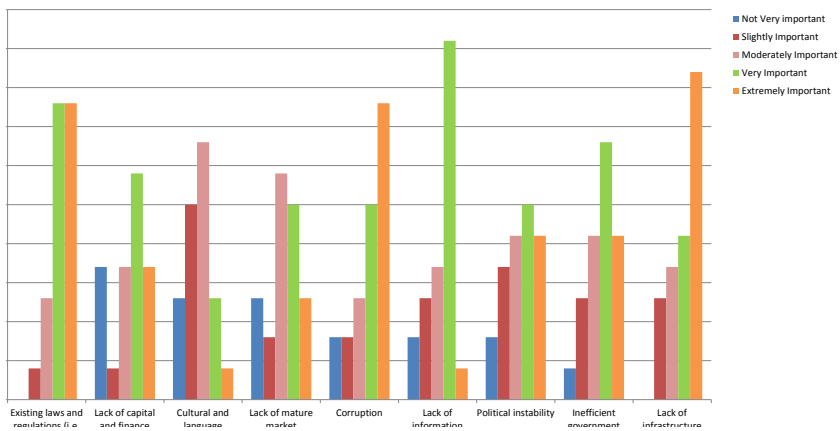
Around 43% companies are involved in trade activities,
Whereas 38% companies are going for direct export.
Only 19 % companies are found to be involved in indirect export.

Only 65% companies shared their business models.
Out of these 65% companies, 47 % are adopting contractual model
followed by 20 % companies which have adopted the turn-key model.
Licensing model is used by 13% of the companies and
same per cent of companies are using franchising mode.
7 % of these companies follow Management Contracting model.

On the issue of investment, 35% of the companies have gone equity based Foreign Direct Investment.
26% companies have adopted Joint Venture,
And another 26% are following Greenfield approach.
Only 13% companies opted Merger and Acquisition strategy for their business.

Problems Faced

Companies face some external problems in the expansion of their business like Existing Laws and Regulation, Corruption, Lack of Infrastructure, Lack of Capital and Finance, Lack of information, Political instability, Lack of mature market, Cultural and language problems and Inefficient government institutions. Each of these problems were rated by the companies on the 5 point rating scale, rating each problem from Extremely important (5) ---not very important(1). The results of the responses are shown in the graph below.




External problems faced by the companies

On analyzing the responses, it is found that the EU companies found Lack of Infrastructure (20%), Existing Laws and regulations (19%) and Corruption (19%) as the biggest problems while working in India. Lack of Information (2%) and Cultural and Language problem (2%) are the least faced challenges.

Best practices

There are many European companies that have been successfully running their businesses in India. According to a study made by Boston Consulting Group in collaboration with Confederation of Indian Industries (2004), the following 10 tips for success in India have been recognised:

1. View India as a key focus area
2. Formulate bold, long term targets that drive decision making
3. Create processes that accelerate the integration as well as localisation of organisation
4. “Change the rules” regarding global metrics, standards to meet market challenges
5. Build for the long term in India regarding people, HR practices and relationship with external stakeholders
6. Define a value-added role for the country management
7. Establish local team credibility

- 
8. Leverage India opportunities beyond the product market
 9. Localise the value chain, based on scale and complexity trade-offs
 10. Formulate India-specific business model strategies (product, value, pricing)

Future opportunities and challenges for the EU industry

India presents a remarkable business opportunity by virtue of its sheer size and growth. Boston Consulting Group has identified the domestic market opportunity as well as the off shoring opportunity. These are presented as follows.

The domestic market opportunity

India's vast population is increasing its purchasing power

- ☞ While ~50% of the population was classified in the low-income bracket³ in 1994-5, this proportion is rapidly declining
- ☞ There is a rapid shift from the low-middle classes to the burgeoning middle class, and an even faster increase in the sizes of the high and upper middle class, fuelling growth in the economy
- ☞ Even more pronounced is the growth of a niche 'super-rich' class, now estimated to comprise of over 100,000 households with net worth of >\$1 mn each.

The growing size of the middle and higher consumer classes with increased income and paying capacity has spurred an increase in consumerism and brand consciousness

- ☞ Companies have been taking advantage of dramatic growth in such consumer markets as automobiles, motorcycles, computers, durable goods, and cellular communication – all exhibiting compounded annual growth rates (CAGR) of 6%-29% from 1996 to 2011(estimated).
- ☞ The domestic market opportunity will further be boosted by a likely increase in propensity to spend and by the growing consumption by the young generation in India.

The off shoring opportunity

- ☞ Off shoring provides a fast growing and increasingly important opportunity for MNCs. It is mainly derived from India's largest asset – its people. India is the largest English-speaking nation in the world with the second largest pool of scientists and engineers.
- ☞ Companies are able to realize significant cost savings by utilizing the highly qualified labor force at attractive rates, and translate this into an important competitive advantage.
- ☞ Many companies are seeking India for the superior management and technical talent base that it offers. Over 100 multinational businesses have set up R&D facilities in India and many have placed Indian talent in key positions in their organizations both locally and globally.

4. Making research together

- India is considered a low cost leader in such areas as steel and metals and a regional base for the high quality production of some manufactured goods such as automotive components, engineering equipment, power equipment, and medical systems.

Conclusions

Taking into consideration the results of the analysis we can conclude on the following points:

- Around 42 per cent companies are involved in industrial production and 46 per cent companies focus on research and development activities. Sales have been identified as the prime activity in which around half of the surveyed companies are involved.
- 'Environment and Energy' are the major activities performed by 29 per cent of the European Companies, followed by 'automotive, transport & logistics' and 'healthcare' which involve 17 per cent companies in each.
- 48 per cent European Companies are found having more than 1000 employees and 55 per cent European Companies are having turnover more than 50 million Euro.
- Availability of talent pool on cheaper cost, low cost of resources, proximity to the customers and market are the major attraction for European Companies to establish their research and development centres in India.
- Product Development and Product Based Innovation have been the major issue behind adopting the research and development activities in India.
- Seeking new markets is the major criteria of 83 per cent European Companies to move to India and resource seeking is another important issue for 67 per cent of the companies.
- Around 43 per cent European Companies are involved in trade activities whereas 38 per cent European Companies are wrapped in direct export.
- 47 per cent are adopting contractual model followed by 20 per cent European Companies which have adopted the turn-key model.
- 35 per cent of the European Companies are the recipient of equity based FDI. 26 per cent European Companies have adopted Joint Venture, and another 26 per cent are following Greenfield approach.
- Quality of product and price of product are found internal problem which should be addressed effectively whereas Existing laws and regulations, Corruption, Political Instability and Insufficient government institutions are the external problems which have been confronted by the European Companies.

4.4 Obstacles for cooperation between European and Indian organisations in Science & technology

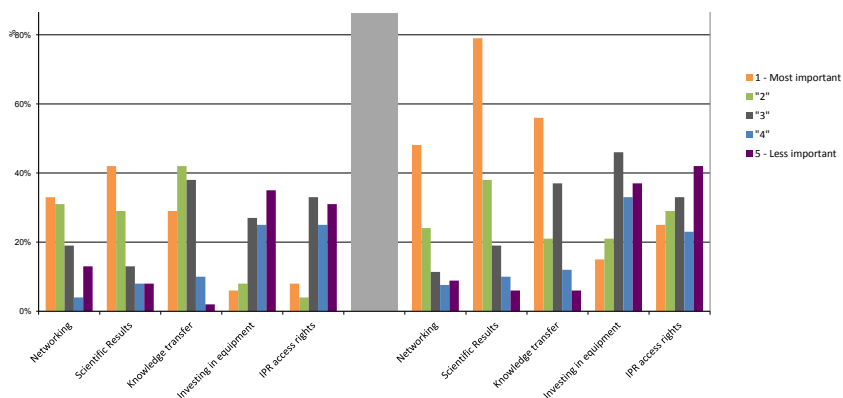
The cooperation between the European Union and India is a way paved with opportunities, challenges but also obstacles. Identifying the latter and looking for solutions could feed the cooperation process between organisations or scientists coming from both regions.

The INDIA GATE team made a survey among participants of Indo-EU projects to identify the experiences of European and Indian researchers with regards to scientific collaboration. Nine questions were answered by around 130 respondents participating to a cooperation research project.

The analysis includes the specificities concerning the initial contact made, the formation and the advancement of the partnership, as well as management of administrative issues regarding the collaboration. The full report is available on the INDIA GATE website.

The European researchers highly appreciate in the Indian partners the capabilities of dealing with the technical aspects of the project and the fact their respect of the Consortium agreement. Quite 90 per cent of Europeans respondents are satisfied of their experience with the Indian partners and in particular of the results achieved by Indian researchers within the project.

Also the Indian partners are highly satisfied of their experience on research collaboration with European researchers, but what they most appreciate is the overall cooperation and communication with European researchers. They are satisfied as well of the results achieved and the time partners spent on project. Then for Indian researchers what is very precious is the interaction with researchers coming from Europe. Both European and Indian researchers did not consider gender issues as a problematic area in the cooperation with counterparts.



*Importance of benefits of engaging in scientific cooperation EU-INDIA
(European on the left - Indian on the right)*

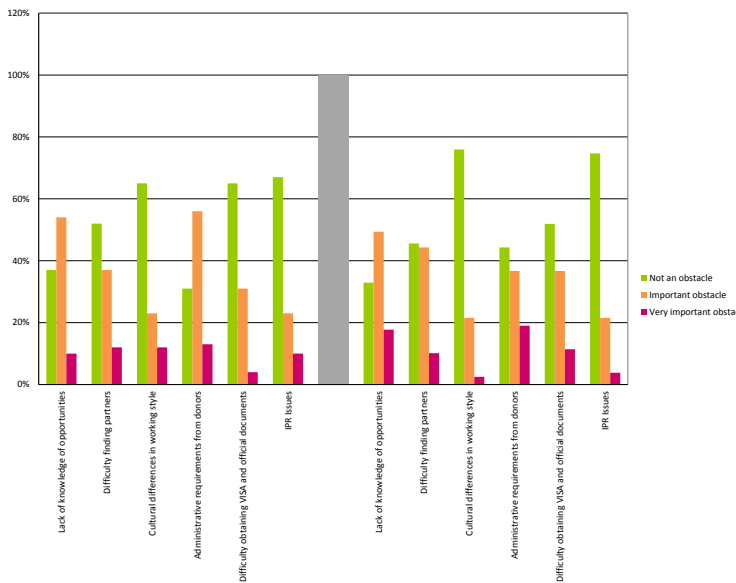
4. Making research together

Indian researchers prefer to collaborate with EU for opportunities to learn state of the art technologies, sharing resources and broadening the vision, networking and knowledge transfer. European researchers are motivated by Knowledge available in India, Quality of manpower in India, Market access and Improving peoples live, Global nature of problems which can be tackled by collaborations only and building a platform for cross border research. Some European researchers feel that there are so many barriers for innovation in EU than India. Thus there are enough give and take for both Indian and EU researchers to enter into collaboration with each other.

One of the important point when cooperate in the scientific field is the differences existing in Intellectual Property Right (IPR) legislation. Interviewed on this point, respondents from both regions declared that IPR doesn't represent an obstacle in the cooperation process and that they didn't encounter any problem concerning this issue (88,5% of European researchers and 100% of Indian ones).

Obstacles

When asked if which of the proposed areas is perceived as an essential obstacle for scientific cooperation, both EU and Indian partners agreed that "Administrative requirements from donors" and the "lack of Knowledge of funding opportunities" are huge obstacles to cooperation.



*Perception of obstacles for scientific cooperation
(European on the left - Indian on the right)*

Apart from the proposed areas both sides declared that there are other areas which could be considered as essential obstacles.

Additional obstacles presented by Indian participants

- ❧ The administrative requirements of the European Commission in terms of reporting are far too cumbersome. There is more emphasis on completing paper work than achieving results. EC really needs to think of ways to simplify reporting requirements.
- ❧ Financial accountability process is extremely time-consuming and results in less time available to focus on the scientific and technical aspects of the project. Further, EU does not support 100% cost eligibility. EU supports need based employment with hourly payments which does not work in India. Being permanent employee of government institutions, the salary budget becomes difficult to manage and utilize. It should be liberalised as per our structure and administrative requirements. The EU financial rules do NOT AT ALL reflect the reality of smaller cooperation partners in developing countries; too often pre-financing is required and the ineligibility of taxes (e.g. for subcontracting or travel) is detached from reality (constituting huge burden on the smaller partner) and offensive to the host country.
- ❧ Audit rules in India are different from that of EU. This poses difficulty in financial reporting.
- ❧ Too much “guarding” of IPRs, leading to insufficient sharing of knowledge.
- ❧ The CORDIS site is too complex and needs a help guide to help people access relevant information.

Additional obstacles presented by European participants

- ❧ Exchange of plant material is not so easy. Requirements from India are very demanding while they have a quarantine service.
- ❧ To some extent, time difference to schedule video or telecommunication conferences. Different academic (teaching / examination obligations) schedules for Europe and India when having academic institutions as project partners
- ❧ The process for obtaining VISA is too slow; a more effective protocol to get the VISA would be convenient and necessary
- ❧ Travel expenses, often limited budgets of the European partners for travel to India. Different framework conditions for research.
- ❧ Administrative obstacles such as permission for our partner(s) to open a bank account in order to receive foreign funding; it took one year to obtain it.
- ❧ It is difficult for Indian organizations to understand the EU programmes and funding and how it works. Not much information for European on how the Indian programmes work.

4. Making research together

- ❧ Enormous and un-necessary bureaucratic difficulties linked to the management of FP projects. Difficulties in financial management due to not only for the differences in some of the administrative rules between Europe and India, but also for the difficult to follow the EC administrative procedures for the funded programs (as for example, the rules for the presentation of Audit certificates in FP6). Understanding the EU financial policy and needs was not given by Indian partners and they were not really willing to accept these.
- ❧ Is there enough appetite on the Indian side? Do we mean the same thing when we say 'research and innovation'? This needs to be investigated. They seem to be happy inside their bubble and subscribe to the theory: 'what is not understood is best ignored'. The scientific knowledge of the Indian partners was poor, so as well project management and technical help needed was much more time consuming than in other projects. Information events for Indians what participation in EU FP project means (esp. in terms of admin and finances) are needed to prepare them in advance! The mismatch is in requirements of the sponsors. The Indian sponsor (DST) appears to be much more relaxed about many administrative issues, which results higher responsibilities attributed to the EU partners and especially the coordinator, with the latter managing both projects in effect.
- ❧ Not having the same priorities for the collaboration.

Conclusions

The obstacles faced by EU researchers to participate in EU-India collaboration are: lack of knowledge of funding opportunities, difficulty finding partners, cultural difference in working style, administrative requirements from donors, difficulty obtaining a VISA, official documents and intellectual property rights issues, getting bio-materials from India, un-necessary bureaucratic difficulties linked to the management of FP projects and quality and dedication of Indian partners.

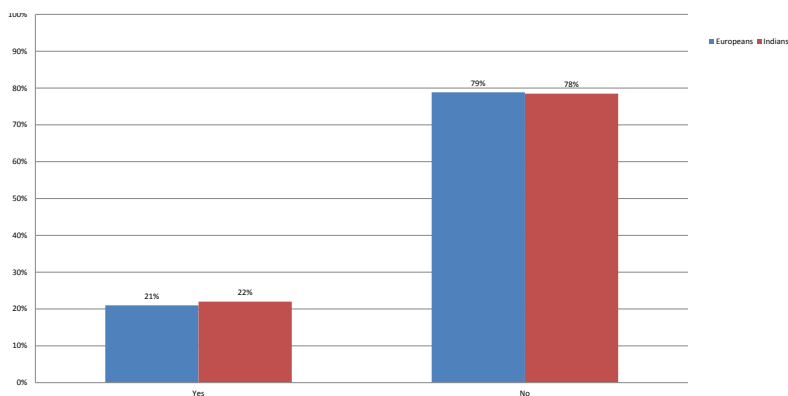
The obstacles faced by Indian researchers to participate in EU-India collaboration are: lack of knowledge of funding opportunities, difficulty finding partners, cultural difference in working style, administrative requirements from donors, difficulty obtaining a VISA, official documents and intellectual property rights issues, administrative requirements of the European Commission in terms of reporting, financial accountability process and lack of 100% support, too much guarding of IPR and CORDIS site is too complex.

Suggestions

Both EU and Indian researchers feel that EC administrative processes are too cumbersome. European Commission need to take effective steps to make the process more simpler. Europeans face VISA problems. This needs to be taken up the European Commission with Government of India. The quality of Indian partners can be ensured by creating the database as suggested earlier. The database will have publications and patent details which can give an idea about the quality of Indian partner.

VISA for travelling to Europe/India

One of the main obstacle for cooperation activities could be the VISA for travelling. Even though it is not perceived as an essential obstacle, Indian and European researchers declared that some solutions shall be found.



Answers to the question "did you encounter any problems arranging for a VISA in order to travel to India/Europe"

Both Indian and European researchers face VISA problem. A VISA for entire Europe with multiple entries and for entire duration of the project may be considered by European Union as done by Australia and USA. The same with the Indian authorities. European Commission may take up this issue with the respective governments.

Both Indian and EU researchers feel that European Commissions administrative and financial procedures are cumbersome and take a lot of time. This should be simplified. Project review meetings should be held in both the countries so that other scientists from the respective organizations can participate in the proceedings. One point which has emerged from the survey is that there is lack of information dissemination about EU projects in India. European partners do not know with whom to contact in India. Calls for funding should not be restricted to beginning of FP programmes in EC and Five Year Plan in India. These should be more frequent. The call for proposal should be relevant to India also. Indian partners should also be given some infrastructural costs that would help researchers in not so established institutions. Pre-financing in the Indian context would be helpful in developing well thought out projects as Indians can not manage this expenditure from the resources of their organizations. Indians also feel that upper limit of the grant should be increased. European researchers have suggested setup a common pocket for EU & India within the respective frameworks to fund bilateral projects. Indian partners should be given more training for managing the project administratively. Some European researchers have commented about the size of the project and have suggested minimum critical size for the project. Some European researchers feel that amount allocated to Indian partners is too low and some time insulting. Rigor of review should be same for both the sides.

4.5 Business culture in Research & Innovation environment: Europe and India face-to-face

Cooperating with persons coming from a different culture is very challenging and knowing which are the differences existing in the work environment and in the culture at large could be strategic for avoiding insuperable mistakes.

Which are the cultural differences to take into account when Europeans and Indians do business together?

It is relevant to point out that both India and EU are multi-cultural and there are wide differences amongst member states (both in India and EU) in culture, business attitudes towards decision making, importance given to time, extent of procedures, informal/formal behavior, etc. While the southern states of EU tend to be more like the cultural aspects of India, the Northern EU states tend to be more individualistic and formal. Hence any generalizations are not totally reflecting India or EU.

Issues	INDIA	EUROPE	Implications
Context	High Context	Low Context	
Quantity of time	More procedure oriented and hence any business activity takes much more time. Approval often needed from multiple agencies .	Well docu guidelines and hence doing business is simpler.	Flexibility is the key for EU to do business with India.
Timeliness	Punctuality is expected but being a few minutes late will not have disastrous consequences. Flexibility is paramount. Family responsibilities often take precedence over business , so last minute cancellations are not unusual.	Punctuality is given a high priority.	Indians need to be more time conscious and less bureaucratic when dealing with EU.
Women in Business	The percentage of women as executives and board members is substantially lower. Increasing trend of women as entrepreneurs.	Corporate are encouraged to increase the number of women. EU country Governments are taking policy measures to increase the number of women in executive suite.	More representation from males at top decision making level from India.

Future vs Present vs Past orientation	Indians tend to reflect more in the past . Precedence takes over when doing business .	More in the present and future.	Important to have good relations for EU companies to do business with India.
Power Distance	High : class consciousness and divisions within society based on position	Lower as compared with India. People in power more approachable.	Better to interact at a high level in India to get results.
Individualism vs Collectivism	More collectivist . Greater emphasis on groups and think more as “WE”. Harmony and Loyalty is considered very important.	More individualistic. eg France is ranked 10th as an individualstic culture; more self-centred and focus on individual goals.	Agreement with a group is more important when doing business with India.
Hierarchy	With its roots in Hinduism and caste system, Indian society operates within a framework of strict hierarchy that defines people’s roles,status and social order.	Lesser focus on Hierarchy. Individual expertise and skills are more respected.	Indians need to look out for the ‘bright spots ‘ in EU business leaders. EU businessmen need to start interactions from the top when dealing with India.
Openness	Professional relations tend to remain formal till rapport is built up. Individual decision making is restricted, therefore information may not be shared without clearance. This may be perceived as lack of openness.		

Research work environment topics

Issue	INDIA	EUROPE
Public-private partnership	Almost negligible. More trust needed to be built between public agencies and their private counterpart.	Significantly higher.
SMEs approaches to research	Totally dependant on Govt funding for research.	Venture capital funding mature and great help to SMEs.
	Initial stages. Research is still quite compartmentalized.	Students are encouraged to study multiple disciplines and hence research is more across disciplines.
Cross Disciplinary research	Not very common. Research is more in verticals/silos.	
Looking for partner: Shall I contact directly the researcher or the Head of office?	Head office approach.	More focus on researcher.

4. Making research together

Researcher independence	Quite high, but the Director of a Lab often would like to take credit.	High.
Ethics in research	Taking credit for a junior researcher is not uncommon.	
Researcher mobility	Mobility is factored in the research proposal. Within country is reasonably good Foreign travel is still insignificant.	International mobility is quite high.
Behaviour in the laboratories	Hierarchical.	
Management of research activities	Lot of control by concerned department from Govt.	Autonomy in Research labs.
Administrative burden to deal with	Takes up a lot of time and extra efforts	
Travel issues	Getting Visa clearance is an issue. Takes time for processing.	
E-mail protocol	Slow in responding. Wait till complete information is available.	Quite prompt . Response within one working day is common.
Training / mentoring	Good training in research field , but lacking in research methodology and presentations.	
Project Meeting	More formal meetings; time bound.	Informal.
Powerpoint presentations	Lot of emphasis on theoretical aspects. Lengthy.	Interesting and come to the point quickly.
Decision making Process	Top centric.	Committee approach by peers.
Disagreements	Often: rivalry amongst research groups.	Maybe on a subtle level.
Social launch/dinner	Not common.	Popular.
Topic of conversation	Mostly on their research field.	General topics like weather, travel, humor.
Dietary habits	Vegetarians are common but in general more flexible.	Particular about food.
Working in group/in partnership	Results presented from a big group, but just one or two scientists may have major contribution.	Individual focus on doing research.
Communication of research results	Publishing in research journals is very popular. Patenting is also catching up.	
Transfer of knowledge	Knowledge mostly ends with publishing a research paper.	Efforts taken by researcher to commercialize.
IPR	Patenting culture becoming common.	Patenting is given lot of importance .

4.6 EU-INDIA COOP initiatives: the Internet window and the info days

The EU-INDIA COOP is an initiative which builds on the positive experience of cooperation between European and Indian stakeholders developed in the 2009 for organizing the first EU-India S&T Cooperation Days in New Delhi.

The EU – INDIA S&T Coop days were organized in order to promote and enhance EU-India Scientific Cooperation, to discover the funding opportunities, to learn the rules of participation and to contribute to the definition of future research topics of mutual interest for the EU and India.

The success of the first event inspired to the involved organisations to continue the experience and offering to European and Indian players information, documents and services to facilitate and enhance their cooperation

In this frame 3 big events have been organised and an Internet window have been created under the name of “EU - INDIA COOP”:

- ❖ EU-India S&T Cooperation Days 2009 in Delhi
- ❖ EU-India S&T Cooperation Days 2010 in Vienna
- ❖ EU-India S&T Cooperation Days 2012 in Hyderabad

The EU-India Cooperation Initiative became the single entry point to all available support measures for the promotion of EU India Science & Technology Cooperation which decided to join up to December 2012.



Website of the EU India Coop Initiative: www.euindicoop.org

4. Making research together

The internet website (www.euindiacoop.org) aims to offer scientists, policy makers and other stakeholders structured and comprehensive information through the EU - India window and to assist projects' cooperation for a harmonised approach, sharing of information and joint planning of activities.

Thirteen projects active in EU-INDIA cooperation, included INDIA GATE, are so far included in this initiative. The website is structured in 5 sections plus a description of each projects' objective and services linkable from the home page:

- ❖ S& Landscape
- ❖ Find a Partner
- ❖ Funding opportunities
- ❖ FP7 Training
- ❖ Policy Dialogue
- ❖ About
- ❖ Link

India Gate has been among the creators of the portal. The Portal has been design to give a direct access to all the services provided by the projects involved. For each service a link is provided to be signposted directly to the page of the website of the Project where the information is available.

EU - INDIA S&T COOP DAYS 2009

When & Where: 4-6 November 2009 , New Delhi -India

Participants: 200 researchers from Europe and India had the opportunity to network, share experience, initiate new partnership, take part in FP7 training and round table discussions on common priorities.

Thematic Focus: Food, Agriculture, Fisheries and Biotechnology & Health

Activities:

- FP7 Info day (highlighting the opportunities for cooperation available for European and Indian researchers)
- Networking and Partnering Events – (providing an opportunity for stakeholders from the EU and India to initiate cooperation in diverse fields of research, and to identify areas of common interest for future collaboration)
- Research policy analysis and development (via interactive roundtable discussions to compare respective EU and India research agendas, potentials and needs and to identify possible main lines of mutual interest in view of further collaboration).
- Training (encouraging and facilitating participation in EU research, including practical sessions on 7th Framework Programme)

Organisers: four projects and initiatives as Biocircle, EBTC, EUINEC and New INDIGO.



EU - INDIA S&T COOP DAYS 2011

When & Where: 1-2 December 2011, Vienna- Austria

Participants: 150 stakeholders from Europe and India: scientists, policy makers as well as industry representatives

Thematic Focus: Biotechnology and Health

Activities:

- ❧ Lessons learnt and results from support projects (presented the results from ongoing support activities for EU India S&T Cooperation)
- ❧ Scientific conference and poster session (Projects funded by the New INDIGO Networking Pilot Programme's first call presented their first results and young scientists, selected by renowned experts, also had the opportunity to present posters to the audience in a dedicated session)
- ❧ Business and Innovation in India: Opportunities for European entrepreneurs (presented challenges and opportunities for European companies starting business in India and how the EBTC in India can help them overcome such challenges)
- ❧ The Vienna Reseachers' Café (matchmaking between more than 100 European and Indian research)
- ❧ International Cooperation - matching scientific and political needs (presented the political context and evolution of the modes of cooperation were presented to the Audience)

Organisers: EUINEC, New INDIGO and INDIA GATE



EU - INDIA S&T COOP DAYS 2012

When & Where: 8-9 November 2012, Hyderabad - India

Participants: 150 scientists, policy-makers and representatives of the private sector from Europe and India to discuss the future of Scientific Technology and Innovation

Thematic Focus: Water

Activities:

- ☞ Keynote Speeches: the Future of EU-India STI Cooperation (presented the EU India STI Cooperation as “a strategic partnership driven by principles of symmetry, parity and reciprocity the Indo European partnership in Research and Innovation and the view of the European Commission on the recent developments in EU International Cooperation Policy in Research and Innovation)
- ☞ Services offered by EU-India Cooperation support activities (presented the services of five projects and initiatives working to promote and facilitate EU India STI Cooperation)
- ☞ Scientific Conference and Poster session (presentations of several scientific collaboration projects between Europe and India. Young scientists were also invited to present their research work as Posters allowing for a better integration of young scientists in EU-India Cooperation)
- ☞ Networking Café (matchmaking between more than 100 European and Indian research)
- ☞ Technology Transfer session: business opportunity in the field of water (presented successful business collaborations and technology transfers between Europe and India in the water and waste water sectors)

Organisers: INDIA GATE, New INDIGO, EURAXESS and EBTC



Appendix 1 - List of the documents downloadable from the INDIAGATE website

- 🌀 List of the Ministries and the funding Agencies in India
- 🌀 Detailed List of opportunities
- 🌀 Database on funding providing organisations
- 🌀 Report on bilateral agreement
- 🌀 Report on status on opening up funding programmes in India
- 🌀 Database on organisations having EU India collaboration
- 🌀 Report on obstacles facing EU organisations
- 🌀 Report on conclusions, best practices and recommendations
- 🌀 Report on Innovation landscape and motives for establishing operations in India
- 🌀 Report on EU Industry in India
- 🌀 Report on Cluster existence and cooperation
- 🌀 India participation in FP7

The report are available on the project's website <http://www.access4.eu/india/518.php>.



Appendix 2 - List of Key institutions' websites

S&T of European Commission

European Commission

http://ec.europa.eu/index_en.htm

The European Commission website provides information about its latest initiatives, programmes and European Union policies and activities in general.

European Commission - DG Research - International Cooperation

International cooperation <http://ec.europa.eu/research/iscp/index.cfm>

EU website addresses international scientific and technological cooperation needs and opportunities in research across the globe and to contribute to peace and prosperity for European citizens.

Participant Portal

<http://ec.europa.eu/research/participants/portal/page/home>

The Participant Portal is the entry point for electronic administration of EU-funded research and innovation projects. Currently the portal covers mainly actions under the 7th EU-Framework Programme for Research and Technological Development (FP7). In the future, its coverage will be extended to other programmes in the area of research and innovation.

Seventh Framework Programme (FP7)

http://cordis.europa.eu/fp7/home_en.html

This section of the CORDIS portal provides information on the current seventh framework programme (FP7) calls for proposals, news, projects and partners etc.

ERA-NET


http://cordis.europa.eu/fp7/coordination/eranet_en.html

This site provides a framework for actors implementing public research programmes to coordinate their activities e.g. by developing joint activities or by mutually supporting joint calls for trans-national proposals.

Ideal-IST

<http://www.ideal-ist.net/>

Ideal-ist is web-based platform and acts as a perfect tool for joining ICT projects, finding appropriate partners for project idea and finding services to support you in your ICT project within the Seventh European Framework Programme.



Indian S&T System

Indian Science and Technology system consists of various ministries, departments, councils and institutes.

Major S&T agencies/departments are:

Council of Scientific and Industrial Research (CSIR)

<http://www.csir.res.in/>

CSIR is a premier industrial autonomous R&D organization. It gives a view on industrial competitiveness, social welfare, strong S&T base for strategic sectors and advancement of fundamental knowledge.

Department of Atomic Energy (DAE)

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

DAE is an independent department under central government. It informs about all the units/labs of atomic energy in India.

Department of Biotechnology (DBT)

<http://dbtindia.nic.in/>

DBT website informs on the development of modern biology and biotechnology in India and also about the major R&D projects and several national and international programmes.

Department of Space (DOS)

<http://www.sac.gov.in/dos.html>

DOS is an independent department under central government that informs about the development and applications of space technology and space science for the socio-economic benefits of the nation.

Department of Telecommunication (DOT)

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

DOT briefs about the research and development under telecommunication, international cooperation and private investments in telecommunication.

Department of Science and Technology (DST)

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

DST website gives a detailed overview of the S&T activities in the country, technology development programmes relating to key sectors and development of international cooperation in S&T.

Department of Scientific and Industrial Research (DSIR)

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

DSIR acts as a platform to promote research in industry and supports scientific laboratories and facilitates the transfer of technology between various stakeholders.



Indian Council of Agricultural Research (ICAR)

<http://www.icar.org.in/>

ICAR is an autonomous organisation. It guides and manages research and education in agriculture including horticulture, fisheries and animal sciences.

Indian Council of Medical Research (ICMR)

<http://www.icmr.nic.in/>

ICMR informs on the latest biomedical research and technological development through various research programmes.

Ministry of Communications and Information Technology (MOCIT) & Department of Information Technology (DIT)

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

The website provides information about latest projects and schemes undertaken in R&D under various aspects of information technology including research efforts in electronics and related fields.

Ministry of Environment and Forests (MOEF)

<http://moef.nic.in/index.php>

MOEF informs about the promotion of environmental and forestry research, international cooperation and creation of environmental awareness.

Ministry of Earth Sciences (MoES) & Department of Ocean Development (DOD)

<http://www.dod.nic.in/>

This site creates awareness of the atmospheric, oceanic and seismic regime & provides information about development of technology and technological aids for harnessing of resources.

Ministry of Food Processing Industries (MFPI)


<http://www.mofpi.nic.in/>

This site acts as a catalyst for guiding the industry, encouraging exports and creating conducive environment for healthy growth of the food processing industry.

Ministry of Non-Conventional Energy Sources (MNES)/ Ministry of Renewable Energy (MNRE)

<http://mnre.gov.in/>

The website gives an overview about the functions relating to all aspects of renewable energy and also promotes national and international programmes in renewable energy.



India- EU Cooperation

European Commission Delegation in India

<http://www.delind.ec.europa.eu/>

Generic overview of the Delegation of European Union in India

European Commission External Relations - India http://ec.europa.eu/external_relations/india/index_en.htm

This site provides information about EU-India relation in general including trade, research, important EU-India ministerial summits, key documents and many others.

European Commission's Directorate for Research

<http://ec.europa.eu/research/iscp/index.cfm?lg=en&pg=india>

This EU website allows you to read latest information about the European and Indian political decisions and advances in the research and development.

India-EU Council

<http://www.indiaeu.eu/>

The website acts as a point of access to the exchange of opportunities across EU-India which further aim to establish and support co-operation among Europeans and Indians.

EuroIndiaResearch

<http://euroindiaresearch.org/>

The portal serves as a main point of access for Indian organizations to know about EU funding in research and development and its main aim is to enhance research level co-operation between European Union and India.

New Indigo

EU-India ERA-NET Project

<http://www.newindigo.eu/>

It is an initiative of European and Indian S&T organisations involved in promoting research cooperation between Europe and India.

The cover features a dark blue top section with three gold stars, a gold diagonal band, and a maroon background with intricate gold floral patterns. The text is in gold.

COOPERATE WITH INDIA

A GUIDE FOR EUROPEAN PLAYERS ON
INDIAN RESEARCH & INNOVATION
FUNDINGS



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