

**GOVERNMENT OF INDIA  
MINISTRY OF SCIENCE AND TECHNOLOGY  
DEPARTMENT OF SCIENCE AND TECHNOLOGY  
LOK SABHA  
UNSTARRED QUESTION NO.1203  
TO BE ANSWERED ON 25/7/2018**

**COMMERCIALIZATION OF INDIGENOUS TECHNOLOGY**

**1203. SHRI KUNWAR PUSHPENDRA SINGH CHANDEL:  
DR. SHRIKANT EKNATH SHINDE:  
SHRI SHRIRANG APPA BARNE:  
DR. PRITAM GOPINATH MUNDE:  
SHRI VINAYAK BHAURAO RAUT:  
SHRI DHARMENDRA YADAV:  
SHRI ANANDRAO ADSUL:  
SHRI ADHALRAO PATIL SHIVAJIRAO:**

Will the Minister of SCIENCE AND TECHNOLOGY विज्ञान और प्रौद्योगिकी मंत्री be pleased to state:

- (a) whether the Government has increased the quality and quantity of basic research, technology transfer, innovation and start-ups;
- (b) if so, the facts in this regard;
- (c) whether there is a need to develop commercial indigenous technology;
- (d) if so, the steps taken to develop commercial indigenous technology and success achieved in this regard so far;
- (e) whether the Ministry of Science and Technology intends to foster and support more collaborative teaching programmes with faculty from both medical and engineering institutions to promote skill development in healthcare technology; and
- (f) if so, the facts thereof?

**ANSWER**

**MINISTER OF SCIENCE AND TECHNOLOGY, MINISTER OF EARTH SCIENCES AND  
MINISTER OF ENVIRONMENT, FOREST AND CLIMATE CHANGE  
(DR. HARSH VARDHAN)**

विज्ञान और प्रौद्योगिकी मंत्री, पृथ्वी विज्ञान मंत्री और पर्यावरण, वन एवं जलवायु परिवर्तन मंत्री

(डा. हर्ष वर्धन)

(a) & (b): Yes Madam. India's Gross expenditure on R&D (GERD) has been consistently increasing over the years and has increased 4 fold from Rs.20,086.34 crores in 2003-04 to Rs. 85,326.10 crores in 2014-15. It is estimated to be Rs. 94,516.45 crores in 2015-16 and Rs. 1,04,864.03 crores in 2016-17. India is far ahead of many developed and developing nations in terms of GERD and it stands among the top 10 leading countries in the world. As per the DST Commissioned Study, 2016 by Elsevier based on SCOPUS, research publication output increased by 68% from 62,955 in 2009 to 106,065 in 2013. India ranked at 6th position in the world in scientific publications ahead of France, Spain and Italy during 2013. India's global citation impact in scientific research has increased to 0.75 during 2009-13 from 0.68 during 2006-10 (World average citation impact is 1.0) According to the Controller General of Patents, Designs and Trade Marks, patent applications

at Indian Patent Office (IPO) increased from 39,400 in 2010-11 to 47854 in 2017-18. Government has strengthened its institutions, established incubators, Centres of Excellence, Technology Parks to enhance the quality and quantity of translational research, technology transfer, innovation and start-ups etc.

Department of Science and Technology has substantially increased the support to research and development in various fields of fundamental research in physical, chemical, engineering and life sciences thereby increasing the quantity and quality of basic research through autonomous organization, Science and Engineering Research Board (SERB). Participation of India in International projects like Thirty Meter Telescope (TMT), Laser Interferometer Gravitational-wave Observatory (LIGO) under the Mega Science Programme of DST and institution of Science and Engineering Research Board demonstrate the commitment of the Government for advancement of fundamental research in the country. Establishment of new and attractive fellowships, strengthening research infrastructure for R&D in Universities etc. are some other steps aimed to step up quality and quantity of research.

Under the Technology Development Programmes of DST, nearly 100 projects are supported every year to develop technologies in the area of Advanced Manufacturing, Waste Management, and Devices for Agriculture, Textile, Analytical and Biomedical Applications. Two specific schemes Water Technology Initiative and Clean Energy Research Initiative have been formulated to develop indigenous research based technologies and also leverage international collaboration to further improve upon developed technologies. National Initiative for Developing and Harnessing Innovations (NIDHI), an umbrella programme was conceived and developed by Department of Science and Technology in 2016, for nurturing ideas and innovations into successful startups. This umbrella programme, NIDHI aims to nurture start-ups through scouting, supporting and scaling of innovations. TIFAC-SIDBI Technology Innovation Programme (Srijan) is being implemented jointly by DST-TIFAC and SIDBI facilitates scaling up of indigenous technology innovations to bring new technologies from lab to market. So far, 47 innovations are technically recommended for scaling, 25 projects approved and 16 innovations are successfully commercialized. In addition, in the Technology Foresight for Automotive Research (TEAR) programme, TIFAC is preparing R&D Plan for specific Technology interventions like Electric Mobility, rare earth magnet based permanent magnet motors for electric vehicles etc. Technology Development Board (TDB) is a unique organization under DST for providing financial assistance to the industrial concerns for attempting development and commercialization of indigenous technology. TDB provides financial assistance by way of Loan; Equity or Grant.

Department of Biotechnology has been implementing a program on basic research in modern biotechnology and is also promoting basic Research in the area of Medical, Agriculture and Environmental Biotechnology. Under the Startup India Action plan, the Department and its public sector undertaking Biotechnology Research Assistance Council (BIRAC), have taken several initiatives to increase the quality and quantity of technology transfer, innovations and start-ups. So far, the Department has supported 4 Bio-clusters and implemented Bangalore Boston Biotech Gateway Program to connect with the institutions in Boston. Further, 2 Equity Funding Schemes have been launched and are operational.

Department of Scientific and industrial Research (DSIR) through Council of Scientific and industrial Research (CSIR) has been publishing high impact papers in journals of international repute such as Nature, Nature Biotechnology, the Lancet and others. CSIR published 5382 research papers in SCI journals of national and international repute during 2017. The average Impact Factor per paper increased from 2.86 in 2013 to 3.18 during 2017. CSIR has been at the forefront of Intellectual Property generation - it enjoys a unique position amongst publicly funded R&D organizations nationally and internationally. CSIR has put in place enabling mechanisms to promote research and innovation in S&T which include: Sharing of the premia & royalty received from the transfer of technology with scientists along with proceeds from contractual R&D and consultancy; Facilitating mobility of researchers between industry and CSIR national laboratories/institutions; and Allowing the researchers to have an equity stake in scientific enterprises; and also spin-offs while in service.

**Indian Council of medical Research has set up Innovation and Translation Research Division at the ICMR Headquarters in 2015 which supports activities like up-scaling, validation, technology assessment, technology transfer under different programs.**

**Technology Incubation and Development of Entrepreneurs (TIDE) Scheme was of the Ministry of Electronics and Information Technology to promotes innovation by nurturing startups in Information Technology, Communications & Electronics (ICTE) domain.**

**Atal Innovation Mission (AIM) under its initiative Atal Incubation Centres has been striving towards building the innovation and start-up ecosystem of India. Under this initiative during 2017, AIM has supported establishment of 13 Atal Incubation Centres and has extended support for scaling up of 6 Established Incubation Centres (EIC).**

**(c) & (d): Yes Madam. It is always desirable to develop commercial indigenous technologies. In this direction, the DST had sanctioned created 5 Technical Research Centres wherein work on more than 50 technologies is in progress. Technology Development Board (TDB) has been consistently providing financial support to the companies for manufacturing the outcome of indigenous research, at the same time, paving a path towards Hi-tech and Hi-risk domains. TDB, Since its inception in 1996, has signed a total of 343 agreements (31<sup>st</sup> March, 2018) with industrial concerns at a total project cost of Rs. 8160.00 crore involving TDB's commitment of Rs. 2122.25 crore. TDB has since then disbursed Rs. 1632.88 crore.**

**The support from DBT to innovative Research and Development activities, Entrepreneurs and Startups has resulted in development of 301 indigenous technologies/products.**

**CSIR has been pursuing focused efforts at enabling commercial exploitation of intellectual property, knowledgebase and/or technologies/products developed at its constituent laboratories. Often, even after licensing of the technologies/products, CSIR handholds the industry partner for further development of the technology so as to facilitate market acceptance and thereby its commercial success.**

**In 2018, Atal Innovation Mission (AIM) has shortlisted 80 new institutions for establishment of Incubation Centres. Among these, 72 applicants are going to set up Atal Incubation Centres and 9 applicants are going to be supported for scaling up of Established Incubation Centres. These Atal Incubation Centres established so far have already incubated 360+ start-ups and contributed towards creation of 6000+ jobs and also encouraged deployment of innovations.**

**ICMR has its in-house mechanism for technology transfer which involves identifying leads that have potential for products are identified from the patents filed by the ICMR- both intramural and extramural. These technologies are place on ICMR website for inviting proposals from interested companies/manufacturers for up-scaling and commercialization of technologies. ICMR also provides handholding in technical support, product launch, for spreading awareness through exhibitions and facilitate in obtaining regulatory approvals on case to case basis as per requirement of technology.**

**Ministry of Earth Sciences has set up Technology Research Board to promote indigenous technology in the field of Ocean, Atmosphere and Geosciences.**

**A Scheme for "Enhancement of Competitiveness in the Indian Capital Goods Sector" has also been launched by the Government in the year 2014 with a financial allocation of Rs.581.22 over a period of five years through Department of Heavy Industries. Till now, the projects worth more than Rs.550 crore have been approved by the under various components of the Scheme such as Centers of Excellence (CoE), Common Engineering Facility Centers (CEFC), Technology Acquisition Fund Programme (TAFP) and Integrated Industrial Infrastructural Facility (IIIF).**

**The Indian Council of Agricultural Research (ICAR) has developed and implemented Guidelines for Intellectual Property Management and Technology Transfer/Commercialization.**

**Institute Technology Management Units (ITMUs) have been established in all ICAR institutes as a single-window mechanism to pursue matters related to technology commercialization with Zonal Technology Management Centers (ZTMC) as the middle-tier and the apex Intellectual Property and Technology Management (IP&TM) Unit at the ICAR headquarters. Further, ICAR has created the National Agriculture Innovation Fund that retains the component of Innovation Fund to upscale the IP management activities and includes a component on Incubation Fund to address the much-needed requirements of business incubation (Agribusiness Incubation Centers established in 24 ICAR institutes and supported 154 Agri-entrepreneurs/start-ups in different sectors of agriculture). Agrinnovate India Limited a registered Company, was established by Department of Agricultural Research and Education (DARE) for technology transfer/commercialization. The success achieved in Intellectual Property Right (IPR) protection is reflected during 2014-15 to 2017-18 as filing of 479 IPRs and signing of 1572 agreements for transfer of ICAR technologies to different public/private organizations.**

**Department of Atomic Energy (DAE) has a technology transfer and collaboration division (T&CD) who coordinate the transfer of technologies to private entrepreneurs. The technologies developed are transferred to industry on non- exclusive basis at very nominal technology transfer fee for fulfilling the requirements of the Nation. Bhabha Atomic Research Centre (BARC) has developed 142 indigenous technologies so far and transferred them to 176 licensees during 2015 to July, 2018.**

**(e) & (f): Yes Madam. CSIR has launched an integrated Skill Initiative Program to contribute towards government's enterprise enhancing programs in Skill India and Stand Up India. These training programs are interconnected and linked to industry requirements. CSIR has launched more than 30 integrated skill initiatives in diverse areas with varying duration.**

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