DST CPR

DST-CENTRE FOR POLICY RESEARCH
PANJAB UNIVERSITY CHANDIGARH

Activity Booklet
2023-24

Professor Renu Vig
Vice - Chancellor

PANJAB UNIVERSITY
CHANDIGARH, *India* 160 014

MESSAGE

DST-Centre for Policy Research at Panjab University, Chandigarh, since its inception has been working enormously for the promotion of Industry-Academia (I-A) interactions, enhancing the Intellectual Property (IP) and promotion of public-private partnership ecosystem in India. The centre is actively engaged in various activities, specifically in conducting studies to strengthen the science, technology and innovation ecosystem at national and regional levels. Over the past nine years, the centre has drawn evidence-based recommendations and submitted them to the Government of India for further deliberations.

I applaud DST-CPR, PU for its significance, particularly towards the Science, Technology and Innovation Policy (STIP) formulation. In 2023, completion of UNIDO sponsored study on "Technology Transfer Centre to increase commercialization of innovations in India" is major achievement of this Center.

I extend my deep appreciation to Prof. Kashmir Singh and his entire team to exemplify DST-CPR, Panjab University's commitment to high-impact research and its application in resolving pressing societal issues. The efforts of this Center are crucial in ensuring that our innovations and ideas positively impact society in the years to come as we strive to establish a thriving ecosystem that boost creativity.

I would also like to express my gratitude to the DST, Government of India for giving us the opportunity to set up a Centre for Policy Research at Panjab University. By embracing the rapidly evolving activities in the domain of Science, Technology and Innovation, I believe with DST led activities in Panjab University, will stimulate the innovation culture at PU aligned with our nation's aspirations and priorities.

My best wishes to DST-CPR, PU for its future endeavors and for successfully fulfilling the new mandates.

(Renu Vig)

Telephones : 0091-172-2541945 (Office), Fax : 0091-172-2541022, E-mail : vc@pu.ac.in
Website : www.pu.ac.in

सत्यमेव जयते
डॉ अखिलेश गुप्ता
Dr. Akhilesh Gupta

वरिष्ठ सलाहकार एवं प्रमुख
नीति समन्वय एवं कार्यक्रम प्रबंधन प्रभाग
विज्ञान और प्रौद्योगिकी विभाग
विज्ञान और प्रौद्योगिकी मंत्रालय
भारत सरकार

Senior Adviser & Head
Policy Coordination & Programme
Management Division
Department of Science and Technology
Ministry of Science and Technology
Government of India

MESSAGE

Science, Technology and Innovation (STI) are foundations to national R&D strategy. Anticipating future challenges and opportunities in ever-evolving science and technology domains requires funding frameworks, regulatory environments, and the development of agendas that can enhance the capacity of scientific discovery and technological advancement. STI policy research is instrumental in studying these factors and their impacts that can bridge the gap between STI and socio-economic challenges. Policy research in STI can help in understanding the importance of national innovation ecosystems that are complex in nature. The achievement in STI policy research has been pivotal in shaping national R&D strategies and international collaborations aimed at advancing scientific temperament and innovation landscape such as setting up the Anusandhan National Research Foundation and launching the National Quantum Mission at the national level.

DST-Centre for Policy Research (CPR), Panjab University (PU) research work on STI policy is a critical contribution in bridging the gap between R&D and policy-making while ensuring the insights gained from innovation ecosystems are effectively translated to recommendations for policy decisions. The centre has brought forward significant case studies to analyze current and emerging trends in the STI landscape to forecast future R&D strategies. Studies presented by DST-CPR, PU has contributed in the formulation of guidelines that encourage innovation and regulate technological impacts with solid scientific evidence and a strong technical standpoint. The tailored policy recommendations provided by DST- CPR, PU in the domain of PPPs, IPRs has significantly synergised the India's R&D activities by addressing the challenges posed by technological innovations at national level. The recommendations provided in context of national technology transfer ecosystem by DST-CPR, PU through their studies on Technology Transfer Centres (TTOs) of India has brought forward the crucial role a TTO plays in strengthening linkages between industry and academia and the need to develop a Technology Transfer Policy for India. Such recommendations led to new initiatives for establishing innovation solutions for effective implementation of a harmonized STI system.

I congratulate DST-CPR, PU for its astonishing work and look forward to more such detailed studies on understanding the STI landscape of India: A vision of Viksit Bharat by 2047 that relies on open science, ease of doing research and way to doubling FTE / Private sector investment.

(Akhilesh Gupta)

Technology Bhawan, New Mehrauli Road, New Delhi-110016
Phone: +91-11-26862512 Email: akhilesh.g@nic.in, gakhilesh2008@gmail.com, Website : www.dst.gov.in

Department of Science & Technology
Govt. of India

DST- Centre for Policy Research

at

Panjab University, Chandigarh

(Estt. Under the Panjab University Act VII 1947 enacted by the Govt. of India)

DST CPR
DST-CENTRE FOR POLICY RESEARCH
PANJAB UNIVERSITY CHANDIGARH

Prof. Kashmir Singh
Principal Investigator & Coordinator
Phone: +91 9501684096
E. mail: dstprc2014@pu.ac.in

Ref. No. 419 /CPR
Dated: 15.07.2024

PREFACE

It is with great pleasure that we present the Annual activity Booklet 2023-24 for the DST- Centre for Policy Research in Science and Technology Panjab University, Chandigarh. This annual booklet presents glimpse of the activities undertaken by the Centre in the preceding year.

DST- CPR, PU stands as a beacon of excellence in policy research related to Science, Technology and Innovation (STI). Science, Technology, and Innovation (STI) are the key drivers of the economy and development of a country. The economic and social impacts of STI require a deep understanding of the STI ecosystem, which includes the interactions between actors, their technologies, and their business models.

I am proud to state that our mission is not only to advance STI ecosystem but also to address societal challenges through interdisciplinary research along with building capacity in critical areas such as Intellectual Property Rights (IPR), effective Public-Private Partnerships (PPP), fostering sustainable industry-academia partnerships, and exploring innovative models for Science & Technology (S&T) financing. Capacity building remains a cornerstone of our mission. These efforts are aimed at empowering our community to effectively navigate and leverage opportunities in the dynamic landscape of science, technology, and innovation.

Throughout the past year, we have done significant studies in these domains that informs policy, supports innovation, and promotes technology transfer. Our studies have influenced national discourse, shaping policies that foster creativity and protect intellectual assets.

Our analyses of PPP models have identified best practices, facilitating collaborations that leverage resources and expertise from both public and private sectors to tackle complex challenges. Moreover, our efforts in building sustainable industry-academia partnerships have led to impactful projects that drive economic growth and societal benefit.

The support of the Department of Science and Technology (DST) has been instrumental in our endeavors, enabling us to expand our research capabilities and educational outreach.

I commend our team for their dedication and achievements, which have positioned DST CPR PU as a forerunner in Policy research in STI ecosystem

As we look forward to the future, we remain committed to advancing knowledge, fostering collaboration, and making meaningful contributions to societal well-being through our research and capacity building initiatives. We are aligning with the national mission of 'Viksit Bharat@2047' and commit to working meticulously on the goals assigned to the CPR by the DST, Government of India.

Prof. Kashmir Singh
Coordinator, DST-CPR
Panjab University, Chandigarh

For correspondence :- Prof. Kashmir Singh, Coordinator, DST – Centre for Policy Research, Guru Teg Bahadur Bhawan, Panjab University, Sector-14, Chandigarh-160014

Contents

Abbreviations

AARDO	Asian-African Rural Development Organization
AI	Artificial Intelligence
AIIMS	All India Institute of Medical Sciences, New Delhi
AIT	ADAMAS Institute of Technology, West Bengal
APPAM	Association For Public Policy Analysis and Management
ASU	Apeejay Stya University, Haryana
AU	Abhilashi University, Himachal Pradesh
AU-C	Anna University, Chennai
AUJ	Amity University, Jharkhand
AUK	Amity University, Kolkata
AU-TN	Annamalai University, Tamil Nadu
BBC	British Broadcasting Corporation
BEML	Bharat Earth Movers Limited
BHEL	Bharat Heavy Electricals Limited
BHU	Banaras Hindu University, Varanasi
BIT	Birla Institute of Technology, Mesra
BPCL	Bharat Petroleum Corporation Limited
BU	Bharathiar University, Tamil Nadu
CA, USA	California, United States of America
C-DOT	Centre for Development of Telematics, New Delhi
CeNS	Centre for Nano and Soft Matter Sciences, Karnataka
CGC	Chandigarh Group of Colleges, Punjab
CGU	C. V. Raman Global University, Odisha
CHARUSAT	Charotar University of Science and Technology, Gujarat
CHITKARA	Chitkara University, Punjab
CIAB	Centre of Innovative and Applied Bioprocessing, Punjab
CII	Confederation of Indian Industry
CIIPP	Centre for Industry Institute Partnership Programme

CIIRC	Centre for Incubation Innovation Research and Consultancy
C-MET	Centre for Materials for Electronics Technology, New Delhi
CMIE	Centre for Monitoring Indian Economy
CPI	Consumer Price Index
CPR	Centre for Policy Research
CPRI	Central Potato Research Institute, Himachal Pradesh
CRIKC	Chandigarh Region of Innovation and Knowledge Cluster
CSIC	Central Sophisticated Instrumentation Cell
CSIR-IMMT	Council of Scientific and Industrial Research - Institute of Minerals And Materials Technology
CSIR-India	Council of Scientific and Industrial Research, India
CSR	Corporate Social Responsibilities
CU	Chandigarh University, Punjab
CUH	Central University of Haryana
CUJammu	Central University of Jammu
CUP	Central University of Punjab
DAE	Department of Atomic Energy (India)
DBT	Department Of Biotechnology
DBUU	Dev Bhoomi Uttarakhand University
DCRUST	Deenbandhu Chhotu Ram University of Science and Technology, Haryana
DfS	Design For Sustainability
DIAT	Defence Institute of Advanced Technology
DIC	District Industries Centre
DIT	Dehradun Institute of Technology
DPIIT	Department for Promotion of Industry and Internal Trade
DRDO	Defence Research and Development Organisation
DRM	Disaster Risk Management
DRR	Disaster Risk Reduction
DST	Department of Science and Technology
DTU	Delhi Technological University
DU	University of Delhi

EoDB	Ease of Doing Business
ESD	Education for Sustainable Development
FDI	Foreign Direct Investment
FEMA	Foreign Exchange Management Act
FER	First Examination Report
FIPB	Foreign Investment Promotion Board
FIT-RAI	Fostering Innovations and Trends-Role of Academia and Industry
FLCTD	Facility for Low Carbon Technology Deployment
FLN	Foundational Literacy and Numeracy
FNF	Friedrich Naumann Foundation, Germany
Galgotias	Galgotias University, Uttar Pradesh
GeSCI	Global E-Schools and Communities Initiative
GESF	Global Education and Skills Forum
GEU	Graphic Era University, Dehradun
GHG	Greenhouse Gas
GIAN	Global Initiative of Academic Networks
GLA	Gla University, Uttar Pradesh
GNA	Gna University, Punjab
GoI	Government of India
Govt.	Government
GPE	Global Partnership for Education
GSSST	Greenko School of Sustainable Science and Technology
GU	Glocal University, Uttar Pradesh
HEIs	Higher Educational Institutes
HESI	Health And Environmental Sciences Institute
I-A	Industry-Academia
IACS	Indian Association for the Cultivation of Science
IARI	Indian Agricultural Research Institute, New Delhi
ICAR	Indian Council of Agricultural Research, New Delhi
ICFRE	Indian Council of Forestry Research and Education, Uttarakhand
ICGEB	International Centre for Genetic Engineering and Biotechnology, New Delhi

ICIFR	International Conference on Industry Focused Research
ICMR	Indian Council of Medical Research, New Delhi
ICSD	International Conference of Sustainable Development
ICT	Information and Communication Technology
ICU	Intensive Care Units
IEEE	Institute of Electrical and Electronics Engineers
IFRC	International Federation of Red Cross and Crescent Societies
IGSTC	Indo-German Science and Technology Centre
IIM	Indian Institute of Management
IIMT	Indian Institute of Management and Technology, Uttar Pradesh
IISc	Indian Institute of Science, Bangalore
IISER-M	Indian Institute of Science Education and Research, Mohali
IISER-TVM	Indian Institute of Science Education and Research, Thiruvananthapuram
IISR	Indian Institute of Sugarcane Research, Uttar Pradesh
IIST	Indian Institute of Space Science and Technology, Kerala
IITH	Indian Institute of Technology, Hyderabad
IIT BHU	IIT (BHU), Varanasi
IIT (ISM)	Indian Institute of Technology (Indian school of mines), Dhanbad
IITB	Indian Institute of Technology, Bombay
IITBAA	IIT Bombay Alumni Association
IITD	Indian Institute of Technology, Delhi
IITG	Indian Institute of Technology, Guwahati
IITGN	Indian Institute of Technology, Gandhinagar
IITI	Indian Institute of Technology, Indore
IITJMU	Indian Institute of Technology, Jammu & Kashmir
IITK	Indian Institute of Technology, Kanpur
IITKGP	Indian Institute of Technology, Kharagpur
IITM	Indian Institute of Technology, Madras
IITMD	Indian Institute of Technology, Mandi
IIT-PAL	Indian Institute of Technology-Professor Assisted Learning, New Delhi
IITRPR	Indian Institute of Technology, Ropar

IITR	Indian Institute of Technology, Roorkee
IMF	International Monetary Fund
INST	Institute of Nanoscience & Technology, Punjab
INTA	Instituto Nacional De Técnica Aeroespacial, Spain
INYAS	Indian National Young Academy of Sciences, New Delhi
IoT	Internet of Things
IP	Intellectual Property
IPR	Intellectual Property Right
IQ	Intelligence Quotient
ISB	Indian School of Business, Punjab
ISEAL	International Social and Environmental Accreditation and Labelling
IWP	India Window Program
J&K	Jammu & Kashmir
JAIN	Jain University, Karnataka
JCBOSE	Bose Institute, Haryana
JIIT	Jaypee Institute of Information Technology, Uttar Pradesh
JNCASR	Jawaharlal Nehru Centre for Advanced Scientific Research, Karnataka
JNU	Jawaharlal Nehru University, New Delhi
JUIT	Jaypee University of Information Technology, Himachal Pradesh
KAHEDU	Karpagam University, Tamil Nadu
KRMU	K R Mangalam University, Haryana
LPU	Lovely Professional University, Punjab
LSEG	London Stock Exchange Group
M&A	Merger And Acquisition
MAHE	Manipal University, Karnataka
MDP	Master's In Development Practice
MGMUHS	Mahatma Gandhi University of Health Sciences, Maharashtra
MNC	Multinational Corporations
MoE	Ministry of Education
MoEF	Ministry of Environment and Forests
MoHUA	Ministry Of Housing and Urban Affairs

MoT	Ministry of Tourism
MoU	Memorandum of Understanding
MSD&E	Ministry of Skill Development and Entrepreneurship
MSE	Micro and Small Enterprises
MSME	Micro, Small, And Medium Enterprises
MU	Marwadi University, Gujarat
MUJ	Manipal University, Jaipur
NASSCOM	National Association of Software and Service Companies
NBRC	National Brain Research Centre, Haryana
NCI	Non-Information and Communication Technology
NCSTC	National Council for Science & Technology Communication
NGOs	Non-Governmental Organizations
NIPER-AHM	National Institutes of Pharmaceutical Education and Research-Ahmedabad
NIPGR	National Institute Of Plant Genome Research, New Delhi
NIRDPR	National Institute of Rural Development & Panchayati Raj, Telangana
NIT	National Institute of Technology
NITC	National Institute of Technology, Calicut
NITG	National Institute of Technology, Goa
NITJ	Dr. B. R. Ambedkar National Institute of Technology, Jalandhar
NITMN	National Institute of Technology, Manipur
NITP	National Institute of Technology, Patna
NITR	National Institute of Technology, Rourkela
NIUA	National Institute of Urban Affairs
NPTEL	National Programme on Technology Enhanced Learning
NQM	National Quantum Mission
NRDC	National Research Development Corporation
NRL	National Research Laboratory
NSD	National Science Day
NSI	National Sugar Institute, Uttar Pradesh
NUS	National University of Singapore
OECD	Organization For Economic Co-operation and Development

ONGC	Oil and Natural gas Corporation
PCPM	Policy Coordination & Programme Management
PGIMER	Postgraduate Institute of Medical Education and Research, Chandigarh
PI	Principal Investigator
PPPs	Public-Private Partnerships
PPSU	P. P. Savani University, Gujarat
PSCST	Punjab State Council for Science & Technology
PSU	Public Sector Undertakings
PU	Panjab University, Chandigarh
Pvt.	Private
QT	Quantum Technology
R&D	Research and Development
RBI	Reserve Bank of India
RCB	Regional Centre for Biotechnology, Haryana
REI	Rajasthan Education Initiative
REVA	Reva University, Karnataka
RIT	Roorkee Institute of Technology
RNTBCI	Renault Nissan Technology and Business Centre India Private Limited
RSPO	Roundtable on Sustainable Palm Oil
S&T	Science & Technology
SDG	Sustainable Development Goals
SDSN	Sustainable Development Solutions Network
SERB	Science and Engineering Research Board
SGGSC	Sri Guru Gobind Singh College of Commerce, Chandigarh
SGGSWU	Sri Guru Granth Sahib World University, Punjab
SMBC	Sumitomo Mitsui Banking Corporation
SME	Small and Medium-Sized Enterprises
SRIHER	Sri Ramachandra Institute of Higher Education and Research, Tamil Nadu
SRISHTI	Scheme for Research in Science, Technology, and Innovation
SRMIST	SRM Institute of Science and Technology, Tamil Nadu
SSRC	Social Science Research Council

STEM	Science, Technology, Engineering, and Mathematics
STI	Science, Technology, and Innovation
STIP	Science, Technology, and Innovation Policy
SUB	Sage University, Bhopal
SWF	Sovereign Wealth Funds
TEC	Technology Enabling Centre
TEZU	Tezpur University, Assam
TIET (Thapar)	Thapar Institute of Engineering and Technology (Thapur University)
TIFR	Tata Institute of Fundamental Research, Maharashtra
TISS	Tata Institute of Social Sciences, Maharashtra
TMU	Teerthanker Mahaveer University, Uttar Pradesh
TRL	Technology Readiness Levels
TSSOT	Triguna Sen School of Technology, Assam
TT	Technology Transfer
TTCs	Technology Transfer Centres
TTOs	Technology Transfer Offices
UILs	University Industry Linkages
UK	United Kingdom
UNDESD	United Nations Decade of Education for Sustainable Development
UNESCO	United Nations Educational, Scientific and Cultural Organization
UNGA	United Nations General Assembly
UNICEF	United Nations Children's Fund
UNIDO	United Nations Industrial Development Organization
UoA	University of Allahabad
UoC	University of Calcutta
UoH	University of Hyderabad
UoK	University of Kerala
UPES	University Of Petroleum & Energy Studies, Uttarakhand
USA	United States of America
UT	Union Territory
UU	Uttaranchal University

VISA	Visa International Service Association
VIT-AP	Vellore Institute of Technology, Andhra Pradesh
WEF	World Economic Forum
WIPO	World Intellectual Property Organization
WRCB	Wadhwani Research Centre for Bioengineering, Bombay
WSDS	World Sustainable Development Summit
WSP	Women Startup Program
WWF	World Wide Fund

INTRODUCTION

DST-Centre for Policy Research, Panjab University, Chandigarh

DST-Centre for Policy Research (CPR) at Panjab University (PU), Chandigarh, is dedicated to advancing research and policy development in Science, Technology, and Innovation (STI). Since its inception in 2014, the centre has served as a critical interface between academia, Private sector, and policymakers, fostering collaborative efforts to address key challenges and opportunities within these domains. It has shown an impetus to the Science, Research, and Innovation System for High Technology led path for India (SRISHTI), an initiative by the Government of India (GOI) under which the Centre has flourished ever since, by being at the forefront in achieving the goal of SRISHTI i.e. accelerating inclusive growth of India.

DST-CPR, PU undertakes a wide range of activities aimed at 'Enhancing the STI landscape in India'. It conducts high-impact research on 'STI policies' by conducting evidence-based studies and organizing meetings, seminars, and brainstorming sessions to facilitate dialogue between academia and Private sector. The Centre has given due emphasis to evidence-based methodologies to identify and promote key areas for the generation of Intellectual Properties (IP). This approach ensures that the policies and initiatives recommended by the Centre are grounded in solid research & data, thereby increasing their effectiveness and impact.

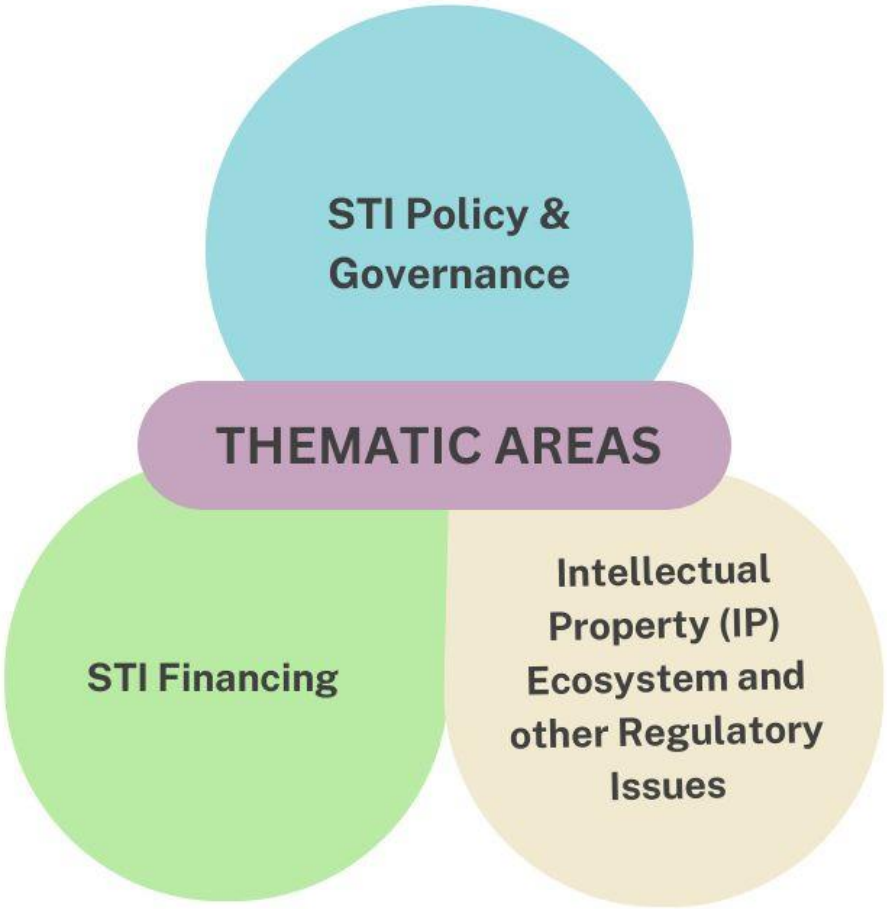
With time the Centre has gained a reputation for conducting thorough analyses of the current STI policy environment by identifying areas where there are gaps that hinder private sector investment in R&D (Research & Development). Based on these findings, the Centre provides actionable recommendations for policy reforms that can create more conducive environment for private sector engagement. Centre has stimulated private sector investment in R&D by putting forward models for Public-Private Partnerships (PPPs) to promote R&D for STI. The Centre is committed to bringing forward tailored innovative models to the unique needs, and circumstances of Indian research. These models aim to enhance collaboration between public institutions and private enterprises, thereby driving significant advancements in R&D.

Over time, DST-CPR, PU has made significant achievements by successfully facilitating multiple meetings, and seminars to bring together leading experts from Industry & Academia (I-A) for developing policy recommendations which have been instrumental in shaping national R&D strategies to establish a strong network of collaborations with stakeholders, universities, research institutions & companies. It is a vital institution that plays a crucial role in shaping the future of STI policies in India. Through its dedicated research, collaborative efforts, and evidence-based policy recommendations, Centre is making significant strides toward promotion of innovation to foster a more dynamic, robust R&D ecosystem in the country.

DST-CPR, PU is achieving new heights by strengthening its research capabilities and expanding its scope of work to cover emerging areas of STI, thereby enhancing its role as a policy advisory body by providing timely & relevant recommendations to policymakers to foster the collaboration between Public and Private entities to drive innovation as well as economic growth. The Centre is progressively moving towards becoming a 'Regional Nodal Centre' for STI policy assistance and facilitation to the States and UTs in Northern India.

From session 2022-2023 onwards, DST-CPR, PU has extended its vision to undertake STI policy research for catalyzing socio-economic development through S&T interventions. DST-CPR, PU is moving ahead with developing science and technology policies for PAN India and provides capacity-building initiatives for IP, PPPs, and I-A Liaison with expertise in STI domains vis-à-vis I-A collaborations, Intellectual Property Rights (IPRs), Technology Transfer (TT), Disaster Risk Management (DRM), and Sustainable Development Goals (SDGs), respectively. The Centre is doing engagement, dialogues, knowledge exchange, and exploring innovative strategies and best practices to enhance the impact of science and technology on society to create a collaborative space for discussing and developing robust policies at the national level.

RESEARCH


STI Policy & Governance
THEMATIC AREAS
STI Financing
Intellectual Property (IP) Ecosystem and other Regulatory Issues

2.1. Theme 1- STI Policy & Governance

DST-CPR, PU is anticipated to conduct evidence-based research to map the STI ecosystem and strengthen the system interconnectedness for STI by bringing the Public and Private sectors to address the issues of collaborative R&D and Technology Transfer. In Session 2023-2024, the Centre has conducted activities to encourage the Private sector's involvement in R&D by identifying best practices of technology-intensive areas where the Private sector is contributing to the Public sector' R&D. The Centre has conducted studies for adopting successful PPPs practices in Artificial Intelligence (AI) domain where private sector-led successful R&D has taken place. DST-CPR, PU has backed to replicate such practices in other technology-intensive domains. DST-CPR, PU looks forward to a framework to enhance Private Sector Participation in Public Sector led R&D systems. In addition, the Centre has taken up the issues relating to the gap existing between the accelerating SDGs and Private sector contribution to STI ecosystem. To ensure long-term sustainability and to cultivate a culture of innovation, DST-CPR, PU has backed the creation of a curriculum, implementation of mentorship programs, and provision of internships to enhance abilities through its studies that include fostering partnerships for industry-aligned education, establishing advisory boards for Education for Sustainable Development (ESD) under PPPs. Centre has addressed the gap between the traditional education being imparted and the skilled education required by industry through a study that provides inferences about industry-focused courses that should be run at Higher Education Institutes (HEIs) level.

2.1.1. Industry-Academia Interactions for R&D

Activity 1. Framing a new comprehensive framework model based on I-A for Universities / HEIs in India

At present, India has many HEIs, universities, vocational, technical, management & other institutes. More than 1100 universities (Govt. & Private) are present in India. Apart from Indian Institute of Technology (IITs), National Institute of Technology (NITs), Indian Institute of Management & Technology (IIMs) & some other institutions, maximum institutes have to accelerate the employment needs by providing maximum placement of candidates via the upgradation of the existing curriculum by introducing more industry-linked courses (strong I-A interlinkages). Currently, according to CMIE 2023 report, the unemployment rate of India is 7.95 %. Industry-academia interlinkages greatly affect the different fields of

academia like science, engineering, technology, agriculture, medicine, etc. In wider aspects, it affects the every corner of the educational field from basic, vocational to professional levels. The demographic dividend is a potent force for national advancement and it greatly affects Indian economic growth to a bigger level, hence an effective I-A linked effective education system is essential to achieve the current demographic dividend. The major impacts of I-A Linkages are shown in Figure 1.

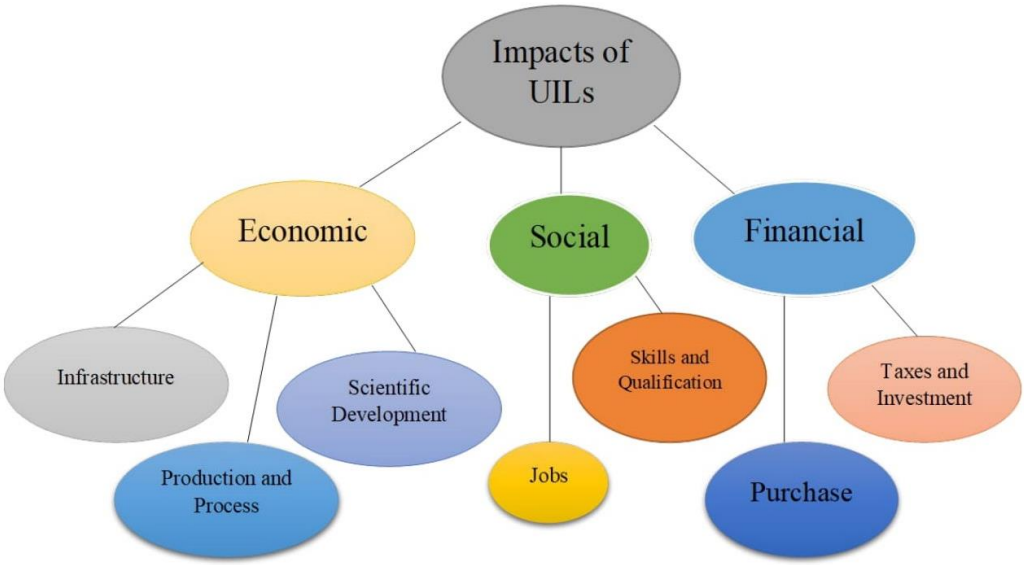


Fig.1. Various Impacts of I-A Collaborations

In India, the full potential of the I-A partnership is far from being exploited due to vital differences between industry and academia. Academicians give less priority to applied research and are not inclined to leave the traditional teaching methods. Academia is largely ignorant of national needs and industry desires and thus unable to commercialize/market its innovative research adequately. Industry, in general, has apathy for the tunnel vision of academia. Also, it is insensitive to the enormous academic resource potential and is dependent on foreign technologies that are easily available. However, I-A synergy is a win-win situation for both the sectors, and also for the progress (economic& societal) of the nation. The government, through its various organizations/agencies, has started many programs to promote I-A interactions leading to innovative research, technologies, and patents.

'A Questionnaire-based' study via online & offline modes on Industry academia Inter-linkages innovation and collaboration ecosystem in HEIs, and selected Industries Like District Industries Centres (DICs), Micro, Small, and Medium Enterprises (MSMEs) & Public Sector Undertakings (PSUs), etc. from all over India is ongoing under 10 point scale as shown in Figure 2.

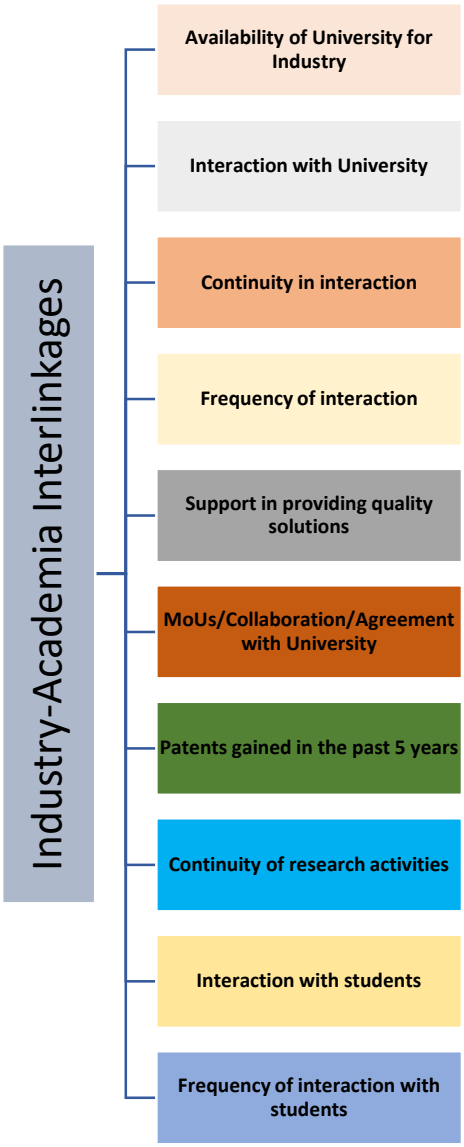


Fig. 2. "10 Points scale" to understand the I-A Linkages in HEIs in India

A model for enhancing translational research ecosystem through I-A collaborations and triple helix model given in Figure 3.

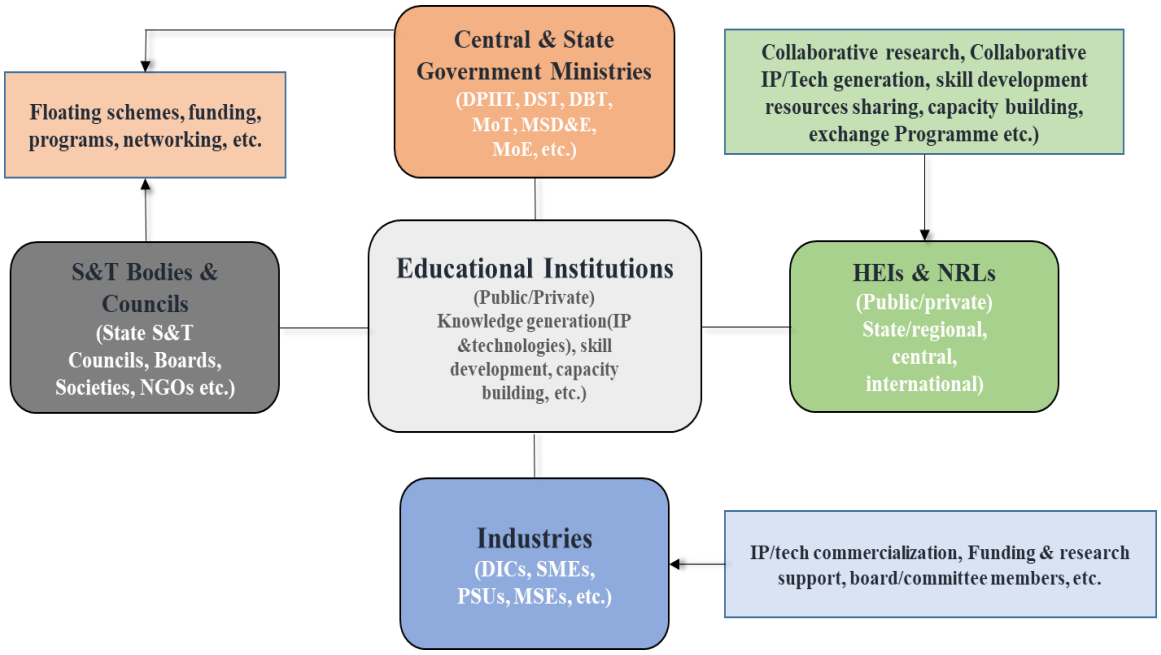


Fig. 3. Framework for I-A Interlinkage

Major Key observations and policy recommendations are the following

Review the policies to strengthen education, health, infrastructure & corporate social responsibilities (CSR) Policies to meet current challenges of improving social Infrastructure. In northern states of India, there is a strong need for I-A Interlinkages centres in universities, corporate laboratories, centres of excellence, entrepreneurship cells/clubs, research parks & technology business incubators. It fulfills the desirable output from a high demographic dividend period & multiplies the Indian GDP by two or three times. Strong University-Industry linkages (UILs) result in the speed of the invention of new technologies in the medical sector, agriculture, science, engineering, climate, energy & many other sectors, departments respectively. The intelligence quotient (IQ) ratio of a particular age group (15-59) is not similar. There are needs for different focused vocational courses according to age structure & their qualifications to equip them with desired skills to earn sufficient amounts of monetary funds.

Already in the Defense sector, in different research areas, centres of excellence, Defence Research and Development Organisation (DRDO) have collaboration programs with IITs & other Institutes. Further, more I-A based specific centres are needed in different institutes, especially in universities of the country. In the Union Budget 2023, the education ministry, the central government of India, increased the budget allocation for higher education from 40,828.35 crores to 44,094.62 crores to strengthen the I-A linkage. One hundred labs are to be opened in different institutes of India for the development of 5G services which help in the development of smart classrooms, advanced transport, healthcare & farming systems respectively. We recommend the new policy to establish strong I-A interlinkage centres in all Universities / HEIs & other high learning institutes of India to achieve sustainable development Goal 9 'Industry, Innovation and Infrastructure' & SDGs11 'Sustainable Cities and Communities by 2030.

2.1.2 PPPs for STI

Activity 1: A comprehensive examination of the role of the Private sector in ESD in India.

ESD is a pivotal tool for enhancing a country's socio-economic status. Sustainable educational practices necessitate collaboration between Public and Private sectors, forming PPPs that significantly contribute to India's socio-economic advancement. These partnerships bolster the STI ecosystem by transferring risk from public to private domains, fostering innovation. Strategic alliances between HEIs and the Private Sector drive sustainable development, promoting resilient and inclusive societies.

DST-CPR, PU conducted a study that underscores the importance of integrating the Private Sector's contributions within the educational curricula through interdisciplinary and holistic approaches. It provides an overview of Indian initiatives where PPPs lead in social, environmental, and scientific education domains, presenting an opportunity to accelerate ESD growth. The study highlights the Private sector's role in achieving SDGs at both institutional and national levels and examines international best practices that India can adopt. Thereby aims to understand and quantify the involvement of the Private sector in various initiatives related to ESD across the country.

The Activity was channelized through two phases. In **Phase I**, mapping of Private sector interventions in ESD at the Institutional level and National level was carried out (Table 1 & 2). Data was collected through published material, the website of the concerned institution/organization, and formal and informal channels for this phase. While in **Phase II** mapping of Private sector interventions in ESD at the International level was carried out (Table 3). For this phase, data were sought through various channels i.e. emails, public domain data available online, and authenticated data banks such as United Nations Educational, Scientific and Cultural Organization (UNESCO), Consumer Price Index (CPI), and visiting individual websites.

Table 1: Private sector interventions in sustainable education at the national level

National Initiative (~32)		**Private Sector Involved**
Name	**Objective**	
SHIKSHA	Eradication of illiteracy from India Breaking the cycle of poverty	HCL Technologies; Redington; Diamond Pick.
Rajasthan Education Initiative (REI)	Support skill development, and improve learning levels through information and communication technology (ICT) and non-information and communication technology (NCI) interventions Reduce gender inequalities, address geographical and physical disparities,	Global e-Schools and Communities Initiative (GeSCI); World Economic Forum (WEF); Confederation of Indian Industry (CII)
Central Square Foundation	Approach across FLN (Foundational Literacy & Numeracy), Covers spectrum for Policy and Innovation	Samagra Development Associates; Madhi Foundation; Language And Learning Foundation; Leadership For Equity; Vikramshila Education Resource Society; Sol's Arc; Peepul; The Education Alliance; Room To Read; Chimple Etc.
Tata Trusts Education Initiatives	Bring together a community of educators who are interested in improving teaching and learning through the use of technology. Recognizes and promotes teachers who use technology in the classroom,	Tata Institute of Social Sciences (TISS); Edelgive Foundation; Tata Trent; Sumitomo Mitsui Banking Corporation (SMBC); Tata Toyo Radiator Ltd etc.

	with their peers, and for their personal growth and productivity.	
India Window Program (IWP)	To shape professionals in terms of technology, culture, and social interaction. To study professionally while living in a new country.	Aptech.
Satya Bharti Quality Support Program	To creates a central data repository for a school, college or university.	Bharti Airtel
Vivekananda-BPCL Skill Development Centre	Focuses on promoting Science, Technology, Engineering, and Mathematics (STEM) education among girls.	Bharat Petroleum Corporation Limited (BPCL)
NASSCOM Foundation's CSR Initiatives	Enhancing infrastructure, teacher training, and the overall quality of education.	Accenture; Amearican Express; ; CISCO Capgemini ; Google; Fujitsu ; Microsoft; J.P Morgan; VISA; Hexagon etc.

Table 2: Private sector interventions in sustainable education at the institutional level

Institution name	**Private sector involved**	**Objectives/ Initiatives**
Indian Institute of Technology Guwahati (IITG)	Propelis Inc	Sustainable Energy Harvesting
	HYGIEA service	Value addition of local fruits for Sustainable Livelihood
	ICF management consulting company (in cooperation with GIZ, Germany)	Sustainable and biodegradable substitutes for single-use plastic
	G-Lab Innovations (P), Kolkata	Technological Complex
	Cadila Pharmaceutical	Social Innovation Laboratory- Design for Sustainability (DfS)
	B.K. Engineering Workshop, Lanka, Nagaon, Assam	Women StartUp Program (WSP)
	Tata Institute of Social Sciences (TISS), Guwahati	Women StartUp Program (WSP)

	PVT Power Switzerland	Sustainable Energy Harvesting
	Cavitation Technologies Inc., Chatsworth, CA, USA	
	Oil India Limited	
	SSI Labs	
	TATA Steel	
	Purple Patch Services (an International company)	
Indian Institute of Technology Kanpur (IITK)	Agnys Waste Management Private Limited.	Project Bhoomi
Indian Institute of Technology Gandhinagar (IITGN)	SSRC	Sustainability Projects in Coursework
	Abellon Clean Energy	Lab-to-Field Technology Transfer
	Aga Khan Rural Support Programme (India)	
	Arvind Envisol Limited	
Indian Institute of Technology Bombay (IITB)	IIT Bombay Alumni Association (IITBAA)	Facilitate Education And Research
	Getinge India	Artficial Intelligence (AI) for Understaffed Intensive Care Units (ICUs)
	Indian Oil	Energy Security and Sustainability
	L&T Technology services	Green Hydrogen Technology Development
	TATA Trusts	Developing and Designing Technology Solutions
	Oracle	Women's Education
	ONGC	Energy Security And Sustainability
Indian Institute of Technology Kharagpur (IITKGP)	BEML Limited	Asha for Education Funds Project
	queens Mary	Infinity Box - Reuse Food
	Hannover	
	NIUA	
	MoHUA	
	Auro society	
	Ericsson	E-Training Programme

Indian Institute of Technology Madras (IITM)	NUS Centre for Cancer Research, Singapore	Reduction of road accident fatalities in Chennai and neighbouring districts
	Automatic Control Laboratory of EPFL	Research, Knowledge Exchange, and joint projects.
	Asian-African Rural Development Organization (AARDO)	Training Programs
	Renault Nissan Technology and Business Centre India Private Limited (RNTBCI)	Research Projects to Reduce Road Accidents and Scholarship Program
	Wadhwani Research Centre for Bioengineering (WRCB)	
	Titan Industries	Innovation Hub for Research, Development, And Industry-Academia Collaboration
Indian Institute of Technology Hyderabad (IITH)	Greenko	The Greenko School of Sustainable Science and Technology (GSSST)
Indian Institute of Technology Delhi (IITD)	BHEL	New Technology and Product Development,
	Pfizer	INDovation program
	Macmillan Education India	Macmillan Budding Scientist
	Samsung India Electronics	Startup Hub
	Hindustan Aeronautics	Projects for Environmental Issues
	Minda Industries	Advancing Research and Innovation in Science, Technology and Innovation
	LG Soft India	R & D, Collaboration & Solution Development In The Key Areas Of AI
	Dr. Reddy's Labs	Training Programme
	IKANOS Inc., California	Solution-based projects for Environmental Issues
	SAFRAN AG, France	Research for Aerospace Sector
	PALL Corporation, USA	IIT-PAL (IIT-Professor Assisted Learning)
	Wartsila Finland Qy, Finland	Sustainable Technology Hub
Indian Institute of Technology Roorkee (IITR)	E-Waste Solutions	The Eco-Group for recycling of electronic waste within the campus
Tata Institute of Social Sciences (TISS)	International Federation of Red Cross and Crescent Societies (IFRC)	Online Certificate Programmes
Indian School of Business (ISB)	ISEAL Alliance	Sustainability benchmarking and Certification Systems
	WWF India	Environmental Conservation Projects
	Giz India, RSPO	Sustainable palm oil production

	FNF (Regional office South Asia)	Policy advocacy and sustainability
	CSR Europe	Corporate Social Responsibility Initiatives

Table 3: Private sector interventions in sustainable education at the international level

International Initiative (~18)		**Private sector involved**
Name	**Best Practice/s of the initiative**	
GESF (Global Education & Skills Forum)	A platform for partnerships and initiatives that aim to improve education worldwide.	Varkey Foundation; Organization for Economic Co-operation and Development (OECD); IEEE Standards Association (IEEE); DQ Institute
Education Data for Decision-Making (EdData) Initiative	Improving education data systems in developing countries. Contributes to evidence-based decision-making in education policies and practices.	Bloomberg Philanthropies and Gates Foundation's
Pearson Affordable Learning Fund	Provide affordable and quality education in developing countries. Address the challenges of education accessibility and affordability.	BBC; Microsoft
Global Partnership for Education (GPE)	Strengthen education systems in developing countries.	Philanthropic foundations; AGA Khan Foundation; Fundacion Carlos F. Novella; Dubai Cares; Education above all; Funsep; Jacobs Foundation; The Lego Foundation
ProSPER.Net	Strengthen the concept and understanding of sustainable development in higher education aligns with the UNDESD goals of	Alexander von Humboldt Foundation in association United Nations University

	reorienting curricula and strengthening the capacity of educators	
EducaRed portal	An internet education project, which isdesigned to encourage the use of the Internet for learning purposes	Telefonica, Span
National Math and Science Initiative	Programs to increase college readiness and advance math and science skills	ExxonMobil, USA
Microsoft's Partners in Learning	To transform education through technology	LSEG's (London Stock Exchange Group); Teladoc Health; Epic's DAX Copilot; Azure OpenAI integrations; Bayer; Siemens; AiFi; Ekimetrics

The study reveals that initiatives led by institutions like IITs and universities, with Private sector collaboration, are crucial for transferring sustainable technologies and building capacity through workshops and outreach events. However, there's a need for increased Private sector attention towards SDGs 4 and 9, as reported in the study. Internationally, Private sector involvement in SDG-related initiatives is significant, especially in developing countries, indicating the potential for collaboration under PPPs.

Activity 2: Identifying best practices of Private sector R&D in technology-intensive areas for replication in public sector R&D under PPPs.

AI is one of the successive technology-intensive domains that promote *in-practice* PPPs. India is ranked 1st in AI skill penetration as per the Stanford AI Index report 2023 and ranks 5th in Private AI investment. No. of patent filing is highest in the case of Machine Learning (12,628) and Internet of things (IoT) (11,071). Intensive Private sector-led R&D was reported in the AI domain compared to other domains such as space technology, Blockchain, Biotechnology, Cyber Security. The transformative potential of AI is crucial for strengthening India's STI ecosystem, which is vital for sustainable growth and competitiveness. AI can revolutionize sectors such as healthcare, agriculture, education, and industry by improving efficiency and

fostering innovation. Therefore, a study was conducted at DST-CPR, PU to identify the best practices of Private sector-led R&D in AI that can be replicated in Public sector-led R&D under PPPs to strengthen the STI ecosystem as a whole.

The study emphasizes the integration of AI in Government, Public, and Private sector-led R&D, and the importance of an informed society for responsible AI adoption under PPPs. It recommends developing AI-specific policies aligned with India's socio-economic context, drawing insights from leading nations like Germany, the USA, the UK, China, and France. By learning from these global models, the study aims to position India as a leader in AI research and application. It proposes a framework for AI-led STI policy focusing on awareness, stakeholder engagement, capacity building, and policy recommendations, ultimately fostering innovation and responsible AI use for societal improvement based upon such ecosystem could be developed for other technology-intensive areas.

The Activity channelized through two phases. Phase I involved a comprehensive review of existing literature, including academic papers, government reports, policy documents, and international organization reports related to AI policies in STI was conducted along with the establishment of formal and informal commutations. Phase II involves the comparison drawn for AI policies across different countries and international organizations to identify commonalities, differences, best practices, and emerging trends.

The study reveals various best practices where the Private sector has proven its worth in R&D in the AI domain such as open science; easy-to-implementation practices; community upliftment; and Betterment of socio-economic stature. Such practices should be catered to the Public sector-led R&D ecosystem under PPPs not for only AI but for other technology-intensive areas. The study embraces open innovation through the PPPs mode that fosters collaboration and drives technological advancement, achieves better risk management, and mitigates potential losses while pursuing innovative projects. The study encourages a long-term and sustained engagement from both sectors is crucial, ensuring consistent progress and a commitment to the partnership's objectives.

2.2. Theme 2- STI Financing

STI Financing India is advancing to strengthen the financial sector for STI. DST-CPR, PU has conducted research to identify the areas of policy gaps for stimulating the investment in R&D. As well as suggest changes in the policy environment. In session 2022-2023 a study was conducted to understand the Role of Foreign Direct Investment (FDI) in strengthening the Nation's R&D and innovation ecosystem as FDI can be a game changer for a post-pandemic India by ensuring that attractiveness to business is improved not only by providing financial incentives. Rather, state governments must invest in achieving the Sustainable Development Goals, which create enabling conditions for investment in R&D. In this regard, the impact of Policies and Initiatives on achieving the 2030 Agenda Goals of India for SDG9 has been conducted to identify the areas of gaps.

2.2.1 Foreign Direct Investment

Activity 1. Role of FDI in strengthening the Nation's R&D and innovation ecosystem

Major objective to carry out this activity is to investigate how financing, whether domestic or foreign, influences the R&D ecosystem and innovation by studying the global and national data and formulating policy recommendations for enhancing these factors and examine and analyze the successful foreign direct investment models across various countries through comparative study. R&D funding play crucial role in innovation and economic growth of any nation as shown in Figure 4.

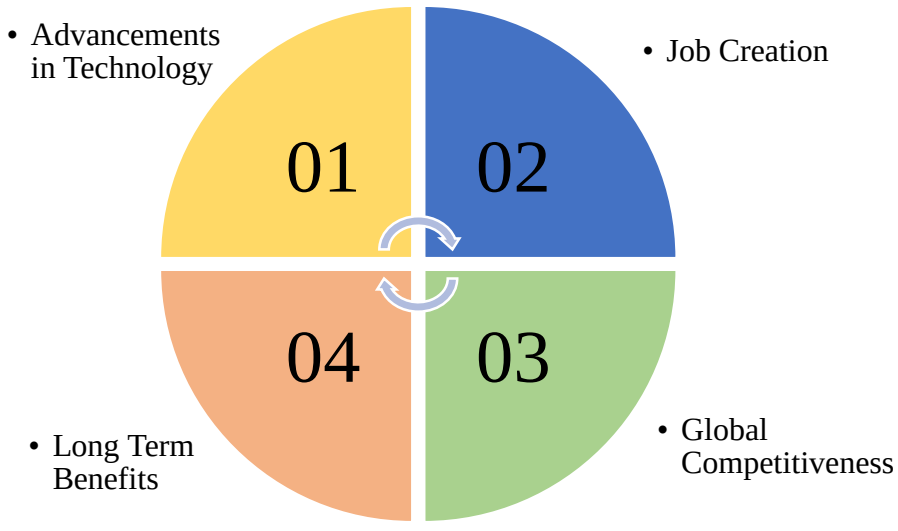


Fig. 4. Innovation and Economic Growth by R&D Funding

R&D and innovation thrive on investment, with FDI serving as a significant form of cross-border investment primarily motivated by profit. FDI not only drives technological advancement but also contributes to economic growth, exports, and employment generation in the host country, fostering enduring relationships. India's history with FDI dates back to the colonial era with the British East India Company. Post World War II, the Japanese expanded their business in India. By the 1990s, China became a major FDI recipient, leading to rapid economic growth.

India embraced FDI with the enactment of the Foreign Exchange Management Act (FEMA) in 1991, starting with a base of one billion dollars. The government adopted a liberal approach, offering tax incentives and cost advantages to multinational corporations (MNCs). Additionally, the Foreign Investment Promotion Board (FIPB) was established under the new foreign investment policy to encourage and support foreign investment. India's FDI regulations are overseen by the Foreign Exchange Management Act (FEMA) and guidelines set forth by the Reserve Bank of India (RBI). The formulation and implementation of FDI policies are carried out by the Department for Promotion of Industry and Internal Trade (DPIIT), collaborating with various government departments. Following are the processes that interact with each other and act as catalysts for the FDI inflow in the host country:

- Regulatory policy
- Capital accumulation or investment environment
- Technology transfer and know-how acquisition
- Market size and Political stability

Moreover, an organization has two options for expanding its business into a foreign market

Greenfield Investment: This involves creating an entirely new business based on a business plan developed by the parent company. India is ranked number one in the Greenfield FDI ranking globally and is part of the top 100 clubs on Ease of Doing Business (EoDB).

Merger and Acquisition (M&A): International acquisitions entail purchasing an existing company. The acquiring company may opt to buy the entire entity, specific segments, or a substantial portion that grants it specific ownership rights.

Joint ventures: involve foreign investors partnering with local entities to create a new business, combining capital, resources, and expertise, and sharing risks and profits. This collaboration enables the integration of local insights and market understanding with the foreign partner's technology, managerial expertise, and global market access.

India's method of identifying foreign investment inflows diverges significantly from the guidelines proposed by the International Monetary Fund (IMF) and Organization for Economic Co-operation and Development (OECD).

In India, FDI is characterized as any investment made by a resident of another country through capital instruments, either (i) in an unlisted Indian company or (ii) constituting 10% or more of post-issue paid-up equity capital on a fully diluted basis of a listed Indian company. According to FDI statistics, an "effective voice" is defined as owning 10% or more of a business; investments below this threshold are classified as "portfolio" investments and are therefore excluded from the FDI data.

To enhance the innovation-based ecosystem and bolster intellectual capital for investment and production technology, developing nations, emerging economies, and countries in transition are actively seeking increased FDI. Beyond importing advanced technologies from developed nations, FDI contributes to the production of high-value export goods in the host nation. Through FDI spillover channels, MNCs often elevate their investment in innovation activities, generating new ideas, expanding the knowledge base, and globally marketing their innovations. Figure 5 describes the different types of investors in home country.

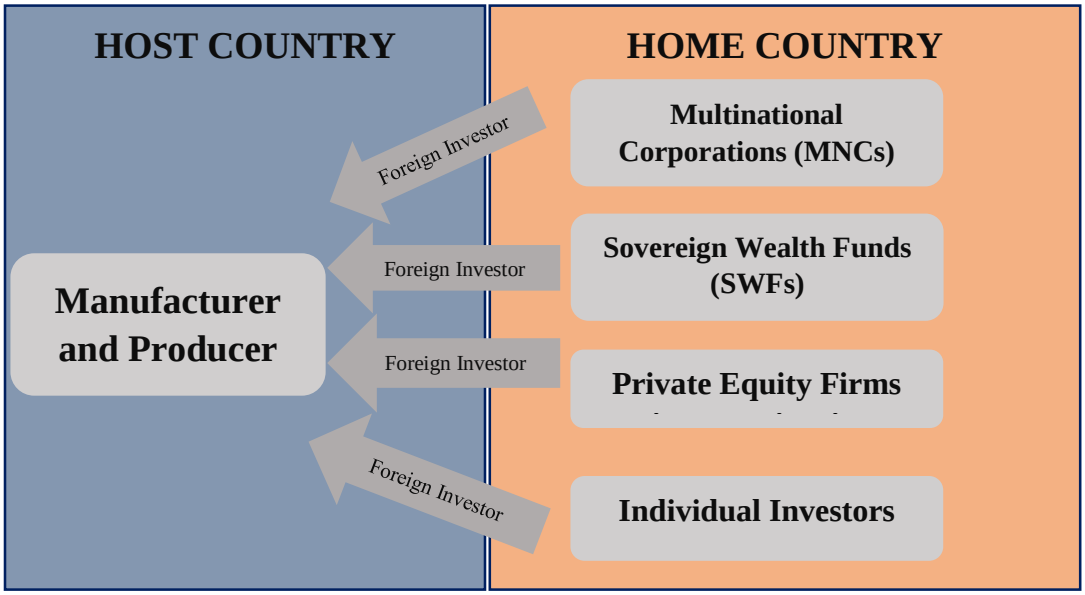


Fig. 5. Different types of Investors in the home country

Key Observations from this study includes over the last two decades, the central government has shifted towards a foreign investment policy characterized by 'liberal and transparent' principles. In this approach, nearly all sectors of the economy allow 100 percent FDI through the automatic route, except specific strategic and core sectors. This investor-friendly climate has significantly contributed to India attracting a substantial amount of FDI, surpassing the share of all other South Asian countries in global FDI over the past decade.

Raising awareness among HEIs to enhance their research credibility and quality, with a specific focus on infrastructure, aiming to attract increased international financing.

Assisting the university in enhancing participation in student exchange programs to foster increased international collaboration.

It is imperative for the central government and especially for the concerned state governments to prioritize Indian research. This involves generating additional job opportunities and offering competitive salaries to retain these professionals, encouraging them to conduct impactful research within the country rather than seeking opportunities abroad for both the research environment and financial compensation.

Effectively utilizing the 100% FDI in higher education in India is the primary goal and National Education Policy (NEP) 2020 is the first step taken in achieving this goal, nevertheless, much more needs to be done.

2.3. Theme 3- Intellectual Property (IP) Ecosystem and other Regulatory Issues

2.3.1 IPR policy research

IPRs play an important role in promoting innovation and economic growth in a country. It is essential to conduct IPR policy research because strong IPR policies provides confidence to researchers that their innovation is protected and it also further boost investments in R&D. In India, HEIs have shown significant growth in research and development leading to a significant number of patent filings over last two decades. Therefore, DST-CPR, PU conducted a research study aimed to map the patent ecosystem of HEIs in the northern states of India from 2000 to 2023 to understand the impact they have made and challenges they are facing which will further help in drawing recommendations for the Government of India (GoI).

Activity 1. Mapping the Intellectual Property Ecosystem of HEIs of Northern States of India

This study was conducted to understand the innovation capacity of HEIs of North India. It will help us to identify the strength and weakness of HEIs. It has also provided the valuable data that will help in creating or refining policies to support R&D ecosystem of HEIs in India. .

In line with the aim of providing comprehensive overview following methodology were followed to undertake this study: Patent data (filed, granted, pending, and expired) was obtained for the years 2000 to 2023 using patent database Questel Orbit. This data was further analyzed to study trends related to annual patenting activity legal status of patents from HEIs and to further dissect it into discipline and Institute-wise categories. A questionnaire was developed by DST-CPR to study the Intellectual property and technology transfer ecosystem of HEIs. The questionnaire has already been sent to various HEIs to collect information. The policy recommendations will be drawn and shared with GoI to boost the intellectual property and technology transfer ecosystem in HEIs.

The analysis of patent filing trends among HEIs in northern India revealed that the number of patents filed has been steadily rising over time, with maximum filling in the year 2023 (Figure 6). This trend shows that government's initiatives and institutional efforts have boosted R&D output within HEIs of north India.

From the data we can see that Uttar Pradesh is emerging as the leader in patent filings in Northern India indicating the state has strong R&D ecosystem with an efficient network of universities, research institutions, and industry collaborations. After Uttar Pradesh, Punjab has recorded a maximum patent filing of 2,450 which shows Punjab's emphasis on promoting research and innovation within its HEIs. Punjab's key sectors such as biotechnology, pharmaceuticals, and agricultural research have played a major role in driving the patent filing trend upwards. The year 2023 marks the peak in patent filings for all northern states, highlighting a region-wide surge in innovation. Jammu & Kashmir and Chandigarh each recorded 47 and 1,298 filings respectively, reflecting their growing focus on R&D. Uttarakhand, with 1,112 filings, and New Delhi, with 1,355 filings, also demonstrated significant increases, underscoring their commitment to fostering a culture of innovation within their academic institutions.

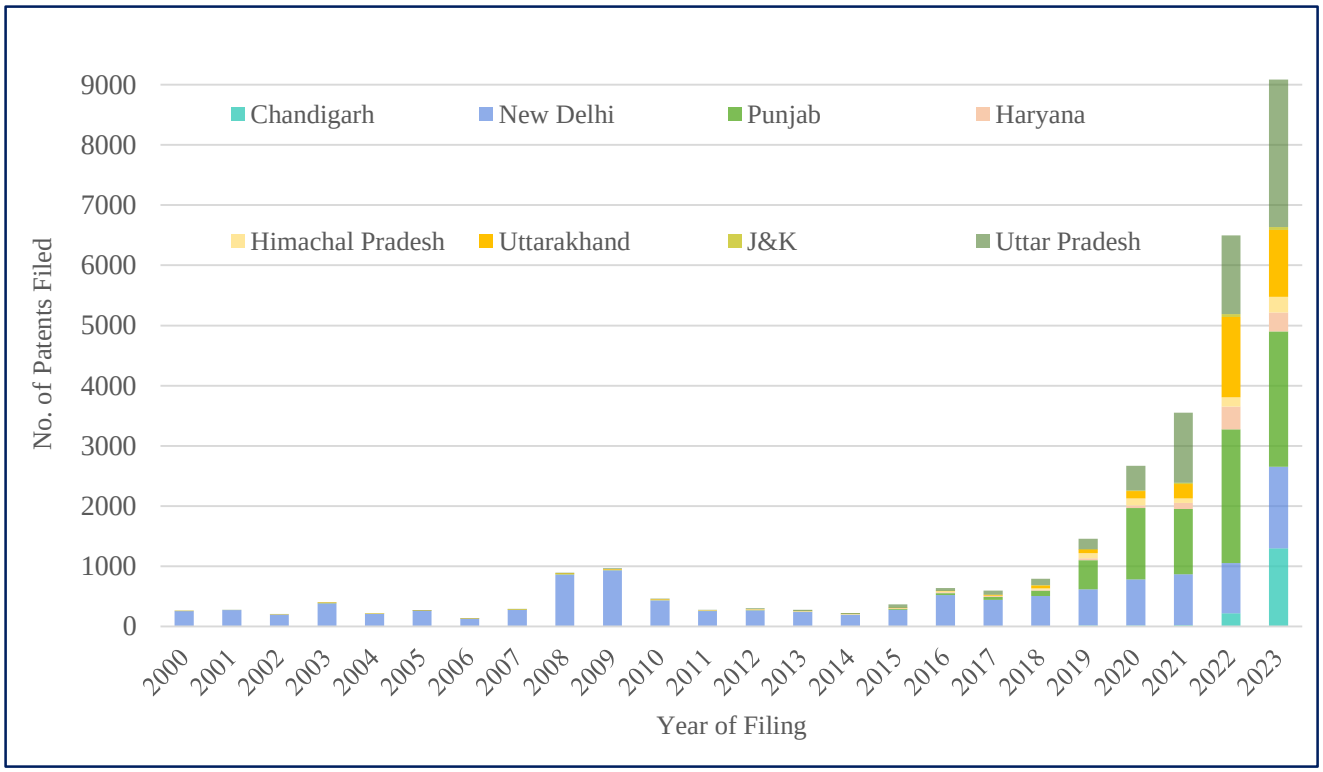


Fig. 6. Year-wise patent filing activity by the HEIs of various states of Northern India

The legal status analysis revealed that the majority of patents filed are coming under the "pending" category. Out of the total patents filed, 20,463 patents (which constitute 66%) are still pending which indicates that these patents are still under examination. 1,568 patents of the total have lapsed. 10% (or 3,196 patents) of the granted patents have expired. So, only 19% of the patents are available in the public database for public use.

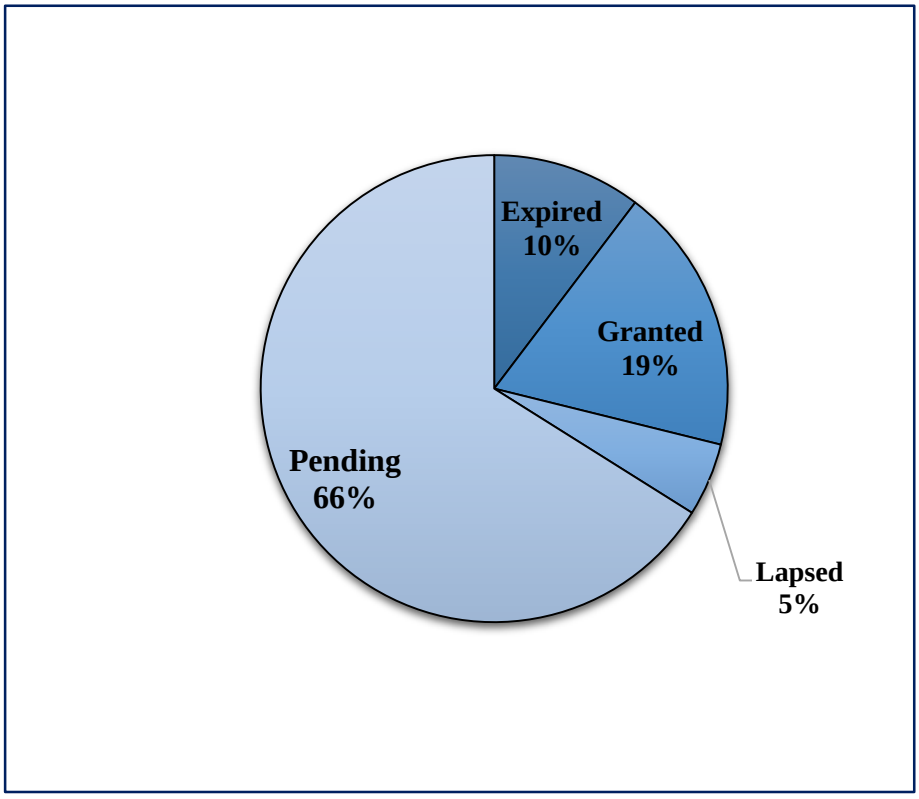


Fig. 7. Legal status of total patents filed by HEIs of Northern States of India

The data represented in Figure 8 shows legal status of patents filed by the HEIs of various states of Northern India. The number of patents granted varied across different states. New Delhi has the highest number of granted patents i.e. 4,168, which is followed by Uttar Pradesh with 701 granted patents. New Delhi has also the highest number of lapsed patents which is 1,433, followed by Uttar Pradesh with 47 lapsed patents. The expired patents data indicates that New Delhi is again at the top with 3,130 expired patents, while Uttar Pradesh next state with 28 expired patents. Punjab has the highest number of pending patents at 7,027, followed closely by Uttar Pradesh with 5,119 pending patents.

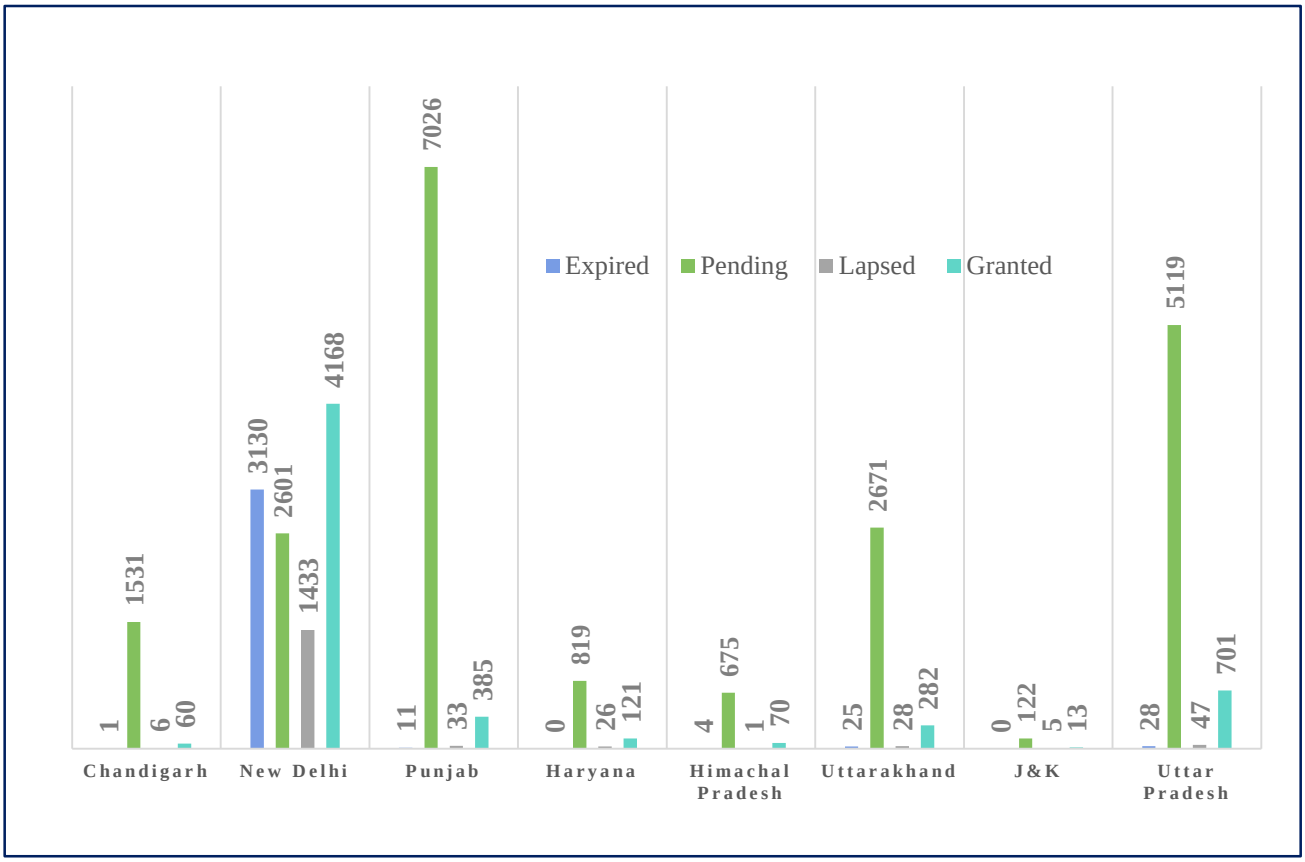


Fig. 8. Legal status of patents filed by the HEIs of various states of Northern India

From this, it is clear that amongst the northern states of India, New Delhi is leading with the maximum number of both granted and expired patents, whereas Punjab has a significant number of pending patents Even though lower numbers of patents are filed from Himachal Pradesh and Haryana, they showed significant increases in 2023 which reveals that these states are boosting their R&D capacities and encouraging innovation within their HEIs.

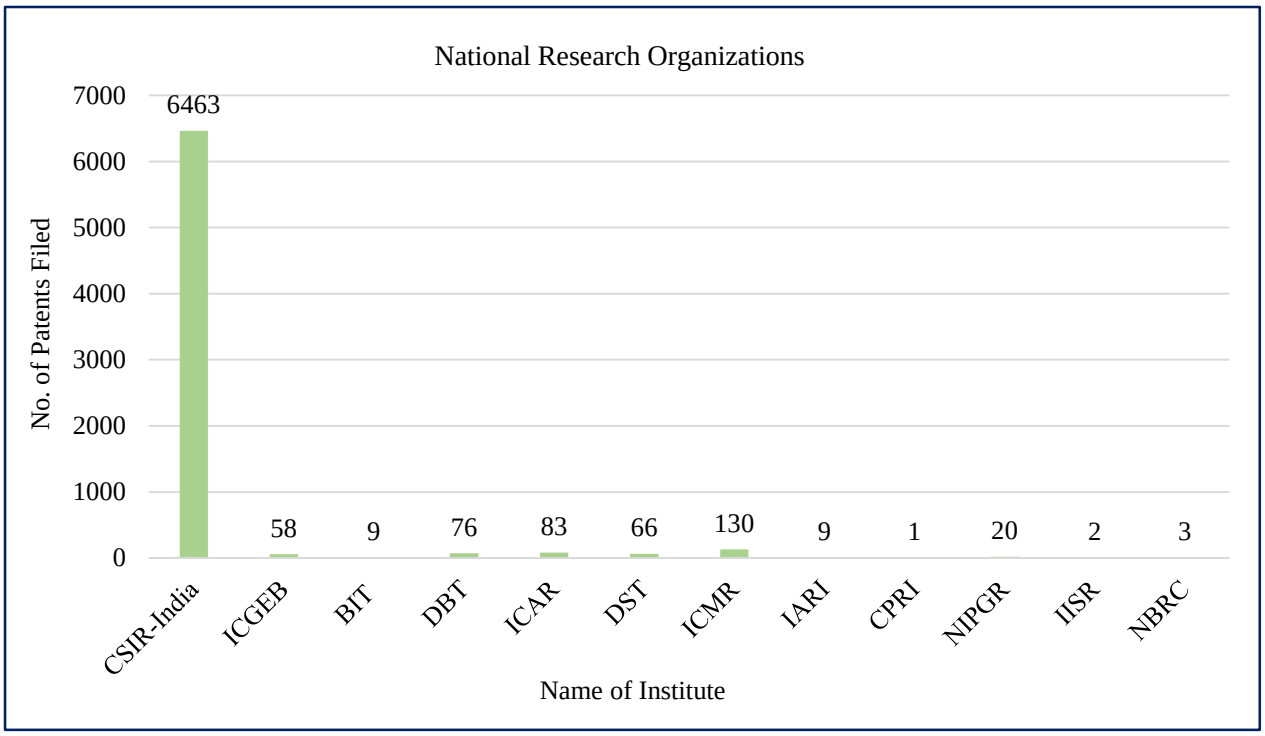
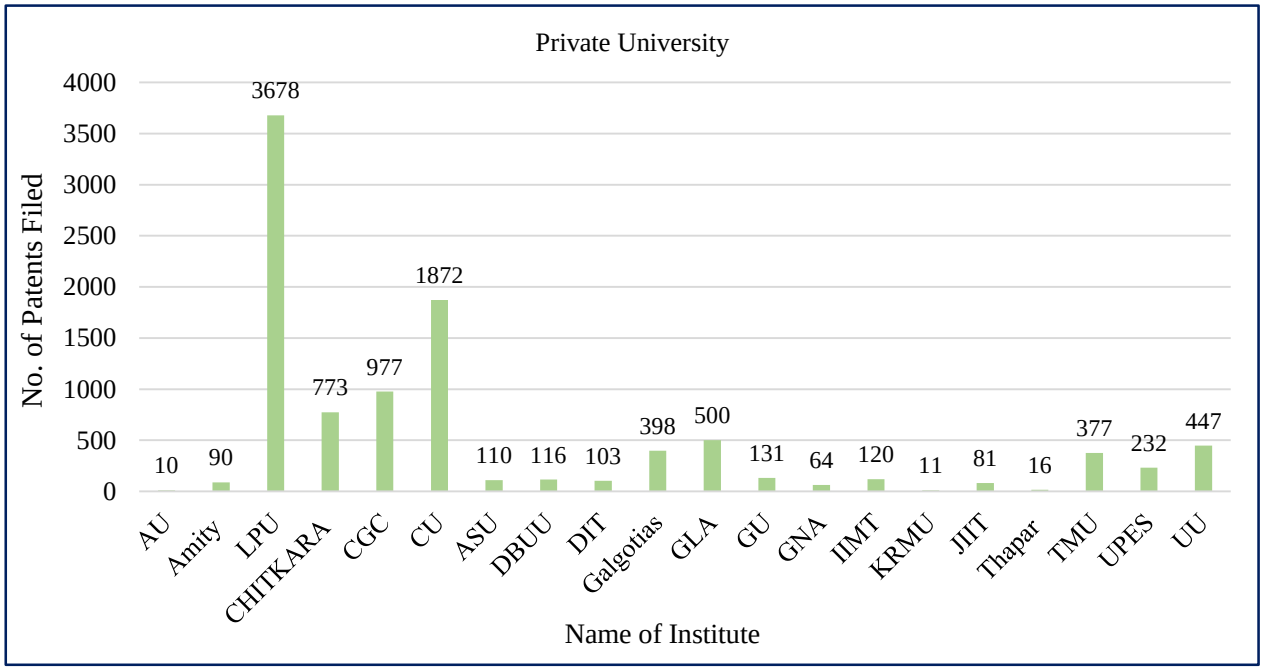


Fig. 9a. Total number of patents filed by the National Research Organizations of various states of



Northern IndiaFig. 9b. Total number of patents filed by the Private Universities of various states of Northern India

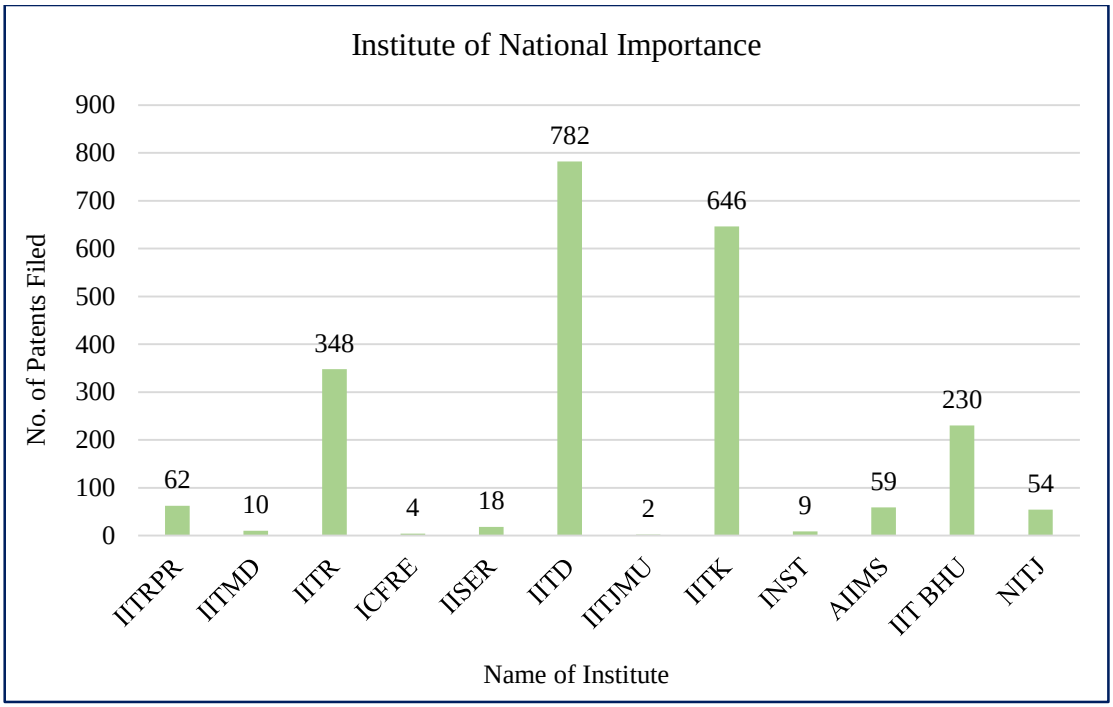


Fig. 9c. Total number of patents filed by Institute of National Importance of various states of Northern India

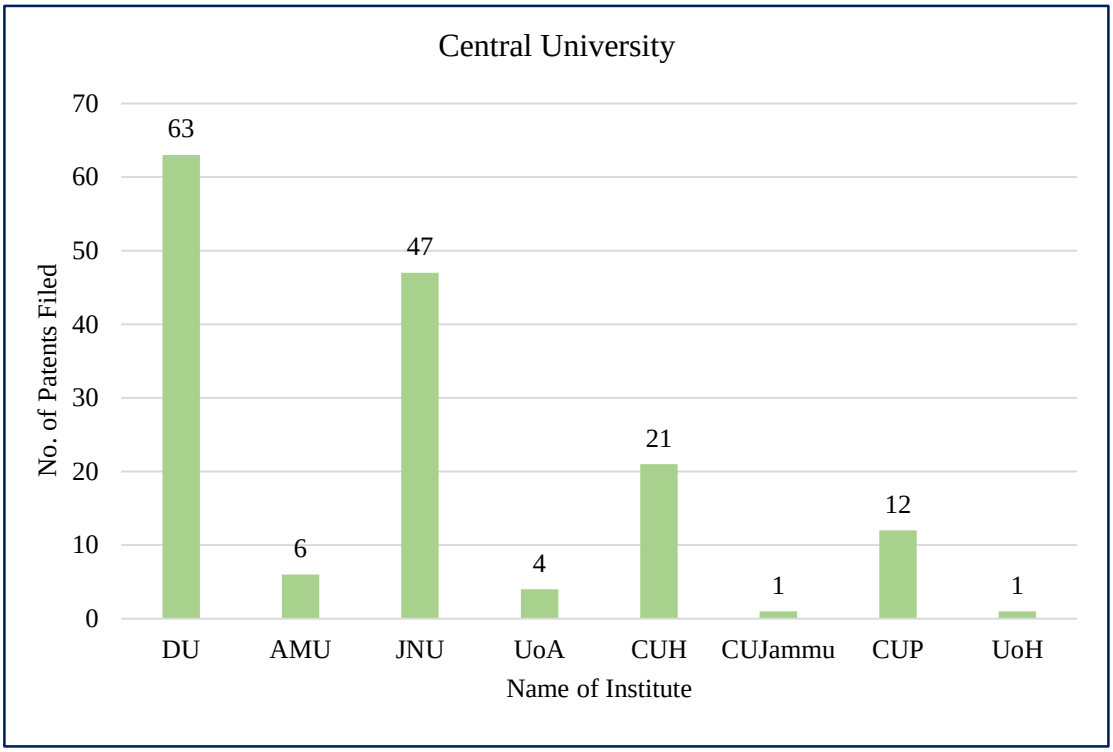


Fig. 9d. Total number of patents filed by Central Universities of various states of Northern India

In different states various HEIs have contributed significantly to boost the innovation ecosystem. While comparing the number of patents filed by National Research Organizations (Figure 9a) it is revealed that Council of Scientific and Industrial Research (CSIR) has the highest number of patent filings as compared to other organizations, ICGEB has also contributed significantly to patent filings, majorly in the area of genetic engineering and biotechnology research. Figure 9b provides an overview of the number of patents filed by various private universities in India. Analysis shows that Lovely Professional University (LPU) has the highest number of filed patents which shows the university's emphasis on research and innovation. Other private universities such as Chandigarh University (CU), Chandigarh Group of Colleges (CGC), and Chitkara University also showed up trending patent activity, indicating their productive research environments. Figure 9c shows the number of patents filed by various Institutes of National Importance. The data reveals that IITD has topped the patent filings with 782 patents in this category which is then followed by IITK 646 patents, and IITR with 348 patents. This indicates a strong research and innovation culture in these institutions. Figure 9d shows the number of patents filed by central Universities of North India. Delhi University is showing a maximum number of filed patents followed by Jawaharlal Nehru University, New Delhi.

Several reasons are responsible for the upsurge of patent filing activities in HEIs of Northern India. These factors include the Government's initiatives aimed at promoting research and innovation, such as funding schemes, better industry-academia collaboration, the establishment of technology transfer offices (TTOs), etc. From the current study, the stakeholders will gain an in-depth understanding of the IP ecosystem in HEIs of North India. It will also help to identify opportunities for growth and improvement and to further make informed decisions to foster innovation in HEIs of India.

Activity 2. Mapping the Quantum technology patent landscape of India to study patenting trends, innovation patterns, and policy implications

National Quantum Mission (NQM) is a remarkable initiative led by the GoI. Its objective is to cultivate an efficient and innovative quantum technology landscape to establish India as a frontrunner in the field of quantum science and technology at the international level. The Mission aims to greatly benefit various sectors including healthcare, energy, communication, finance, banking, security etc. In alignment with the NQM, this study was conducted to reveal the innovation trends in the field of Quantum Technology (QT) in India.

It will help us to identify the trends in quantum technology research. It has also provided the valuable data that will help in creating or refining policies to support QT innovation ecosystem of India. Patent data (published, granted, lapsed, expired and pending) was obtained for the years 2000 to 2023 using Orbit Intelligence database. Data was analyzed to study annual patenting activity, legal status, subject-wise and Institute-wise categorization.

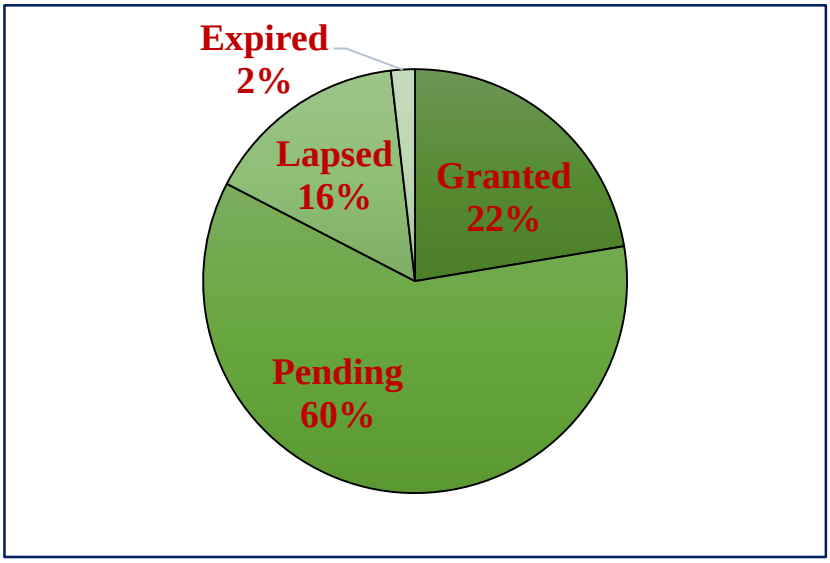
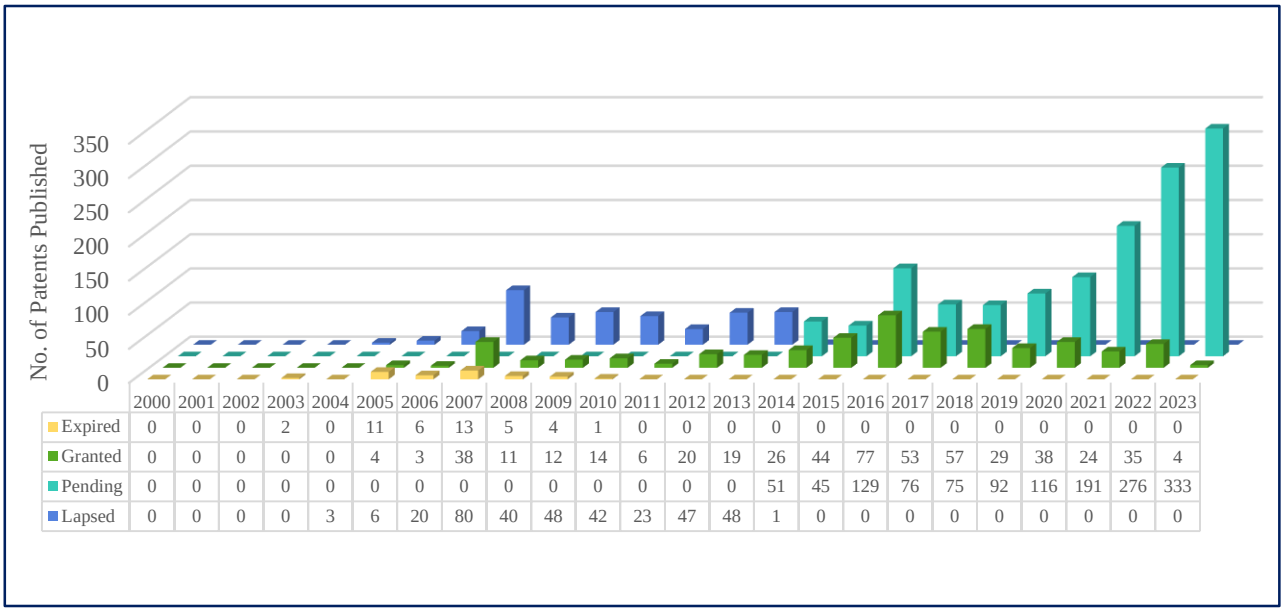


Fig. 10. Legal status of total QT patents filed by HEIs of India

Figure 10 depicts the status of patents related to QT published by HEIs from 2000 to 2023. Till 2023, 60% of patents published in quantum technologies are still in the pending category. Only 22% (514 patents) of the total patents published in quantum technologies have been granted and are still active. Out of the granted patents, 16% have lapsed, and 2% have expired. So, the majority of the patents in quantum technologies from HEIs are still pending, while a small percentage are available for public access.



	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
Expired	0	0	0	2	0	11	6	13	5	4	1	0	0	0	0	0	0	0	0	0	0	0	0	0
Granted	0	0	0	0	0	4	3	38	11	12	14	6	20	19	26	44	77	53	57	29	38	24	35	4
Pending	0	0	0	0	0	0	0	0	0	0	0	0	0	0	51	45	129	76	75	92	116	191	276	333
Lapsed	0	0	0	0	3	6	20	80	40	48	42	23	47	48	1	0	0	0	0	0	0	0	0	0

Fig. 11. Legal status of QT patents filed by the HEIs of India

Figure 11. Illustrates the annual patent activity in QT from the year 2000 to 2023. In the year 2007 maximum number of patents expired.

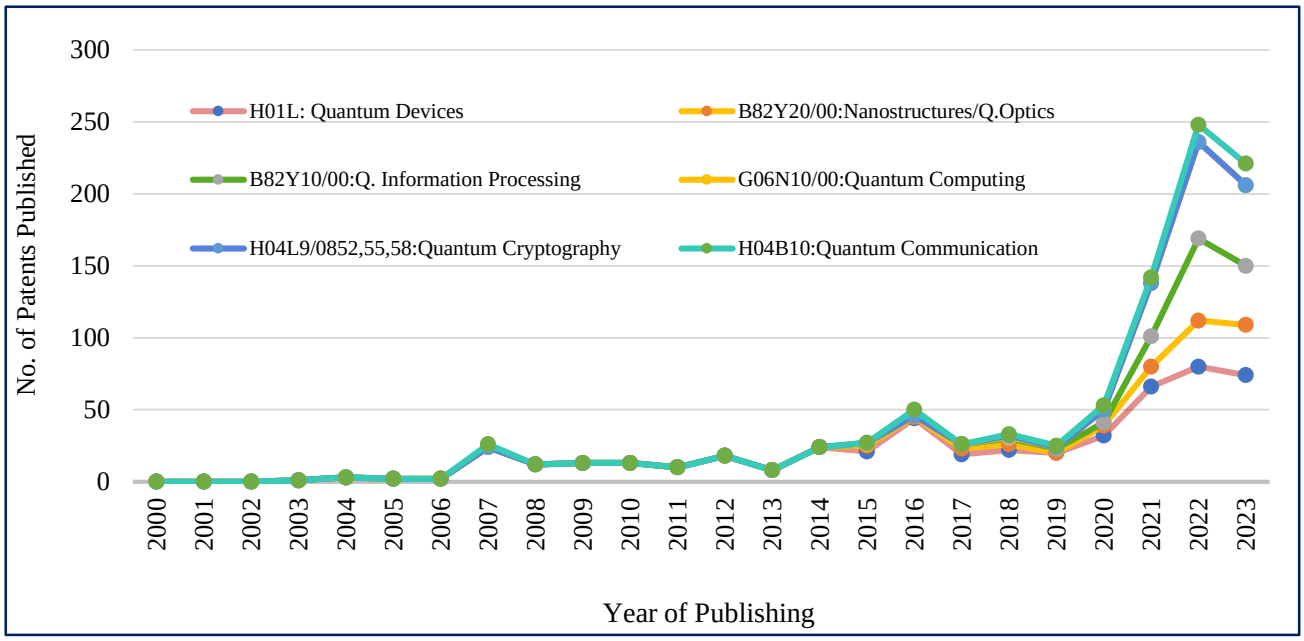


Fig. 12. Subject-wise classification of application of QT patents

The total number of patents published from the year 2000 to 2023 in various fields related to QT are shown in Figure 12.

This trend suggests that QT have been rapidly advancing since the year 2000. Areas related to Quantum Computing and QT saw substantial growth from 2000 to 2023.

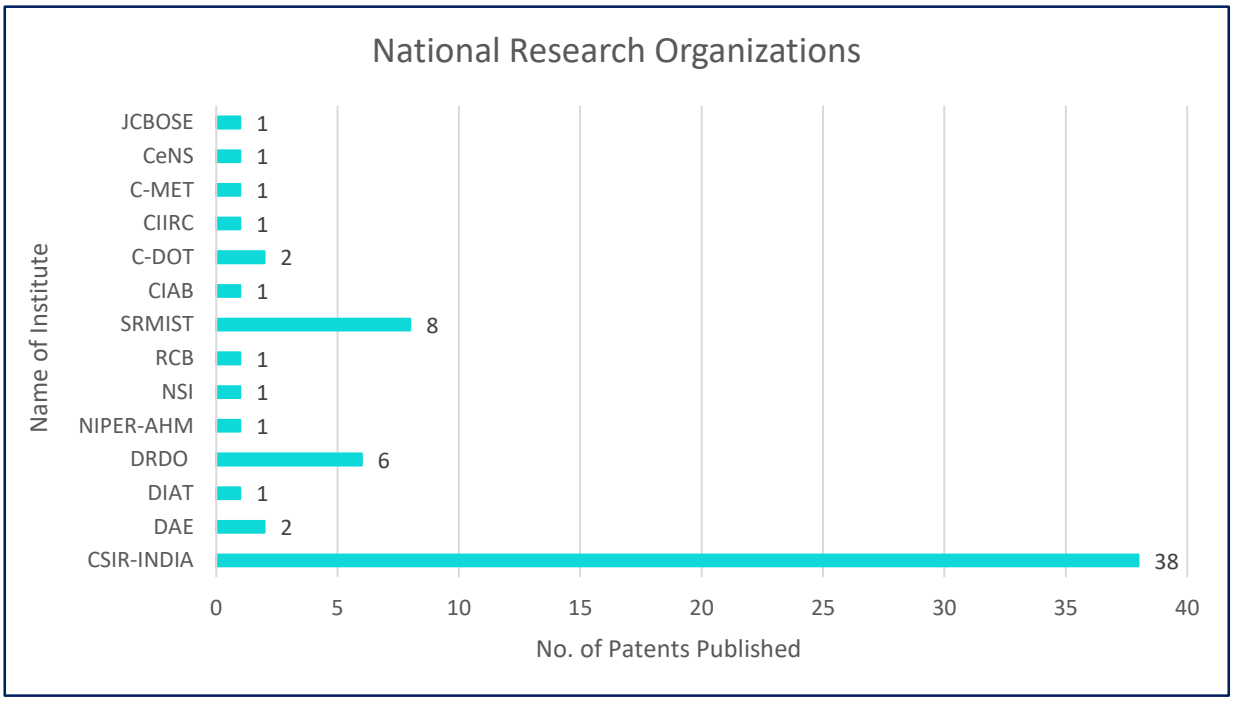


Fig. 13a. Patents published by National research Organizations in the area of QT

Upon analyzing data to study the patenting trend in National Research Organizations (Figure 13a), it was revealed that CSIR has outperformed among all the National Research Organizations as it has a significant patent portfolio. SRM Institute of Science and Technology (SRMIST) is at second place for its contribution to innovation in (QT) in India.

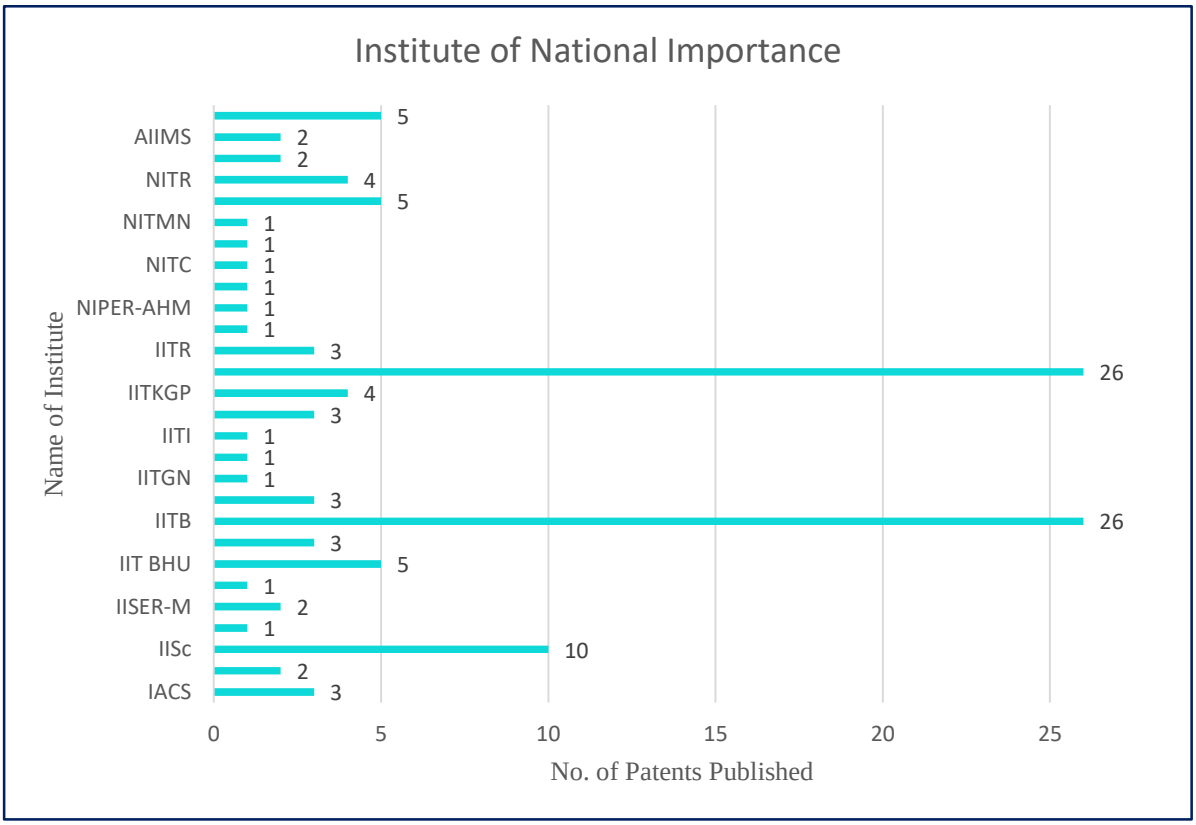


Fig. 13b. Patents published by Institutes of National Importance in the area of QT

Comparison of number of patents published in QT among various Institutes of National Importance revealed that IIT Bombay and IIT Madras are leading institutions in India doing impactful research and innovation in QT (Figure 13b).

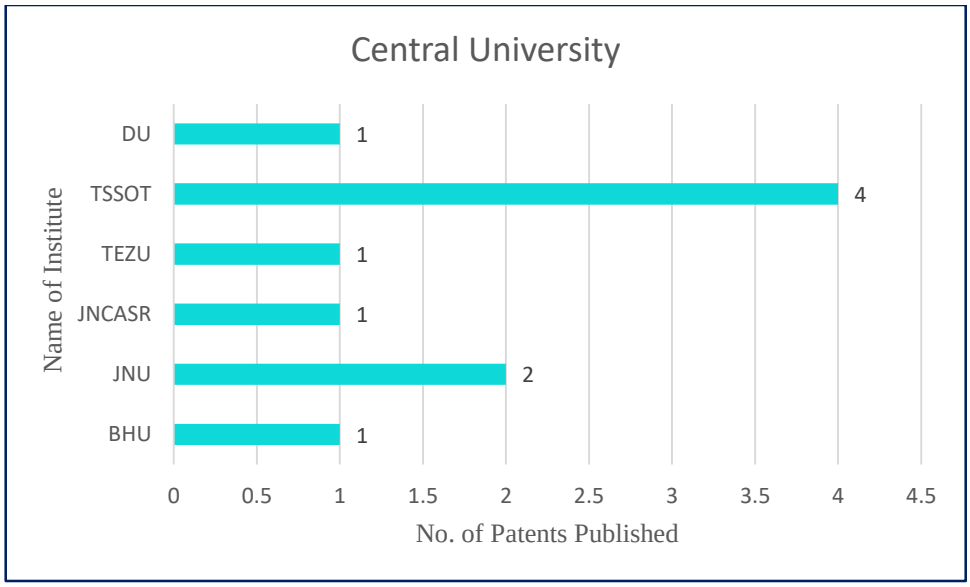


Fig. 13c. Patents published by Central Universities in the area of Quantum technology

Among the Central Universities, Triguna Sen School of Technology (TSSOT) which is a part of Assam University has the highest number of published patents in QT (Figure 13c) which indicates innovations from this institute has a great impact on QT innovation in India. Second place among central universities is occupied by JNU, New Delhi.

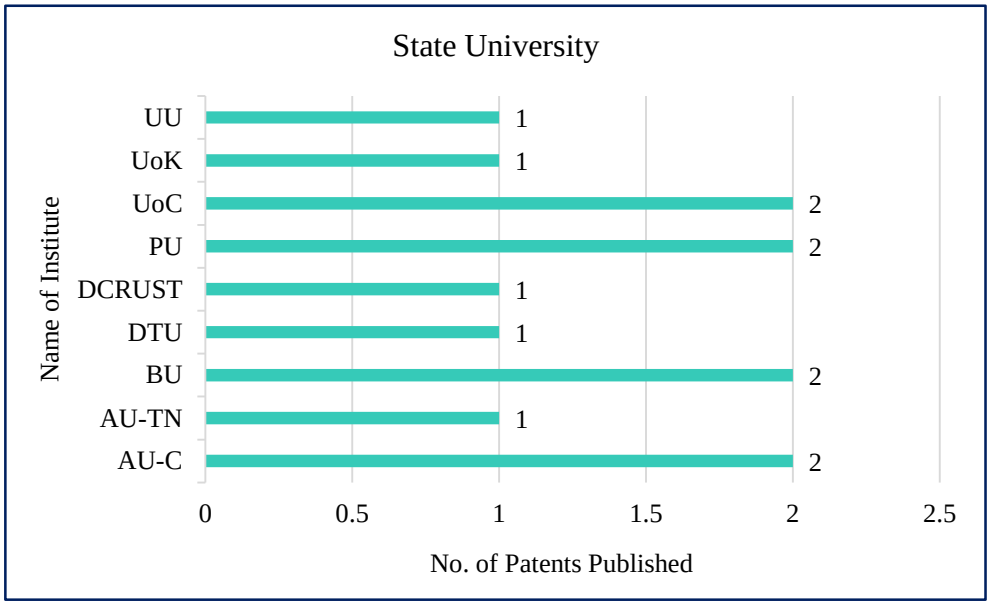


Fig. 13d. Patents published by State Universities in the area of QT

Among state universities highest number of patents published in QT include, University of Calcutta (UoC), Panjab University (PU), Bharathiar University (BU), and Anna University Chennai (AU-C) followed by Uttaranchal University (UU) and University of Kerala (UoK). Figure 13e depicts the number of patents published by various private universities. The University of Amity leads by publishing 15 patents. Karpagam University (KAHEDU) and SRM University each published 6 patents, showing significant contributions to the field of quantum technology. Reva University (REVA), Shoolini University (Shoolini), and P.P. Savani University (PPSU) each published 4 patents, indicating their active involvement in research activities.

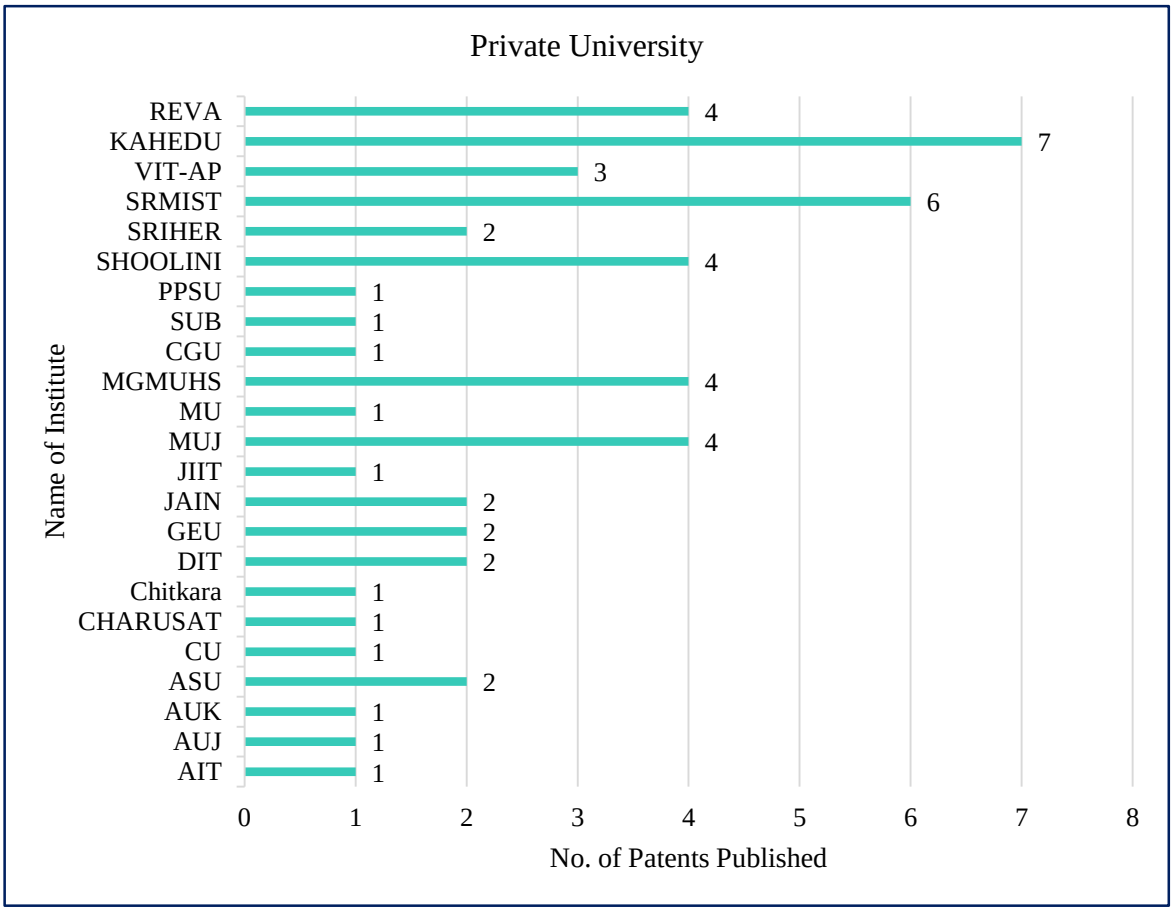


Fig. 13e. Patents published by Private Universities in the area of QT

This data highlights that University of Amity was the most productive private university based on quantum technology patent publication among private universities, while other private universities also showed a significant number of patents filed from 2000 to 2023 in the field of quantum technology. The findings from this study has provided valuable insights for proposing policy recommendations that will boost India's QT innovation ecosystem.

CAPACITY BUILDING

3.1 Certificate Course

To undertake capacity building and training in the areas of science, technology, and innovation policy ecosystem.

- Awareness and outreach programmes designed.
- Upcoming Certificate course in IPRs has been proposed and approved by the Board of Studies and is further submitted to the academic council for approval.

3.2 Workshop proposal submitted

- *Workshop on Intellectual property rights* under SERB- "Accelerate Vigyan" Karyashala.
- *Workshop on the landscape of bringing Intellectual Property to market* under "Global Initiative of Academic Networks" (GIAN).
- *Workshop on the Dynamics of Intellectual Property Rights in the Landscape of Technology Transfer* under "Global Initiative of Academic Networks" (GIAN).

3.3 Workshop symposium/conferences Organized

- *Workshop on Role of Intellectual Property rights in protecting innovation in textile and fashion industry* sponsored by Punjab State council for Science and technology
- *Commemoration of World Intellectual Property Day 2023* support from Industry partner Knowledgentia Consultants, New Delhi.
- *Symposium on IP Management* collaboration with the Department of Biotechnology at Punjab University, Chandigarh.
- *03 days training Workshop "Disaster Risk Management and Technological Innovations"* sponsored by Punjab State council for Science and technology
- *Conference organized entitled "Sustaining Progress: Global Perspectives on Public Private Partnerships (PPP) Investments"* collaboration with Institutes Innovation Council.
- *National Science Day Workshop on "New Horizons in Artificial Intelligence & Machine Learning"* sponsored by Punjab State council for Science and technology
- *Training Workshop on Patent search and Patent Mining* collaboration with Institutes Innovation Council.

Commemoration of World Intellectual Property Day 2023

An event to commemorate "World Intellectual Property Day 2023" with the theme in focus is "Women and IP: Accelerating Innovation and Creativity" in collaboration with the Department of Computer Science & Applications, PU, and DPIIT-IPR Chair, PU with support from Industry partner Knowledgentia Consultants, New Delhi is organized on 26th April, 2023. The event aimed to bring together eminent people in society including domain experts, members of academia and key stakeholders on a common platform for understanding the role, contribution and challenged women face in the field of IP. Around 150 participants took part in this program, including faculty members, researchers, and students from various institutions from Chandigarh and nearby.

Symposium on IP Management

A one-day symposium titled "Intellectual Property (IP) Management in Academic and Research Institutes" in collaboration with the Department of Biotechnology at Panjab University, Chandigarh is organized on October 19, 2023, The symposium's goal was to introduce the concept of intellectual property management—including creation, protection, and capitalization—to researchers, academics, and entrepreneurs working on fundamental and translational research projects in order to meet the needs of an increasingly global market. Around 150 participants took part in the symposium, including faculty members, researchers, and student.

Workshop on Disaster Risk Management and Technological Innovations

A 3-day training program on "Disaster Risk Management and Technological Innovations" from 22nd to 24th November 2023. The training program aimed to bring together domain experts, members of academia, scientists, researchers, and key stakeholders on a common platform for understanding the role of science in enhancing Disaster Resilience by exploring the penetration of Science, Technology and Innovation (STI) in Disaster Risk Reduction (DRR). Eminent Speakers from Prestigious Institutions such as the National Disaster Management Authority (NDMA), Punjab State Disaster Management Authority (PSDMA), PGIMER, CSIR-CSIO, PU, and IISER, Mohali gave insightful achievements in the domain of DRM to the participants. The workshop provided a great platform to learn various techniques and technologies successfully implanted for disaster resilience and mitigation. Institutions such as Punjab Red Cross Society, DRDO-DGRE, CSIR-CSIO, and IMD Chandigarh came on board to let the participants get insights into innovations taking place at the national level in Disaster Risk Management. This workshop catered to 50 participants from different colleges and universities taking part in the training program

Conference on "Sustaining Progress: Global Perspectives on Public Private Partnerships (PPP) Investments"

A Conference on "Sustaining Progress: Global Perspectives on Public-Private Partnerships (PPP) Investments" is organized on 29th November, 2023. The event consisted of deliberation talks by eminent speakers on Pubic Private Partnerships as well as a Panel discussion with the aim of "understanding the landscape of PPP in Indian R&D ecosystem and financing". The role of FDI in strengthening the Science, Technology and Innovation (STI) ecosystem of India was also taken up in another panel discussion emphasizing the Role of Mergers and acquisitions (M&A) for the inflow of FDI in India in the R&D ecosystem of public state universities. The event is witnessed the presence of several distinguished guests, including directors/heads of renowned institutes, representatives from Technology Transfer Offices at HEIs, representative from United Nations Industrial Development Organization (UNIDO) as well as students from various institutions.

National Science Day Workshop on "New Horizons in Artificial Intelligence & Machine Learning"

A one Day National Science Day Workshop on "New Horizons in Artificial Intelligence & Machine Learning" was organized on 1st March 2024 under the theme NSD-2024: "Indigenous technologies for Viksit Bharat", catalyzed and supported by Punjab State Council for Science & Technology (PSCST), National Council for Science & Technology Communication (NCSTC) and Department of Science & Technology (DST), Govt. of India. The event provided a great platform to learn various AI techniques and tools that are successfully implanted for socio-economic upliftment. The event witnessed the participant's engagement through Quiz and Poster presentation activities. This workshop catered to more than 100 participants from different colleges and universities by taking part in the National Science Day celebration and thereby gaining knowledge on the theme "New Horizons in Artificial Intelligence & Machine Learning"

Training Workshop on Patent search and Patent Mining

A one-day training workshop on “Patent Search and Patent Mining” on Tuesday, 12th March 2024 was organized. The event provided a great platform for hands-on training to learn about copyrights, trademarks and generating revenues. Overall, the event brought forward the idea of finding a novel solution to a localized problem and getting valued patents out of it. The event witnesses the active participation in the hands-on training provided by the experts. This workshop had more than 70 participants from different colleges and universities comprising researchers, faculties, and professionals.

OUTREACH ACTIVITIES

Events

- *Indo-German Science & Technology Centre (IGSTC)* outreach event
- *National IP Conference 2023*
- Webinar hosted by the Office of CGPDTM, "*WIPO IP Diagnostics – Indian Adaptation: Identify your IP and Unlock the potential to protect the Intangible Assets*"
- *Workshop-IP maxima* 2023
- *International Conference on Next-Generation Digital Technologies*
- *World Intellectual Property Forum-2024*
- *Conference: Industry-Academia 4.0*
- *Workshop for PPP Structuring Toolkit*
- Special talk on *Translational Research and Assessing the Technology Readiness Levels* (TRLs) of R&D
- Conference entitled *Fostering Innovations and trends: role of academia & industry (FIT-RAI-2024)*
- CSIR-IMMT: In TEC - *National e-Workshop on Innovation and IPR* (NeW IPR-2023)
- Global SCAPE: Justice, equity, diversity and inclusion in *SciComm Workshop*
- 23rd edition of the *World Sustainable Development Summit* (WSDS)
- *Intellectual Property (IP) and Development - IP and Innovation for Sustainable Agriculture*, WIPO
- 2023 Policy Dialogue*: IP in Virtual Worlds and NFTs by INTA*
- *Eighth Session of the WIPO Conversation Generative AI and IP*, WIPO
- *Science-Policy in Action for the Green and Digital Transition, Science Europe*
- *2023 Geneva Science and Diplomacy Anticipation Summit*
- *78th United Nations General Assembly* (UNGA78)
- 2023 HESI Global Forum
- International *'Technology Transfer Symposium'*, *National Research Development Corporation* (NRDC)
- *Europe's influential climate adaptation conference*, *ECCA*

Courses

- *IP Management & Technology Transfer*- Certification and Credit Course by NPTEL (January 22nd-March 23rd, 2024)
- DL-101 *General Course on Intellectual Property* (February 8th-March 24th, 2024
- Course on Public-Private Partnerships (*PPP Lab-UNICEF project*) (January 31st, 2024)
- Course on Science Communication*: Research Productivity and Data Analytics using Open Source Software* (January 22nd-April 12th, 2024)

Talks/Lecture Delivered

- Prof. Kashmir Singh delivered talk on "*Start-ups policies to promote Entrepreneurship*" at Central University of Punjab, Bathinda, August 18th, 2023
- Prof. Kashmir Singh, was invited as speaker at Chandigarh University, Punjab on November, 9th 2023. Prof. Kashmir delivered the *talk on Intellectual Property (IP) Management*
- Prof. Kashmir Singh, Coordinator, DST-CPR, PU was invited as panelist at *Indo-German Science & Technology Centre* (IGSTC) outreach event platform on 14th September, 2023 held at Chandigarh.
- Dr. Ravneet Kaur delivered *a talk in Conference, Science Research and Innovation protection*
- Dr. Ravneet Kaur invited as panelist for panel discussion in *INYAS Science Diplomacy Workshop*

OUTCOMES

5.1 Publications

Articles-Published

IP Ecosystem In Panjab University: A Case Study - *International Journal of Research And Analytical Reviews*
Chauhan, A., Tewari, R., Singh K.

An overview of India's National Educational Policy, 2020: key features and the way forward. - *International Journal of Creative Research Thoughts*
Chauhan, A. and Singh, K.

IPR in the Digital Age: A Scopus-based Review of Research Literature. - *Journal of Emerging Technologies and Innovative Research*
Chauhan, A. and Singh, K.

IPR and Artificial Intelligence: A Path to the Future. - *High Technology Letters Journal.*
Chauhan, A. and Singh, K.

An Overview of India's National IPR Policy and Comparative analysis with top 5 IIPRI Indexed Countries. - *High Technology Letters Journal.*
Chauhan, A. and Singh, K.

Innovators in India need to gear up for filing more patents - *Current Science*
Bhardwaj, M. and Arora, S.

Quantum Technology Transforming Healthcare in India - *Current Science*
Verma, D., Kaur, R., Naveen, Singh, K.

Articles-Under Review

Empowering Education through Private Sector Involvement: A Sustainable Development Perspective - *A Sustainable Development Perspective. Journal of Education for Sustainable Development-JESD*
Kaur, S., Nishika, Singh, K.

Private sectors' interventions in Disaster Risk Management
through Corporate Social Responsibility - *Journal of Integrated Disaster Risk Management*
Kaur, S. and Singh, K.

Policies in Progress: A Cross-Country Analysis of AI Regulation in Science, Technology, and Innovation (STI) - *Engaging Science, Technology, and Society*
Nishika, Kaur, S., Singh, K.

Industry – academia interlinkages & its effect on socio-economic development of the nation, a Systematic study - *Journal of Innovation and Knowledge*
Singh, S., Singh, M., Singh, K.

Conference Proceedings

Private Sector Interventions in Sustainable Education-Part II. - *International Conference of Sustainable Development (ICSD)-2023*
Kaur, S. and Singh, K.

Book Chapters

Reinvigorating Science, Technology, and Innovation in the country by factoring components of the innovation system- *Science, Technology and Innovation Ecosystem: A National and Global Perspectives*
Chauhan, A., Trikha, R., Singh, K.
A comprehensive study of the governance of India's scientific, technological, and innovative endeavors- *Science, Technology and Innovation Ecosystem: A National and Global Perspectives*
Kajal, M., Trikha, R., Singh, K.
Science, Technology and Innovation (STI) Policy Framework for Socio-economic Growth of the Nations- *Science, Technology and Innovation Ecosystem: A National and Global Perspectives*
Trikha, R. and Singh, K.
The developments and the current state of the art in IP Acts in India- *Science, Technology and Innovation Ecosystem: A National and Global Perspectives*
Chauhan, A., Bhardwaj, M., Singh, K.
Significance of strengthening STI ecosystems for achieving sustainable development goals- *Science, Technology and Innovation Ecosystem: A National and Global Perspectives*
Chongtham, N., Santosh, O., Bhardwaj, M.
Fostering inclusive development with citizen science and geospatial technologies- *Science, Technology and Innovation Ecosystem: A National and Global Perspectives*
Verma, R., Kaur, S., Singh, K.

5.2 Evidence-based key recommendations provided by the Centre:

A. "Technology Transfer Centres to Increase Commercialization of Innovations in India"

B. Strengthen the Private sector intervention in sustainable development

A. Technology Transfer Centres to increase commercialization of innovations in India

An evidence-based study to map the Technology Transfer activities was conducted. The Bureau of Energy Efficiency, Ministry of Power, and UNIDO jointly launched the Facility for Low Carbon Technology Deployment (FLCTD), a project, to facilitate the deployment and scaling of innovative low-carbon technologies in India. The project aims to promote innovation in clean and efficient energy technologies for industrial and commercial sectors and address technology gaps to reduce greenhouse gas (GHG) emissions. The study was based on the information collected through desk research and qualitative and quantitative data from field visits and meetings with 25 TTOs nationwide. The study identified critical gaps and challenges faced by the Technology Transfer Centres (TTC) / Technology Transfer Offices (TTO) in (a) public and private technical institutes/universities, and (b) private and public laboratories and research facilities to strengthen the industry-academia relations for more substantial technology transfer and commercialization engagements in the country. The report further provides a best practices framework from

five international ecosystems vis-à-vis the United States of America, Switzerland, Germany, Israel, and South Korea, and from studying the Indian ecosystem.

Recommendations:

- **Trainings:**
  - Foundational training program - technology transfer and commercialization concepts.
  - Awareness program - specific challenges associated with transferring and commercializing climate tech.
  - Specialized training and capacity building – TRL upgrade, technology assessment, technology valuation, negotiations, deal design and drafting, record keeping, and performance review.
- **Standardization**

- Development of standard definitions of technology transfer terminology in India.
- Preparation and dissemination of ready reference material for establishing a TTO.
- Templates/frameworks for documentation, record keeping, and monitoring.

- **Mentoring**
  - National and international TTOs.
- **Networking**
  - Development of a calendar of sectoral events for knowledge exchange between industry and academia.
  - Encourage P-2-P networking and knowledge exchange through a dedicated knowledge-sharing platform.
  - Encourage multi-disciplinary team building and collaboration.
  - Match-making with specific industry bodies, associations, and forums for effective interaction.

B. Strengthen the Private sector intervention in sustainable development

Engage in partnership, with the private sector to develop and execute education and training initiatives that are compatible with the requirements of the industry. This guarantees that young minds possess practical expertise and are more adequately ready for job opportunities, so making a positive contribution to long-term sustainable growth. Under PPPs, the establishment of industry advisory boards should be encouraged that are comprised of professionals who can provide insights into current industry needs and trends, guiding the development of relevant programs. Such an assertion in fostering collaborative research projects between academic institutions and industries should be mushroomed that address the industry-specific challenges and promote innovation for sustainable growth. Higher education institutions can improve their reputation, credibility, and quality by looking up at the global initiatives for ESD and working with other top-tier local and international higher education institutions, faculty, and student exchange programs. As well as they should also continue offering education programs or professional development courses in collaboration with industries to support lifelong learning and skill enhancement for working professionals

Recommendation:

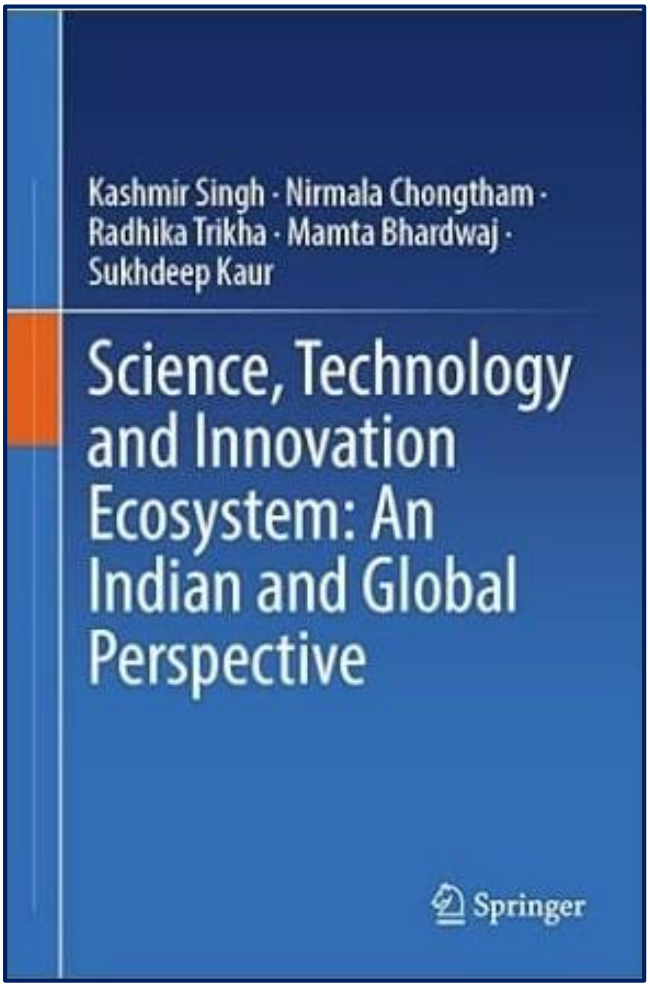
- Execution of education and training initiatives compatible with the requirements of the private sector in alignment with SDGs.
- Establishment of private sector-led advisory boards comprised of professionals to provide insights into current business needs and trends, and guidance for the development of relevant programs**.**

5.3 MoUs

- MoU between DST-Centre for Policy Research Panjab University, Chandigarh, and Doon University, Dehradun, Uttarakhand.
- MoU signed with Knowledgentia Consultants, New Delhi for IP and technology transfer and awareness and outreach

5.4 Upcoming book

A book titled “Science, Technology and Innovation Ecosystem: An Indian and global prospective” is focussing on the Science, Technology, and Innovation ecosystems of India in comparative analysis with other innovation-backed global countries. The book will span the entire STI ecosystem with a special focus on the system interconnectedness required for strengthening it. The building of interconnect within actors of the STI ecosystem is one of the paramount requirements to reinvigorate the entire STI ecosystem. The book will also be presenting the crucial role of STI in bringing socio-economic development with a national and international perspective. The book will come up with the policy directives and program interventions backed by evidence to revamp the STI system addressing the societal and economic needs of the country. The book will be a one-stop point for policymakers, industrialists, academicians, and social organizations to develop their strategies for strengthening the STI system and empowering the STI actors by promoting system interconnectedness. The book will chart out the pathway for creating a knowledge-based economy with a focus on knowledge production to knowledge consumption by means of knowledge diffusion.



NEWS CORNER

प्रदेश में कौशल विकास और प्रशिक्षण गतिविधियों को मिलेगा बढ़ावा - Avikal Uttarakhand

प्रदेश में कौशल विकास और प्रशिक्षण गतिविधियों को मिलेगा बढ़ावा - दून, पंजाब विवि और आईएसटीडी के बीच एमओयू अविकल...

avikaluttarakhand.com

दून, पंजाब विवि और आईएसटीडी के बीच एमओयू

https://avikaluttarakhand.com/uttarakhand/skill-development-and-training-activities-will-get-a-boost-in-the-state/

देहरादून,बुधवार 14 फरवरी 2024
www.amarhindustan.co.in
7

दून विवि ने पंजाब विवि के साथ हस्ताक्षर किए

अमर हिन्दुस्तान

यह समझौता ज्ञापन राज्य भर में कौशल विकास और प्रशिक्षण गतिविधियों को बढ़ावा देने में नए द्वार खोलेगा

देहरादून। दून विश्वविद्यालय ने पंजाब विश्वविद्यालय, चंडीगढ़ और आईएसटीडी, नई दिल्ली के साथ समझौता ज्ञापन पर हस्ताक्षर किए। कुलपति प्रो. सुरेखा डंगवाल की उपस्थिति में आज दून विश्वविद्यालय में दो महत्वपूर्ण एमओयू पर हस्ताक्षर किये गये।पहले एमओयू पर रजिस्ट्रार डॉ. एम.एस.मंडरवाल ने सुश्री अनीता चौहान, राष्ट्रीय अध्यक्ष इंडियन सोसाइटी फॉर ट्रेनिंग एंड डेवलपमेंट आईएसटीडी, नई दिल्ली के साथ और दूसरे पर रजिस्ट्रार, पंजाब यूनिवर्सिटी, चंडीगढ़ के साथ हस्ताक्षर किए। आईएसटीडी देश की एक प्रमुख प्रशिक्षण संस्था है, जिसकी स्थापना अप्रैल 1970 में पूरे देश में प्रशिक्षण और विकास को बढ़ावा देने के लिए एक राष्ट्रीय स्तर की गैर-लाभकारी सोसायटी के रूप में की गई थी। आज ISTD के देश में 54 से अधिक चैप्टर और 12,000 से अधिक पेशेवर सदस्य हैं। पंजाब विश्वविद्यालय पीयू की शुरुआत 1882 में लाहौर में हुई थी,

जिसमें विज्ञान और प्रौद्योगिकी, मानविकी, सामाजिक विज्ञान, प्रदर्शन कला और खेल में शिक्षण और अनुसंधान में उत्कृष्टता हासिल करने की एक लंबी परंपरा है। यह समझौता ज्ञापन राज्य भर में कौशल विकास और प्रशिक्षण गतिविधियों को बढ़ावा देने में नए द्वार खोलेगा। डंगवाल ने आशा व्यक्त की कि कौशल विकास में अपेक्षित प्रमाणीकरण नौकरी बाजार में एक नितांत आवश्यकता है और आईएसटीडी एनईपी 2020 के अनुरूप इसे पूरा कर सकेगा।दूसरा समझौता ज्ञापन डीएसटी-सीपीआर, पंजाब विश्वविद्यालय के साथ था जिसका मुख्य उद्देश्य सहयोग बढ़ाना था। प्रोफेसर कश्मीर सिंह ने उपरोक्त समारोह में पंजाब विश्वविद्यालय का प्रतिनिधित्व किया, डॉ. ए.सी. जोशी, सेयर प्रोफेसर, सीपीपी, दून विश्वविद्यालय ने कार्यक्रम का समन्वय किया। प्रो. आर.पी. ममगाईं, प्रो. एच.सी. पुरोहित, राजेंद्र सिंह, ईडी, यूजेवीएन, अनूप कुमार, जीएम, ब्रिडकुल, कर्नल डी.पी. डिमरी, निधि जोशी, अजय बिष्ट कार्यक्रम के दौरान उपस्थित थे।

हिमालयी राज्यों में अध्ययन करेंगे दून और पंजाब विवि

राज्य में कौशल विकास और प्रशिक्षण गतिविधियों को मिलेगा बढ़ावा

संवाद न्यूज एजेंसी

देहरादून। दून विश्वविद्यालय के साथ मिलकर पंजाब विश्वविद्यालय और आईएसटीडी नई दिल्ली हिमालयी राज्यों में अध्ययन करेंगे।

इसके लिए दून विवि ने पंजाब विवि और आईएसटीडी के साथ समझौता ज्ञापन पर हस्ताक्षर किए। पहले एमओयू पर दून विवि के रजिस्ट्रार डॉ. एमएस मंडरवाल ने आईएसटीडी की राष्ट्रीय अध्यक्ष अनीता चौहान के साथ और दूसरे पर पंजाब विवि के रजिस्ट्रार के साथ हस्ताक्षर किए।

आईएसटीडी देश की एक प्रमुख प्रशिक्षण संस्था है, जिसकी स्थापना अप्रैल 1970 में देश में प्रशिक्षण और विकास को बढ़ावा देने के लिए राष्ट्रीय स्तर की गैर-लाभकारी सोसायटी के रूप में की गई थी। दून विवि की कुलपति प्रो. सुरेखा डंगवाल ने कहा, यह समझौता ज्ञापन राज्यभर में कौशल विकास और प्रशिक्षण गतिविधियों को बढ़ावा देने में नए द्वार खोलेगा। दूसरा समझौता ज्ञापन डीएसटी-सीपीआर पंजाब विश्वविद्यालय के साथ था, जिसका मुख्य उद्देश्य सहयोग बढ़ाना था। नीति निर्माण के क्षेत्र में और हिमालयी राज्यों में अध्ययन और परियोजनाओं को चलाने के लिए पंजाब विवि ऐसी गतिविधियों का केंद्र होगा, इससे हिमालयी अध्ययन में अनुसंधान में लंबे समय से महसूस की जा रही कमी को पूरा किया जा सकेगा।

दून यूनिवर्सिटी में कुलपति प्रो. सुरेखा डंगवाल ने दून विवि और पंजाब विश्वविद्यालय और आईएसटीडी, नई दिल्ली के साथ समझौता ज्ञापन पर हस्ताक्षर किया। संवाद

दून विश्वविद्यालय ने पंजाब विवि के साथ आईएसटीडी के साथ भी किया एमओयू

MoU sign between Doon University, Uttarakhand Panjab University, Chandigarh

A report on the study entitled "Technology Transfer Centres to Increase Commercialization of Innovations in India" being carried out by the DST – Centre for Policy Research, Panjab University under the Facility for Low Carbon Technology Deployment (FLCTD) project which is supported by United Nations Industrial Development Organization, New Delhi was presented to Professor Renu Vig, Vice Chancellor, Panjab University (PU).

Prof. Kashmir Singh, Coordinator, DST – Centre for Policy Research, Panjab University apprised the Vice Chancellor, PU about the need, key observations, major findings, and recommendations.

The study aims to strengthen India's innovation ecosystem by enhancing the technology transfer function in various higher education institutes and research laboratories

Release of UNIDO Report entitled "Technology Transfer Centres to Increase Commercialization of Innovations in India"

https://dst.gov.in/study-technology-transfer-centres-aiming-increase-commercialization-innovations-released

https://www.drdo.gov.in/drdo/sites/default/files/drdo-news-documents/NPC13Mar2024.pdf

https://www.facebook.com/100064584579617/posts/pfbid0PXDWseFNLFksvSQBL9snH7LAhntRzcNHwXYcq6XSheBMxcwcTwTLLfpyQeRa5NCTl/?app=fbl

7. Way forward

DST-CPR, PU

- Wishes to transform into a sustainable institutional and training centre for research in S&T and IP, skill building, and training in the Northern part of India.

- Aspire to be actively linked with the national policy-making team and work ‘under hub and scope model’ for DST- PCPM Division, GoI, New Delhi.

- Aspires to become a nodal point for science policy research for the northern region catering to Jammu and Kashmir, Ladakh, Haryana, Punjab, Chandigarh, Himachal Pradesh, and Uttarakhand.

- Future studies to be undertaken in the centre will help to add literature to existing policy-related research areas. In addition to this, the studies undertaken will help to address the policy-related gaps and provide suggestions and recommendations to policymakers.

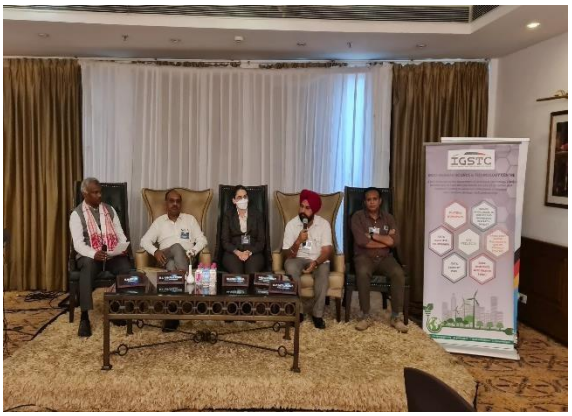
GLIMPSE OF MOMENTS

Consultative Meeting under UNIDO-FLCTD project

Commemoration of World Intellectual Property Day

Training workshop on Patent Search and Patent mining

Invited talks on Science Research and Innovation Protection



Indo German Technology Centre (IGSTC) outreach event
Symposium on IP Management

Symposium on IP Management

3 days training Workshop Disaster Risk Management and Technological

Conference on Sustaining Progress: Global Perspectives on Public Private Partnerships (PPP) Investments

Workshop on “New Horizons in Artificial Intelligence & Machine Learning” under under the theme NSD-2024: “Indigenous technologies for Viksit Bharat”

Prof. Kashmir Singh invited as speaker at Chitkara University

International Conference on Industry 4.0

World Intellectual Property Forum 2024 (WIPF-2024)

International Conference on Industry Focused Research (ICIFR)-TEC-2022

ADVISORY COMMITTEE

S. No.	Name	Designation
1.	Prof. Renu Vig	Vice Chancellor Panjab University, Chandigarh
2.	Dr. Akhilesh Gupta	Senior Adviser/Scientist-H Head, Policy Coordination & Programme Management (PCPM) Division Secretary, Science & Engineering Research Board Department of Science & Technology Government of India, New Delhi
3.	Sh. Rahul Tewari	Secretary, Department of Science, Technology & Environment, Punjab
4.	Dr. Jatinder Kaur Arora	Executive Director Punjab State Council for Science & Technology, Chandigarh
5.	Sh. Lalit Jain	Director (Environment, Sci. & Tech.) Government of Himachal Pradesh
6.	Dr. Ashok Khemka	Principal Secretary Science and Technology Department, Govt of Haryana
7.	Dr. Chander Shekhar Khare	Director Department of Science & Technology, Govt of Haryana
8.	Prof Durgesh Pant	Director General Uttarakhand State Council for Science and Technology
9.	Sh. Umang Narula	Advisor to LG Administration of Union Territory of Ladakh
10.	Sh. Nasir Ahmad Shah	Additional Director, J&K Science, Technology & Innov ation Council Department of Science & Technology, Jammu & Kashmir
11.	Shri Debendra Dalai	Secretary & Director Science & Technology, Administration of Union Territory of Chandigarh
12.	Dr. Hiro Bhojwani	Former Head Research Planning & Business Development, CSIR, New Delhi
13.	Dr. Ranjana Aggarwal	Director, CSIR-National Institute of Science Communication and Policy Research, New Delhi
14.	Dr. Yashawant Dev Panwar	Head & Scientist- E Patent Facilitating Centre, Technology Information, Forecasting and Assessment Council, New Delhi

15.	Dr. K. S. Kardam,	Fmr. Senior Joint Controller of Patents & Designs. PATENT OFFICE DELHI and Boudhik Sampada Bhawan, Dwarka-14, New Delhi-110075.
16.	Prof. Anuradda Ganesh	Director, Research & Innovation at Cummins Technologies (I) Ltd, Mumbai
17.	Mr Jibak Dasgupta	Head, Innovation, Entrepreneurship and IPR activities, CII, New Delhi
18.	Prof. Rakesh Basant	Professor of Economics, IIM, Ahmedabad
19.	Shri Avinash Kumar	Adjunct Professor, Sharda University, Greater Noida Fmr. Addl Director (IPR), DRDO (HQ) Ministry of Defence, Govt. of India
20.	Prof. Rupinder Tewari	Former & First Coordinator, DST-Centre for Policy Research Mentor, Technology Enabling Centre, Panjab University, Chandigarh
21.	Prof. Kashmir Singh	Coordinator DST-Centre for Policy Research Panjab University, Chandigarh

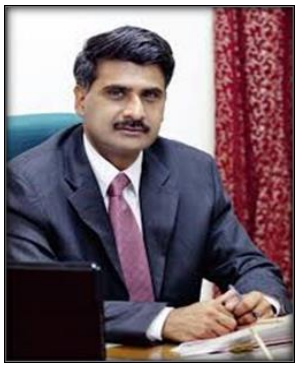
STAFF DETAILS

Prof. Kashmir Singh
Coordinator and Principal Investigator

Prof. Kashmir Singh is leading the DST-CPR, PU with his tremendous research experience with active participation in administrative activities as well. He has authored more than 100 national and international Publications and editor of reputed international journals. Three patents are credit to him and 01 successful technology transfer to the industry. He has been running and completed over 14 research projects. He has supervised over 25 Ph.D. students. Prof. Singh has made his mark in the scientific communities with his contributions and received wide recognition from various agencies around the world. Prof. Kashmir Singh's major research interest involves Plant Genetic Engineering and Biotechnology, Intellectual Properties (IP) and Technology Transfer and Public Private Partnerships. He is contributing immensely in strengthening the Science, Technology and Innovation (STI) ecosystem.

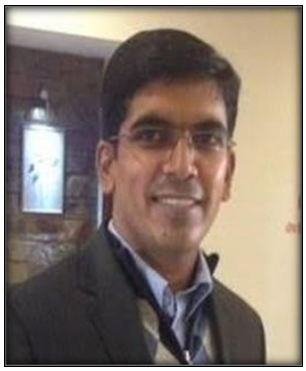
Prof. Manu Sharma
Co-Investigator

Prof. Manu Sharma is Co-Investigator, DST-Centre for Policy Research. He is professor of Mechanical Engineering at University Institute of Engineer and Technology (UIET) at PU, Chandigarh. He is also honorary Director at Centre for Industry Institute Partnership Programme (CIIPP) and Coordinator, Technology Enabling Centre (TEC). He has expertise in Public Private Partnerships and Industry-Academia Linkages. He has several research papers in international and national Journals to his credit. He is involved in several sponsored research projects sponsored by UGC, DST, AICTE, etc. He has experience of mentoring various Start-up company such as “Finamics Engineering”. He was instrumental in establishing “Entrepreneurship Development Cell (EDC)” in UIET, PU, Chandigarh.



Prof. Sanjeev K Sharma
Co-Investigator

Prof. Sanjeev K Sharma is Co-Investigator of DST-Centre for Policy Research. He is professor at University Institute of Applied Management Sciences (UIAMS) at PU, Chandigarh. He is also the director of Internal Quality Assurance Cell (IQAC), Coordinator, Interdisciplinary Centre for Swami Vivekananda Studies. Prof. Sharma has expertise in Intellectual Property Rights (IPR), IP & Business Management and Technology Transfer Ecosystem. He is associated with various capacity building initiatives in science, technology, IP, innovations and assists the CPR to generate revenue- based models by undertaking academic programmes in the field of Science Technology & Innovations (STI) and IP.



Dr. Deepak B. Salunke
Co-Investigator

Dr. Deepak B. Salunke is Co-Investigator, DST-Centre for Policy Research. He is Asst. Professor, Department of Chemistry at PU, Chandigarh and also Coordinator, National Interdisciplinary Centre of Vaccines, Immunotherapeutics and Antimicrobials. Prior to join PU, Dr. Salunke has worked with reputed industries and developed energetic collaborations as well as gained experience in handling intellectual property. He has immensely contributed to strengthen the Industry-Academia linkages. He is a PhD from CSIR-NCL Pune and has over 15 years of teaching and research experience with 80 publications in the international journals of high repute and 4 patents to his credit. Dr. Salunke is recipient of Indo-French Sandwich Thesis Scholarship, Assistant Research Professorship and postdoctoral Fellowship at the University of Kansas, USA, Postdoctoral fellowship of National Science Council of Taiwan, Ramalingaswami Fellowship of DBT India and Newton-Bhabha Fellowship.

Prof. Jagdeep Kaur
For Support and Guidance

Prof. Jagdeep Kaur provides support and guidance to DST-Centre for Policy Research, with her expertise in research and other domains related to STI. She is a Professor in Department of Biotechnology, PU, Chandigarh. She actively provides consultancy in various domains and events organized by DST-CPR . She is member of various national and international committees for evaluation as well as funding committee and reviewer of scientific research. She has been awarded Post doc fellowship internationally from University of Pennsylvania and Thomas Jefferson University, Philadelphia, PA, USA and nationally from CSIR- IMTECH, Chandigarh. She has numerous publications to her credit. She has got 3 patents and one technology transfer to her credit.

Prof. Jyoti Rattan,
For Support and Guidance

Prof. Jyoti Rattan provides support and guidance to DST-Centre for Policy Research, PU, Chandigarh. She is a Professor in the Department of Laws, PU, Chandigarh. She has expertise in administrative sciences. She has authored and co-authored several national and international publications and also working as a reviewer for reputed professional journals. She has an active association with different societies and academies around the world. She has made her mark in the scientific community with the contributions and widely recognition from honourable subject experts around the world. Her major research interest involves International Law, Human Rights of Women: International Instruments and their Assimilation in Indian Legal System.

Prof. Luxmi Malodia
For Support and Guidance

Prof. Luxmki Malodia provides support and guidance to DST-Centre for Policy Research, PU, Chandigarh. She is a Professor in Human Resource Management at the University Business School, Panjab University, Chandigarh. She is Ph.D in Human Resources, LL.B and LL.M. She has 20 years of experience in teaching and research in UBS, PU, Chandigarh. She has to her credit three books, 61 research papers published in reputed international and national journals, 10 research papers in edited books, seven research papers as conference proceedings and 48 papers presented in various national and international seminars/conferences. Nine students have completed their Ph.D successfully under her guidance and currently 7 students are pursuing Ph.D under her supervision. She has been awarded doctoral fellowship from Indian Council of Social Science Research (ICSSR), New Delhi in 2002.

Dr. Ravneet Kaur
Project Scientist –III

Dr. Ravneet Kaur is currently serving as a Project Scientist III at DST-Centre for Policy Research (DST-CPR), Panjab University, Chandigarh. In this role, she participates in providing evidence-based insights and recommendations on science and technology (STI) policies. Additionally, she is also responsible for capacity building initiatives aimed at enhancing the understanding the role of STI in the academic and industrial sectors. Dr. Kaur's career spans diverse roles in research, industry, and teaching across prominent institutions globally. She has secured several prestigious grants and fellowships, including Marie Curie Post-Doctoral Fellowship, NSERC Visiting Scientist Fellowship, Canada, SERB Young Scientist Fellowship, DST Women Scientist Fellowship, and other fellowships.

Dr. Sandeep Singh
Project Scientist –III

Dr. Sandeep Singh working as Project Scientist-III at the DST Centre for Policy Research, Panjab University Chandigarh. He has done PhD from IIT Roorkee, Postdoctoral from IISER Mohali. He has worked with Dr. SSBUICET, PU as Research Scientist under DST-PURSE Grant, Senior Demonstrator in CSIC Department of PGIMER Chandigarh and Assistant Professor in Chemical Science Department of SGGSWU, Fatehgarh Sahib, Punjab & SGGSC, Sector -26 Chandigarh. He has publications in reputed International Journals. Presently he is working in the domain of Industry-Academia interlinkages for HEIs.

Dr. Sukhdeep Kaur
Project Scientist –II

Dr. Sukhdeep is working in the domains of Science, Technology, and Innovation (STI) policy research, Strengthen Industry-Academia Interlinkages, Public Private Partnerships (PPPs), Technology Transfer, and Disaster Risk Management (DRM). She is a Ph.D. in snow physics. Her expertise is an interdisciplinary mixture of fields such as Physics (Subfields: Solid state /Applied/ Electronics/ Experimental/ Engineering/ Computational Physics), Statistics, Cryosphere, Computer languages, Geophysical Instrumentation, and Data analysis. She has contributed to some important national and international projects in the domain of Technology Transfer, Gender Equality for DRM, Research Designs, and Scientific Conduct Research that centered on Intellectual Honesty, Integrity, Open Science, and Scientific Misconduct in various capacities.

Dr. Neha Taneja
Project Scientist –II

Dr. Neha Taneja is Project Scientist-II at DST-Centre for Policy Research (CPR), Panjab University, Chandigarh. Dr. Taneja obtained her doctorate degree from IIT Roorkee. Her field of expertise is chemistry and research interest includes organocatalysis, asymmetric synthesis, synthesis of natural products and analytical chemistry. Her association with renowned institutions like IIT Delhi and Seoul National University, Seoul, South Korea gave her a versatile R&D experience. Currently, she has been looking into the mandate of STI financing in India both from national and international bodies.

Dr. Deepika Verma
Project Scientist –I

Dr. Deepika Verma is Project Scientist-I at DST-Centre for Policy Research (CPR), Panjab University, Chandigarh. Dr. Verma did her PhD from the Department of Biotechnology, Panjab University. She has authored several national and international research articles published in esteemed and peer-reviewed journals. Prior to the present commitment she worked as guest faculty at the Department of Biotechnology, Panjab University, providing her expertise in Recombinant DNA Technology, Plant Biotechnology, IPR, and Biosafety to graduate students. Currently, she is contributing towards studying the current patent ecosystem in the Higher Educational Institutes and identifying the barriers in technology commercialization and further based on evidence, preparing policy documents for enhancing Triple Helix Collaborations for innovation

Mr. Manraj Singh
Project Associate-I

Manraj Singh is a Project Associate at DST-CPR, PU. He is a Master of Chemistry and GATE qualifier. Currently, contributing to fostering industry-academia interlinkages to develop innovative policy solutions aimed at bridging the gap between academic research and practical applications in industry. Additionally, his work also includes understanding policy framework in the area of SDG9. Contribute towards Mapping of Industry-Academia needs for STI through a Questionnaire-based feedback study from various Industries and Higher Education Institutes (HEIs) in India.

Miss Nishika
Project Associate-I

Nishika is a Project Associate at DST-Centre for Policy Research (CPR), Panjab University, Chandigarh. She did her Masters in Microbiology from Shoolini University, Solan. During her academic journey, she also gained stimulating internship experience in design patent filing, patent search, and first examination report filing (FER) in the field of IPR. Nishika influences her scientific background to contribute to the dynamic field of policy research and plays a crucial role in conducting research and analyzing data in the field of Public-Private Partnerships (PPPs), contributing significantly to the development of innovative policy solutions and the development of a new country-specific model for the promotion of PPP for R&D.

Mr. Naveen
Project Associate-I

Naveen is a Project Associate at DST-Centre for Policy Research (CPR), Panjab University, Chandigarh. Naveen did his Masters in Biophysics from Panjab University, Chandigarh. He has worked as a Junior Demonstrator at, CSIC Department, PGIMER Chandigarh. He is working in the domain of IPR, Assessment and identification of patenting trends in HEIs, and Mapping IP filing, technology transfer and commercialization aspects of HEIs

Ms. Ruchika

Secretarial Staff/ Data Entry Operator

Ms. Ruchika handles a wide range of administrative tasks, including managing internal and external communications, and maintaining office records. She ensures office operations run smoothly, providing essential support to DST-CPR, PU.

Mr. Ravinder Kumar

Helper

Mr. Kumar plays a crucial role in supporting daily operations and ensuring the smooth functioning of office. Perform basic office tasks, delivering messages, assist with running errands as well as ensure cleanliness and hygiene of the centre.

TESTIMONIALS

Dr. Harsh Nayyar

Director, Research and development cell, Panjab University

DST-Centre for Policy Research at Panjab University is working on promoting awareness about the importance of science, technology and innovation by conducting national level workshops, seminars, and brain-storming conferences. These events train not only young researchers, but also, faculty members, industry professionals, and policy makers among others. The Centre has also initiated efforts in the direction of introducing certificate courses, such as fundamentals of intellectual property and intellectual property rights, and public-private partnership, to train a wider audience about the art of generating intellectual property and its protection and management. The Centre is proactive in strengthening the start-up ecosystem of the University by providing evidence based mapping of industry-academia practices existing nationally and internationally. I congratulate the DST-Centre for Policy Research for working in this area.

Dr. Jatinder K Arora

Fmr. Executive Director, Panjab state council for Science & Technology

Intellectual property (IP) plays a crucial role in fostering socio-economic development. India has been making significant strides in the generation of intellectual property (IP). Despite that creating an enabling ecosystem for collaboration between industry and academia is essential for maximizing the potential of intellectual property creation and commercialization. I appreciate the DST Centre for Policy Research of Panjab University for their diligent work in this regard. I encourage DST- CPR, and PU to also strengthen the researchers in the nation by providing up with strategies to inspire young people to get into science and research. I wish the vibrant DST-CPR team at Panjab University great success in the future.

Dr. Sujit Bhattacharya

Chief Scientist and Advisor/Dean Policy Research, CSIR-NIScPR

"India's Science, Technology, and Innovation Policy (STIP) plays a crucial role in shaping the country's development trajectory by fostering innovation, research, and technological advancement across various sectors. STIP aims to create an ecosystem conducive to scientific and technological progress, enhance competitiveness, and address societal challenges. To promote innovation and economic progress, there has been an increasing focus in recent years on developing partnerships between the public and private sectors as well as between industries and academia. I congratulate the DST- Centre for Policy Research for working on these mandates and being a crucial part of the STIP 2020 formulations. I hope the Centre comes up with more evidence-based studies and recommendations to enhance the country’s societal and economic growth"

Follow Us

LinkedIn

Facebook

Twitter

DST-Centre for Policy Research (CPR)

Guru Teg Bahadur Bhawan, Panjab University, Sector 14, Chandigarh, 160014

Official Website: cpr.puchd.ac.in

Phone no.0172-2534124

dstprc2014@pu.ac.in