India-Republic of Korea Industrial R&D Programme

सत्यमेव जयते
Department of Science & Technology
Government of India

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History and Background

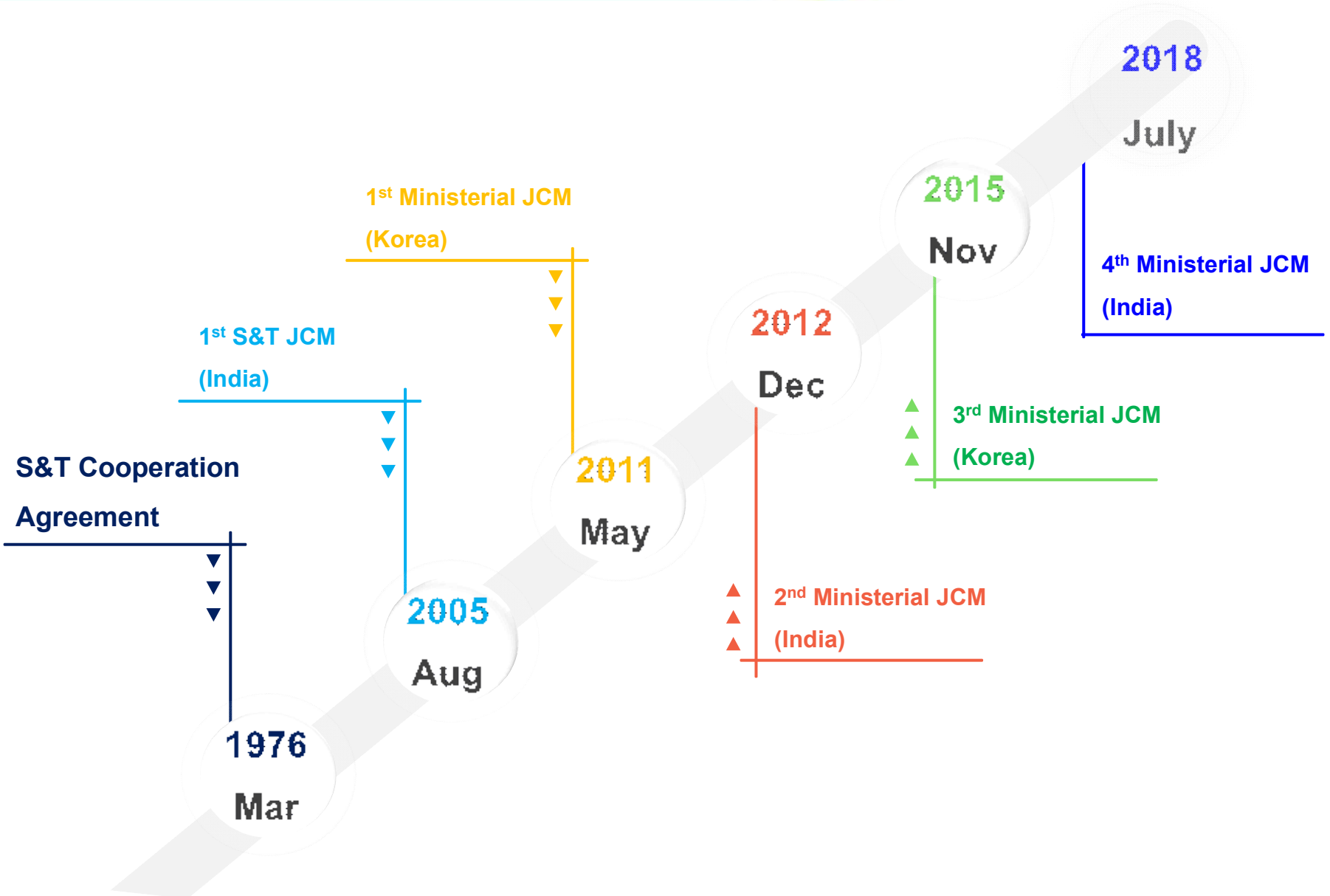
S&T Agreement was concluded in 1976
Further it was renewed in 1993 and 2006.

So far Six Joint Committee meetings held
Last meeting held in Seoul in November 2015

To review overall bilateral S&T cooperation, the two Science Ministers meet alternatively in India and Korea

Last meeting of S&T Ministers held in New Delhi on 9th July 2018

History and Background



S&T Cooperation Programs

Basic Research:

- [illegible]
- Robotics & Engineering Sciences
- Nutrition & Food Safety

  Renewable Energy
- Chemical & Biochemical Technologies
- Health & Medical science

  Material Science & Technology
- Water Resources & Environment
- Information & Communication Technologies

Joint Network Centre:

- Robotics
- [illegible]
- Cyber Physical System

S&T Cooperation Programs

Industrial R&D:

- Digital Transformation
- Future Manufacturing
- [illegible]
- Health Care

Joint Workshops

Industrial Partnership Development Activities

Industrial R&D Programme

Attract joint Indo - Korean **industry ' s investment** in technology development with techno-economic perspective through collaboration

Promote eco - system of **innovation** and **techno - entrepreneurship** by adopting best global practices

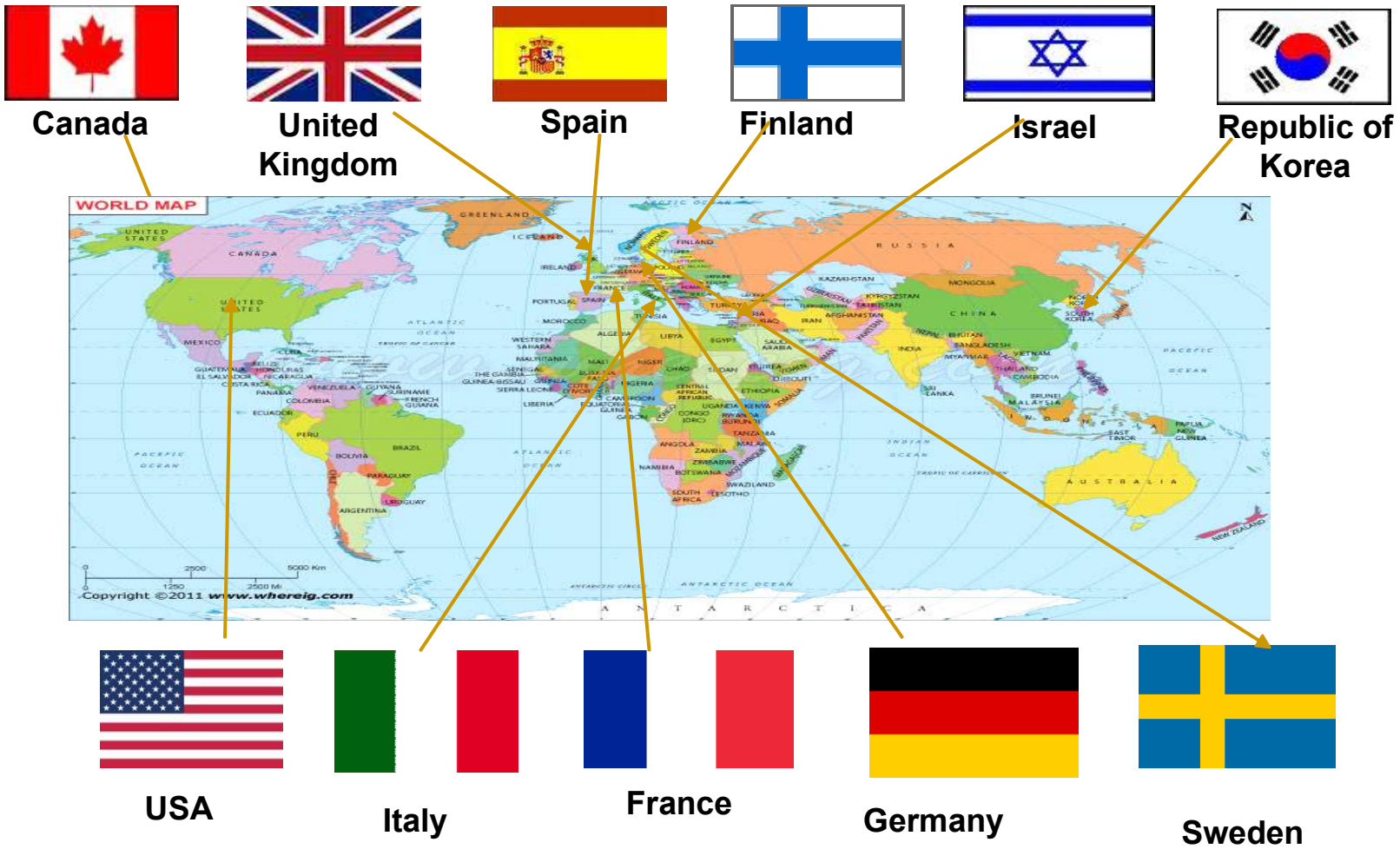
Forge frontline **global technological alliances** for Indian companies towards achieving R&D competence in foreign and domestic markets

Provide demand driven **technology development** and **solutions** through global partnerships

Projects aimed to yield new **IP, prototype, product** or **process**

Use innovative **PPP model** for implementing Industrial R&D programs

DST's Bilateral Industrial R&D Programs

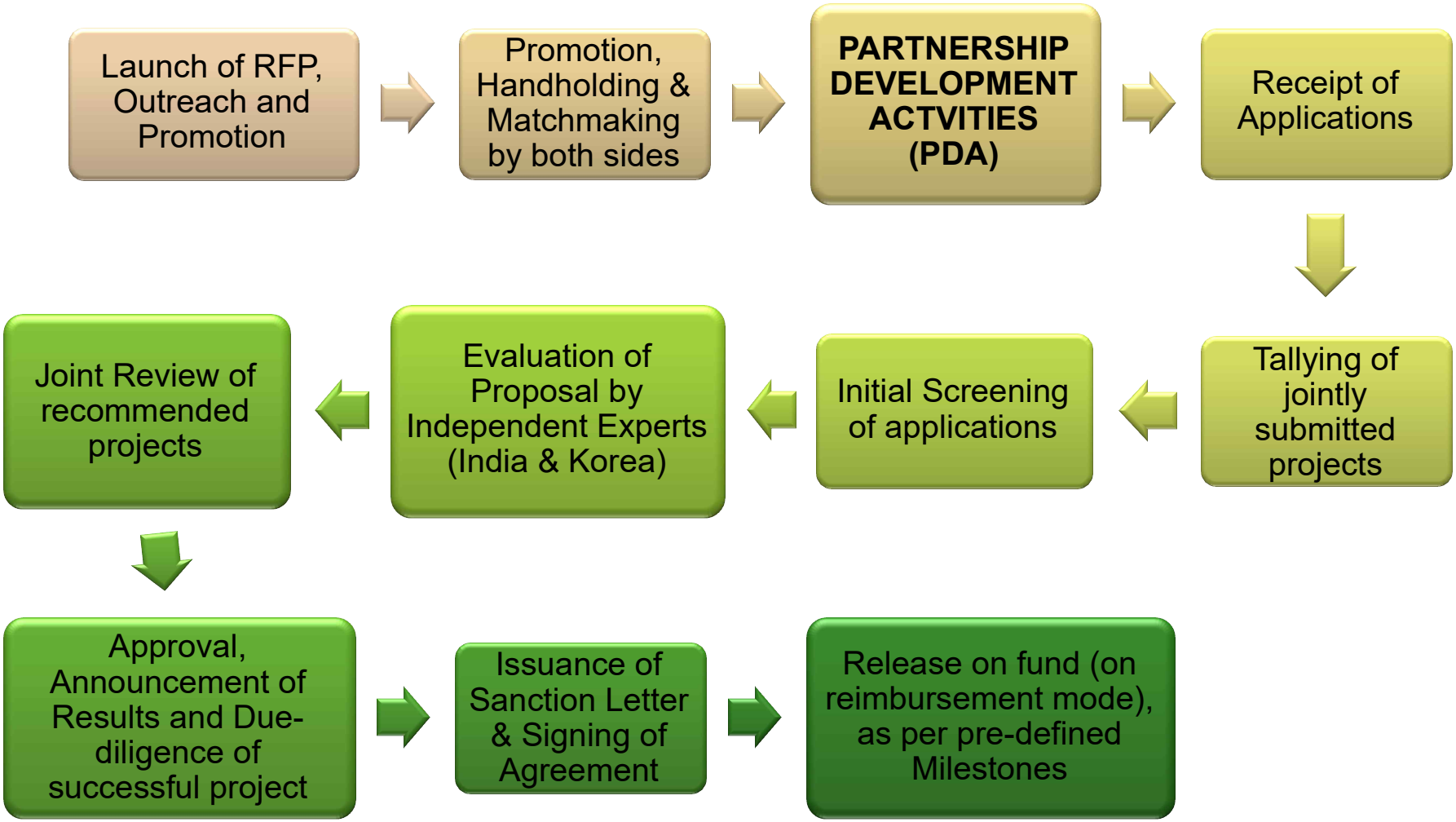


GITA – A Unique Institution

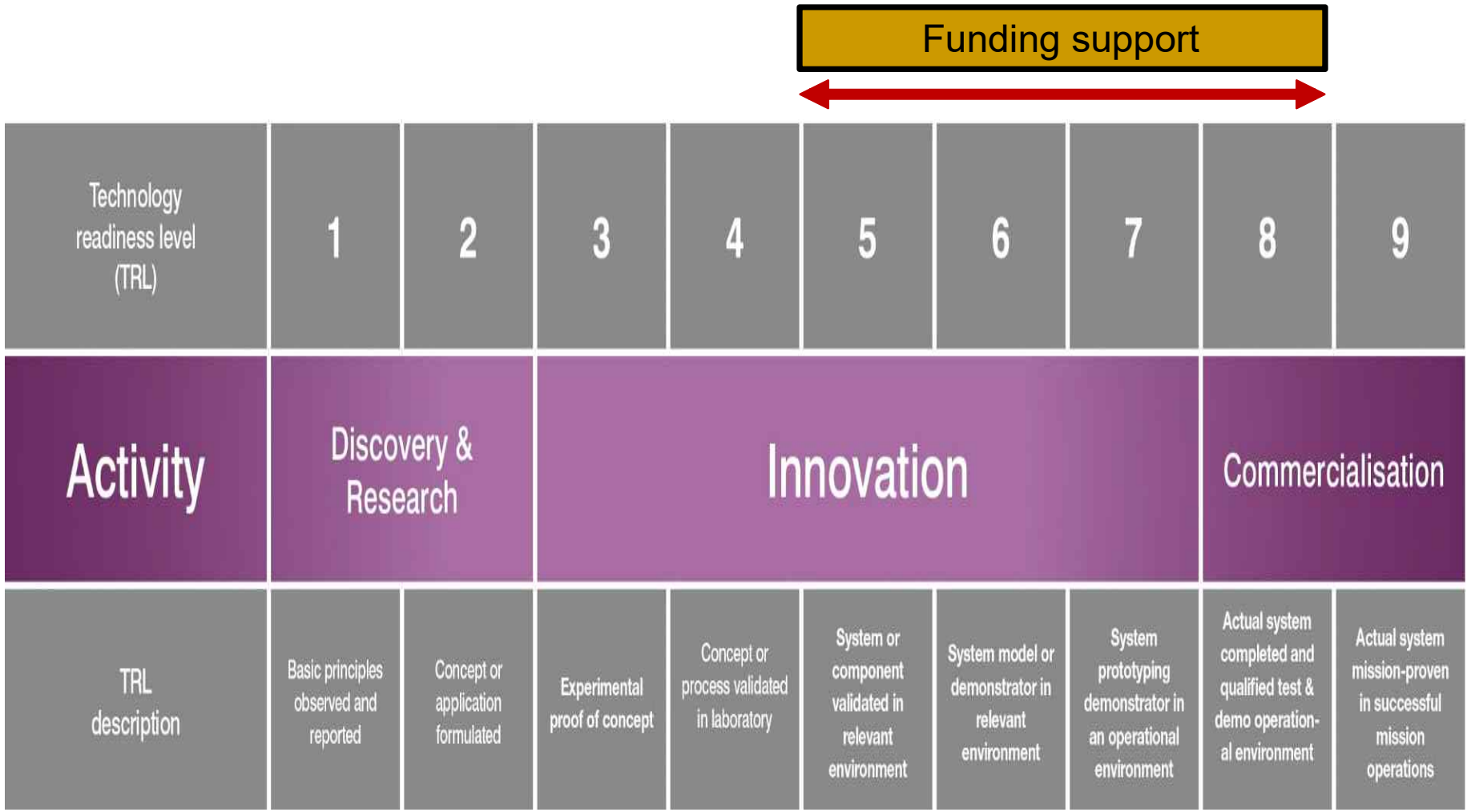
- **An Innovative PPP mechanism** - Government's Arm's Length Org anization – driven by industry – manned by professionals for **incr easing Indian industry's investment** in technology by
  - **Mapping** technology gaps
  - **Connecting** among technology developers, providers, commercializes
  - **Evaluating** through transparent process, technology offers across the globe on appropriateness from techno-economic perspective for India
  - **Funding** through quick disbursal process and flexible funding modes (loan/grant/equity), last phase of technology development that conne cts the market
  - **Demonstrating** technology solutions impacting lives of people

- **A one-stop-shop institution** for providing demand-driven Techn ology solutions by establishing Institutional & Global Alliances wit h all participants as stake-holders.
- **Enables** Indian companies to achieve competitive leadership in bo th global and domestic knowledge markets.

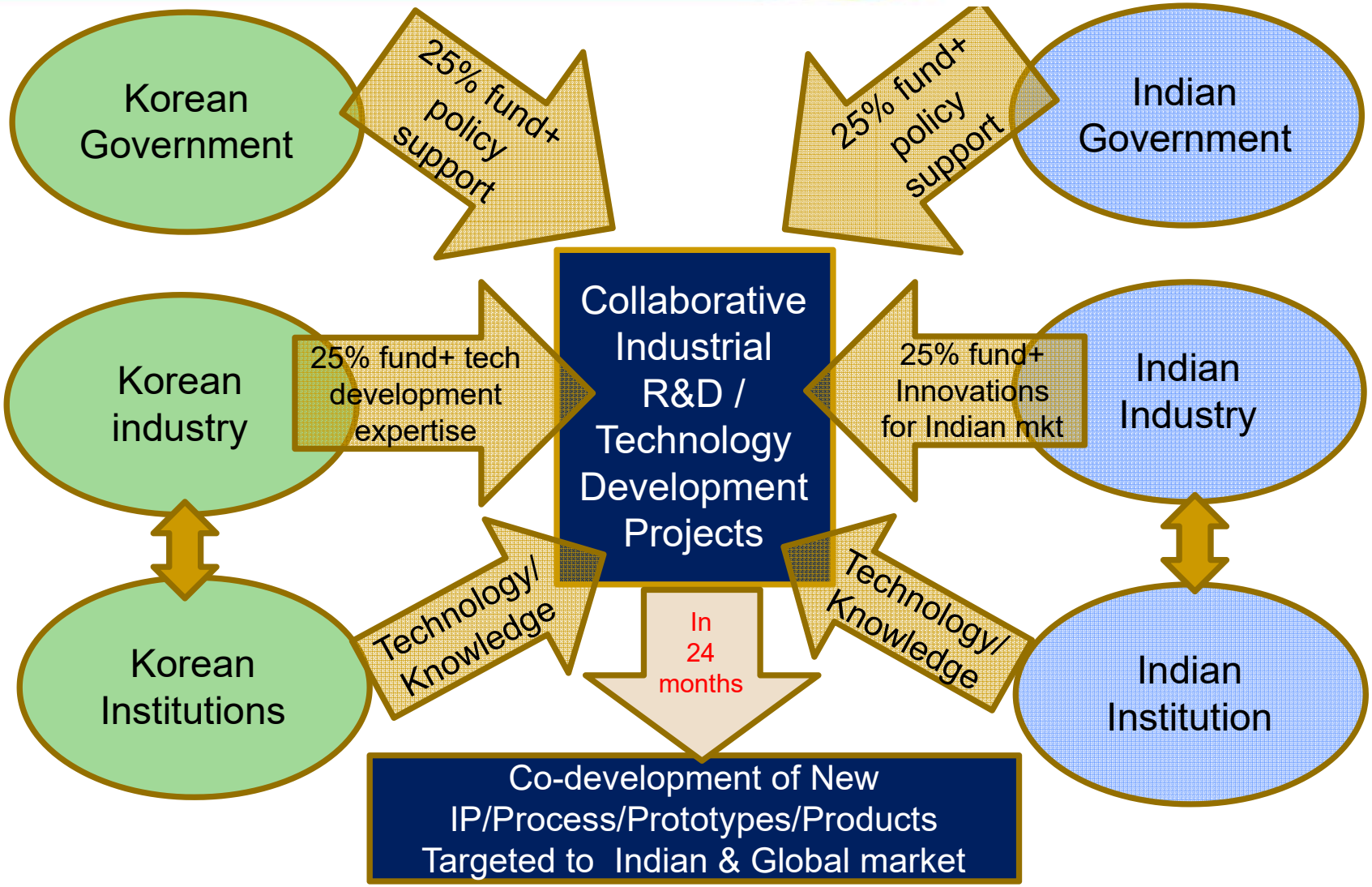
Implementation Process



Technology Readiness Levels (NASA model)



Funding Model



Status of Implemented Projects: RFP 2014

Project Title: Design & Development Of Robotic Endotrainer

Indian Project Partners	Korean Project Partners
Larsen & Toubro (L&T) Technology Services, Bangalore PSG College of Technology, Coimbatore PSG Institute of Medical Sciences and Research, Coimbatore	Rastech, Inc., Daejeon

Project Details

Robotic surgery is revolutionising treatment by providing minimally-invasive and yet, precise, stable and dextrous functionality to surgeons, especially in the case of neurosurgery. Training is critical and virtual simulators are less accurate than actual robotic training systems. The latter, however, tend to be expensive and are rarely available in India.

The project aimed to develop a multi-condition, low cost surgical robot, as a Robotic Endotrainer, aiming at affordable yet advanced medical treatment and surgery, as an indigenised product. Aiming a completely indigenized product, this robot will be used for training the surgeons and medical students, in hospitals, research institutions and colleges in the field of minimally invasive robotic surgery.

Highlights

- New product to market
- Cost of final product estimated at INR 60 lakhs vs. INR 20 cr for imported alternative
- Novel sensor design developed for enabling haptic feedback
- Will facilitate more widespread training of surgeons using robotic systems leading to improved patient outcomes

Status of Implemented Projects: RFP 2015

Project Title: Smart EPM Block System Development for Industry Robot with Flux Detecting and Safety Function Technology	
Indian Project Partners	**Korean Project Partners**
East Coast Magnets Pvt. Ltd., Hyderabad Shree Magnets Pvt. Ltd., Kolkata	KITECH, Korea TSG Korea
Project Details	
The robotic arm of the industrial robots, traditionally have electric, hydraulic or pneumatic jaws. A perennial issue is that robotic applications don't always securely lift heavy cargo. Joint collaboration allowed design and development of a robotic arm clamping fixture having an electro permanent magnetic system with real-time flux (unit of measurement) sensing technology to safely handle/ lift/ transport/ place ferrous and ferrous alloy items.	

Highlights

- Enables safe and secure material handling by dynamically assessing clamping power requirement basis load conditions.
- Solution can work across machine tools, automobile, electronics, fabrication industries.
- Can be retrofitted into existing robotic arms and used off-grid.
- 97% more energy efficient than traditional systems.

Status of Implemented Projects: RFP 2015

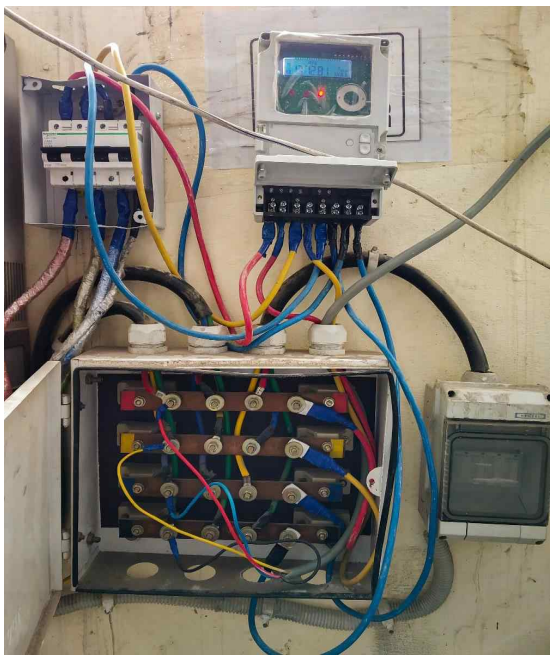
Project Title: Design and Development of Autonomous Amphibious Unmanned Aerial Vehicle and UAV Mountable Water Sampling Devices for Water Based Applications	
Indian Project Partners	**Korean Project Partners**
UCAL Fuel Systems Ltd., Chennai Veltech Dr.Rr & Dr.Sr Technical University, Chennai	ROVITEK Wellness Convergence Research Center
Project Details	
Existing water sampling and water quality assessment methods typically do not employ smart, ICT enabled technologies. Korean and Indian team members executed design and development of an amphibious unmanned aerial vehicle for real time water quality analysis	

Highlights

- Integrated autonomous amphibious vehicle with ability to function autonomously
- Unique solution for water quality assessment in remotely located and also inaccessible water bodies through an amphibious vehicle
- Integrated sensory systems for on-board /real-time water quality analysis
- Controller Design, Inertial measurement unit, COMM Protocol & Autopilot for amphibious UAV being done..

Status of Implemented Projects: RFP 2017

Project Title: Design and Development of Advanced Power Electronics and Related Technologies for Integration of Solar Power Plants with Power Utility Grids	
Indian Project Partners	**Korean Project Partners**
Allied Engineering Works Pvt. Ltd., Delhi	Jubix Co., Ltd., South Korea
Project Details	
The project aims to have field deployment of grid integration technology at Low Tension Voltage level, integrating with Photo Voltaic systems and reducing electricity tariff for stakeholders in the long run. This project supports Make In India Mission.	



Highlights

- Promotes cleaner approach of power generation by making solar power systems more feasible to connect to the power grid
- Reduction in cost of power generation due to effective management, storage and consumption
- Bi-directional Meters having remote management facility of sensing data and control mechanism for integration of Solar PV and other renewable generation.
- Smart Energy Management (SEM) Module for solar invertors to optimize solar generation, storage and usage

Status of Approved Projects: RFP 2018

Project Title: Next-generation robust reconfigurable fixed-wing UAV with wing mophing concept for shipdeck operations	
Indian Project Partners	**Korean Project Partners**
Tata Advanced Systems Ltd. Bangalore	KEVADRONE CO. LTD. Yuseong-gu, Daejeon
Project Details	
The project aims to developm unique product (a robust fixed-wing UAV) that can operate off a ship deck autonomously without the need for landing aids on ship deck	

Highlights

- A reconfigurable UAV involving wing morphing where one or more of the wing parameters (sweep, taper, aspect ratio, twist, dihedral , camber) can be altered in flight.
- A reconfigurable solution that may be used for land based as well as ship based operations.
- Improvement in the surveillance capabilities of the Indian, Korean and allied navies and coast guard units
- Enhanced capabilities of oil and gas companies that have significant offshore assets and extraction facilities

Status of Approved Projects: RFP 2018

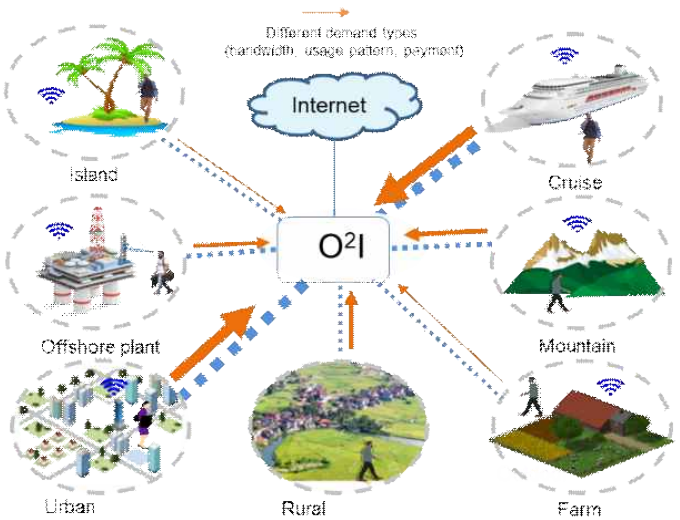
Project Title: Development Of Metallo-Mechanical Prediction Module Of Magnesium Forging and its Application to Automotive Components	
Indian Project Partners	**Korean Project Partners**
Lite auto components Ltd, Hyderabad Automotive Research Association of India (ARAI)	MFRC, Jinju, Gyeongnam
Project Details	
The project is to develop a light weighting and efficient two automotive components by using advanced magnesium alloys through forging route for electric vehicle applications. Presently one of the components i.e. bracket for urea tank is made of cast iron and the other component from Electronic Power Assisted Steering system is made of steel..	

Highlights

- Drastic weight reduction of the automobile leads to less fuel consumption, less emissions of green house gases, hence will result in acheving the stringent emission norms like BSVI, Euro VI etc
- Safety of the passengers will be improved due to high shock absorbing capacity of Magnesium
- Noise , Vibration and Harshness (NVH) reduction leads to more comfortable drives
- High heat dissipation capacity of magnesium leads to better battery efficiency of electric vehicles

Status of Approved Projects: RFP 2019

Project Title: On-demand Internet networking technology development	
Indian Project Partners	**Korean Project Partners**
Lepton Software Export & Research Pvt. Ltd, Gurugram	SMFi, Seoul
Project Details	
The project aims to develop On-demand & Onsite (O2I) Internet system for large Internet infrastructure market in the developing countries in Africa and Asia. Leveraging new services using many benefits of for On-demand & Onsite internet, new areas are explored in the scope of network-isolated areas, portable Internet infrastructure, and ultra-wide IoT. Location intelligence.	



Highlights

- Scalable Network architecture for demand-oriented networking
- Wireless trunking transport based on satellite or terrestrial wireless link
- Smart operation & management
- Intelligent network security system
- PoC system for Indian market

Status of Approved Projects: RFP 2019

Project Title: Personalized Light Solution based Growth Environment Platform for Plant Factory	
Indian Project Partners	**Korean Project Partners**
SAL Biosciences Pvt Ltd, Bengaluru (SAL Agrotech Pvt. Ltd)	Farm8 Co. Ltd, Gyeonngi
Project Details	
A personalized crop growth environment platform for vertical farming systems by identification of the unique combination of spectral components which work synergistically on plants and can be used in very low quantities	

Highlights

- Improvement in energy use efficiency through plant specific optimized spectral recipes
- Improvement in profit margins for indoor farms.
- Year-round production of crops through multiple cycles of growth and no weather-related crop failures.
- Eliminates use of pesticide in farming. Pathogen infections can be eliminated through inclusion of UV light in the customized lighting solution.

Status of Approved Projects: RFP 2019

Project Title: Development of microgrid-linked solid oxide fuel cell system using diesel fuel	
Indian Project Partners	**Korean Project Partners**
h2e Power Systems Pvt Ltd, Pune	HnPower Inc., Daejeon
Project Details	
The project aims to develop reformer that can process diesel fuel & generate syngas as clean fuel. 2) To generate clean, highly efficient and reliable electricity using solid oxide fuel cells. 3) To demonstrate proof of concept system (SOFC-3kW+SolarPV-2kW+Battery-10kWh) under simulated load conditions of rural micro-grid in laboratory conditions.	

Highlights

- Improved electrical efficiency with diesel fuel (from 18% to ~50%).
- Reduction in cost of electricity (Potential to generate electricity @ > / =Rs 8/kWh for high commercial volumes).
- Reduction in environmental pollution with diesel fuel (CO2 emission=60% reduction, NOx & SOx= 100% reduction).
- Flexible solution to combine solar as a renewable energy source.
- No issues regarding fuel storage & transportation (e.g. Hydrogen fuel has lower storage density & needs to be stored at high pressure of 350/700 barg).
- These micro-grids have potential to penetrate to the remotest corner of the country.

Status of Approved Projects: RFP 2019

Project Title: Development of Diagnostic panel for inherited retinal diseases	
Indian Project Partners	**Korean Project Partners**
Nucleome Informatics Pvt Ltd, Hyderabad	Oneomics Co Ltd, Gyeonggido
Project Details	
The project aims to develop User-friendly consulting software that will be developed in this study will serve as a well-organized and comprehensive variants resource for clinicians and researchers and will ultimately help in the improvement of Genetic counselling, disease diagnosis and treatment of hereditary retinal disorders.	

Highlights

- NGS big data for 1000 IRD patients (500 Indian and 500 Korean patients).
- To detect structural variants in 100 patients affected with Inherited Retinal disorders by performing WGS on PacBio's Sequel II System
- Linux based tool for genetic analysis of IRD Consulting software for hospital doctors Manuscripts

India-Republic of Korea Future Strategic Group

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Ministry of Science and ICT

beyond leading technology KIAT

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Digital Transformation: information and communication technologies (ICT) including IoT, AI, Big Data.

Future Manufacturing: smart factory; electric vehicle; 3D printing; robotics & automation; advanced material.

Future Utilities: 'clean-tech' including efficient waste management and clean water; renewable energy technology and energy efficiency.

Health Care: affordable health care for the elderly and disabled; natural healthcare products.

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DEPARTMENT OF
SCIENCE & TECHNOLOGY

वाणिज्य और उद्योग मंत्रालय
MINISTRY OF
COMMERCE AND INDUSTRY

Funding Agency

Ministry of Trade, Industry and Energy

Ministry of Science and ICT

India	Korea
Department of Science & Technology, Ministry of Commerce & Industries Govt. of India	Ministry of Science and ICT, Ministry of Trade, Industry and Energy Govt. of Republic of Korea

GLOBAL INNOVATION & TECHNOLOGY ALLIANCE

Implementing Agency

beyond leading technology KIAT

KETEP 한국에너지기술평가원

NRF National Research Foundation of Korea

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