2024
Call for Proposals
for CY 2026 Funding

Republic of the Philippines
DEPARTMENT OF SCIENCE AND TECHNOLOGY
PHILIPPINE COUNCIL FOR INDUSTRY, ENERGY AND EMERGING TECHNOLOGY RESEARCH AND DEVELOPMENT

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Who is DOST-PCIEERD?

The **Philippine Council for Industry, Energy, and Emerging Technology Research and Development** (PCIEERD) is one of the three sectoral planning councils of the Department of Science and Technology (DOST).

Our Mandate

Support for Research and Development

Human Resource and Institution Development

S&T Information Dissemination and Promotion

Support for Technology Transfer and Commercialization

Policy Development and Advocacy

R&D Priorities

ENERGY — Energy Efficiency, Transportation

INDUSTRY — Electronic & Semiconductor Industries, Mining & Minerals, Metals & Engineering, Food Processing, Process

EMERGING TECHNOLOGIES — Materials Science/Nanotechnology, Genomics/Biotechnology, Information & Communications Technology, Space Technology Application, Photonics, Artificial Intelligence, Data Science

SPECIAL CONCERNS — Climate Change Adaptation, Disaster Risk Reduction & Management, Environment, Human Security, Creative Industries, Science Communication, Policy
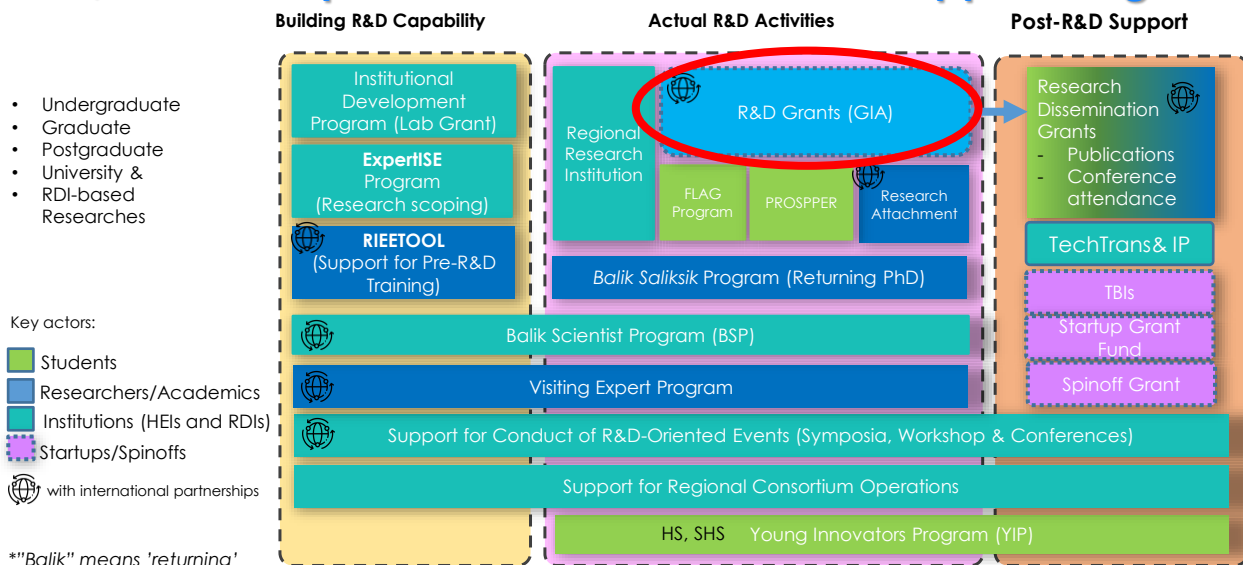
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Pre-, con- and post-R&D Human Resource Support Programs

Building R&D Capability   **Actual R&D Activities**   **Post-R&D Support**

- Undergraduate
- Graduate
- Postgraduate
- University &
- RDI-based Researches

Key actors:
- Students
- Researchers/Academics
- Institutions (HEIs and RDIs)
- Startups/Spinoffs
- with international partnerships

"Balik" means 'returning'

Institutional Development Program (Lab Grant)

ExpertISE Program (Research scoping)

RIEETOOL (Support for Pre-R&D Training)

Regional Research Institution

R&D Grants (GIA)

FLAG Program

PROSPPER

Research Attachment

Research Dissemination Grants
- Publications
- Conference attendance

TechTrans& IP

TBIs

Startup Grant Fund

Spinoff Grant

Balik Saliksik Program (Returning PhD)

Balik Scientist Program (BSP)

Visiting Expert Program

Support for Conduct of R&D-Oriented Events (Symposia, Workshop & Conferences)

Support for Regional Consortium Operations

HS, SHS   Young Innovators Program (YIP)

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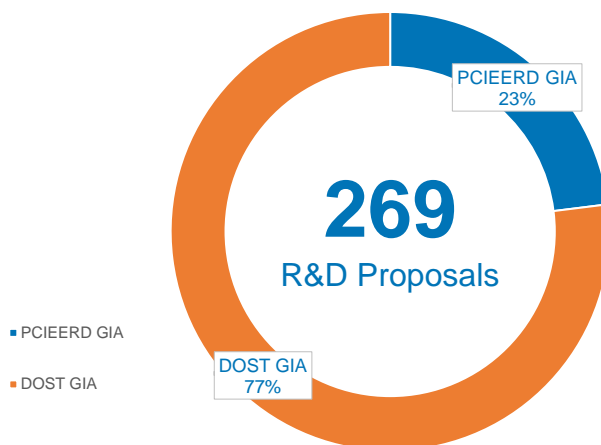

DOST Pillars and 11 Priority Areas

Human Wellbeing Promoted	Wealth Creation Fostered	Wealth Protection Reinforced	Sustainability Institutionalized
Food Security	Job Creation and Entrepreneurship / Regional Development	Climate and Disaster Resilience	Facilities Upgrading
Health Security	Industry Competitiveness		Digital Transformation
Water Security and Environmental Protection			Smart and Sustainable Cities and Communities
Energy Security			
Human Resource Development			

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2026 Budget: P4.59 Billion

269
R&D Proposals

PCIEERD GIA
23%

DOST GIA
77%

■ PCIEERD GIA

■ DOST GIA

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Human Wellbeing Promoted

PCIEERD's Priority Areas on ***Food Security***

1. Food Innovation Program

a. ***Enabling Systems for Food Innovation***
New Processing and Packaging Technologies for Local Food Industries
Nutrition-sensitive food processing technologies
- Freeze Concentration Technology (for calamansi & other juices, coconut water)
- Optimum extraction and dehydration technologies for local spices
- High Pressure Processing
- Pulsed Electric Field Processing
- Isochoric Freezing

Smart Packaging Solutions
- Self-heating mechanism for RTE food
- Freshness indicators lor local commodities

Processing Technologies for Sustainable Food Products (i.e. Plant Based Food, Alternative Proteins, Sweeteners)
- High Moisture Extrusion
- Biomass and Precision Fermentation
- Cell-based Food Production
- 3D Printing for Meat and Fish Alternatives for Food Service

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PCIEERD's Priority Areas on *Food Security*

1. Food Innovation Program

b. *Innovative Food Products*

Utilization of Food Processing Industry By- Products for Food Application

- Shrimp production by-products (extracts, chitosan)
- Alternative flours for food industrial use
- Lycopene from tomato processing by-products as as food ingredients/additives
- Food fibers (Banana, bamboo, etc.)
- Plant protein concentrates
- Fruit bioactives and polysaccharides (mangosteen, pineapple, bignay) as food ingredients/additives

c. *Specific Industry or Regional Concerns*

- Oleoresins, Essential Oils, and Dry Spices as Food Ingredients

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PCIEERD's Priority Areas on *Food Security*

2. Smart Food Value Chain

a. *Development of Integrated Food Value Chain Resource Management System*
b. *Smart/Innovative Technologies in Value Chain : Smart Retailing System*
c. *Scoping study on food systems transformation for the Philippines*

3. Food Safety Program

Food Safety R&D

a. *Development of Guidance Manual on Safety Aspects of Food Processing Equipment*
b. *Development of MSMEs' Traceability Systems*
c. *Food Safety Risk Profiling*

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PCIEERD's Priority Areas on **Food Security**

3. Food Safety Program

Food Safety S&T Services
- Application of globally-accepted methods for food safety parameters: validation and standardization
- Provision of analytical testing services for quality assessment of local products
- Establishment of the National Food Safety Reference Laboratory
- Development of Food Reference Materials and establishment of proficiency test methods

Food Safety HRD
- Human Resource Development on Food Safety
- Updating and Development of food safety modules
- Development of Massive Open Online Courses on Food Safety

Food Safety Knowledge and Tech Transfer and Policy Advocacy
- DOST Food Safety Fora and Summit

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BAGONG PILIPINAS

Human Wellbeing Promoted

PCIEERD's Priority Areas on **Food Security**

4. DOST Halal S&T Program
- Halal S&T Summit
- Halal Knowledge Center

5. Innovation for Philippine Food Systems Transformation
- Capacity Building for food and nutrition researchers on geospatial data analysis
- R&D for supply chain optimization for reducing food waste and improving food distribution efficiency
- System development for mapping, monitoring, and analyzing food systems for improved food environment decision making, consumer behavior, and healthier diets

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BAGONG PILIPINAS

Human Wellbeing Promoted

PCIEERD's Priority Areas on **Water Security & Environmental Protection**

1. **National Research and Development Program for the Prevention and Control of Water Pollution**
   a. *Development of Rapid Test Kits for detection of pathogens and other emerging contaminants in WW, etc.)*
   b. *Development of Cost-effective Technologies on Water/Wastewater Reuse, Water recycling for industries and communities*
   c. *Development/ Application of treatment for removal of HM, micropollutants and other emerging pollutants*
   d. *Pilot scale/industry scale application for AI-based water treatment and/or resource recovery, desalination, deionization, etc.*
   e. *Development of microplastic capturing technology and treatment for industries and/or waterbodies*
   f. *R&D on Oil Spill detection, testing and other methods*

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PCIEERD's Priority Areas on **Water Security & Environmental Protection**

2. **National Research and Development Program for the Prevention and Control of Air Pollution**
   a. *Development of GHG emission monitoring & assessment tools and protocols*
   b. *Development of GHG capture & mitigation technologies*
   c. *Establishment of locally developed emission factors and standards*
   d. *Cost-effective air pollution treatment technologies focusing on control and abatement*
   e. *Development of real-time spatio-temporal emission inventory, monitoring and ambient air quality forecasting*

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PCIEERD's Priority Areas on **Water Security & Environmental Protection**

3. **Innovative Solutions to Solid Waste Management**
    a. *Establishment of a Life Cycle Analysis Certification Protocol/Standards for plastic packaging products, single use plastics, etc. and its alternatives*
    b. *Development of technologies/strategies for marine litter prevention and reduction from point & non-point sources*
    c. *Value-adding of Solid Wastes/By-products from ship recycling, plastic materials and other conventional sources*
    d. *Integrated solutions following Bio-Circular-Green Economy (BCG) model for solid waste reduction, prevention & control*
    e. *Establishment of Recyclability Testing Facility and development of database of Recyclables including Plastics*
    f. *Establishment of Demo/Model Facility for Waste Infrastructure: Strengthening of the Waste Management Flow*

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PCIEERD's Priority Areas on **Water Security & Environmental Protection**

4. **Program for the Extraction of Critical Minerals**
    a. *On-shore advance extensive ore exploration (5 Areas)*
       -Metallic Minerals
       -Non-metallic Minerals
    b. *Off-shore advance extensive ore exploration (5 Areas)*
    c. *Quantitative ore characterization*
       On shore
       - Metallic Minerals
       - Non-metallic Minerals
       Offshore Minerals

5. **Program for Technologies in Support of Mine Rehabilitation**
    a. Ex-ante assessment of offshore mining

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PCIEERD's Priority Areas on **Energy Security**

1. **Renewable Energy**
   a. *Biodiesel Oil Palm & Empty Palm Bunch (EPB) Viability Assessment*
   b. *Sustainable Aviation Fuel*
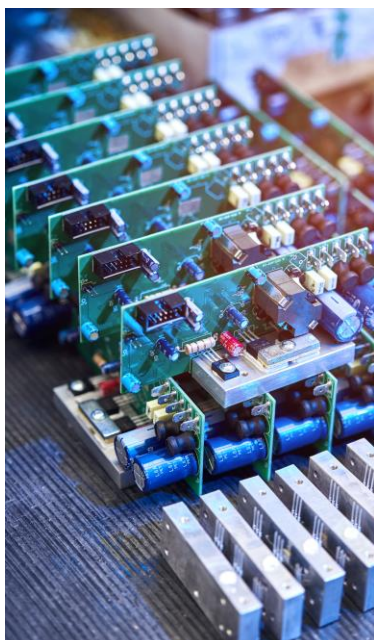   *-Hydrogen*
      -Biodiesel
      -Bioethanol

2. **Energy Efficiency/Energy Storage/Hydrogen**
   a. *Cost effective technologies for hydrogen production, separation and purification*
   b. *Hydrogen carriers, storage, handling, transport and utilization*

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PCIEERD's Priority Areas on **Energy Security**

3. **Materials for Energy, Materials Informatics**
   a. *Hydrogen Fuel Cell R&D*
   b. *Smart packaging using nanomaterials (also for virology applications)*
   c. *Advanced surface coatings for aerospace applications*
   d. *Materials Informatics for energy applications, etc.*
   e. *Plasma Technology R&D*
      -Plasma surface engineering
      -Plasma energy generation
      -Plasma nanotech
      -Plasma electronics
   f. *Nanomaterial safety (i.e. policy and implementation)*

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Human Wellbeing Promoted

PCIEERD's Priority Areas on *Human Resource Development*

1. **E-governance and Citizen Services**
   a. *Chemical Safety and Security - DILG, PNP, BFP*
      • *Data Analytics for monitoring traceability of in transit chemicals*
      • *Data Analytics for classification and management of chemicals for explosives and weapons*
      • *Data Analytics for chemical logistics*
   b. *Geospatial data analytics for food*
      • *Food Supply chain*
      • *Food value chain*
   c. *Permit processing and Management - DILG, PNP, BFP*
   d. *Financial and Auditing Analytics - DBM, BSP*
   e. *Revenue and Labor Analytics - DOLE, BIR, PSA*
   f. *Legislation and Judiciary Analytics - Senate, Congress, DoJ*
   g. *Enterprise or Business Analytics – MSMEs*

2. **Heritage Innovation Program**
   a. *Innovations for Traditional Knowledge Preservation and Protection*
   b. *Technologies for Cultural and Heritage Management and Protection*

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Wealth Creation Fostered

PCIEERD's Priority Areas on *Job Creation and Entrepreneurship / Regional Development*

1. **Regional Search for Innovative Women Entrepreneurs: Uplifting the Role of Women-led Social Enterprises in Regional Development and**
2. **Science and Technology Parks to Accelerate Research and Knowledge**

   For both calls:
   a. *Assessment of competency requirements, capabilities and needs for target grantees in the regions*
   b. *Research on regional factors affecting performance and development of entrepreneurship in the regions*
   c. *Development of learning modules and capacity building programs*
   d. *Development of operational capacities, business models, partnerships and networking*
   e. *Promotion and networking to increase partners and linkages*
   f. *Development and validation of sustainability plans*

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Wealth Creation Fostered

PCIEERD's Priority Areas on   *Industry Competitiveness*

1. **Optical Information and Communication**
   a. *LiFi, Optical Fiber Networks, Optical Wireless Access, Optical Cross-Connects*
   b. *Analog radio over fiber for wireless access (5G)*
   c. *Information Processing*
   d. *Optical Field Programmable Gate Arrays*
   e. *Photonic Integrated Circuit- Local fabrication and Characterization*
2. **Manufacturing**
   a. *Lasers development (parallelized beam sources ,diode solid state, high energy), beam shaping, beam guidance*
   b. *Photolithography, optical amplifiers, holographic interferometry*
   c. *Smart packaging using nanomaterials (also for virology applications)*
   d. *Advanced surface coatings for aerospace applications*
   e. *Additive Manufacturing – Machine Learning*

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Wealth Creation Fostered

PCIEERD's Priority Areas on   *Industry Competitiveness*

3. **Computational optics and biophysics**
   a. *Computational optics*
   b. *Foundational biophysics (simulation and modelling)*
4. **Nuclear Science R & D**
   a. *R & D on low energy electron beam for materials development*
   b. *Neutron Imaging - Development of Neutron Irradiation and Imaging System for research and industrial applications*
   c. *Advanced Application of Neutron Beams*
5. **Game Development**
   a. *Digitization of traditional sports and AI for game analytics*
   b. *Application of extended reality technology for cultural preservation*
   c. *Development of metaverse platform and motion capture technology for facial, body, and hand gestures*

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PCIEERD's Priority Areas on   *Industry Competitiveness*

6. Animation
  a. *Automatic music generation and AI-assisted sound engineering*
  b. *AI in 3D animation/character simulation*
  c. *Process R&D for graphics design technique*

7. Film Development
  a. *Development of algorithmic video editing*
  b. *Development of 3D pre-visualization software*
  c. *Development of personalized sound control technology*

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Wealth Creation Fostered

PCIEERD's Priority Areas on   *Industry Competitiveness*

8. Small satellite subsystem or components for research and applications
  a. *Conduct of research on small satellite subsystem or components for various applications (e.g. M2M/IoT enabled satellite, AI for onboard systems*
  b. *Nano-/Microelectromechanical system (N/MEMS) for small satellites and aerospace applications*
  c. *Lightweight materials and components for spacecraft and satellite applications*

9. Jewelry Design and Innovations Program
  a. *Technologies for Design and Production of Fine and Fashion Jewelry*
  b. *Software and Tools for Jewelry Making*

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Wealth Creation Fostered

PCIEERD's Priority Areas on **Industry Competitiveness**

10. Smart Manufacturing

a. *Development of systems for degradation, performance, and predictive maintenance/Development of collaborative diagnostics and decision-making*

b. *Development of a generic cloud-based Manufacturing Execution System (MES) for smart manufacturing /Development of SCADA or automation system and digital twin /Develop digital transformation model for electronics industry companies*

c. *Process visualization through AR/VR /Development of cyber-physical production systems*

11. Semiconductor Manufacturing Services

a. *Development of new classes of electronics which are flexible, paper-based, and radiation-hardened*

b. *R&D and feasibility study on wafer fabrication*

c. *Advanced memory and logic technologies*

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PCIEERD's Priority Areas on **Industry Competitiveness**

12. Electronics Manufacturing Services

a. *Prototyping of collaborative and swarm robots and implementation of robot-as-a-service*

b. *Development of biomimetic sensors and smart dust*

13. Footwear Program

a. Material Innovation for Footwear Applications
R&D on Sustainable Local   Materials for Footwear
b. Footwear Design and Technologies
• R&D on Specialized Footwear
• R&D on Design for Footwear

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Wealth Creation Fostered

PCIEERD's Priority Areas on *Industry Competitiveness*

14. Furniture Applications Program
  a. *Material Manipulation*
    • *Local Materials from Wood and non-Wood*
    • *Sustainable Materials for Outdoor and Indoor*
    • *Sustainable and biodegradable furniture packaging materials*
  b. *Furniture Design and Application*
    • *AI-based solutions for Furniture Design and Production*
    • *Woodcarving technologies for furniture*
    • *Specialized Furniture*

15. Agro-industrial
  a. *Value Adding Technologies on citrus, mango, rice, sweet potato, tropical fruits , rubber, coffee, and cacao for industrial application except food*
  b. *Process Improvement on the Mooney viscosity of processed rubber*
  c. *Novel uses for rubber wastes*
  d. *Integration of local materials as rubber fillers to improve cost and properties*

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Wealth Creation Fostered

PCIEERD's Priority Areas on *Industry Competitiveness*

16. Chemical and biological manufacturing
  a. *Reduction of the cost of production of bio-based polymers from indigenous feedstock for industrial application*
  b. *Chemical Recycling of Polymers towards Cost Reduction*
  c. *Development of Mono-material flexible packaging towards improved recyclability*
  d. *Development of recyclable adhesives*
  e. *Catalyst development for waste-to-fuel applications*

17. Textiles
  a. *Development of localized man-made polymers such as lyocell for textile applications*
  b. *Development of tropical fabrics from novel fibers*
  c. *Recycling of post-industrial polymers to produce filaments*
  d. *Establishment of material resource center/library from fibers to textile*

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Wealth Protection Reinforced

PCIEERD's Priority Areas on   Climate and Disaster Resilience

1. **Geological**
   a. Development and deployment of alternative localized early warning system (EWS) for Tsunami
   b. Modeling Earthquake Hazards from new and historical data

2. **Hydrometeorological**
   a. Sectoral impacts and risk assessment of possible changes in rainfall, temperature, wind, humidity, and other meteorological elements
   b. Ocean Forecast System for Marine Activities and related Disasters (Ship Route Gale Warning Visualization)
   c. Impacts of climate change-driven droughts and extreme rainfall events in the development of related hazards

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Sustainability Institutionalized

PCIEERD's Priority Areas on   Facilities Upgrading

1. **Defense S&T and Relevant UVS**
   a. Enhance Secured Communications
   b. Multi-mission UVS Common Platform
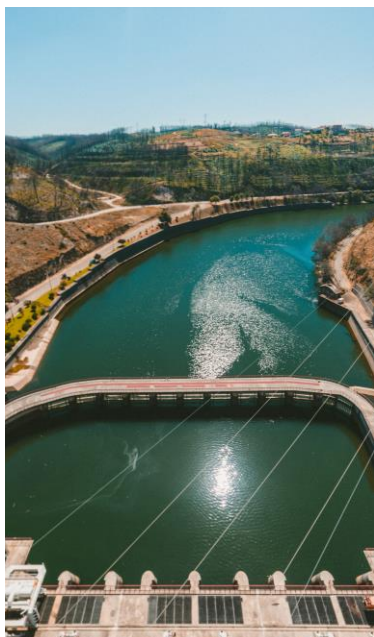   c. Integration of Radar systems composite operation

2. **Construction**
   a. Construction industry digitalization transformation (BIM application, wearables, robotics, 3D concrete printing, data digitization visualization and analysis)
   b. Competitive sustainable construction indigenous materials - chemical substitutes (adhesive, superplasticizer, waterproofing, hardeners, coating, retardants, grouts, etc), construction waste valorization, natural rubber-based products for construction application
   c. Earthquake Engineering System and Technologies

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Sustainability Institutionalized

PCIEERD's Priority Areas on Facilities Upgrading

3. Water
    a. *Automated water monitoring and control systems for dams /reservoir/watershed/utilities*
    b. *Hydrological model updating with monitoring and visualization system in major river basin surface and underground water supply*
    c. *Sustainable water management for island communities*

4. Imaging
- *Photodetectors/photosensors for security, night vision, motion detection, gas sensing, etc., ranging visual sights, periscopes (land and sea combat), optical beam forming and steering, imaging and image processing, fluorescence spectroscopy, teraHertz spectroscopic imaging, Raman Imaging, Near-field Imaging, 3D Imaging Instrumentation.*

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Sustainability Institutionalized

PCIEERD's Priority Areas on Facilities Upgrading

5. Machining and Fabrication
    a. *FASTPhils: Fabricators Assessment and Scoping in the Philippines*
    b. *Scoping for Physical Metrology (e.g., Mass, Temperature)*
    c. *Locally Design and Development of innovative, cost-effective, and appropriate Metal Equipment, Machine Parts and Engineered Products for food processing industry (e.g. coconut, coffee, cacao, adlai, etc.), agri-industry (e.g. rubber, abaca, ramie), military weapon manufacturing, creative industry (e.g. shoe), automotive parts and components manufacturing (e.g. e-Vehicle), security and defense, automation, etc.*
    d. *Small scale automated food processing equipment for food services and food manufacturing industries (e.g. VCO, cashew, peanut, snackfood, etc.)*

6. Metal Casting
    a. *R&D on Metal Product Recycling and Development (i.e., ship recycling, manhole, etc.)*

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PCIEERD's Priority Areas on Facilities Upgrading

7. **Tool and Die**
   a. *Design and development of molds and die for processing and fabrication applications to various sectors(e.g., food industries, e-vehicle manufacturing, creative industries, defense, etc.)*

8. **Surface Engineering**
   a. *Ship Metal Coating Technologies*

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PCIEERD's Priority Areas on Facilities Upgrading

9. **Natural Products**
   a. *Scale-up extraction facility (cGMP for cosmetics, pharmaceutical and personal care industry) for high value products (e.g. essential oil)*
   b. *Characterization and Standardization of Natural Products for the following:*
      - *application and formulation in cosmetics*
      - *hydrocolloids for personal care applications*
      - *Omega-3 oil purification from fish and algae*
      - *Natural polymers for modified drug release in vivo for personal care applications excluding cosmeceuticals and pharmaceutical applications*
   c. *Valorization of Various Wastes for extraction of natural compounds for various industry applications except as food ingredient (eg. development of pharma excipient from agro-forestry, Seed nut and seed cake pongamia, bitaog, malunggay, pili pulp and resin, banana, pineapple, coconut, and molasses, and calamansi)*
   d. *Development of Natural Dyes from Novel sources for industrial applications except as food ingredient (microbial, pili pulp skin and other sources)*
   e. *New Technologies such as pulsed electric field (PEF), high pressure processing (HPP) for extraction of natural products for industrial application except as food ingredient*

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Sustainability Institutionalized

PCIEERD's Priority Areas on *Digital Transformation*

1. **Additive Manufacturing**
   a. *Machine Learning*

2. **Computing and Data Science**
   a. *R&D on sovereign cloud computing*
   b. *Development of smart data capture software*
   c. *Application of data ontology and data archiving for DOST public services*

3. **Connectivity and Communications**
   a. *Development of swarm communication*
   b. *Development of software-defined radio platforms and techniques / prototyping of cognitive radio*
   c. *R&D addressing wave spectrum challenges with 5G technology*

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4. **Cybersecurity**
   a. *Threat/Intrusion/Phishing Detection and Prevention*
   b. *Intelligent Security and Automation*

5. **Machine Learning**
   a. *AI for Government Operations and Services Delivery*
   b. *AI for Banking and Finance*
   c. *AI for Education/Learning*
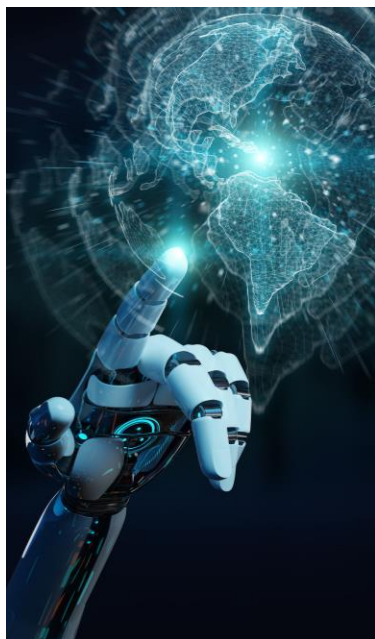
6. **Natural Language Processing**
   a. *Real-time Translation System for Bilingual/Multilingual Conversation*

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7. **Intelligent Robotics**
   a. *Development of Autonomous Underwater Robot*
   b. *Development of Autonomous Radiation-Monitoring Assistance Robot*

8. **AI in Cybersecurity**
   a. *Threat/Intrusion/Phishing Detection and Prevention*
   b. *Security Automation*
   c. *Adversarial AI*

9. **Emerging AI platforms**
   a. *Generative AI*
   b. *Cognitive Computing*
   c. *Swarm AI*

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10. **Quantum Technology**
    a. *Development of algorithms for quantum networks;*
    b. *Application of quantum cryptography;*
    c. *Implementation of error-corrected logical qubits with fault-tolerant gates*
    d. *Quantum communication*

11. **Development of High Altitude Pseudosatellite (HAPS) and High-altitude Long-endurance (HALE) unmanned aerial vehicle**

12. **Development of applications for space debris monitoring**

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PCIEERD's Priority Areas on **Smart and Sustainable Cities and Communities**

1. **Smart City**

   a.Collaborative Diagnostics with Prescriptive Analytics Using Smart City Indices and Tools
   b. Decision Intelligence for priority applications of the LGUs

2. **Application using other and new available satellite data**
   a. SAR and InSAR
   b. Hyperspectral
   c. Satellite altimetry and other space geodetic techniques application

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PCIEERD's Priority Areas on **Smart and Sustainable Cities and Communities**

3. **Earth Observation (EO) Data Cubes and its applications**
   a. Development of EO Data Cubes for Big Data Analytics and Management of EO data
      • Geo-data management for Big EO data
      • AI in remote sensing and geoinformatics
      • Machine Learning and Deep Learning in Image and Spatial Analyses

   b. Development of EO Application Products from the Open Data Cube addressing Sustainable Development Goals and contributing to Global Policy Frameworks

   c. Establishment of Web-based or Cloud computing services for big data EO analytics
      • Cloud computing for big data EO analyses
      • EO Sensor web and IoT
      • Collaborative, cloud-source and volunteered geospatial data

   d. Development of thematic applications for EO Data Cubes
      • Urban and Pollution
      • Hydrology and Water Resource
      • Environment and Disaster Management

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En la cabecera: 28 Nov 2023.

Science Communication for Innovation Program

1. **Science Communication**
   a. *Research on Science Communication*
   b. *Research Studies on Evaluation of Science Communication*
   c. *Capacity-building Programs on Science Communication*
   d. *Development of Facilities for Science Communication* e. Development of Science Communication Technologies

2. **Advancing Science Centers' Innovation through Research and Development**
   a. *Researches in Science Centers*
   b. *Technologies for Science Centers*
   c. *Human Resource Development*

3. **Research Extension to Accelerate Communication Hub**
   a. Development of IEC materials to include: traditional and non-traditional methods such as learning management systems, knowledge management systems, websites and social media accounts, video production, physical kiosks and among others in selected locations.
   b. Development of Information & Dissemination activities on any of the following:
      - Capacity building among targeted beneficiaries (seminars, conferences, town hall meetings)
      - Advertising and promotional efforts like press conferences, media engagements, media buying, and exhibitions.

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2024
Call for Proposals
for CY 2026 Funding

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