DEPARTMENT OF SCIENCE AND TECHNOLOGY

RESEARCH AND DEVELOPMENT SURVEY REPORT

2018

Survey Proponent:

INSTITUTE OF STATISTICS

College of Arts and Sciences

University of the Philippines Los Baños

MAY 2021

Department of Science and Technology

RESEARCH AND DEVELOPMENT SURVEY REPORT 2018

Institute of Statistics
College of Arts and Sciences
University of the Philippines Los Baños

May 2021

Department of Science and Technology

The Department of Science and Technology is the premiere science and technology body in the country charged with the twin mandates of providing central direction, leadership, and coordination of all scientific and technological activities, and of formulating policies, programs, and projects to support national development.

Institute of Statistics

The Institute of Statistics (INSTAT) is an academic unit in the College of Arts and Sciences, University of the Philippines Los Baños and a Commission on Higher Education's Center of Excellence in Statistics. It is mandated to accelerate and intensify instruction, research and extension efforts in statistics supportive of science and technology and national development goal.

Cover Design by Prof. John Lorenzo A. Yambot

The overall design features illustrations of different people performing R&D activities. These illustrations represent the four main sectors of R&D Personnel: HEIs, government sector, business and industry sector, and PNPIs. The contributions and collaborative efforts of R&D personnel contribute to the improvement of the quality of life of Filipino people. This growth is symbolized by the four colored arrows pointing upwards. The colors of the arrows are based on the colors of the Philippine flag to symbolize the significant contributions of R&D in nation-building.

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We extend our heartfelt thanks to the institutions listed in the next pages of this report that responded to the2018 R&D Survey thereby, contributing to its successful completion.

Dr. Maligalig coordinated the drafting of this report. She also wrote the first and last chapters — on updating the R&D Indicators and on the summary and recommendations, respectively. Prof. Borromeo wrote about the sources of research and development (R&D) funds in Chapter 2 and on R&D publications in Chapter 5. Prof. Cambel led the analysis on R&D personnel which is presented in Chapter 3 and Prof. Roldan examined the R&D expenditures that are discussed in Chapter 4. Mr. Lesmoras consolidated the methodological notes in Appendix A and generated the statistical tables in Appendix B. Grant L. Leceta formatted the report and Prof. John Lorenzo A. Yambot designed its cover.

We hope that this report will contribute to improving the monitoring of the Philippines' research and development indicators and encourage more methodological research to improve data quality.

Dr. Liza N. Comia
Director
Institute of Statistics

Institutions that Responded to the 2018 R&D Survey

1 – Ilocos Region

Bureau of Fisheries and Aquatic Resources Regional Office - Ilocos Region
National Integrated Fisheries Technology Development Center
Central Ilocandia College of Science and Technology Colleges
Colegio de Dagupan
Department of Agriculture Regional Office - Ilocos Region
Department of Education Regional Office - Ilocos Region
Department of Health Regional Office - Ilocos Region
Department of Health Treatment and Rehabilitation Center - Dagupan
Department of Science and Technology Regional Office - Ilocos Region
Department of Social Welfare and Development - Ilocos Region
Don Mariano Marcos Memorial State University - Open University
Don Mariano Marcos Memorial State University-Mid La Union
Ilocos Sur Polytechnic State College - Candon
Ilocos Sur Polytechnic State College - Cervantes
Ilocos Sur Polytechnic State College - College of Engineering and Technology - Santiago
Ilocos Training and Regional Medical Center
Immaculate Conception School of Theology
Luna Colleges
Lyceum Northwestern University
Mariano Marcos Memorial Hospital and Medical Center
Mariano Marcos State University - Main
Mines and Geosciences Bureau Regional Office - Ilocos Region
NJ Valdez Colleges Foundation
Northwestern University
Pangasinan State University - Alaminos City
Pangasinan State University - Asingan
Pangasinan State University - Bayambang
Pangasinan State University - Binmaley
Pangasinan State University - Infanta
Pangasinan State University - Main
Pangasinan State University - Open University
Pangasinan State University - Urdaneta City
Philippine Carabao Center - Region 1
Philippine Carabao Center at Don Mariano Marcos Memorial State University
Philippine Rice Research Institute - Batac
San Carlos College
Union Christian College
University of Northern Philippines

2 – Cagayan Valley

Bureau of Fisheries and Aquatic Resources Regional Office - Cagayan Valley
Agricultural Pilot Center Fish Farm
Cagayan Valley Integrated Agricultural Research Center - Region 2
Cagayan State University - Andrews
Cagayan State University - Carig
Cagayan State University - Lal-lo
Cagayan State University - Sanchez Mira

Cagayan Valley Colleges of Quirino
Cagayan Valley Medical Center
Department of Agriculture Regional Office - Cagayan Valley
Cagayan Valley Lowland and Marine Research and Outreach Station
Cagayan Valley Research Center
Department of Agriculture - Southern Cagayan Research Center - Minanga Norte, Iguig
Department of Agriculture - Southern Cagayan Research Center - Cagayan Breeding Station
Department of Agriculture - Isabela Experiment Station
Department of Agriculture - Nueva Vizcaya Experiment Station
Department of Agriculture - Northern Cagayan Experiment Station
Department of Agriculture - Quirino Experiment Station
Department of Agriculture - Batanes Experiment Station
Department of Education Regional Office - Cagayan Valley
Department of Health Regional Office - Cagayan Valley
Department of Science and Technology Regional Office - Cagayan Valley
Department of Social Welfare and Development - Cagayan Valley
Isabela State University - Cauayan Campus
Isabela State University - Ilagan Campus
Isabela State University - Jones Campus
Isabela State University - Roxas Campus
Isabela State University - San Mariano Campus
Mines and Geosciences Bureau Regional Office - Cagayan Valley
National Economic and Development Authority Regional Office - Cagayan Valley
Philippine Carabao Center at Cagayan State University
Philippine Normal University - North Luzon Campus
Philippine Rice Research Institute - Isabela
Quirino State University
Quirino State University - Cabarroguis
Saint Ferdinand College - Cabagan Campus
Saint Mary's University of Bayombong
Saint Paul University Philippines
Southern Isabela General Hospital
St. Ferdinand College - Ilagan
University of Cagayan Valley
University of La Salette
University of Perpetual Help System

3 – Central Luzon

AMG Skilled Hands Technological College, Inc.
Aurora State College of Technology
Aurora State College of Technology - Casiguran
Bataan General Hospital and Medical Center
Bataan Peninsula State University - Abucay
Bataan Peninsula State University - Dinalupihan
Bataan Peninsula State University - Orani
Bulacan Agricultural State College
Bulacan State University - Main
Bureau of Fisheries and Aquatic Resources Regional Office - Central Luzon
Research Outreach Station for Freshwater - National Freshwater Fisheries Technology Center - Region 3
Central Luzon College of Science and Technology - Olongapo City

Columban College - Olongapo City
Department of Agriculture Regional Office - Central Luzon
Department of Education Regional Office - Central Luzon
Department of Health Regional Office - Central Luzon
Department of Science and Technology Regional Office - Central Luzon
Department of Social Welfare and Development - Central Luzon
Don Honorio Ventura Technological State University - Main
Don Honorio Ventura Technological State University - Porac
Don Honorio Ventura Technological State University - Sto.Tomas
Gordon College
Holy Cross College - Pampanga
Jose B. Lingad General Memorial Hospital
La Consolacion University Philippines
Manuel V. Gallego Foundation Colleges
Maritime Academy of Asia and the Pacific
Mines and Geosciences Bureau Regional Office - Central Luzon
Nueva Ecija University of Science and Technology - Atate
Nueva Ecija University of Science and Technology - Gapan City Campus
Nueva Ecija University of Science and Technology - Main
Nueva Ecija University of Science and Technology - Peñaranda
Nueva Ecija University of Science and Technology - San Leonardo
Nueva Ecija University of Science and Technology - Sebani Estate Agricultural College
Nueva Ecija University of Science and Technology - Sumacab Campus
Nueva Ecija University of Science and Technology - Talavera
Our Lady of Fatima University-Pampanga
Pampanga State Agricultural University
Philippine Carabao Center
Philippine Carabao Center - Region 3
Philippine Center for Postharvest Development and Mechanization
Philippine Rice Research Institute
Philippine State College of Aeronautics - Pampanga Extension
Polytechnic University of the Philippines - Sta. Maria, Bulacan
Ramon Magsaysay Technological University - Ramon Magsaysay Polytechnic College
Sugar Regulatory Administration - Luzon Agricultural Research and Extension Center
Tarlac State University
Wesleyan University - Philippines Cabanatuan
Wesleyan University - Philippines Aurora

4A – CALABARZON
Adventist University of the Philippines
Batangas State University - Alangilan
Batangas State University - Lemery
Batangas State University - Lipa City
Batangas State University - Lobo
Batangas State University - Main
Batangas State University - Malvar
Batangas State University - Rosario
Calayan Educational Foundation
Cavite State University - Bacoor City Campus
Cavite State University - Cavite City Campus

Cavite State University - General Trias Campus
Cavite State University - Main
Colegio De San Juan De Letran - Calamba
Colegio ng Lungsod ng Batangas
Department of Health - Tagaytay City Treatment and Rehabilitation Center
Department of Health Regional Office - CALABARZON
Department of Science and Technology Regional Office - CALABARZON
Ecosystems Research and Development Bureau
First Asia Institute of Technology and Humanities
Forest Products Research and Development Institute
International Rice Research Institute
Laguna College of Business and Arts
Laguna State Polytechnic University - Los Baños
Laguna State Polytechnic University - Main
Laguna State Polytechnic University - San Pablo City
Laguna State Polytechnic University - Sta. Cruz
Laguna University
Los Baños National Crops Research and Development Center
Pambayang Kolehiyo ng Mauban
Philippine Carabao Center - Region 4A
Philippine Council for Agriculture, Forestry and Natural Resources Research and Development
Philippine Rice Research Institute - Los Banos
Philippine Society for Microbiology, Inc.
San Sebastian College - Recoletos de Cavite
Sanctuario Nature Farms Corp.
Southern Luzon State University
Southern Luzon State University - Alabat
Southern Luzon State University - Gumaca Campus
Southern Luzon State University - Lucena
Southern Luzon State University - Tagkawayan
Southern Luzon State University - Tiaong Campus
St. Joseph College - Cavite City
Trimex Colleges
University of Batangas
University of Batangas - Lipa
University of Perpetual Help System Dalta - Molino Campus
University of Rizal System - Angono
University of Rizal System - Antipolo
University of Rizal System - Binangonan
University of Rizal System - Tanay
University of Rizal System - Taytay
University of the Philippines - Open University
University of the Philippines Los Baños
University of the Philippines Los Baños Foundation, Inc.

4B – MIMAROPA

Bureau of Fisheries and Aquatic Resources Regional Office - MIMAROPA
Divine Word College of Calapan
Kabalikat Para sa Dios at Bayan (KADBAYAN)
Marinduque State College - Main Campus

Marinduque State College - Sta. Cruz Campus
Marinduque State College - Torrijos Campus
Mindoro State College of Agriculture and Technology - Bongabong Campus
Occidental Mindoro State College
Occidental Mindoro State College - Labangan Campus
Occidental Mindoro State College - Sablayan Campus
Palawan Polytechnic College
Palawan State University
Palawan State University - Balabac
Palawan State University - Coron
Palawan State University - Cuyo
Palawan State University - Narra
Palawan State University - Roxas
Palawan State University - Sofronio Española
Palawan State University - Taytay
Philippine Rice Research Institute - Mindoro Satellite Station
Romblon State University - Calatrava Campus
Romblon State University - San Andres Campus
Romblon State University - Sta. Fe Campus
Romblon State University - Sta. Maria Campus
Western Philippines University
Western Philippines University - Busuanga
Western Philippines University - Culion
Western Philippines University - El Nido
Western Philippines University - Puerto Princesa

5 – Bicol Region
Aemilianum College
Ateneo de Naga University
Bicol Regional Training and Teaching Hospital
Bicol University - Main
Bureau of Fisheries and Aquatic Resources Regional Office - Bicol Region
Regional Fisheries Research and Development Center
Regional Fisheries Training Center
Camarines Norte State College - Main
Camarines Norte State College - Mercedes Campus
Camarines Norte State College - Panganiban Campus
Central Bicol State University of Agriculture - Sipocot
Department of Agriculture Regional Office - Bicol Region
Albay Research Outreach Station
Department of Education Regional Office - Bicol Region
Department of Health Regional Office - Bicol Region
Department of Social Welfare and Development - Bicol Region
Divine Word College of Legazpi
Dr. Emilio B. Espinosa, Sr. Memorial State College of Agriculture and Technology
Fiber Industry Development Authority - Region 5
Mabini Colleges
Mariners' Polytechnic Colleges Foundation of Canaman
Mines and Geosciences Bureau - Region 5
Partido State University - Caramoan Campus

Partido State University - Main
Partido State University-Sagñay Campus
Philippine Coconut Authority - Albay Research Center - Region 5
Philippine Rice Research Institute - Bicol
Polytechnic University of the Philippines – Ragay

6 – Western Visayas
Aklan State University - Kalibo Campus
Aklan State University - Makato
Bureau of Fisheries and Aquatic Resources Regional Office - Western Visayas
Bureau of Plant Industry - La Granja National Crop Research, Development and Production Support Center
Bureau of Plant Industry - National Mango Research and Development Center
Capiz State University - Dumarao Campus
Capiz State University - Main
Capiz State University - Poblacion Mambusao
Carlos Hilado Memorial State College - Bacolod Campus
Carlos Hilado Memorial State College - Main
Central Philippine State University - Cauayan Campus
Central Philippine State University - Hinigaran Campus
Central Philippine State University - Ilog Campus
Central Philippine State University - Main Campus
Central Philippine State University - Moises Padilla Campus
Central Philippine State University - Victorias City Campus
Central Philippine University
Colegio de la Purisima Concepcion
Corazon Locsin Montelibano Memorial Regional Hospital
Department of Agriculture Regional Office - Western Visayas
Department of Education Regional Office - Western Visayas
Department of Health Regional Office - Western Visayas
Department of Science and Technology Regional Office - Western Visayas
Department of Social Welfare and Development - Western Visayas
Guimaras State College - Baterna Campus
Guimaras State College - Main
Iloilo City Community College
Iloilo Science and Technology University - Barotac Nuevo Campus
Iloilo Science and Technology University - Dumangas Campus
Iloilo Science and Technology University - Main
Iloilo Science and Technology University - Miagao Campus
Iloilo State College of Fisheries - San Enrique Campus
International Care Ministries Foundation, Inc.
John B. Lacson Colleges Foundation - Bacolod
John B. Lacson Foundation Maritime University - Molo
Julio and Florentina Ledesma Foundation, Inc.
La Consolacion College - Bacolod
Mines and Geosciences Bureau Regional Office - Western Visayas
Northern Iloilo Polytechnic State College - Ajuy Campus
Northern Iloilo Polytechnic State College - Concepcion Campus
Northern Iloilo Polytechnic State College - Estancia, Iloilo
Northern Iloilo Polytechnic State College - Lemery Campus
Office of the Provincial Agriculturist - Province of Negros Occidental

Office of the Provincial Agriculturist - San Jose, Antique
Philippine Carabao Center at La Carlota Stock Farm
Philippine Carabao Center at Visayas State University
Philippine Carabao Center at West Visayas State University
Philippine Normal University - Cadiz
Philippine Rice Research Institute - Negros
Philippine Sugar Research Institute Foundation Experiment Station
St. Paul University of Iloilo
STI College - Kalibo
Sugar Regulatory Administration - Bacolod
Sugar Regulatory Administration - La Carlota City
Technological University of the Philippines - Visayas
University of Antique - Tario Lim Antique School of Fisheries
University of Negros Occidental-Recoletos
University of Saint La Salle
University of San Agustin
West Visayas State University - Calinog Campus
West Visayas State University - Himamaylan Campus Extension
West Visayas State University - Lambunao Campus
West Visayas State University - Main
West Visayas State University Medical Center
Western Institute of Technology

7 – Central Visayas
Bohol Island State University - Balilihan Campus
Bohol Island State University - Calape Polytechnic College
Bohol Island State University - Candijay
Bohol Island State University - Clarin
Bohol Island State University - Tagbilaran
Bureau of Fisheries and Aquatic Resources Regional Office - Central Visayas
Bureau of Learning Resources
Cebu Institute of Technology-University
Cebu Normal University
Cebu Normal University - Balamban
Cebu Normal University - Medellin
Cebu Technological University - Barili Campus
Cebu Technological University - Moalboal Campus
Cristal e-College (Panglao Campus)
Department of Agriculture Regional Office - Central Visayas
Department of Education Regional Office - Central Visayas
Department of Health Regional Office - Central Visayas
Department of Science and Technology Regional Office - Central Visayas
Department of Social Welfare and Development - Central Visayas
Foundation University
Mater Dei College-Bohol
Mines and Geosciences Bureau Regional Office - Central Visayas
Negros Oriental State University - Main Campus
Philippine Carabao Center at Ubay Stock Farm
Philippine Fiber Industry Development Authority - Region 7
Siquijor State College

Southwestern University PHINMA
University of Bohol
University of San Carlos
University of the Visayas - Gullas College Minglanilla Campus
University of the Visayas - Mandaue Campus
Velez College
Vicente Sotto Memorial Medical Center

8 – Eastern Visayas
Asian Development Foundation College
Bureau of Fisheries and Aquatic Resources Regional Office - Eastern Visayas
Department of Agriculture Regional Office - Eastern Visayas
Abuyog Experiment Station
Babatngon Experiment Station
San Jorge Experiment Station
Department of Education Regional Office - Eastern Visayas
Department of Health Regional Office - Eastern Visayas
Department of Science and Technology Regional Office - Eastern Visayas
Department of Social Welfare and Development - Eastern Visayas
Eastern Samar State University
Eastern Samar State University - Can-Avid Campus
Eastern Samar State University - Guiuan Campus
Eastern Samar State University - Salcedo Campus
Eastern Visayas State University
Eastern Visayas State University - Burauen Campus
Eastern Visayas State University - Carigara Campus
Eastern Visayas State University - Ormoc Campus
Leyte Normal University
Mines and Geosciences Bureau Regional Office - Eastern Visayas
Northern Samar Colleges
Palompon Institute of Technology
Palompon Institute of Technology - Tabango Campus
Philippine Fiber Industry Development Authority - Region 8
Philippine Rice Research Institute - Samar Satellite Station
Philippine Science High School - Eastern Visayas Campus
Saint Paul School of Professional Studies
Samar State University
Southern Leyte State University
University of Eastern Philippines
University of Eastern Philippines - Laoang Campus
University of the Philippines Manila (Palo Leyte)
Visayas State University - Alang-Alang Campus
Visayas State University - Tolosa Campus
Visayas State University - Villaba Campus

9 – Zamboanga Peninsula
Andres Bonifacio College
Bureau of Fisheries and Aquatic Resources Regional Office - Zamboanga Peninsula
Department of Agriculture Regional Office - Zamboanga Peninsula
Department of Education Regional Office - Zamboanga Peninsula

Department of Health Regional Office - Zamboanga Peninsula
Department of Science and Technology Regional Office - Zamboanga Peninsula
Dipolog City Institute of Technology
Fiber Industry Development Authority - Region 9
Josefina H. Cerilles State College
Josefina H. Cerilles State College - Canuto M.S. Enerio College of Arts and Trades
Josefina H. Cerilles State College - Dumingag
Josefina H. Cerilles State College - Guipos
Josefina H. Cerilles State College - Josefina
Josefina H. Cerilles State College - Kumalarang
Josefina H. Cerilles State College - Margosatubig
Josefina H. Cerilles State College - Molave Annex
Josefina H. Cerilles State College - Ramon Magsaysay
Josefina H. Cerilles State College - San Pablo
Josefina H. Cerilles State College - Sominot
Josefina H. Cerilles State College - Tabina
Josefina H. Cerilles State College - Tukuran
Mines and Geosciences Bureau Regional Office - Zamboanga Peninsula
Philippine Carabao Center at Mindanao Livestock Production Complex
Philippine Coconut Authority - Zamboanga Research Center
Philippine Rice Research Institute - Zamboanga Satellite Station
Philippine Technological and Marine Sciences - Zamboanga del Sur
Saint Vincent's College
Universidad de Zamboanga
Universidad de Zamboanga - Ipil
Western Mindanao State University
Western Mindanao State University - Alicia
Western Mindanao State University - Curuan
Western Mindanao State University - Imelda
Western Mindanao State University - Ipil
Western Mindanao State University - Olutanga
Zamboanga City State Polytechnic College
Zamboanga City State Polytechnic College - Kabasalan
Zamboanga City State Polytechnic College Extension Program at Ayala Technical Vocational School
Zamboanga City State Polytechnic College Extension Program at Vitali Technical Vocational School

10 – Northern Mindanao

Bukidnon State University - Kadingilan
Bukidnon State University - Libona
Bukidnon State University - Medina ESC
Bukidnon State University - Talisayan ESC
Bureau of Fisheries and Aquatic Resources Regional Office - Northern Mindanao
Capitol University
Central Mindanao University
Central Mindanao University Hospital
Department of Agriculture Regional Office - Northern Mindanao
Research Center for Upland Development
Malaybalay Stock Farm
Northern Mindanao Agricultural Crops and Livestock Research Complex
Regional Crop Protection Center

Department of Health Regional Office - Northern Mindanao
Department of Science and Technology Regional Office - Northern Mindanao
DepEd Regional Office - Northern Mindanao
Fiber Industry Development Authority - Region 10
La Salle University
Lourdes College
Mindanao State University - Lanao Del Norte Agricultural College
Mindanao State University - Maigo School of Arts and Trades
Mines and Geosciences Bureau Regional Office - Northern Mindanao
Misamis University
Misamis University - Oroquieta City
Northern Mindanao Medical Center
Northwestern Mindanao State College of Science and Technology
Our Lady of Triumph Institute of Technology
Research Institute for Mindanao Culture
St. Michael's College
University of Science and Technology of Southern Philippines
University of Science and Technology of Southern Philippines - Claveria
Xavier Science Foundation, Inc.

11 – Davao Region
Ateneo de Davao University
Brokenshire College
Compostela Valley State College-Maragusan Branch
Compostela Valley State College-New Bataan Branch
Cor Jesu College
Crocodylus Porosus Philippines, Inc.
Davao del Norte State College
Davao National Crop Research and Development Center
Davao Oriental State College of Science and Technology
Davao Oriental State College of Science and Technology-Banaybanay Campus
Davao Regional Medical Center
Department of Agriculture Regional Office - Davao Region
Department of Health Regional Office - Davao Region
Department of Science and Technology Regional Office - Davao Region
Department of Social Welfare and Development Regional Office - Davao Region
Fiber Industry Development Authority - Region 11
Mindanao Kokusai Daigaku
Mines and Geosciences Bureau Regional Office - Davao Region
People Collaborating for Environmental and Economic Management in Davao Foundation, Inc.
Philippine Coconut Authority - Davao Research Center
Philippine Eagle Conservation Program Foundation, Inc.
Southern Mindanao Analytical Laboratories Consortium c/o Davao City Water District
Southern Philippine Adventist College
Southern Philippines Agriculture, Business, Marine and Aquatic School of Technology
St. Mary's College of Tagum
Tagum Doctors College
University of Mindanao - Panabo College
University of Mindanao - Main
University of Mindanao Peñaplata College

University of Mindanao Tagum College
University of Southeastern Philippines-College of Agriculture - Tagum Mabini
University of Southeastern Philippines-Main
University of the Philippines Mindanao
Yamog Renewable Energy Foundation, Inc.

12 – SOCCSKSARGEN

Bureau of Fisheries and Aquatic Resources Regional Office - SOCCSKSARGEN
Cotabato City State Polytechnic College
Cotabato Foundation College of Science and Technology - Antipas Campus
Cotabato Foundation College of Science and Technology - Katipunan Campus
Cotabato Foundation College of Science and Technology - Pikit Campus
Cotabato Regional and Medical Center
Department of Agriculture Regional Office - SOCCSKSARGEN
Balindog Research and Experiment Station
Amas Research and Experiment Station
Aroman Research and Experiment Station
Department of Education Regional Office - SOCCSKSARGEN
Department of Health Regional Office - SOCCSKSARGEN
Department of Science and Technology Regional Office - SOCCSKSARGEN
Mahintana Foundation, Inc.
Mindanao State University - General Santos
Mines and Geosciences Bureau Regional Office - SOCCSKSARGEN
Notre Dame Educational Association, Inc.
Notre Dame University
Philippine Carabao Center at University of Southern Mindanao
Philippine Rice Research Institute - Region 12
Ramon Magsaysay Memorial College - Marbel
STI College - Gen. Santos
Sultan Kudarat State University
Sultan Kudarat State University - Access
Sultan Kudarat State University - Bagumbayan
Sultan Kudarat State University - Glan
Sultan Kudarat State University - Lutayan
Sultan Kudarat State University - SNA
University of Southern Mindanao - Kidapawan City Campus
University of Southern Mindanao - Main

National Capital Region

Advanced Science and Technology Institute
Air Force Research and Development Center
Army Support Command Research and Development Center
Asian Institute of Maritime Studies
Ateneo de Manila University - Quezon City
Ateneo Graduate School of Business
Ateneo Law School
Ateneo School of Government
Ateneo School of Medicine and Public Health
John Gokongwei School of Management
School of Humanities

School of Science and Engineering
School of Social Sciences
Biodiversity Management Bureau
Bureau of Animal Industry
Bureau of Fisheries and Aquatic Resources Regional Office - CALABARZON
Regional Fisheries Training and Fisherfolk Coordination Division
Bureau of Fisheries and Aquatic Resources Regional Office - NCR
Bureau of Jail Management and Penology
Bureau of Local Employment
Bureau of Plant Industry
Bureau of Soils and Water Management
Centro Escolar University - Makati
Centro Escolar University - Manila
Climate Change Commission
Cottage Industry Technology Center (CITC)
Culion Foundation, Inc.
Dangerous Drugs Board
De La Salle University - Manila
Demographic Research and Development Foundation, Inc.
Department of Agriculture Regional Office - MIMAROPA
Department of Agriculture Regional Office - CALABARZON
Department of Agriculture Regional Office - NCR
Department of Energy
Department of Health Regional Office - MIMAROPA
Department of Health Regional Office - NCR
Department of Public Works and Highways
Bureau of Research and Standards
Department of Science and Technology Regional Office - MIMAROPA
Department of Science and Technology Regional Office - NCR
Department of Science and Technology - Central Office
Department of Social Welfare and Development - NCR
Department of Trade and Industry - NCR
Department of Education Regional Office - NCR
Schools Division Office - Caloocan City
Schools Division Office - Las Piñas City
Schools Division Office - Makati City
Schools Division Office - Malabon City
Schools Division Office - Mandaluyong City
Schools Division Office - Manila City
Schools Division Office - Marikina City
Schools Division Office - Muntinlupa City
Schools Division Office - Navotas City
Schools Division Office - Parañaque City
Schools Division Office - Pasig City
Schools Division Office - Quezon City
Schools Division Office - San Juan City
Schools Division Office - Valenzuela City
Design Center of the Philippines
Electronic Industries Association of the Philippines, Inc.
Environmental Management Bureau

Far Eastern University
Food and Nutrition Research Institute
Foreign Service Institute
Forest Management Bureau
Governance Commission for GOCCs
Health Futures Foundation, Inc.
Industrial Technology Development Institute
Intramuros Administration
Komisyon ng Wikang Filipino
Las Piñas General Hospital and Satellite Trauma Center
Local Government Academy
Lung Center of the Philippines
Mapua University-Makati
Mapua University-Manila
Marie Eugenie Institute, Inc.
Marikina Polytechnic College
Metals Industry Research and Development Center
Mines and Geosciences Bureau
Mines and Geosciences Bureau Regional Office - CALABARZON
Mines and Geosciences Bureau Regional Office - MIMAROPA
National Book Development Board
National Dairy Authority
National Economic and Development Authority - Central office
National Food Authority
Technology Research Development Department
National Kidney and Transplant Institute
National Maritime Polytechnic
National Research Council of the Philippines
National Tobacco Administration
Nutrition Foundation of the Philippines, Inc.
Occupational Safety and Health Center
Oscar M. Lopez Center for Climate Change Adaptation and Disaster Risk Management Foundation, Inc.
Pamantasan ng Lungsod ng Pasig
Philippine Atmospheric, Geophysical and Astronomical Services Administration
Philippine Children's Medical Center
Philippine Coconut Authority
Philippine Council for Industry, Energy and Emerging Technology Research and Development
Philippine Fiber Industry Development Authority
Philippine Fiber Industry Development Authority - Region 4
Philippine Heart Center
Philippine Institute for Development Studies
Philippine Institute of Pure and Applied Chemistry
Philippine Institute of Volcanology and Seismology
Philippine Nuclear Research Institute
Philippine Social Science Council Inc.
Philippine Statistical Research and Training Institute
Philippine Statistics Authority - Central Office
Philippine Textile Research Institute
Philippine Tuberculosis Society, Inc.
Polytechnic University of the Philippines

Rizal Technological University-Pasig
Saint Pedro Poveda College
Science Education Institute
St. Scholastica Research and Development Foundation, Inc.
St. Scholastica's College
Sugar Regulatory Administration
Systems Plus Computer College - Quezon City
Technological University of the Philippines - Manila
Technological University of the Philippines - Taguig
Technology Application and Promotion Institute
The Philippine Women's University - Manila
Tourism Promotions Board Philippines
University of Santo Tomas
University of the East Caloocan
University of the Philippines - Philippine General Hospital
University of the Philippines Diliman
Asian Center
Cesar E.A. Virata School of Business
College of Education
College of Human Kinetics
College of Music
College of Social Work and Community Development
Marine Science Institute
Office of the Vice Chancellor for Community Affairs
School of Labor and Industrial Relations
School of Library and Information Studies
University of the Philippines Foundation, Inc.
University of the Philippines Manila
University of the Philippines Planning and Development Research Foundation, Inc.
Valenzuela Medical Center
WeatherPhilippines Foundation, Inc.

Cordillera Administrative Region
Abra State Institute of Science and Technology - Bangued
Abra State Institute of Science and Technology - Main
Benguet State University-Main
Benguet State University-Open University
Bureau of Fisheries and Aquatic Resources Regional Office - CAR
Bureau of Plant Industry - Baguio National Crop Research, Development, and Production Support Center
Bureau of Plant Industry Regional Office - CAR
Department of Agriculture Regional Office - CAR
Cordillera Integrated Agricultural Research Center
Department of Education Regional Office - CAR
Department of Health Regional Office - CAR
Department of Science and Technology Regional Office - CAR
Department of Social Welfare and Development - CAR
Kalinga State University-Dagupan
Kalinga State University-Main
Mines and Geosciences Bureau Regional Office - CAR
Mountain Province State Polytechnic College-Main

Philippine Fiber Industry Development Authority - Region 1
Philippine Statistics Authority - CAR
University of the Philippines Baguio
Cordillera Studies Center

Autonomous Region in Muslim Mindanao
Bureau of Fisheries and Aquatic Resources Regional Office - Autonomous Region of Muslim Mindanao
Cotabato Foundation College of Science and Technology - Datu Montawal Campus
Department of Education Regional Office - ARMM
Ministry of Science and Technology
Mindanao State University - Main
Mindanao State University - Tawi-Tawi College of Technology and Oceanography
Notre Dame of Jolo College
Sulu State College

Caraga
Agusan Colleges
Bureau of Fisheries and Aquatic Resources Regional Office - CARAGA Region
Cooperative Development Authority Regional Office - Caraga Region
Department of Agriculture Regional Office - CARAGA Region
Department of Health Regional Office - Caraga
Department of Science and Technology Regional Office - Caraga Region
Department of Social Welfare and Development Regional Office - Caraga Region
DepEd Regional Office - Caraga Region
Mines and Geosciences Bureau Regional Office - Caraga
Philippine Carabao Center at Central Mindanao University
Philippine Fiber Industry Development Authority - Region 13
Philippine Normal University-Mindanao Campus
Philippine Rice Research Institute - Field Office Bukidnon
Philippine Rice Research Institute - Agusan
Surigao del Norte College of Agriculture and Technology
Surigao Del Sur State University - Cagwait
Surigao Del Sur State University - Cantilan
Surigao Del Sur State University - Lianga
Surigao Del Sur State University - Main
Surigao Del Sur State University - San Miguel
Surigao Del Sur State University - Tagbina
Surigao Education Center
Surigao State College of Technology - Main
Surigao State College of Technology - Malimono
University of Southeastern Philippines - Bislig Campus

Acronyms

ADB	Asian Development Bank
ARMM	Autonomous Region in Muslim Mindanao
ASPBI	Annual Survey of Philippine Business and Industry
BPI	Bureau of Plant Industry
CALABARZON	Cavite, Laguna, Batangas, Rizal, and Quezon
CAR	Cordillera Administrative Region
CHED	Commission on Higher Education
CPBI	Census of Philippine Business and Industry
DA	Department of Agriculture
DOH	Department of Health
DOST	Department of Science and Technology
FTE	full-time equivalent
GDP	gross domestic product
GERD	gross expenditure on research and development
GRDP	gross Regional Domestic Product
HC	headcount
HEI	higher education institution
ICT	information and communications technology
INSTAT	Institute of Statistics
MIMAROPA	Mindoro, Masbate, Romblon, and Palawan
MOOE	maintenance and other operating expenses
NCR	National Capital Region
NGO	non-government organization
NRCP	National Research Council of the Philippines
OECD	Organisation for Economic Co-operation and Development
PCAARRD	Philippine Council for Agriculture, Aquatic and Natural Resources Research and Development
PCIEERD	Philippine Council for Industry, Energy and Emerging Technology Research and Development
PCNC	Philippine Council for NGO Certification
PNPI	private non-profit institution
PSA	Philippine Statistics Authority
PSCED	Philippine Standard Classification of Education
R&D	research and D]development
SDG	sustainable development goal
SEO	socio-economic objectives
Soccsksargen	South Cotabato, Cotabato, Sultan Kudarat, Sarangani, and General Santos
TSL	Taylor series linearization
UIS	UNESCO Institute for Statistics
UN	United Nations
UNESCO	United Nations Educational, Scientific and Cultural Organization
UPLB	University of the Philippines Los Baños

CHAPTER 1

Updating the Philippines' Research and Development Indicators

Technological innovation has propelled the economic progress of countries that initiated and those that further enhanced them. These technologies were usually developed through research to improve efficiency and the quality of outputs. Research and development (R&D) results in new knowledge, techniques, and technologies that can increase productivity and also widen the perspectives and provide insights for the betterment of the population and environment.

As part of the Sustainable Development Goal (SDG) Agenda 2030, countries including the Philippines, have pledged to "build resilient infrastructure, promote inclusive and sustainable industrialization and foster innovation" (UIS, 2020). SDG Target 9.5 calls upon countries to "enhance scientific research, upgrade technological capabilities of industrial sectors" and in particular for developing countries, to encourage innovation and substantially increase research and development outputs. To achieve this target, governments must craft policies, programs and projects that could bring about substantial increase in R&D.

Good data support system is needed to formulate effective policies, programs and projects that foster research and development. The magnitude of inputs to R&D in terms of personnel and expenditures and their focus on various sectors, scientific fields and other categories of classifications are used as basis for planning and monitoring. The government, as well as the private sector, would also need to allocate their resources so that their desired R&D levels can be achieved effectively. These resources are investments that, in the long term, are expected to result in further economic development. For these important tasks, policy makers need data on the level of expenditure on various types of research areas and the total number of different types of R&D personnel for evidence-based decision making.

Usually, R&D data are fragmented within an institution with in-house research. Expenditures on R&D can be captured from the accounting system while personnel data can be collected through the human resources office of an institution. The responsibility for compiling R&D data may not also be well-defined within an institution and through the government hierarchy. Hence, the use of administrative records based on the accounting system and personnel records have not been explored well until 2003 when the Department of Science and Technology (DOST) started to conduct the Survey on Research and Development Expenditures and Personnel (R&D Surveys).

There are government agencies, higher education institutions (HEIs), private non-profit institutions (PNPIs), and the business and industry sectors that conduct research. As shown in Figure 1.1, in addition to their own funds, these institutions may obtain their respective R&D funding from various sources like the government, private sector, foreign and other sources. The target population of the R&D Surveys are institutions that conduct in-house research for the given reference period. There is no separate survey for the sources of funds. DOST collects R&D data from government, HEIs and PNPIs, while the Philippine Statistics Authority (PSA), gathers R&D data from the business and industry sector through two questions in the Annual Survey of Philippine Business and Industry (ASPBI). DOST, using both the results of the R&D surveys that it conducts and those from ASPBI, provides national and sub-national estimates of total R&D expenditure and number of personnel in R&D. These data items are used in estimating R&D indicators for crafting and monitoring R&D policies both at the country and regional levels.

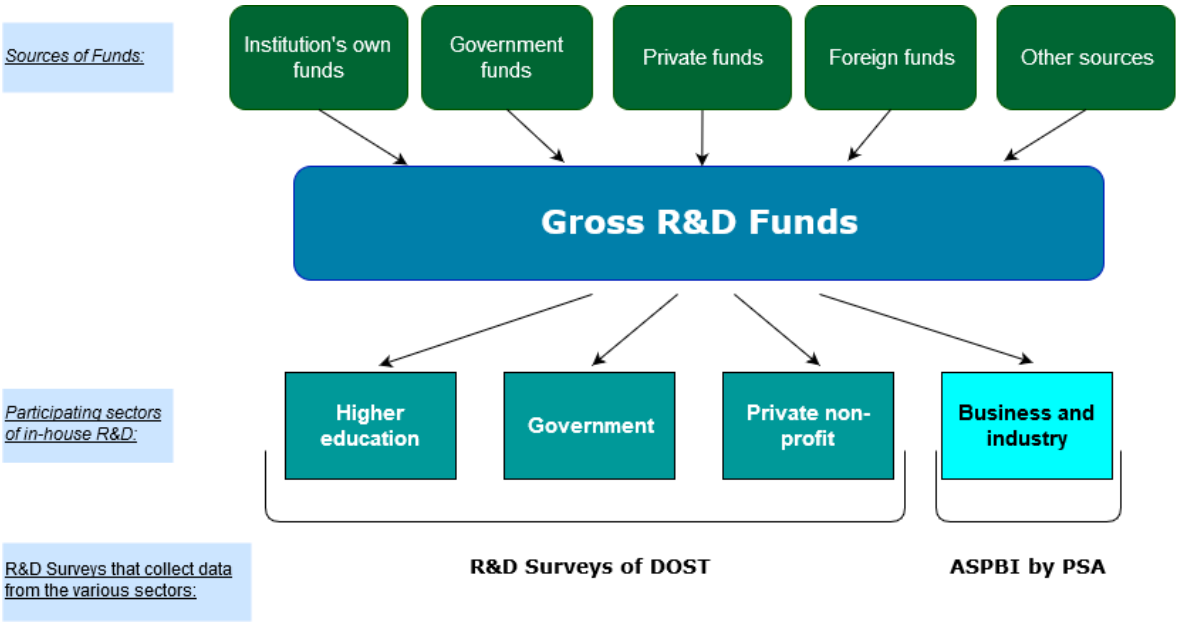


Figure 1.1. Fund Sources and Types of Institutions that Conduct In-house Research.

In recognition of the importance of good quality data support system for effective policies and programs, DOST commissioned the Institute of Statistics (INSTAT) of the University of the Philippines Los Baños (UPLB) to conduct the 2018 R&D Survey and in the process, develop methods that can further improve the design and general operations of the R&D surveys in future rounds. INSTAT streamlined the questionnaire after careful study of the survey objectives, the model questionnaires from other countries and those recommended by international organizations. The development of the sampling frames for government agencies, HEIs, and PNPIs, the selection of samples, field operations, data processing and validation, and data analysis are described in detail in the Appendix A of this report.

This report presents the R&D indicators that were derived based on the 2018 R&D Survey and some data from the 2018 Census of Philippine Business and Industry (CPBI) in lieu of the results from the 2018 ASPBI that is yet to be published as of this writing. The use of the 2018 CPBI together with the 2018 R&D Survey in deriving estimates for total R&D personnel and expenditures is described in Appendix A. Results from previous survey rounds are also presented in this chapter so that relevant trends could be identified. Since the 2018 ASPBI is still forthcoming, the R&D statistics that will be presented in the succeeding

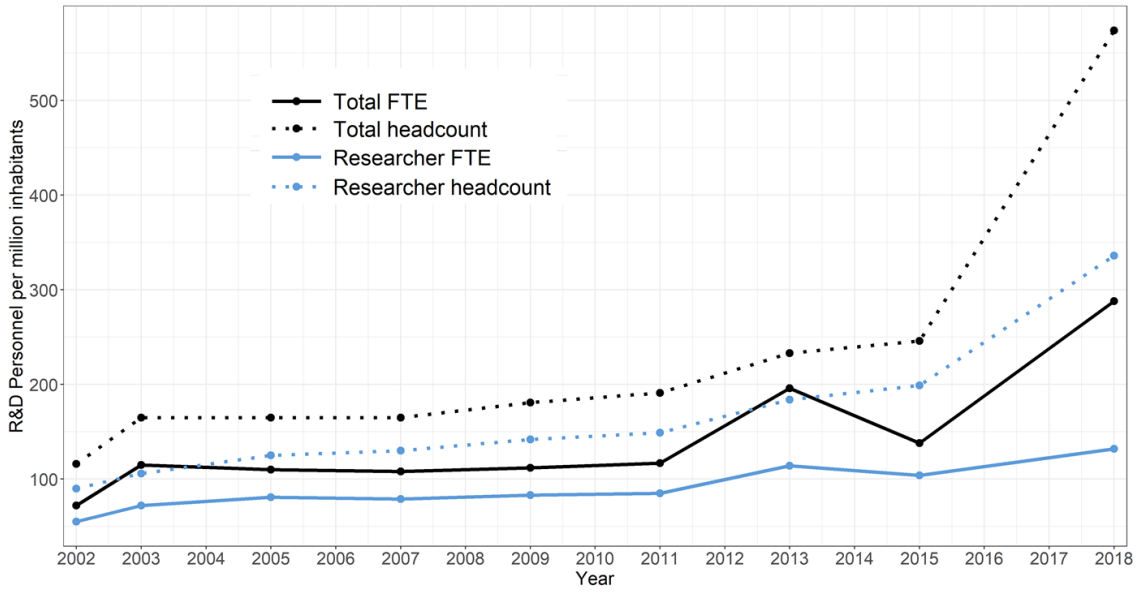
chapters will be based only on the three sectors that were covered by the survey — government, HEIs and PNPIs. Statistics on inputs like sources of funds and R&D personnel are discussed in chapters 2 and 3, respectively. Expenditures on R&D statistics are discussed in chapter 4 and the research outputs in terms of publication statistics are examined in chapter 5. Conclusions and recommendations are presented in the last chapter. Appendix A contains the methodological notes on the R&D Survey. All statistical tables are in Appendix B. The organization that planned and managed this survey is described in Appendix C.

R&D Personnel Indicators

R&D personnel are measured in terms of headcount (HC) and full-time equivalent (FTE) data. HC data are on the total number of persons who are mainly or partially employed in R&D. Headcount data are also the most appropriate measure for collecting additional information about R&D personnel, such as age group, gender, or highest educational attainment (UIS, 2014). On the other hand, FTE is used in counting the number of persons engaged in R&D since the degree of involvement of people in research varies. For some, R&D may be their primary function while for others, it could be a secondary function. For example, graduate faculty in HEIs usually divide their time across three functions – research, instruction, and extension. If only those with R&D as primary function are counted, the resulting statistics will be an underestimate while if every one that does research is counted, regardless of time devoted to R&D, an overestimate would be obtained. Hence, FTE is considered to be a better measure of R&D personnel.

Indicators on R&D personnel are usually presented in terms of per million inhabitants to allow better comparison across areas and time, since population grows through time and differs across regions. The indicators that are presented in this chapter in figures are also summarized in Appendix Tables B1.1 to B1.4.

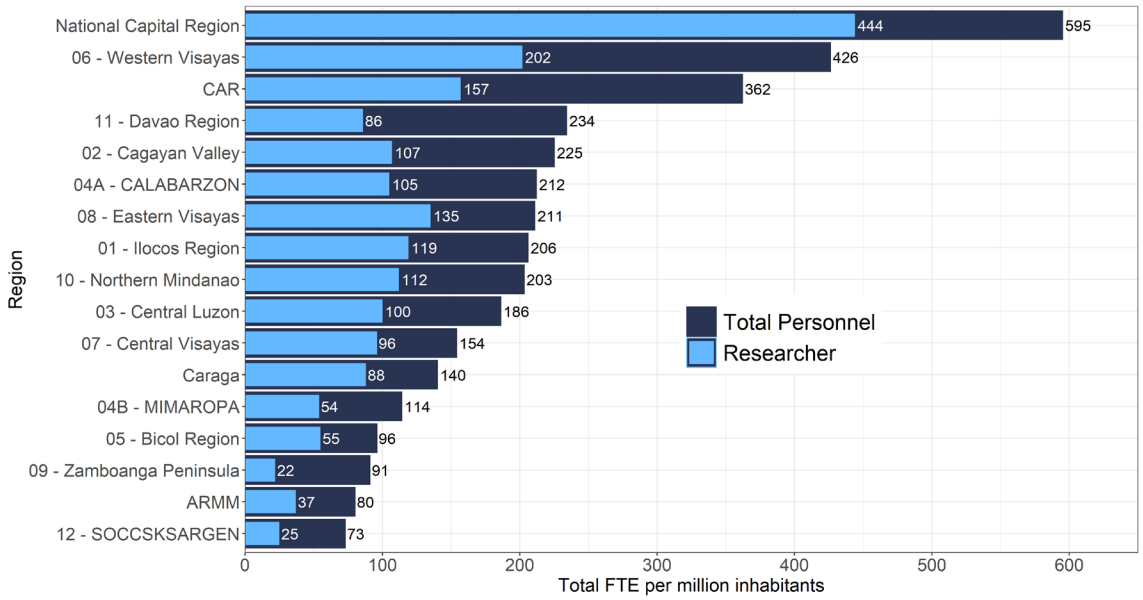
Figure 1.2 presents the FTE R&D personnel and researchers (per million inhabitants) through the years of R&D Surveys. The FTEs of all personnel and researchers increased substantially in 2013 from a fairly constant series in 2003-2011. However, there was a sharp decline for both FTEs in 2015 while substantial increases were achieved in 2018 for both the FTEs of R&D personnel and researchers.



Sources: 2018 R&D Survey and previous years, 2018 CBPI, 2015 ASPBI and previous years

Figure 1.2. Headcount and Full Time Equivalent of R&D Personnel and Researchers (per million inhabitants).

To examine R&D in the regions, the regional FTE total R&D personnel and researchers per million inhabitants are presented in Figure 1.3. The National Capital Region (NCR) has the highest density of both total R&D personnel and researchers, while SOCCSKSARGEN, Zamboanga Peninsula and ARMM have the least numbers of R&D personnel and researchers.



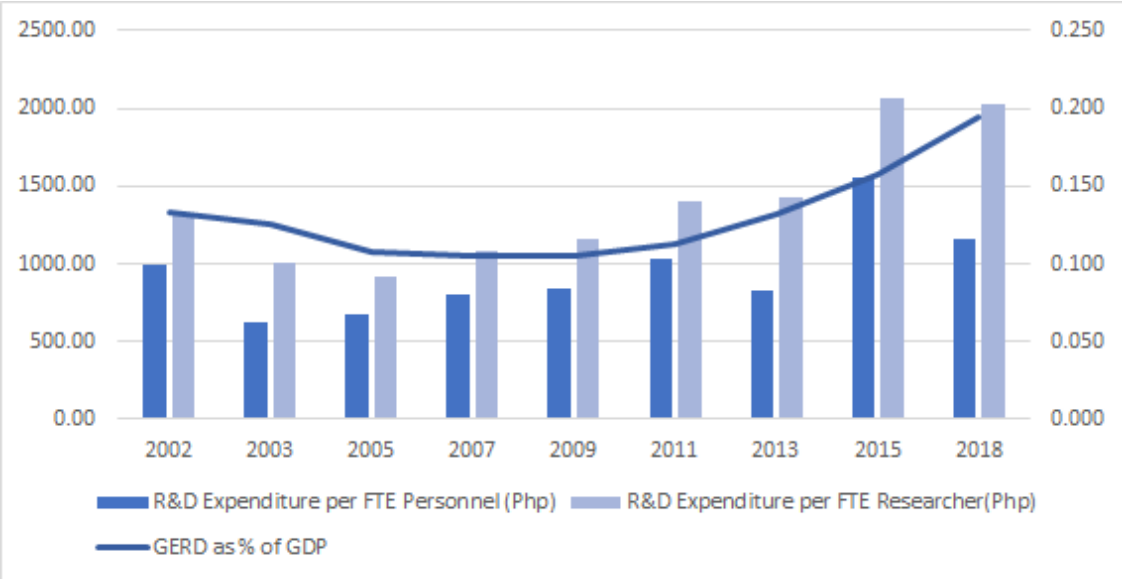
Source: 2018 R&D Survey

Figure 1.3. Total R&D Personnel and Researchers by region (per million inhabitants, 2018).

R&D Expenditures Indicators

R&D Expenditure includes expenditure funded from all sources – internal and external (contracts and grants) and undertaken by the institution (reporting unit) on its own behalf or for other parties. Gross expenditure on R&D (GERD) is a recommended aggregate for R&D expenditure. It is the total of intramural expenditure on R&D performed within the country during a reference period. Intramural expenditures are all expenditures for R&D performed within an institution (reporting unit) – whatever the source of funds. They also include expenditures made outside the institution but in support of in-house research. GERD is the total of the R&D expenditures of the four sectors – government, higher education, private non-profit and business and industry sectors. As previously indicated, because the 2018 ASPBI is not yet available, GERD was completed by using data from the 2018 CPBI.

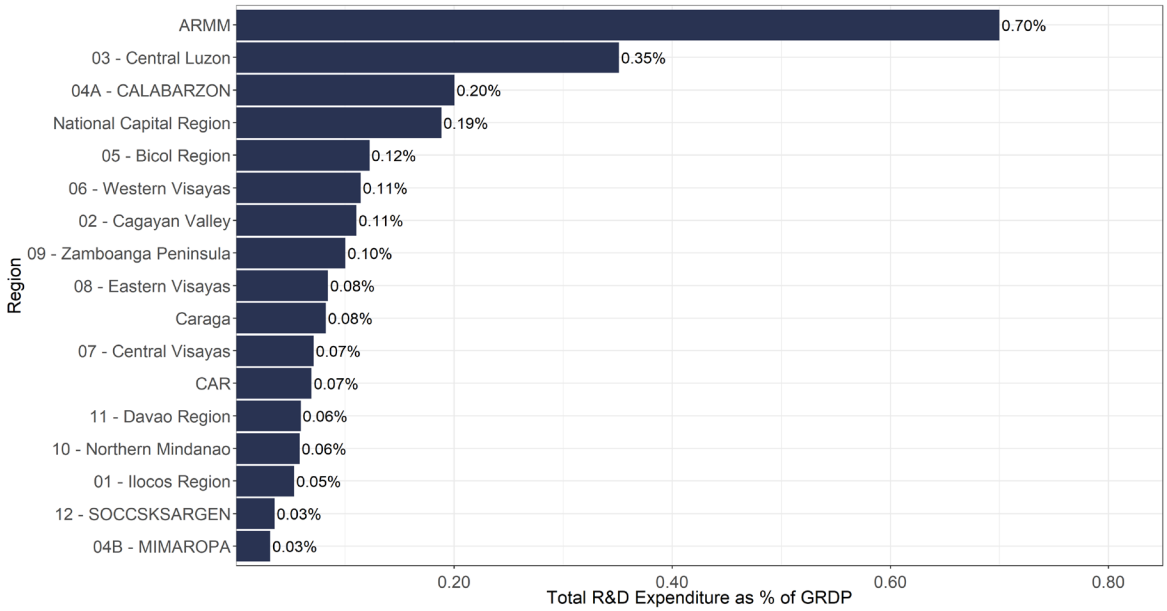
To compare our country's performance with others the indicator used is GERD as percent of the gross domestic product (GDP). Two other indicators used are the R&D expenditure per FTE R&D personnel and per researcher FTE. These indicators are shown in Figure 1.4. GERD as percent of GDP has increased steadily from 0.112 in 2011 to 0.194 in 2018. On the other hand, the R&D Expenditure per FTE personnel fluctuated in the same period with a substantial decrease in 2018. This is because the total R&D personnel in 2018 more than doubled from 2015 while total expenditure did not register a commensurate increase. The R&D expenditure per FTE researcher declined in 2013, rose in 2015 and held steady in 2018.



Sources: 2018 R&D Survey and previous years, 2018 CBPI, 2015 ASPBI and previous years

Figure 1.4. R&D Expenditure Indicators, 2002-2018.

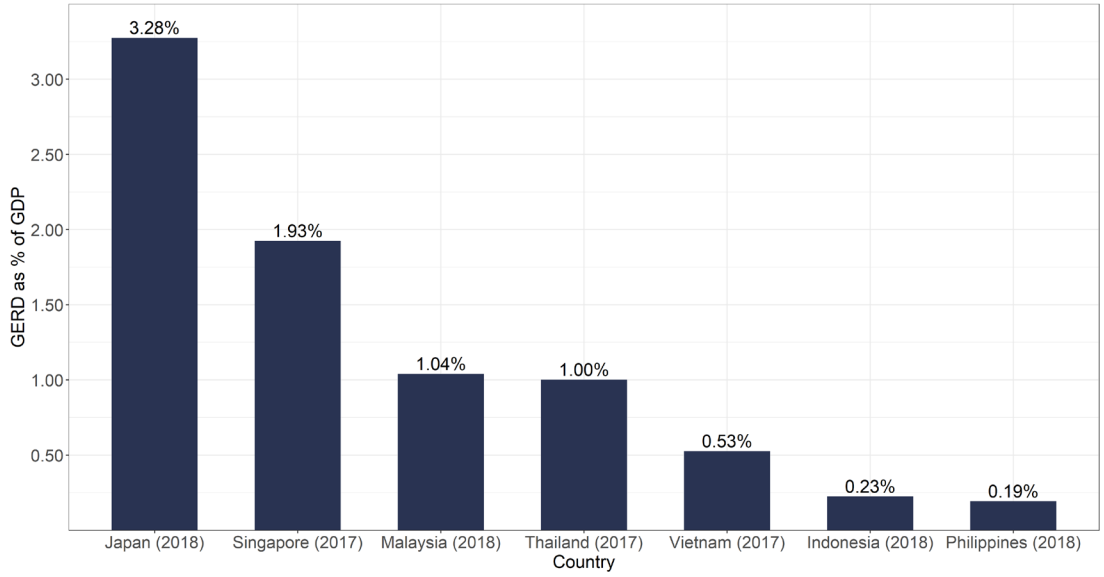
To monitor the regions' (subnational) performance, the region's total R&D expenditure as percent of the gross regional domestic product (GRDP) is used. As shown in Figure 1.5, ARMM followed by Central Luzon, has the highest total R&D expenditure as percent of GRDP while MIMAROPA and SOCCSKSARGEN have the lowest. ARMM registered the highest because its R&D expenditures are considerably large compared to its gross regional domestic product. This implies that research activities in ARRM are well-funded compared to other economic activities. CALABARZON garnered the third highest R&D expenditure as percent of GRDP.



Source: 2018 R&D Survey

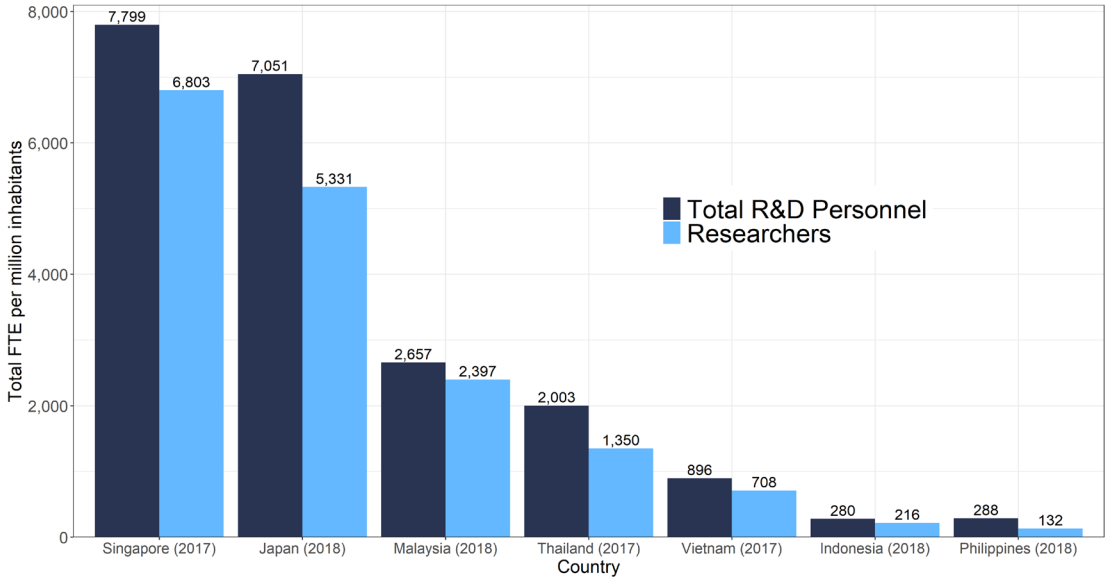
Figure 1.5. Total Regional R&D Expenditure as % of the Gross Regional Domestic Product.

GERD as % of GDP and Researchers in full-time equivalent per million inhabitants are two key indicators that are used to monitor the Sustainable Development Goals Target 9.5: Enhance scientific research, upgrade the technological capabilities and industrial sectors in all countries. The latest year values of these two indicators together with total R&D personnel per million inhabitants are presented in Appendix Table B1.5 for the Philippines and some of its neighboring countries, Indonesia, Japan, Malaysia, Singapore, Thailand. Figures 1.6 and 1.7 show that the Philippines is almost at par with Indonesia but lagging behind the rest of these countries on the basis of the indicators mentioned above.



Sources: UNESCO Database, 2018 R&D Survey, 2018 CPBI

Figure 1.6. GERD as Percent of GDP of Selected Asian Countries.



Sources: UNESCO Database, 2018 R&D Survey, 2018 CPBI

Figure 1.7. FTE of R&D Personnel per million inhabitants of Selected Asian Countries.

Note that the latest available estimates from other countries were either for 2017 or 2018. The Philippines FTE researchers per million inhabitants is an underestimate because it does not yet include the business and industry sector.

CHAPTER 2

Sources of Funds for Research and Development

Achieving successful R&D results requires resources and infrastructure. This chapter describes the sources of funds of institutions with R&D activities in 2018. These sources can be either internal, which are funds that came from the institution's budget, or external funds, which came from sources outside of the performing institutions (OECD, 2015). Monitoring the flow of funds from different sources could give insights on how the limited resources for R&D can be effectively managed. Areas for possible realignment may also be identified. For example, the government, as a significant investor in R&D, will be able to monitor and evaluate its budget appropriations and identify R&D performing sectors that need additional support.

In the 2018 R&D survey questionnaire, the respondents were asked for information on the breakdown of the total R&D expenditure according to the source of funds. To simplify the reporting procedure, only the percentages of the total R&D expenditure that were spent on each of the sources of funds were provided by the respondents. The sources listed in the survey instrument include the institution's own funds, other government funds, private funds, foreign funds, and other sources. Institution's own funds were later classified to the funding sector where the institution belongs. This resulted in the aggregation to four major sources of funds namely government, private, foreign, and other sources. Government funds consisted of the funds spent using the government budget and the public HEI's own funds. Private funds comprised those of the PNPIs and private HEIs in addition to the funds received from private sources like business enterprises. Both the sectoral and the regional distribution of the total R&D expenditures by sources of funds were estimated to facilitate comparison among the sectors and the regions, respectively.

To measure the flows of R&D funds in the country, from the funding sectors to the R&D performing sectors, the amount of funds received from each source was computed as the product of its estimated percentage with the total R&D expenditure of the sector. It should be noted that the resulting estimate of the flows of funds is an underestimate as it lacks information on the sources of funds for the business enterprise sector. ASPBI which is the source of the data for businesses and industries does not cover the sources of funds in its questionnaire. Although the results of the 2018 R&D Survey estimated the amount received by the government, HEI, and PNPI from the private funding, there is no available data on how much the business enterprise sector received from the government and other sectors, if any. It is then an assumption that the business enterprise sector financed their R&D and funded other sectors. In addition to measuring the flows of funds, the survey also asked the R&D performers on whether they provided funds to any R&D activity or project that was performed by other institutions. The distribution was then summarized according to the sector.

Figure 2.1 shows that the R&D activities of government institutions, including public HEIs were largely dependent on government funding. In the PNPI sector, most of the funds that PNPIs spent on their R&D came from the government and private sectors, with 60.4% and 32.6%, respectively. The largest share in R&D expenditure among public HEIs was the government funding with 94.7%. On the other hand, private HEIs used mostly their own funds on R&D activities.

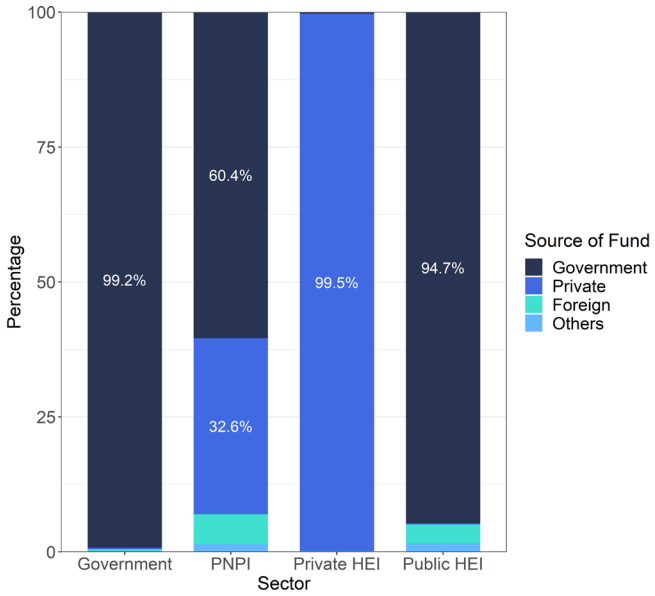


Figure 2.1. Percent Distribution of R&D Expenditures by Source of Funds.

Examining the R&D expenditure at the regional level showed that the government is the dominant funding source for all regions (see Figure 2.2).

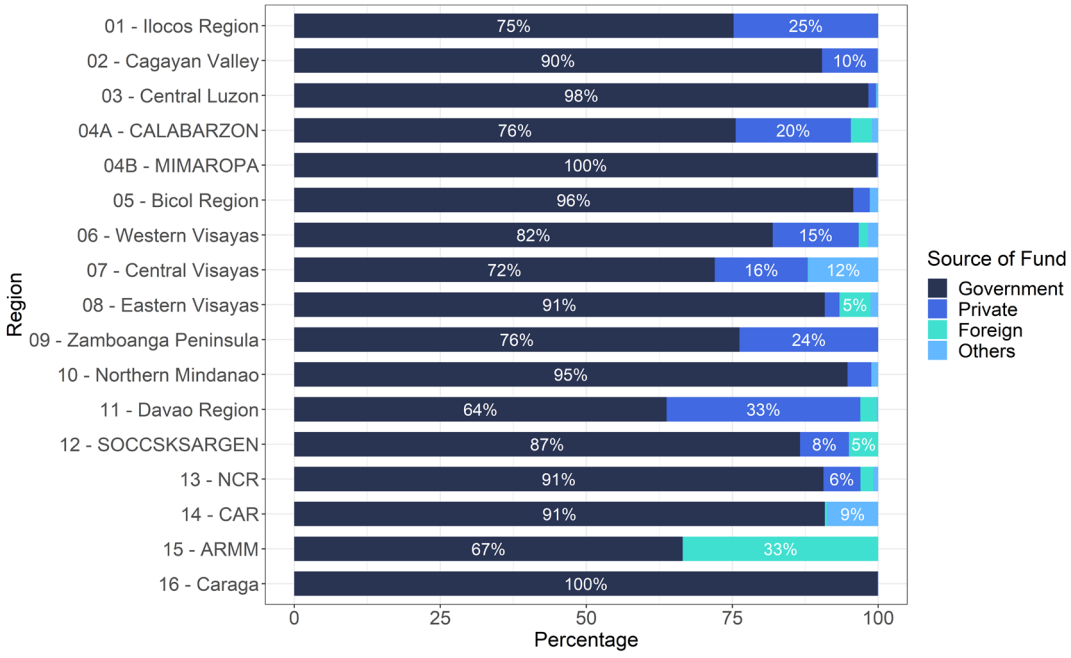


Figure 2.2. Regional R&D Expenditures by Source of Funds.

All regions also showed that the government sector mostly financed their R&D activities. For the PNPI sector, however, in the five regions that have PNPIs, the private sector was the leading source of funds for three— NCR, Western Visayas, and Davao and the government for CALABARZON. Public HEIs in all the regions used mostly government funds to conduct their research. On the other hand, R&D of private HEIs was self-financed in all regions except for Western Visayas where the government share was at 69.3% (see Figure 2.3). The details on the R&D fund sources by region are available in Appendix Tables B2.2 to B2.7

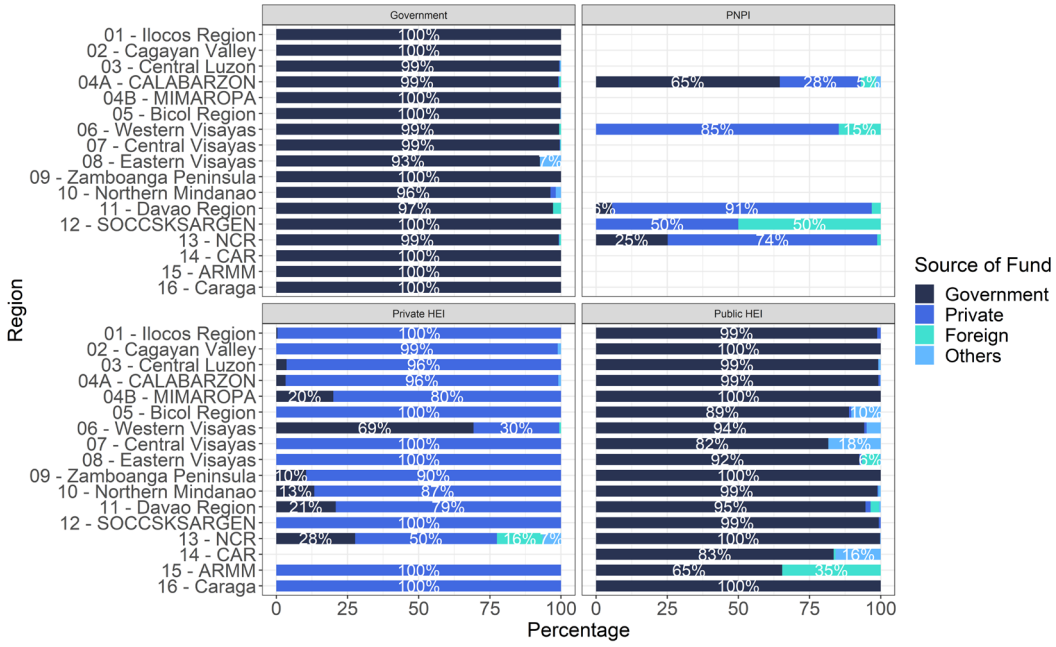


Figure 2.3. Regional R&D Expenditures by Source of Funds and Sector.

The heatmap in Figure 2.4 shows the flows of R&D funds. Each grid represents a flow from a funding source to a sector. A darker shade of a grid indicates more heat and hence, higher flow. The government sector provided most of the R&D investment (about Php 24.39 billion). Of which 37.2% financed R&D

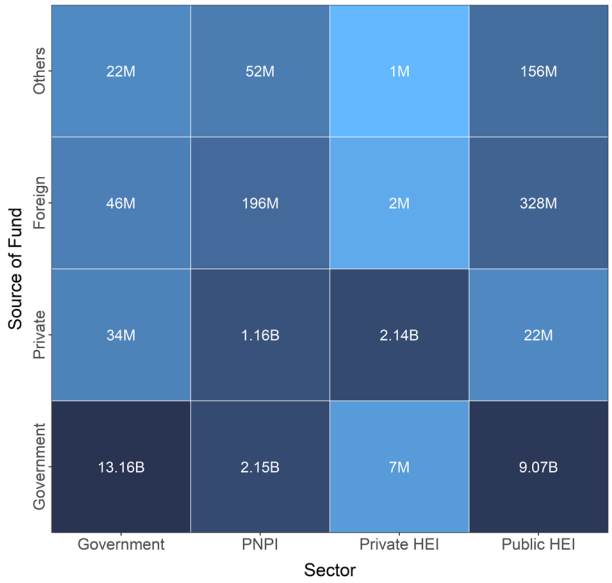


Figure 2.4. Major Flows of R&D Funding in the Philippines.

activities in public HEIs, and 8.8% in PNPIs. Only about 0.03% of government funds went to private HEIs, which spent mostly their own funds and contributions from PNPIs to support their R&D activities. Public HEIs and PNPIs were the recipients most of the foreign funds for R&D.

Figure 2.5 shows that 22% of government institutions that undertake in-house R&D also supported other institutions' R&D activities. Likewise, 31% of PNPIs provided funds to other institutions. On the other hand, only very few public and private HEIs financed the R&D activities of other institutions.

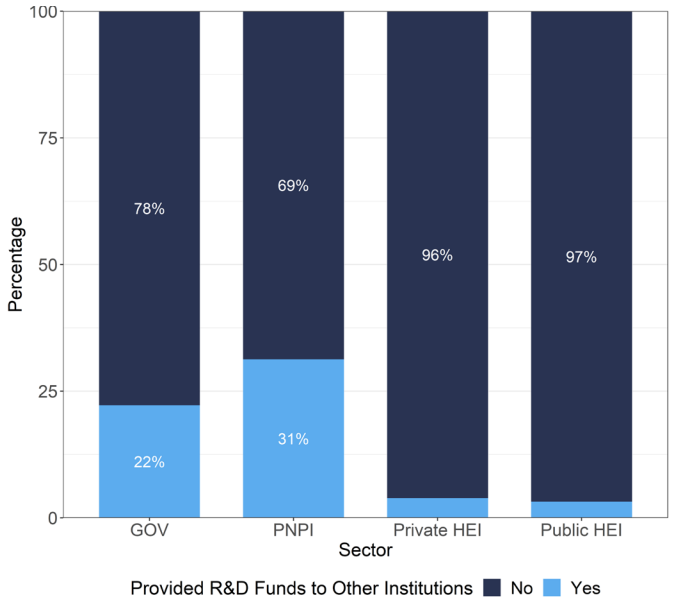


Figure 2.5. R&D-Performing Institutions that Provided R&D Funds to Other Institutions.

CHAPTER 3

Research and Development Personnel

Research and development (R&D) personnel include all persons engaged directly in R&D or those providing direct services for the R&D activities. They are classified according to their actual function in R&D activities: researchers, technicians, and other supporting staff. Researchers are professionals engaged in the conception or creation of new knowledge. They conduct research and improve or develop concepts, theories, models, techniques instrumentation, software, or operational methods. Technicians, on the other hand, are persons whose main tasks require technical knowledge and experience in one or more fields of engineering, the physical and life sciences, or the social sciences, humanities, and the arts. They participate in R&D by performing scientific and technical tasks involving the application of concepts and operational methods and the use of research equipment, normally under the supervision of researchers. Lastly, the other supporting staff includes skilled and unskilled craftsmen, and administrative, secretarial, and clerical staff participating in R&D projects or directly associated with such projects (OECD, 2015).

R&D personnel are measured in terms of headcount (HC) and full-time equivalent (FTE) data. HC data are based on the total number of persons who are mainly or partially employed in R&D. Headcount data are the most appropriate measure for collecting additional information about R&D personnel, such as age, sex, age group, highest qualification, among others (UIS, 2014). On the other hand, FTE is considered the main R&D personnel statistic for international comparisons. It is used for counting the number of R&D personnel because of the varying degrees of their functions in R&D activities. R&D may be the primary of some but a secondary function of others.

The 2018 R&D survey questionnaire collected Information on the number of personnel according to sex, highest educational attainment, field of science and technology, and age group per occupation (researchers, technicians, and other support staff). R&D personnel's highest qualification were based on the standard classification set in the 2017 Philippine Standard Classification of Education (PSCED) wherein the three education levels (early childhood, primary education and lower secondary education) were combined into one. R&D personnel headcount according to the percent of time spent on R&D was also collected in the survey.

A substantial growth in the country's R&D personnel, whether measured as HC or FTE, was observed from 2015 to 2018. The country's personnel headcount from the higher education institutions (HEI), government, and the private non-profit institutions (PNPI) for the financial year 2018 reflects a 238.0% growth since 2015. In terms of FTE, the total R&D personnel FTE from the three institutional sectors in 2018 represents an increase of 265.2% than that of in 2015.

R&D Personnel by Sector

Figure 3.1 shows that researchers have the largest share of R&D personnel in all sectors. Between the public and private HEIs, the former has a higher number of researchers compared to the latter.

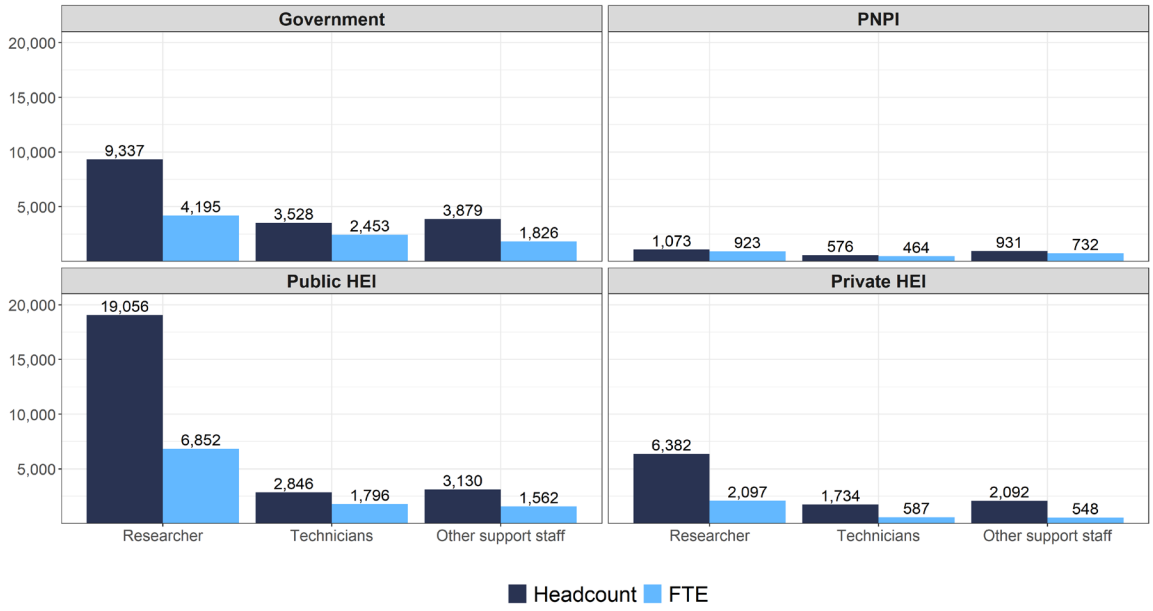


Figure 3.1. R&D Personnel Headcount and FTE by Sector.

Of the total R&D personnel, 65.7% are researchers, 15.9% are technicians and 18.4% are other support staff. The estimates of R&D personnel by occupation are presented in Appendix Table B3.1.

HEIs own the largest share of R&D personnel (64.6%), with about 71% of them in public HEIs. Government comprises 30.7% of the total R&D personnel while there are about 4.7% in PNPIs. HEIs posted almost 200% growth from 2015. The government also had a notable increase in R&D personnel in 2018 of about 340% from 2015. Likewise, PNPIs also registered a 346% growth in R&D personnel since 2015.

R&D Personnel by Region

Based on Figure 3.2, NCR has substantially higher numbers of R&D personnel. CALABARZON registered the second highest frequencies but which are less than one third to those of NCR. Zamboanga Peninsula and ARMM have the lowest numbers of R&D personnel.

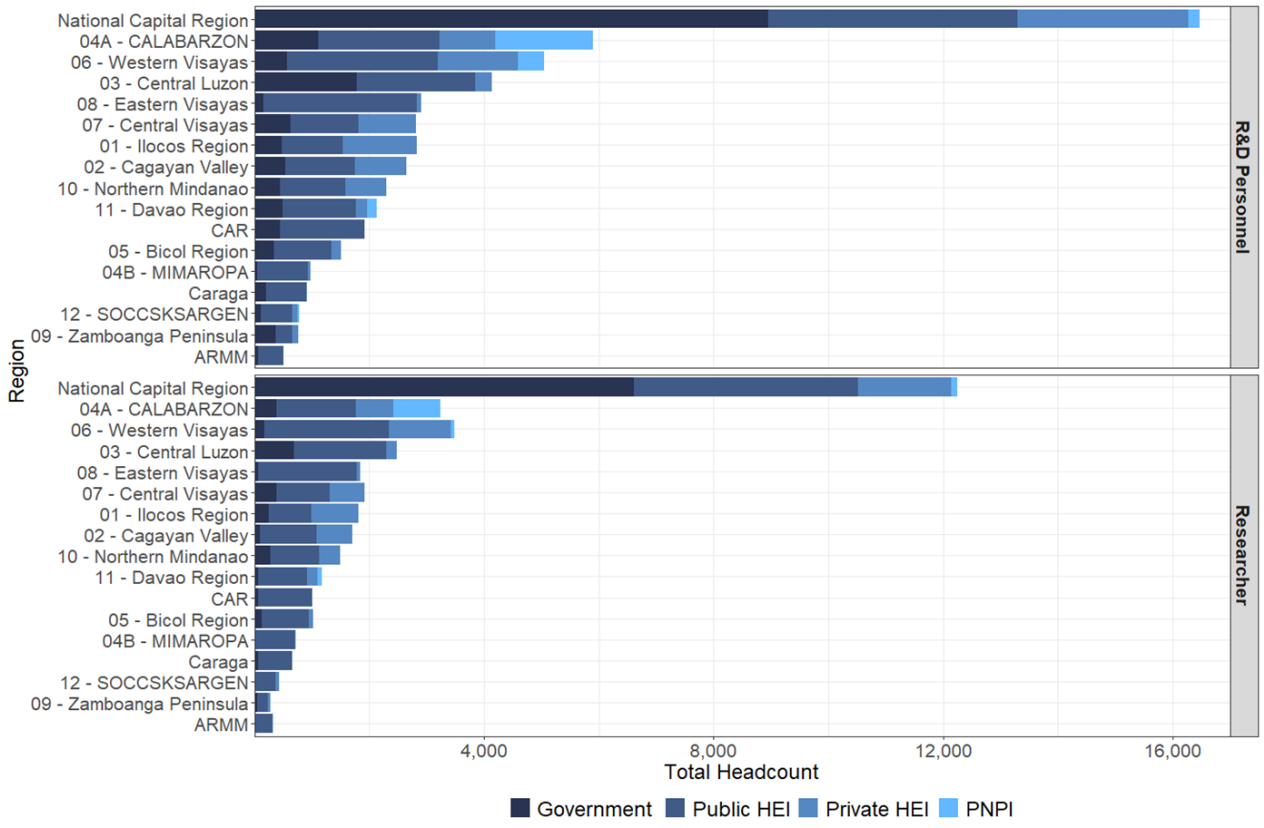


Figure 3.2. R&D Personnel and Researcher by Region.

HEIs have the most numbers of R&D personnel. Figure 3.3 shows that NCR, Eastern Visayas, and Western Visayas are the top three regions with the highest frequencies in public HEIs. For private HEIs, NCR, Western Visayas and Ilocos Region are the top three. There are no private HEIs that undertook in-house research in the sampled institutions for CAR.

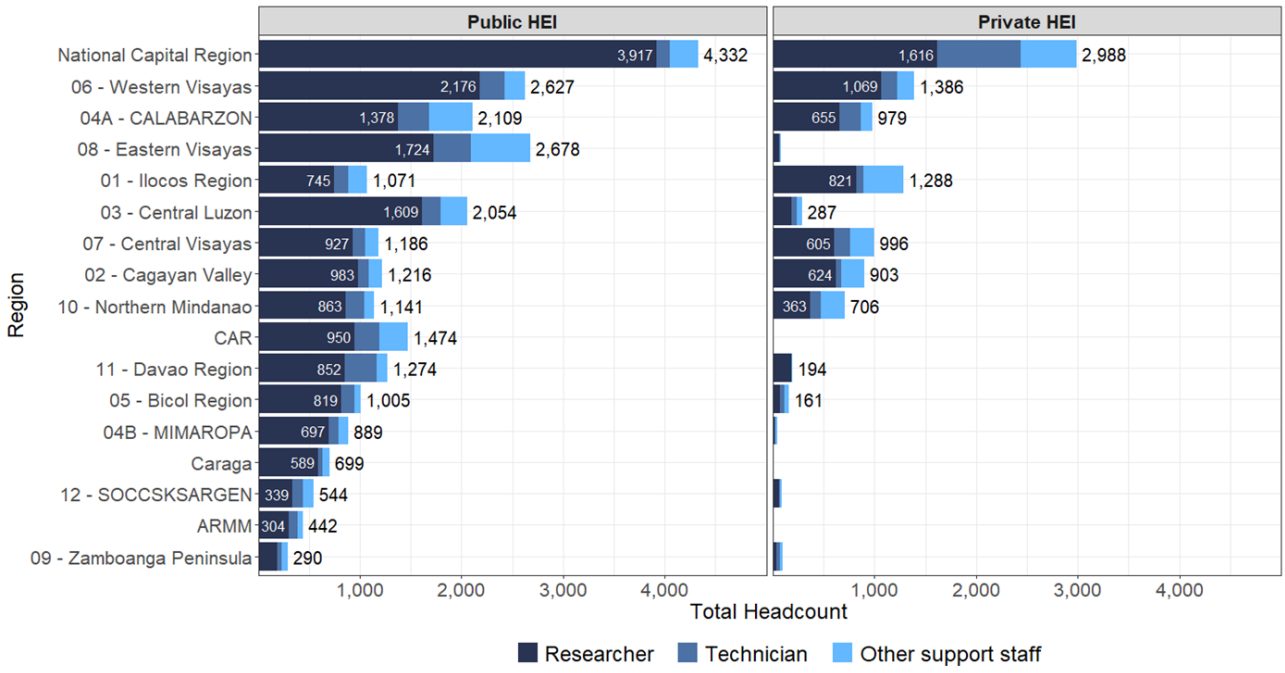


Figure 3.3. R&D Personnel by Region and HEI Type.

R&D Personnel FTE by Sector

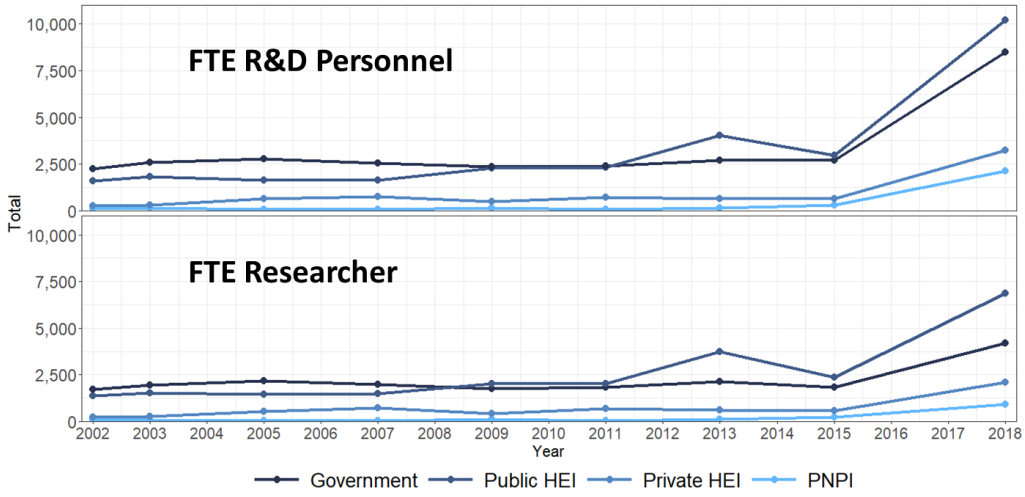
A trend similar to that of R&D personnel was observed in the FTE. HEIs own the largest share (55.9%), followed by the government (35.3%) and PNPIs (8.8%). Moreover, all sectors posted more than 200% growth from 2015.

Although there is a substantial increase in both the HC and FTE among HEI, government, and the PNPI sectors, the 2018 survey data revealed that less than half of work time (44.05%) on these sectors was spent on R&D activities (calculated as FTEs as a percentage of headcount). This was a little higher as compared with the 2015 R&D survey results which showed that about 40.76% of work time was spent on R&D activities for the same set of sectors.

On average, R&D personnel in government and PNPIs devote more of their time in doing R&D activities than those in HEIs. On average, government R&D workers devote about half of their time in doing R&D activities, while PNPI personnel allot 82% of their time to R&D tasks. On the other hand, HEI personnel spend only about 38% of their work time on R&D activities, with researchers in public HEIs devoting 36% and those in private HEIs, about 33% to R&D work. This is probably because academic staff are expected to undertake three main functions — teaching, research and service.

On average, technicians spent most of their work time (61.0%) on R&D activities. While researchers spent only 39.2% of their work time on R&D activities.

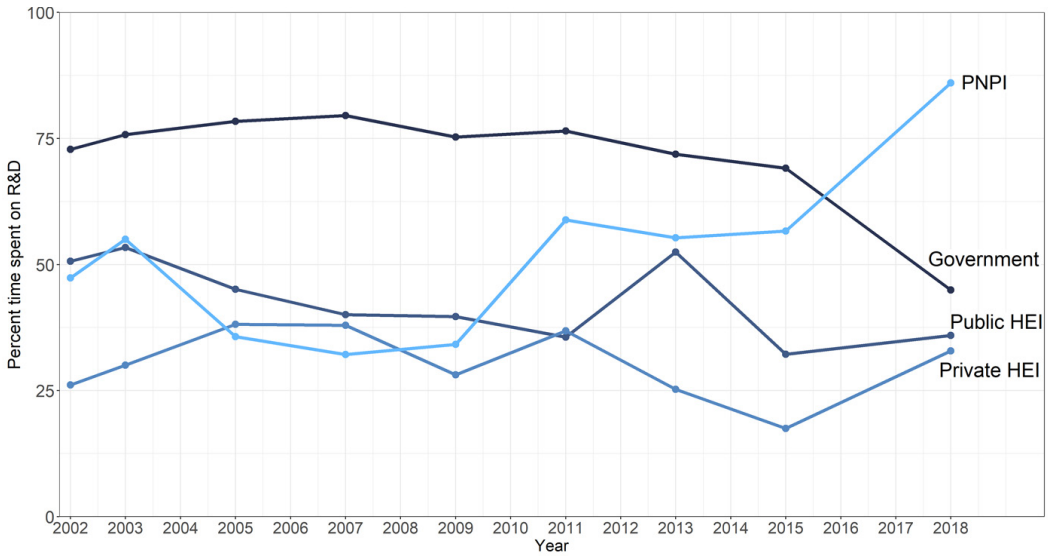
Figure 3.4 presents the FTE R&D personnel and researchers from 2002 to 2018. The FTEs of all personnel and researchers in public HEIs increased substantially in 2013 from a fairly constant series in 2002-2011. However, there was a sharp decline for both FTEs in 2015. Substantial increases were achieved in 2018 for both the FTEs of R&D personnel and researchers in all sectors.



Source: 2018 R&D Survey and previous years

Figure 3.4. R&D personnel FTE and Researcher FTE by Sector 2002-2018.

It was observed that the average percentage of work time spent by researchers in doing R&D activities from the government and HEIs was lower from 2011 to 2018, than it was from 2002 to 2009. A report by the ADB in 2011 states that, in Asia, teaching has been the primary focus at most institutions, but attention to research is increasing. However, as reflected in the survey data from 2002 to 2018, it seems that it is a different scenario in the Philippines. Between the public and private HEIs, the former had a higher median percentage of work time spent by their R&D personnel from 2002 to 2018 on R&D activities than the latter (see Figure 3.5).



Source: 2018 R&D Survey and previous years

Figure 3.5. Percent Time spent by Researchers on R&D by Sector 2002-2018.

R&D Personnel FTE by Region

The top three regions with the highest R&D personnel FTE for the HEI sector are NCR, CALABARZON, and Western Visayas. Meanwhile, for the government sector, NCR has the highest frequencies followed by Central Luzon. For the PNPIs, CALABARZON has the highest R&D personnel FTE. The regional estimates on R&D personnel FTE are presented in Appendix Tables B3.23 to B3.26.

Figure 3.6 shows that researchers in NCR public HEIs spent more than half of their work time in R&D activities while the rest of the researchers in other public HEIs spent less than half. For the private HEIs, researchers in MIMAROPA and Central Luzon devote more than half of their work time in doing R&D activities. Moreover, notable differences in the percentage of time spent by researchers were found between those working in public and private HEIs. To cite an example, researchers from public HEIs in NCR spent about 66% of their work time on R&D activities while those from private HEIs in NCR spent only 38.0%. Across regions, the median percentage of work time spent by researchers from public and private HEIs, was about 28% and 35%, respectively.

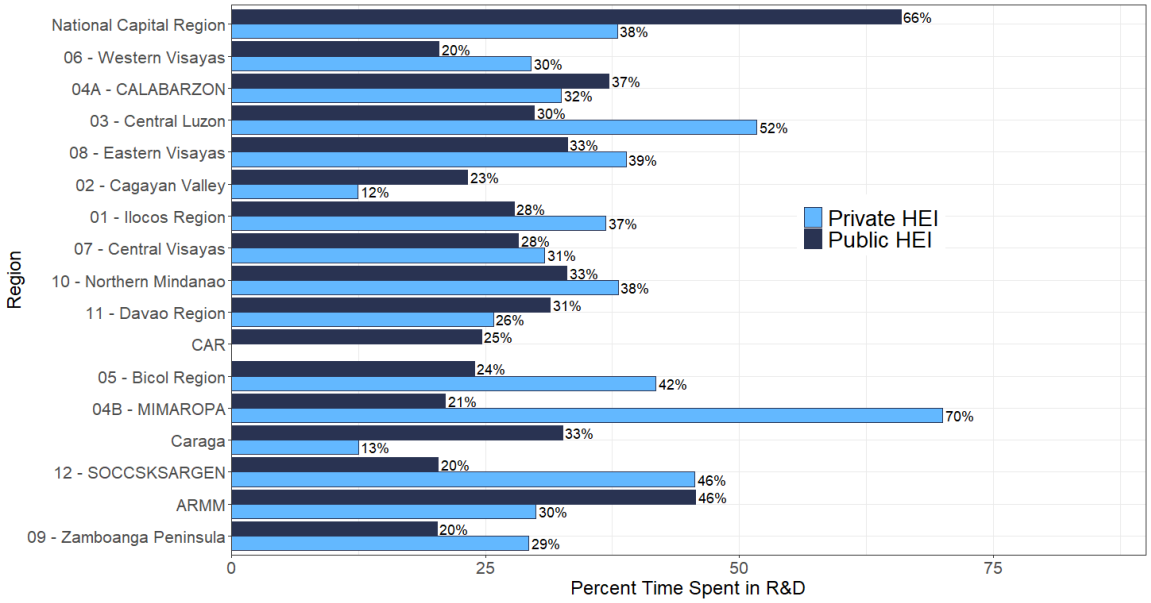


Figure 3.6. Percent Time Spent by Researchers on R&D per HEI Type.

R&D Personnel by Sex

Disaggregation of the R&D personnel headcount by sex gives an indication of gender parity in the scientific workforce. This is one of the indicators of the Sustainable Development Goals under the target of women and girls' empowerment should be achieved by the year 2030 (UN, 2016).

Figure 3.7 shows that most of the researchers in government, HEIs, and PNPIs are female. Of the total researchers in the country, approximately 58% are females. This is higher than the world average of about 30% in 2017 and the average of Eastern and South-Eastern Asian countries at 24.9% (UIS, 2020). Meanwhile, among the technicians, 51% of them are male.

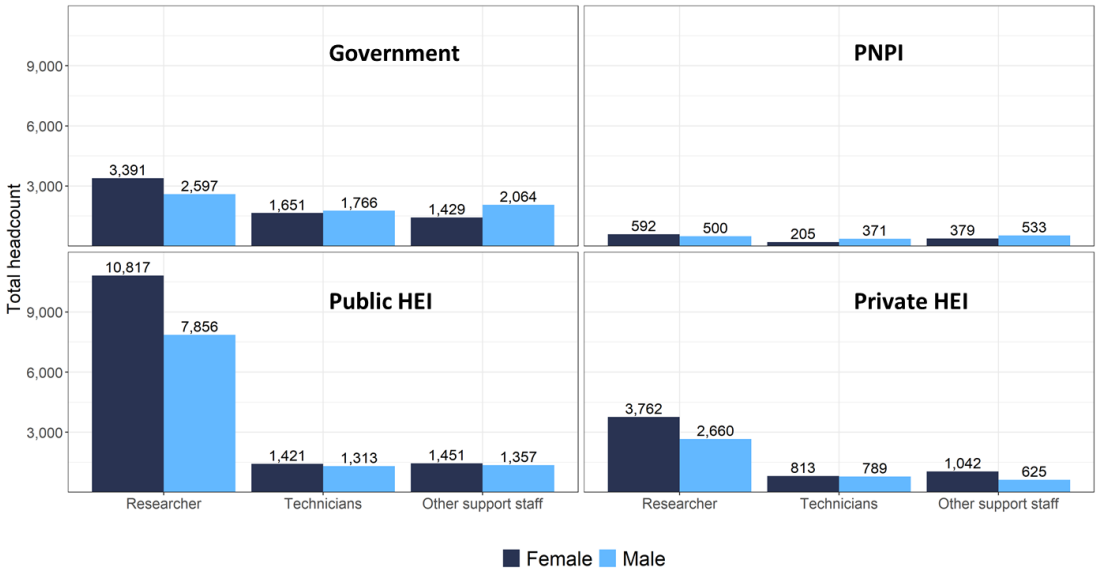


Figure 3.7. R&D Personnel by Sector and Sex.

Figure 3.8 shows that there are more female R&D personnel in many regions except for Davao and Zamboanga Peninsula. There are also more female researchers in all regions except for Zamboanga Peninsula.

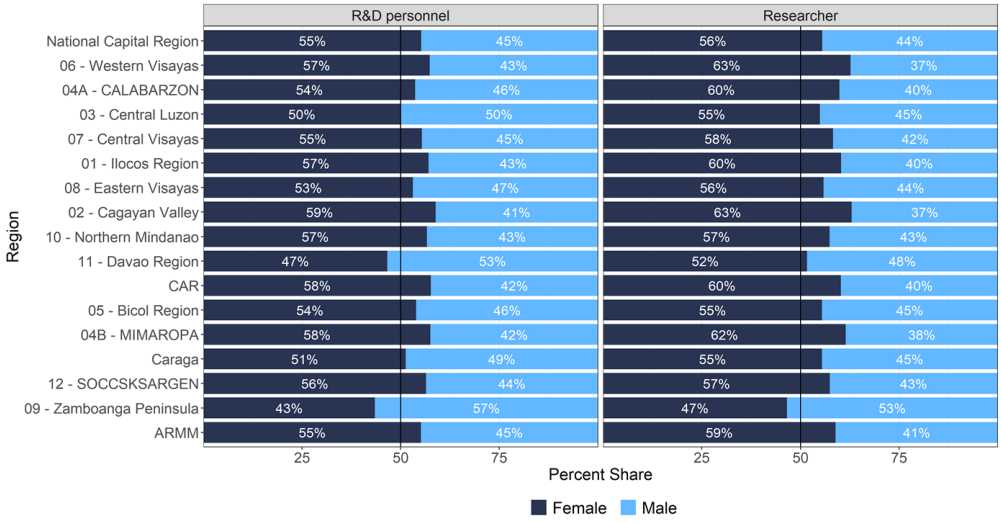


Figure 3.8. R&D Personnel and Researcher by Region and Sex.

R&D Personnel by Age Group

Figure 3.9 shows that a relatively younger population comprises the R&D personnel. Moreover, it shows that researchers are generally older than technicians and other support staff.

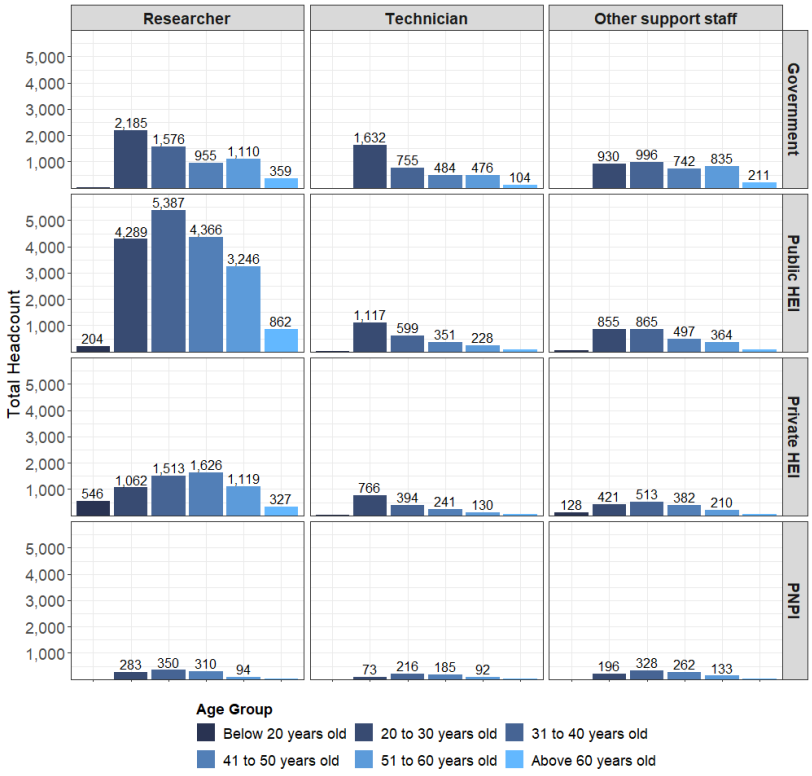


Figure 3.9. R&D Personnel by Sector and Age Group.

Of the total researchers in the country, about 27.7% were 31 to 40 years old while only 5.0% were above 60 years old. Comparing the public and private HEIs, there were more researchers in public HEIs aged between 20 to 40 years old (52.7%) than there were in private HEIs (41.6%).

R&D Personnel by Highest Education Qualifications

Although it is not yet well developed in most countries in Asia, the importance of graduate education is recognized in research and development. Producing personnel with doctoral degrees strengthens the research capacity of a country (ADB, 2011). Graduate scholarship programs such as those offered by the Department of Science and Technology are instruments for promoting S&T areas in the country. Based on the survey data, the percentage of researchers in the government sector who had either master level or equivalent or doctoral level is way below their counterpart in the HEI.

As shown in Figure 3.10, most of the researchers from both the public and private HEIs have a master level or equivalent while only a few have a bachelor certificate or lower. For the government sector, more than half of the researchers have a bachelor level while only about 19% have a doctorate level or equivalent. It is interesting to note that more than half of the researchers from PNPIs have a doctoral level or equivalent. About 60% of both technicians and other support staff have a bachelor level.

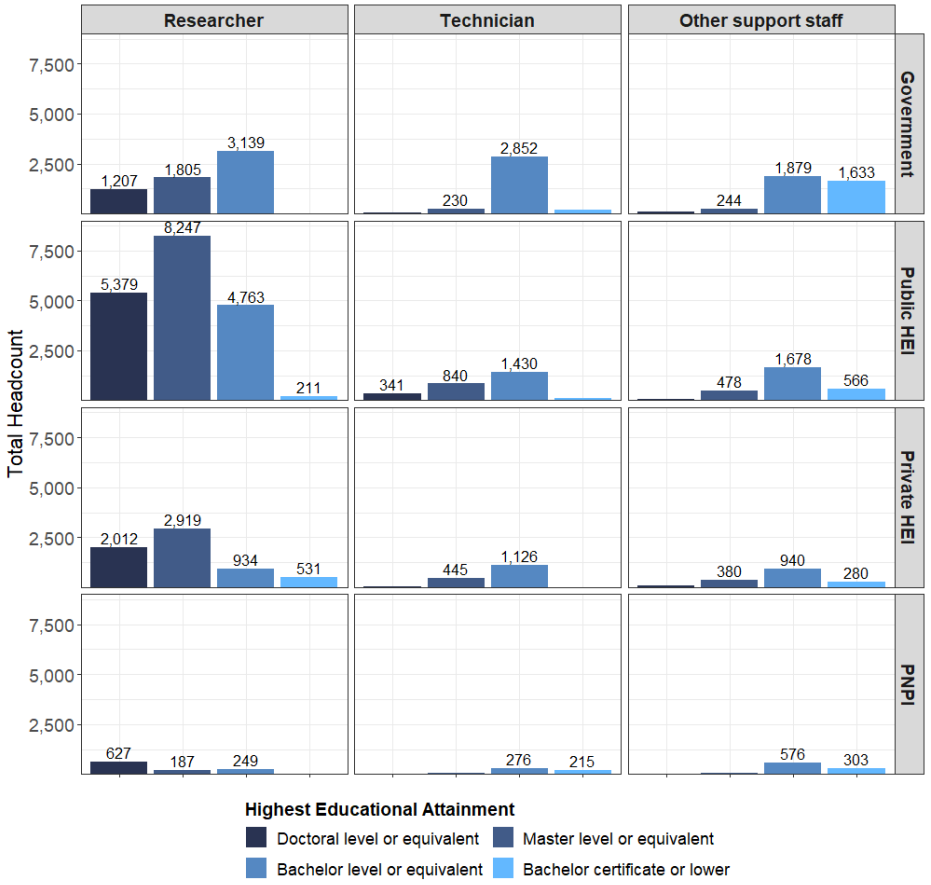


Figure 3.10. R&D Personnel by Sector and Highest Education Qualifications.

R&D Personnel by Fields of Science and Technology

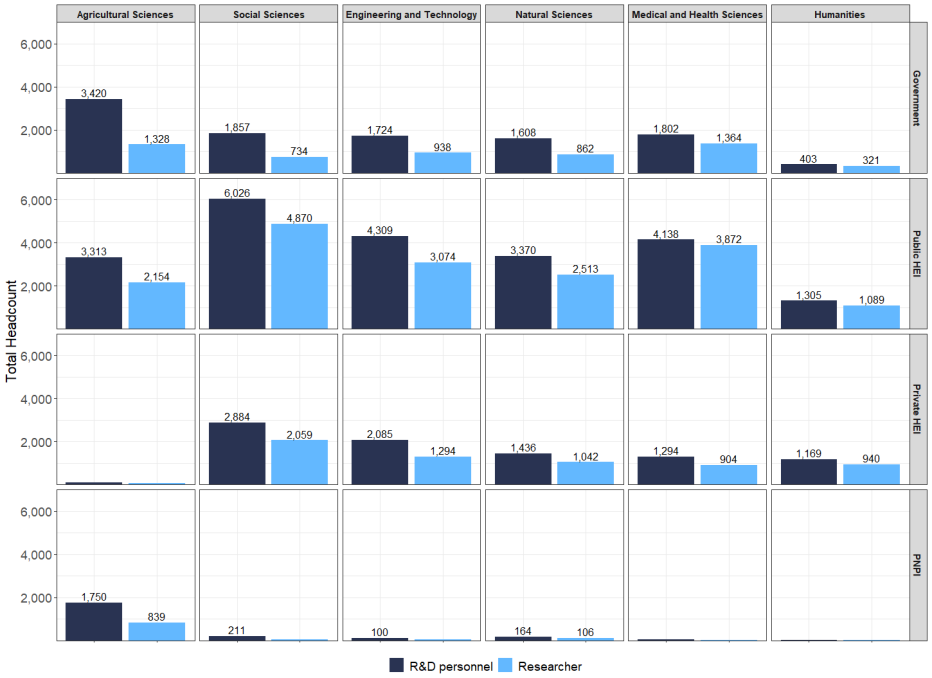


Figure 3.11. Researcher Headcount by Sector and Field of S&T.

Based on Figure 3.11, researchers in the government sector are concentrated in the medical and health sciences (22.8%) and agricultural sciences (22.2%). Also, the majority of the researchers in PNPIs were from the field of agricultural sciences (78.2%) while those in HEIs have diverse research interests. Most of the researchers in HEIs were from the field of social sciences (27.5%), medical and health sciences (19.0%), engineering and technology (17.4%), and natural sciences (14.1%).

The data that were discussed here are presented in Appendix Tables B3.1 to B3.32.

CHAPTER 4

Research and Development Expenditures

Monitoring the R&D expenditure is essential in providing the status of R&D activities in the country. This helps in crafting policies that will support in sustaining areas with good R&D indicators and in improving areas that need further support in R&D activities.

Data regarding the R&D expenditure were gathered based on the expenses or cost incurred by the R&D institution in the implementation of its R&D activities in 2018. The survey questionnaire was given to the respondents who have the most knowledge in the R&D activities of their institution in the three sectors: government, Higher education institutions (HEI), and Private non-profit institutions (PNPI). The following estimates of the total R&D expenditures does not include the business and industry sector.

The R&D expenditures data were collected by filling the R&D expenditure section in the questionnaire which is divided into several accounting categories: (1) personnel services which comprise of the wages, salaries and all related labor costs including the benefits paid in cash or in kind to personnel who rendered direct services in the R&D activity; (2) maintenance and other operating expenses (MOOE) which comprise of all paid and payable expenses and costs of office and laboratory supplies, materials, subscriptions to journals, books, rental of buildings, maintenance, computer service, travel, postal services, and repairs of equipment, etc. used in the implementation of the R&D activities, (3) capital outlay which comprise of paid and payable expenses and costs of land, building and other structures, vehicle, plant machinery, equipment and other similar capital expenditures incurred in the implementation of the R&D activities, and (4) imputed Rental Costs which refers to the costs of rent of land, building and other structures, vehicle, plant, machinery, equipment and other similar capital expenditure items acquired or purchased before January 1, 2018 if the said facilities were to be rented for the implementation of the R&D activities. The expenditure from all the accounting categories were added to get the total R&D expenditure of the institution.

The percentage of the total expenditure spent according to the type of research: basic research, applied research, and experimental development were also collected. The R&D expenditure was also classified according to its percentage distribution in the field of science: Natural Science, Engineering and Technology, Agricultural Science, Medical Sciences, Social Sciences, and Humanities. The R&D expenditures were also classified according to the percentage of R&D expenditure primarily devoted to the following socio-economic objectives (SEO) such as Exploration and exploitation of the earth, Environment, Exploration and exploitation of space, Transport, telecommunication and other infrastructures, Energy, Industrial production and technology, Health, Agriculture, Education, Culture, recreation, religion and

mass media, Political and social systems, structures and processes, Defense, and Information and Communications Technology. The total R&D expenditure per region was also estimated to provide a comparison of the R&D expenditure profile across the regions.

Note that the total R&D expenditure here refers to the total for the three sectors only — government, HEIs and PNPIs. Data from the 2018 ASPBI are not yet available.

Total R&D Expenditure

The total R&D expenditure of government, HEIs and PNPIs in the Philippines for fiscal year 2018 is Php 28.5 billion which is higher than Php 21.9 billion in 2015, which also included the R&D expenditure of the business and industry sector. Expenditure on personnel services registered the highest percentage (48%) of the country's total R&D expenditure of about Php 13.7 billion. This was followed by MOOE of about Php 9.8 billion. The smallest share in the R&D expenditures was on imputed rental costs at about Php 337 million.

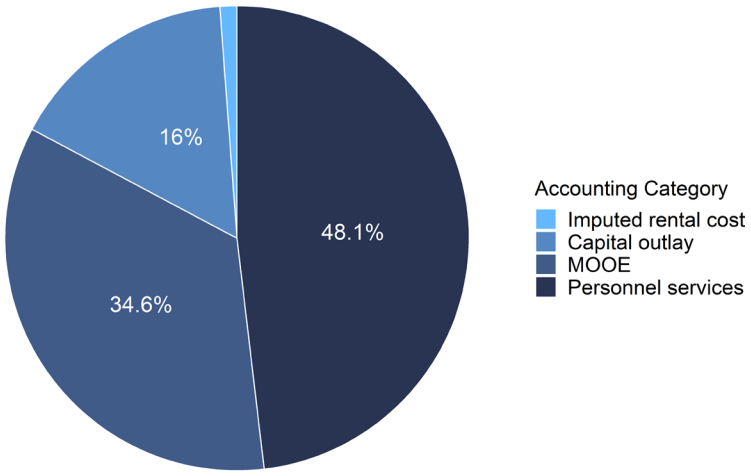


Figure 4.1. Distribution of Total R&D Expenditures According to Accounting Category.

Total R&D Expenditure by Sector

The government sector had the highest R&D expenditure of about Php 13 billion in 2018 which is higher than the Php 5.3 billion R&D expenditure in 2015.

The higher education sector contributed the second largest share in the country's total R&D expenditure in 2018 with R&D spending of Php 12 billion which is higher than the Php 8 billion R&D expenditure in 2015. Private HEIs spent Php 2 billion in R&D which is higher from its Php 2 billion R&D expenditure in 2015. R&D Expenditure of the Public HEIs is also higher from Php 6 billion in 2015 to Php 9 billion in 2018.

The private non-profit institutions (PNPI) sector contributed the least R&D expenditure share in 2018 which amounted to Php 3.5 billion.

Figure 4.2 shows the increasing trend in R&D expenditure for the three sectors with the highest increase in the government sector.

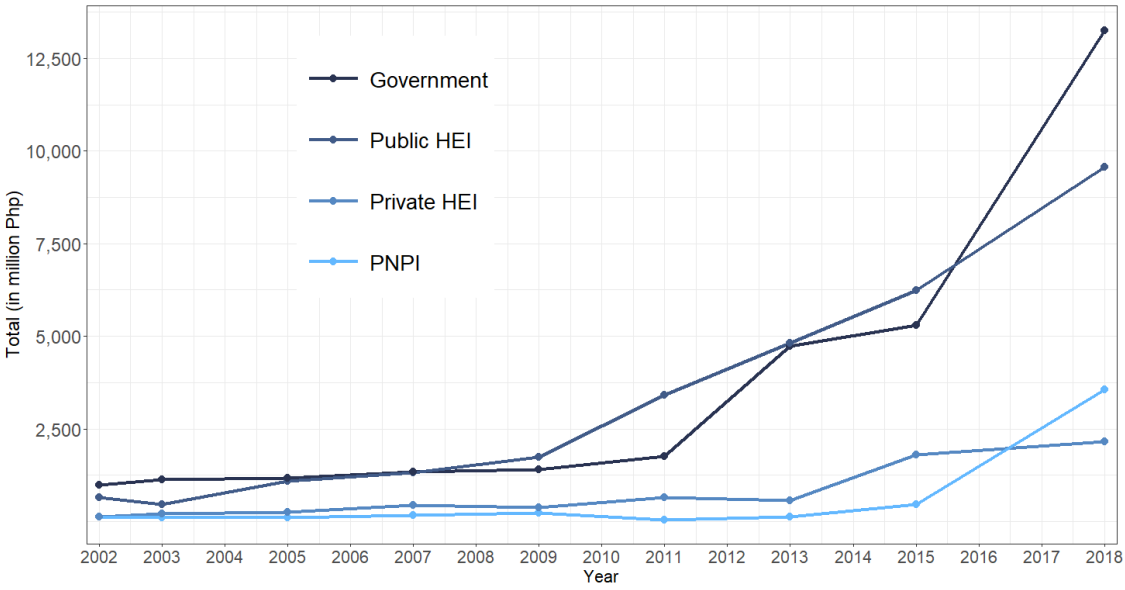


Figure 4.2. Total R&D Expenditure (in million Php) Trends per Sector.

Figure 4.3 shows the trend of R&D expenditure per FTE R&D personnel. The graph indicates a decline in R&D expenditure per FTE R&D personnel from 2015 to 2018 in the government sector, public and private HEI. A gradual increase in R&D expenditure per FTE R&D personnel was observed in the PNPIs.

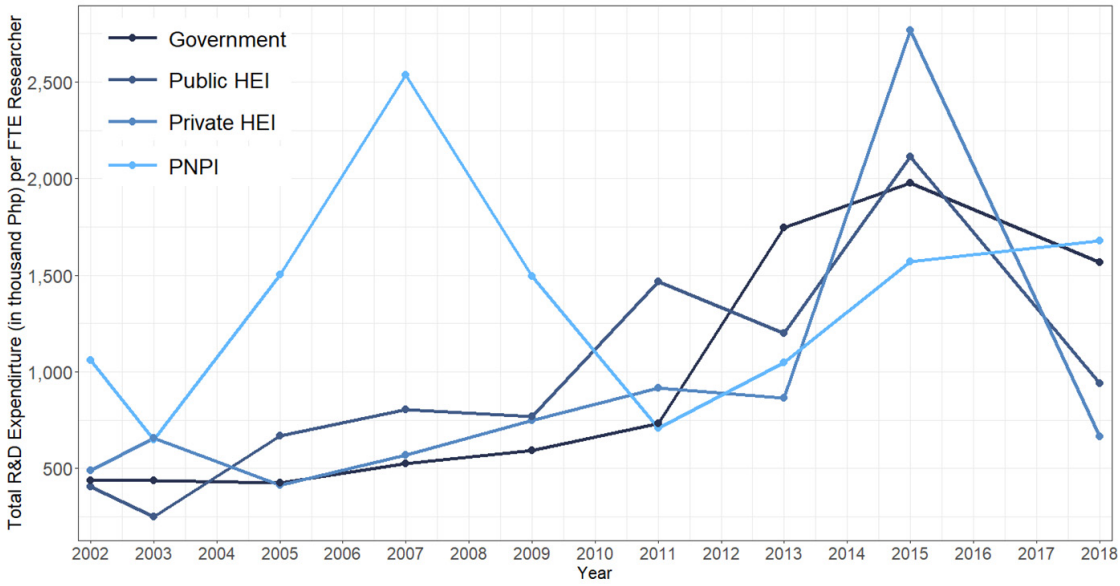


Figure 4.3. Total R&D Expenditure (in thousand Php) per FTE R&D Personnel Trends per Sector.

Figure 4.4 indicates that the R&D expenditure of the government sector is mostly on MOOE while those in the higher education sector spent their R&D money on personnel services. The private non-profit sector spent a relatively equal amount for personnel services and MOOE. The complete information regarding the R&D expenditure by accounting category per sector is tabulated in Appendix Table B4.1.

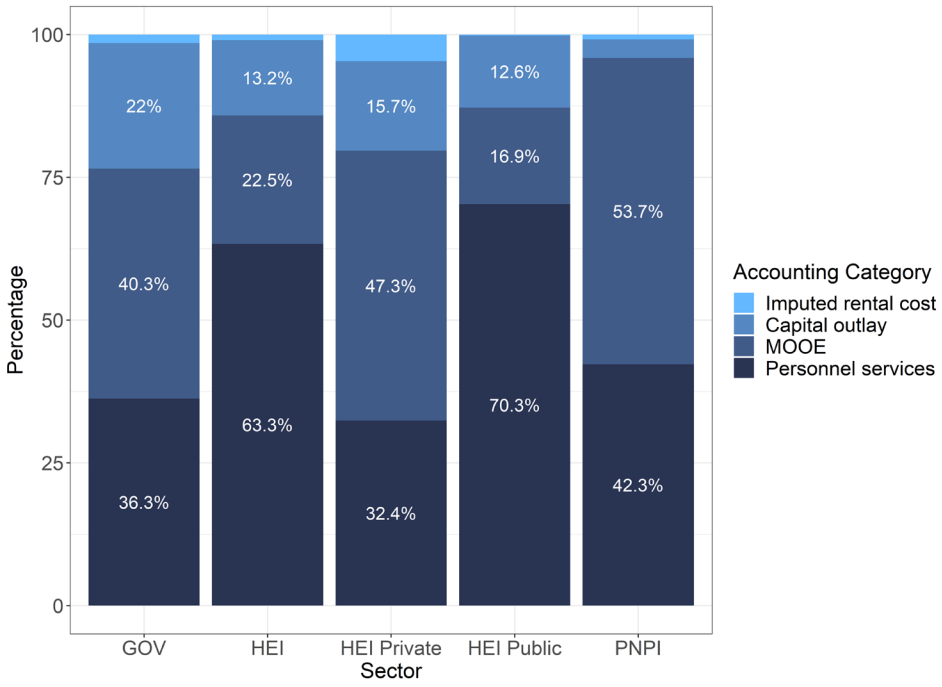


Figure 4.4. Total R&D Expenditures by Accounting Categories and Sector.

Regional R&D Expenditures

The regional total R&D expenditure in 2018 in Figure 4.5 shows that NCR had the highest share at Php 12 billion, followed by Central Luzon and CALABARZON of about Php 5 billion. MIMAROPA spent the least among the regions with an R&D expenditure of about Php 80 million in 2018.

The regional R&D expenditure of PNPIs shows that of the only five regions with PNPIs, the CALABARZON region has the highest expenditure of about Php 3 billion followed by Davao region of about Php 133 million and Western Visayas of about Php 69 million.

On the other hand, NCR dominates in the government R&D expenditure, followed by Central Luzon and CALABARZON. This reflects the higher number of government agencies with research and development initiatives in these regions. MIMAROPA has the least government R&D expenditure.

The higher education sector R&D expenditure also shows that NCR spent the highest of about Php 6.63 billion. This was followed by the R&D expenditures of the higher education sector in the CALABARZON and ARMM. The least R&D expenditure in the higher education sector was estimated in the Cagayan Valley of about Php 62 million. Among the private HEIs, the regions with high R&D expenditure are NCR and Western Visayas. In comparison with the public HEIs, the regions with high R&D expenditure are NCR and CALABARZON. Appendix Table B4.5 shows the complete information of the R&D expenditures by region.

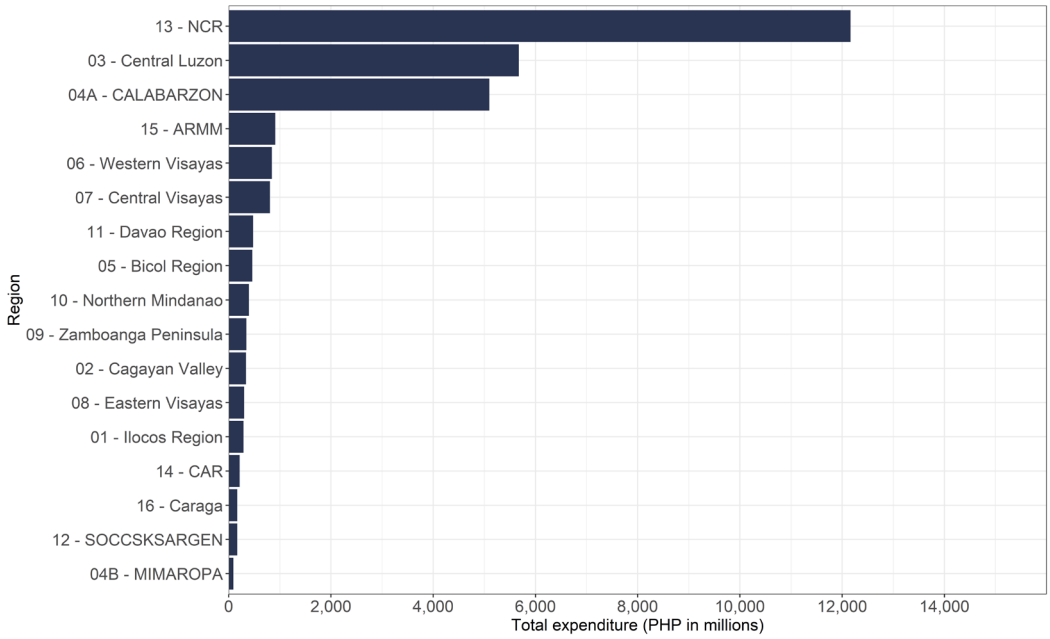


Figure 4.5. Total R&D Expenditures by Region.

R&D Expenditure by Type of Research

About 62% of the total R&D expenditure in the country were spent on applied research, 25.3% on basic research and 11.9% on experimental development.

Figure 4.6 shows that private non-profit sector and government spent most of their R&D funds on applied research. HEIs have a more diverse expenditure pattern with 36.5% of their total R&D expenditure allocated for basic research, 47.2% and 16.3% on applied and experimental research, respectively.

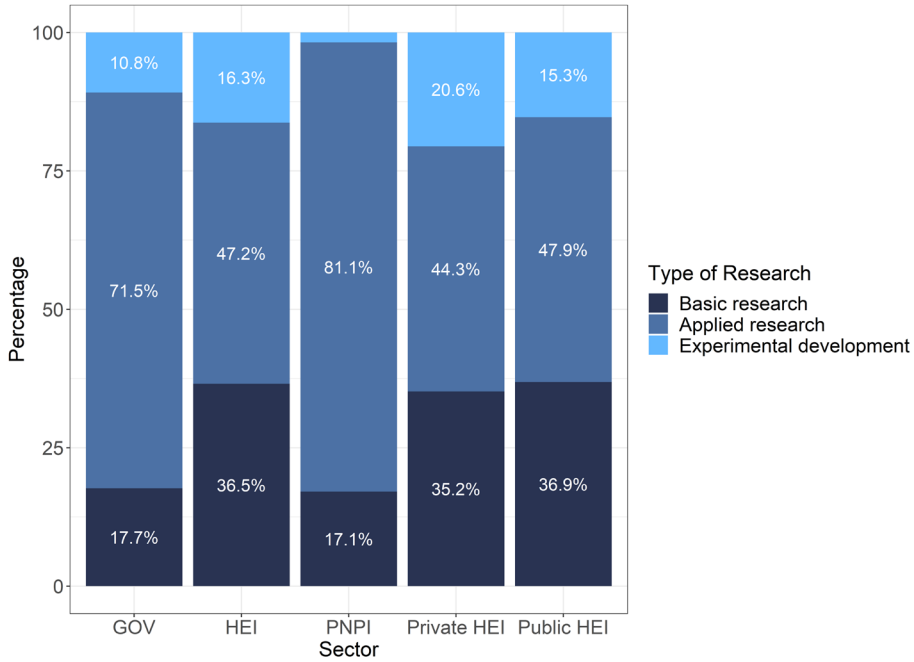


Figure 4.6. R&D Expenditures by Type of Research per Sector.

R&D Expenditure by Field of Science

R&D in agricultural sciences received about 40% of the total R&D expenditure. Other dominant fields of science were natural sciences and engineering and technology.

Figure 4.7 shows that the expenditure patterns of the private non-profit and government sectors are similar with the agricultural sciences as the most dominant field. This is expected since many of the government agencies have projects related to the development of the agricultural sector of the country. In comparison, the higher education sector has a more diverse expenditure pattern with most of its R&D expenditure being spent in the field of natural sciences, followed by social sciences, engineering and technology, and agricultural sciences. A large share in R&D expenditure in the private HEIs was spent on engineering and technology followed by social sciences. In comparison, the dominant field of science in the public HEIs are in the field of natural sciences, social sciences, agricultural sciences, and engineering and technology.

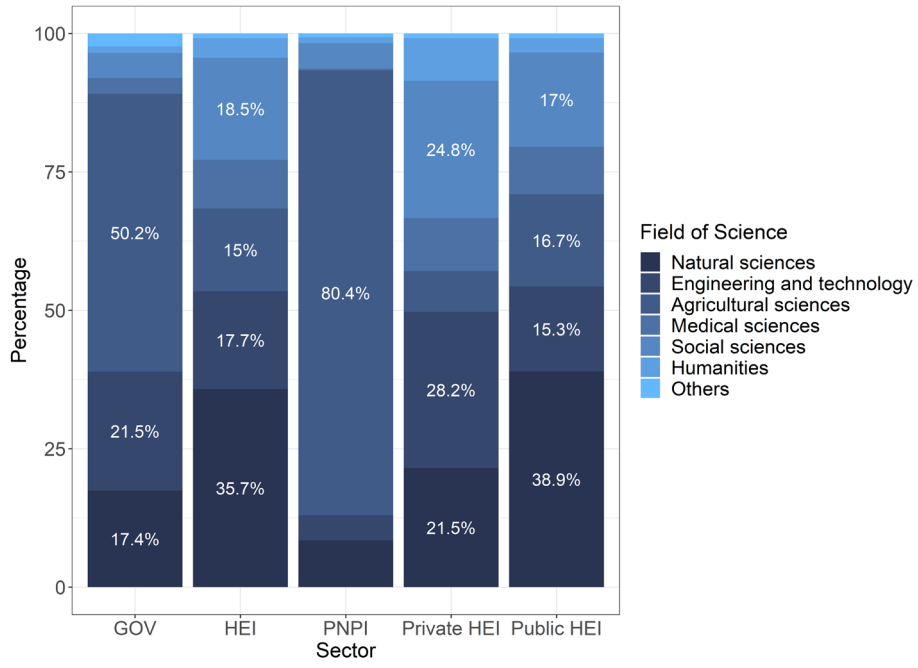


Figure 4.7. R&D Expenditures by Field of S&T per Sector.

R&D Expenditures by Socioeconomic Objective

The R&D expenditure was also classified according to its socioeconomic objectives which are societal goals to which the research outputs will have the main influence and relevance. In 2018, 42.7% of the total R&D expenditure was devoted to improving the agriculture, while 13.8% aimed at improving the environment, 10.1% for exploration and exploitation of the earth and 7% for health.

Figure 4.8 shows that PNPIs and government agencies geared the majority of their R&D activities towards improving the agricultural sector while HEIs have more varied socio-economic objectives like improving the exploration and exploitation of the earth, environment, agriculture, and health. Both public and private HEIs

are also concerned with the protection of the environment and private HEIs are also interested in improving health while public HEIs focus on exploration and exploitation of the earth as shown in Figure 4.9.

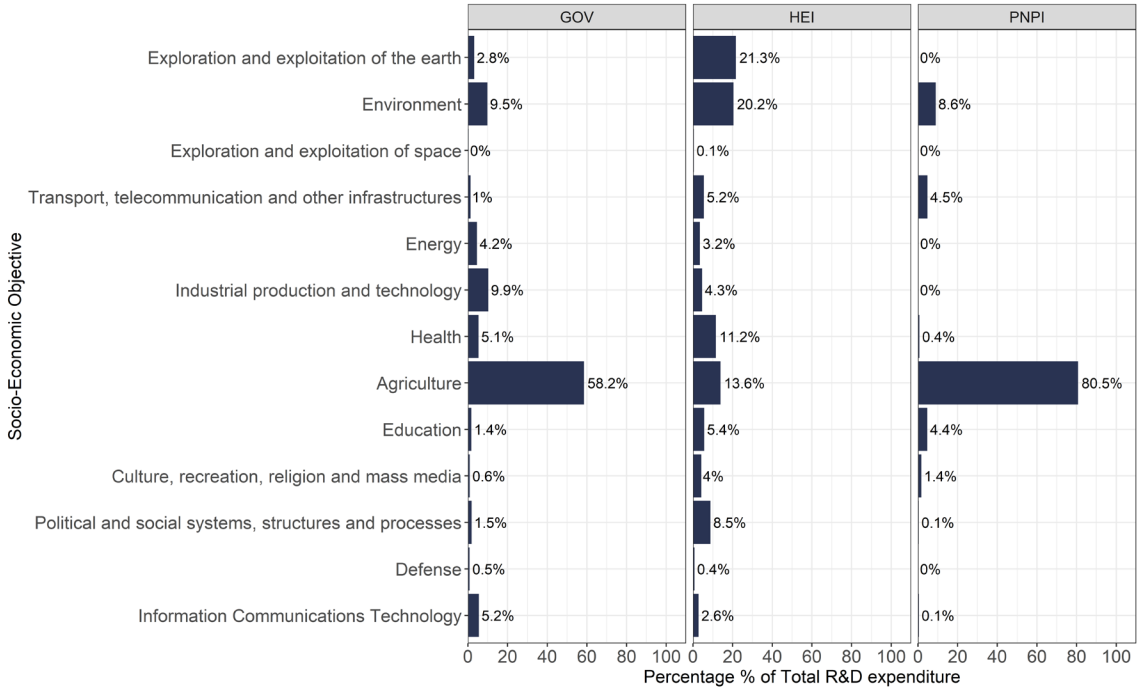


Figure 4.8: Percentage of Total R&D Expenditures by Socio-economic Objective per Sector.

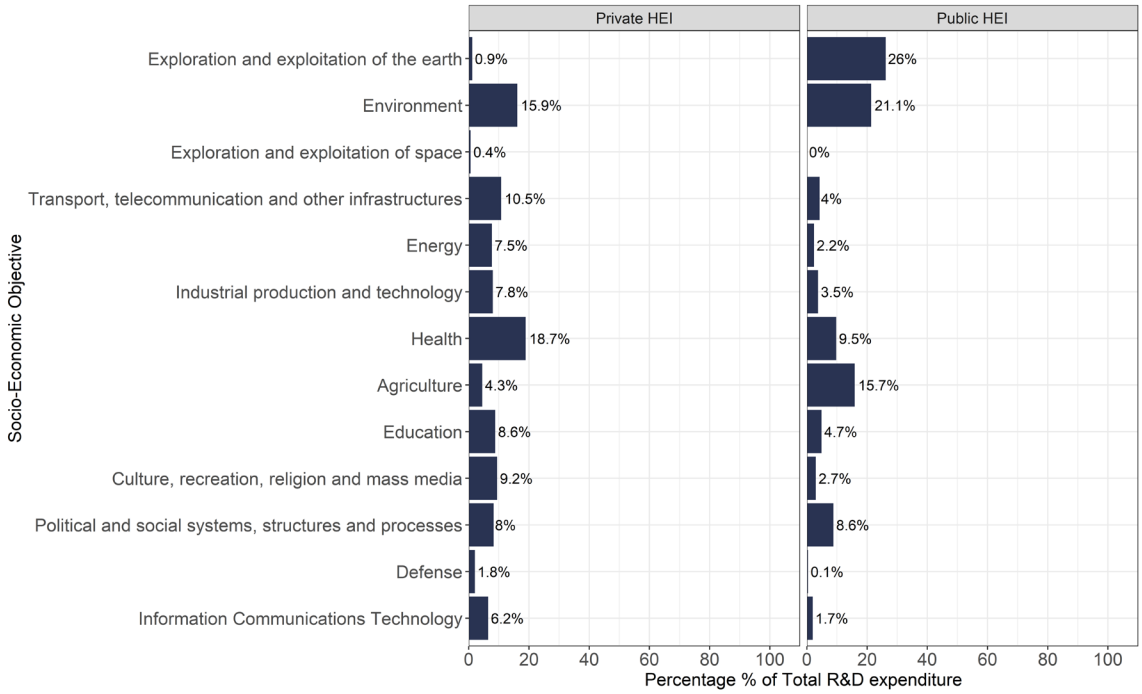


Figure 4.9. Percentage of Total R&D expenditures by socio-economic objective between Public and Private HEI.

Regional R&D Expenditures by Type of Research: Higher Education Sector

Figure 4.10 shows that there are regions that have a relatively high percentage share of R&D expenditure on basic research as compared to applied and experimental development. These regions are Ilocos region, Cagayan Valley, MIMAROPA, Western Visayas, and SOCCSKSARGEN.
The regions with relatively higher percentage share of R&D expenditure in applied research are: Central Luzon, CALABARZON, Eastern Visayas, Northern Mindanao, Davao Region, and ARMM.

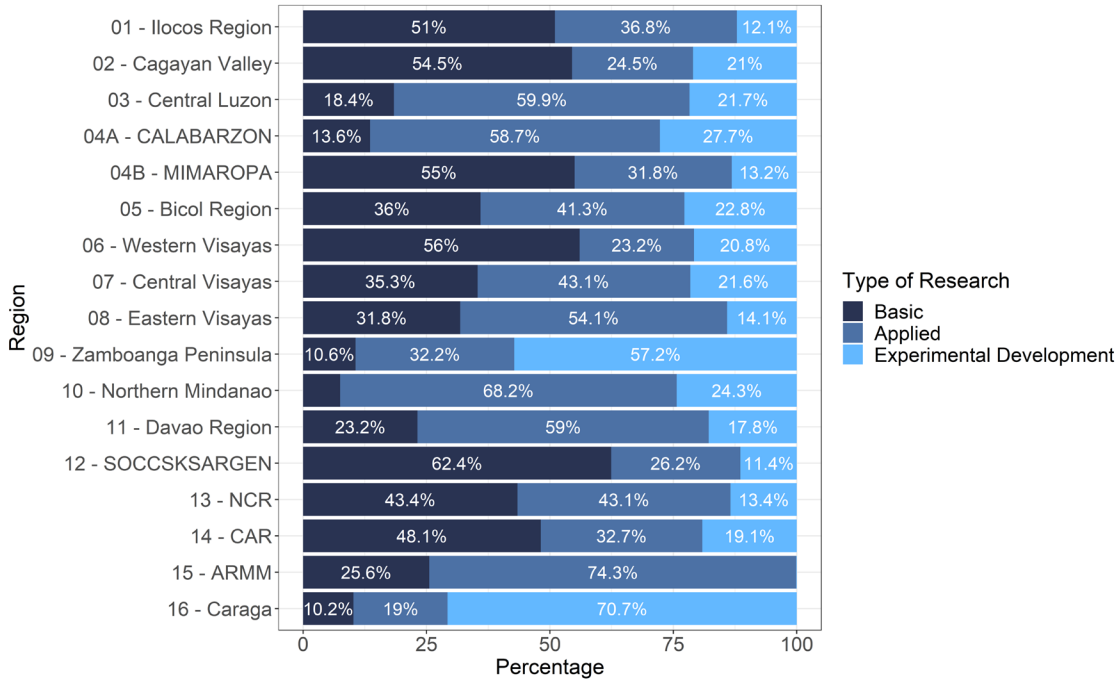


Figure 4.10. Regional R&D Expenditures of HEIs by Type of Researcher.

Meanwhile, the regions with relatively higher percentage share of R&D expenditure in experimental development are Zamboanga Peninsula, and CARAGA.

Regional R&D Expenditures by Type of Research: Government Sector

Figure 4.11 shows that almost all regions have a relatively higher percentage share of R&D expenditure in the applied research. These indicate that many of the research initiatives in the regions are applied research as compared to basic and experimental development.

However, there are also regions that have a relatively higher percentage share of R&D expenditure on basic research as compared to applied and experimental development. These regions are MIMAROPA, and Central Visayas. Meanwhile, only Cagayan Valley has a relatively higher percentage share of R&D expenditure in experimental development.

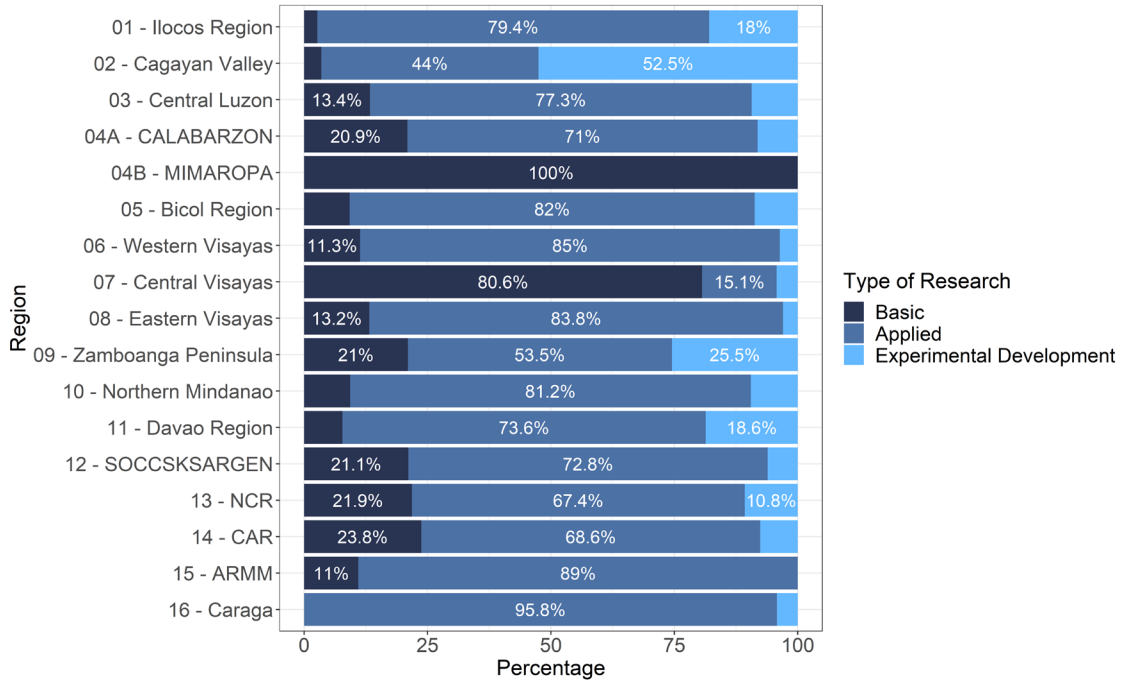


Figure 4.11. Regional R&D Expenditures of the Government by Type of Research.

Regional R&D Expenditures by Type of Research: Private Non-Profit Sector

Figure 4.12 shows that of the five regions that have PNPIs, SOCCSKSARGEN has a relatively higher percentage share of R&D expenditure (50%) in experimental development while Western Visayas has a higher percentage share R&D expenditure (52%) in basic research. The three other regions have higher percentage share in applied research.

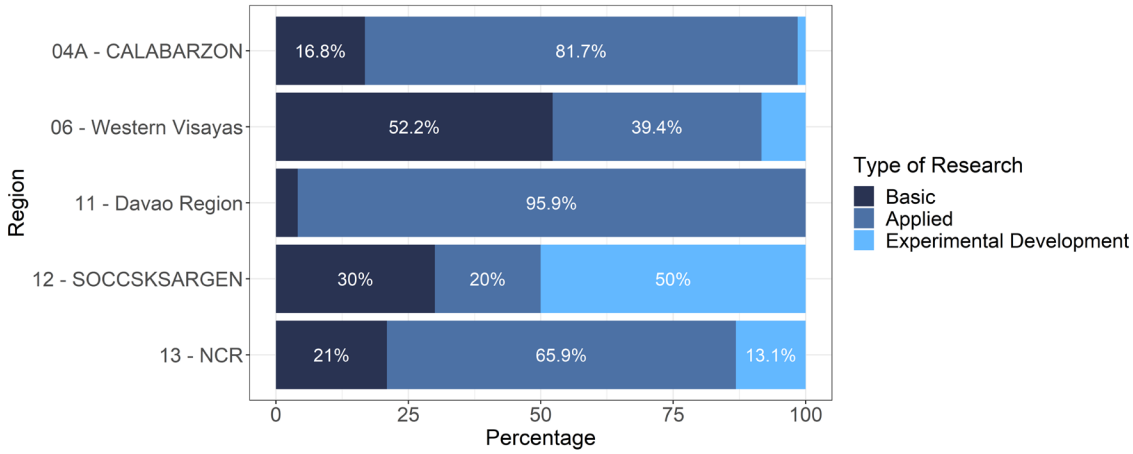


Figure 4.12. Regional R&D Expenditures of PNPIs by Type of Research.

Regional R&D Expenditures by Field of Science: Higher Education Sector

Figure 4.13 indicates that generally there is variation in the priorities in research among the regions. Higher percentage share of R&D expenditure for the field of natural sciences was observed in NCR, Western Visayas, and Central Visayas. Northern Mindanao, Central Luzon and Zamboanga Peninsula have larger percentage share of R&D expenditure in engineering and technology. The regions of Caraga, CALABARZON, SOCCSKSARGEN, and Zamboanga Peninsula have larger percentage share of R&D expenditure in agricultural sciences relative to other regions. The regions with large percentage share of R&D expenditure for medical sciences are CAR, NCR and Northern Mindanao. HEIs in ARMM and MIMAROPA spent almost half of their R&D expenses in social science. The least prioritized field of science is the humanities among the HEIs but Ilocos region, Cagayan Valley and ARMM spent at least 10% of their total R&D expenditure in this field.

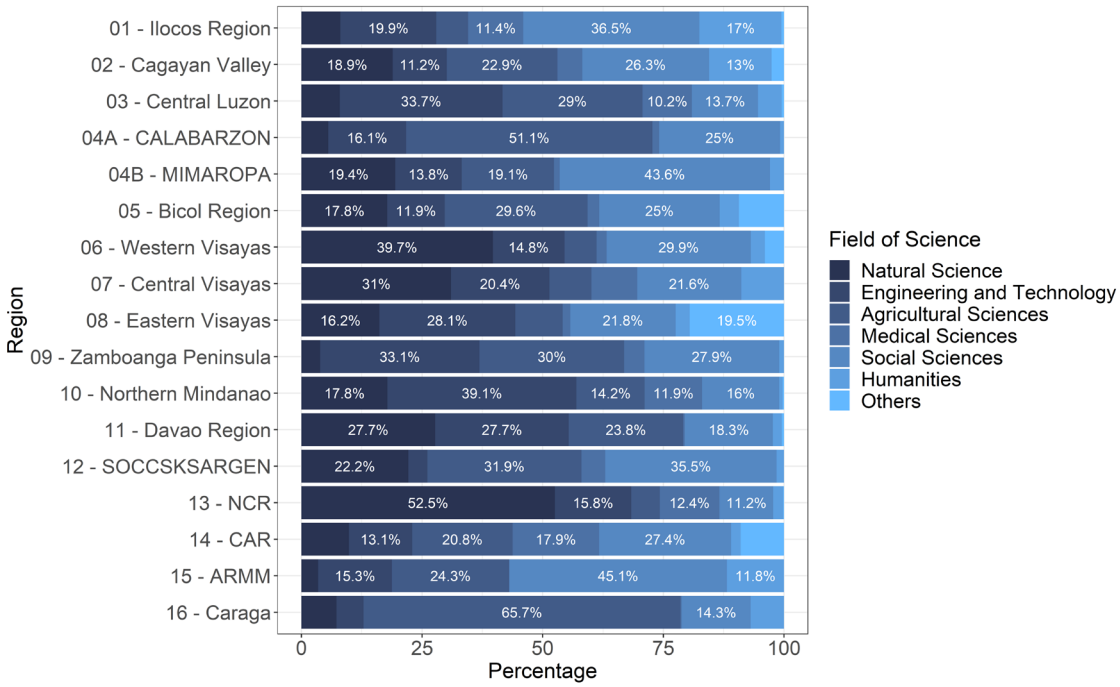


Figure 4.13. Regional R&D Expenditures of HEIs by Field of Science.

Regional R&D Expenditures by Field of Science: Government Sector

Figure 4.14 shows that in the government sector, there are variations of priorities in research but agricultural sciences is the dominant field of science for many of the regions except for CALABARZON in which R&D in natural sciences has a higher percentage share and NCR where engineering and technology is the primary field of science. Northern Mindanao and NCR are the only regions where research in the medical sciences is more than 5% of their total R&D expenditure. Percentage share of social science research on the total R&D expenditure is low among the many regions but CALABARZON spent about 13% of its research fund in this field. Humanities is the least prioritized in terms of funding in many of the regions.

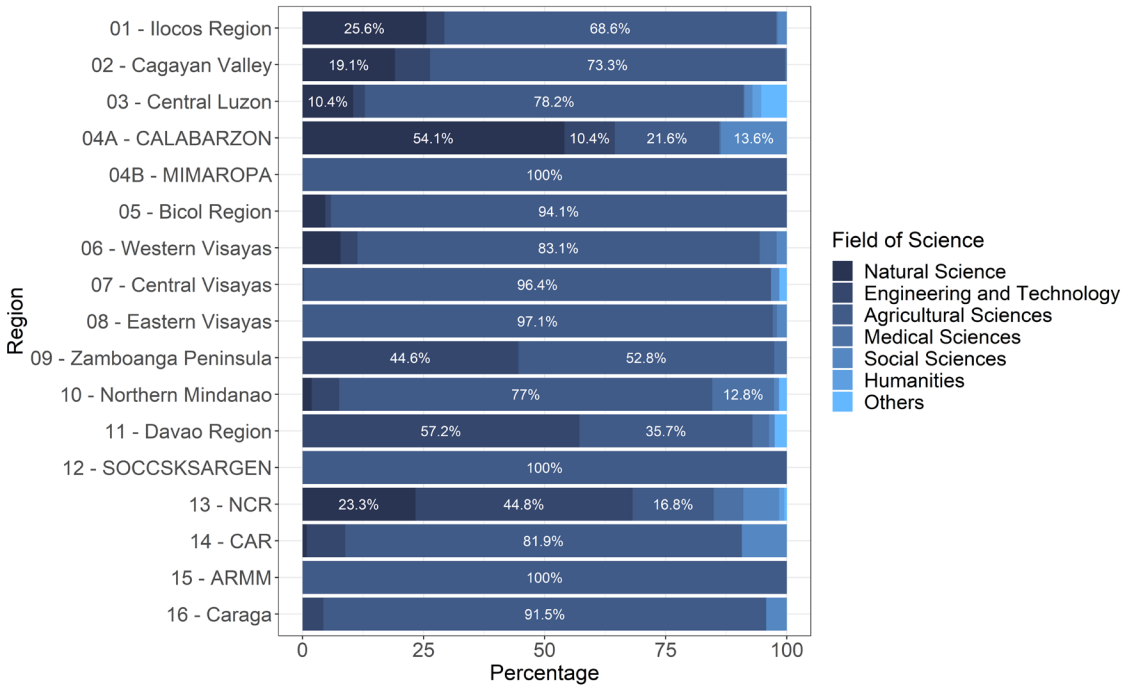


Figure 4.14. Regional R&D Expenditures of Government by Field of Science.

Regional R&D Expenditures by Field of Science: Private Non-Profit sector

Figure 4.15 indicates that of the five regions with PNPIs, agricultural science is the primary field of science in the R&D in CALABARZON and Western Visayas. Natural science is highly prioritized in the Davao region while PNPIs in NCR spend their R&D funds in the different fields of science.

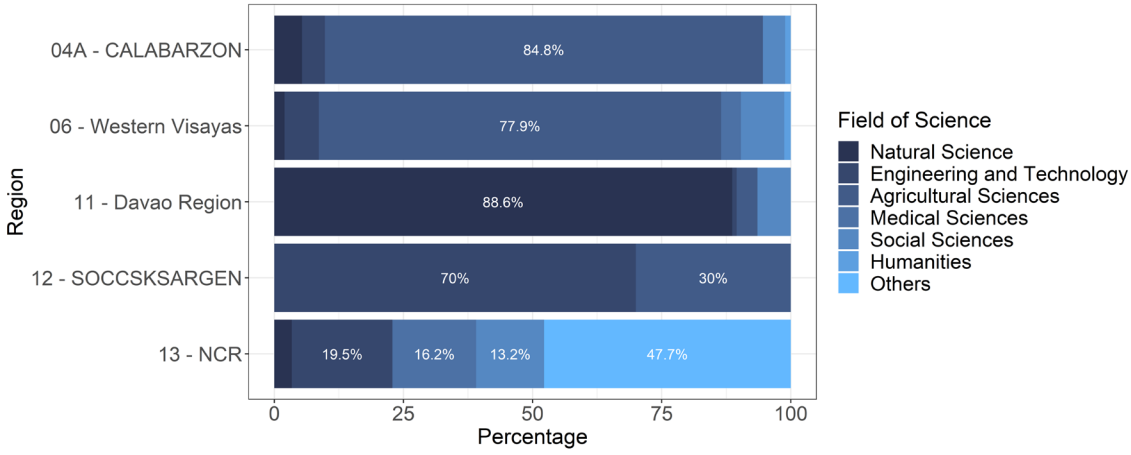


Figure 4.15. Regional R&D Expenditures of PNPIs by Field of Science.

CHAPTER 5

Research and Development Publications

Dissemination of completed research can be done through conferences, seminars, publication in journals, among others. Sharing research outputs with the professional community contributes to the creation of new knowledge and innovation as well as further improves the research through feedback and reviews. Moreover, published research outputs strengthen the credibility of the work of the researchers and elevate the visibility of the institutions to which the researchers belong.

The 2018 R&D survey included a question on whether the responding institutions have publications in scientific journals and their number of publications in local and international scientific journals during the reference period. The following discussion involves sectoral comparison based on the proportion of institutions with research publications and the total number of local and international publications. The regional statistics were also examined, especially on public and private HEI publications.

Publishing research outputs is practiced more in HEIs than in government and in PNPIs. As shown in Figure 5.1, about 74.7% of HEIs have publications, while only 37% and 33.6% of PNPI and government agencies, respectively. Higher proportion of Public HEIs have publications than those from private HEIs. Overall, the HEIs produced 3,014 local and 5,044 international publications in 2018, which constitute 92% of all publications.

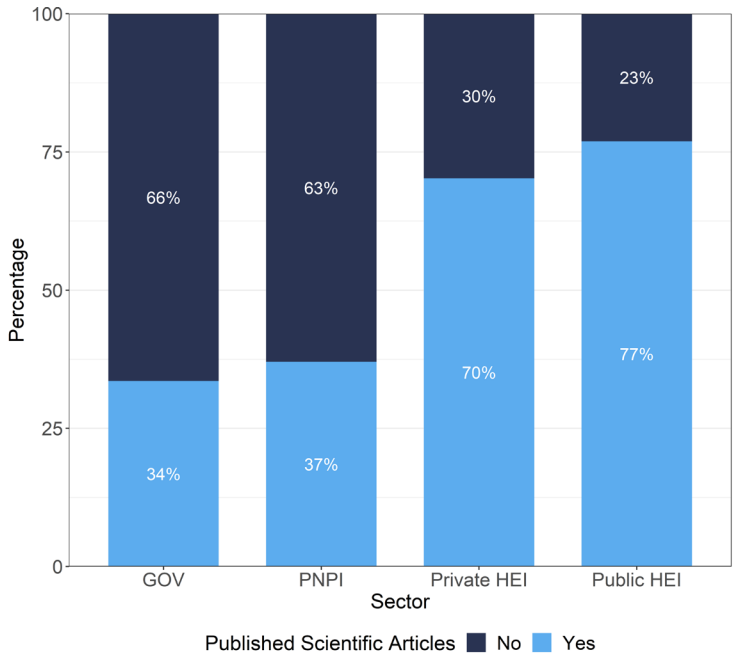


Figure 5.1. Proportion of Institutions with Publications by Sector.

Figure 5.2 below highlights a significant difference in the number of publications between public and private HEIs. Public HEIs produced 50% more local and 60% more international publications than private HEIs. Both the private non-profit sector and the government sector had a relatively small number of publications. This situation can be explained by the fact that most HEIs require publications in refereed journals as an important criterion for promotion and tenure. To be able to secure a tenured position in a HEI, a faculty must be able to produce a specific number of publications. Likewise, the promotion of a faculty also hinges on the number of publications that he/she has written.

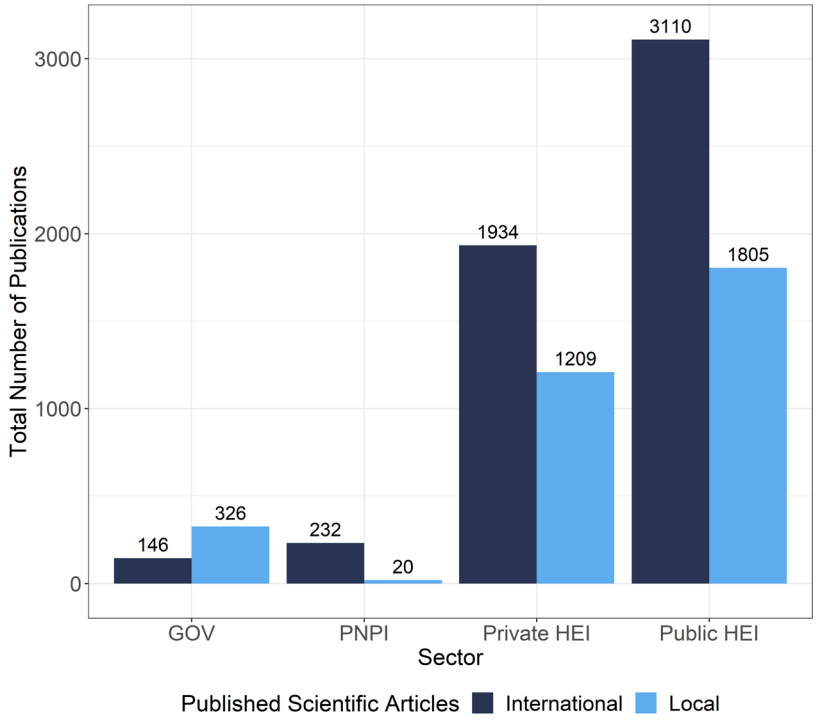


Figure 5.2. Publication of Scientific Articles by Sector.

Examining the ratio between local and international publications across the sectors specifically for the HEIs showed that public and private HEIs had almost the same distribution. The total number of international publications was approximately 1.6 times higher than that of the local publications for both HEIs. The details on the scientific publications by sector are presented in Appendix Table B5.3.

The regional total number of publications showed that NCR produced most of the government publications at 49.5% and followed by Ilocos Region at 29.7%. Of the PNPI publications from the five regions with PNPIs, CALABARZON's share was the highest at 88.1%. For HEI publications, the top three regions were NCR (33.7%), Western Visayas (9.6%), and CALABARZON (7.6%).

Figure 5.3 shows the number of publications of public and private HEIs by region. Public HEIs have more publications than private HEIs in all the regions except for NCR, which owns 57% of all private HEIs publications, and Bicol. Public HEIs in NCR, Western Visayas, and Central Luzon have the highest number of publications among the regions.

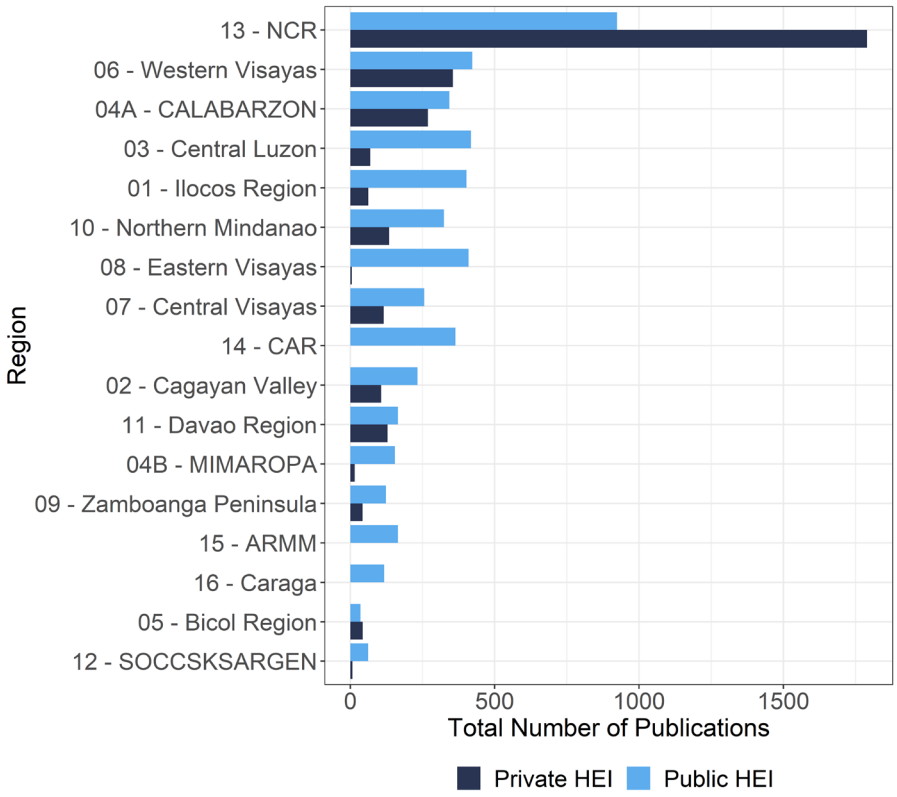


Figure 5.3. Publication of Scientific Articles by HEI Type and Region.

The complete information on the regional estimates on published scientific articles is presented in Appendix Tables B5.4 to B5.6.

CHAPTER 6

Conclusions and Recommendations

Encouraging results were obtained in the 2018 R&D Survey. Despite the incomplete data from the business and industry sector, the gross expenditure on R&D (GERD) as percent of the gross domestic product rose from 0.156 in 2015 to 0.194* in 2018. The number of R&D personnel more than doubled from 246 per million inhabitants to 574 in the same period. If the current trends are maintained, the Philippines may be able to catch up with its neighboring countries in terms of the R&D indicators.

Because there was no R&D Survey that was administered for the business and industry sector, the more in-depth analysis presented in chapters 2-4 of this report covered only the three sectors – government, HEIs and PNPIs. Hence, the following conclusions can only be drawn from these three sectors.

The government sector is the leading source of R&D funds in the country. Aside from financing its own R&D, the government also funded 60.4% and 94.7% of PNPI and public HEIs total R&D expenditure, respectively. The private higher education institutions, however, used mostly their own funds for research and development.

There were 54,564 R&D personnel from government, HEIs and PNPIs. Of these, 65.7% are researchers, 15.9% are technicians and 18.4% are other support staff. About 58% of the researchers are females, while 51% of the technicians are males. About 69.3% of the researchers have at least a master's degree. Researchers in government are concentrated in agricultural, medical and health sciences, while researchers in HEIs have more varied interests; the most popular of them are social sciences, medical and health sciences and engineering and technology. Researchers in PNPIs are mostly in agriculture sciences. NCR, CALABARZON and Western Visayas are the regions with the most numbers of researchers.

The total R&D expenditure from the government, HEIs and PNPIs is Php 28.5 billion in 2018. The expenditure on personnel services constitutes 48% of the total R&D expenditure. The government sector has the highest R&D expenditure followed by the higher education sector. The public HEIs total R&D expenditure is higher than that of the private HEIs. NCR had the highest share in the total R&D expenditure followed by Central Luzon and CALABARZON. Most of the expenses were used to fund applied research and agricultural sciences especially in the government and private non-profit sector.

The higher education sector had a more diverse expenditure pattern and spent most of its R&D funds in natural sciences, social sciences, and engineering and technology. Most of the funded research had relevant impact in agriculture, environment, exploration and exploitation of the earth, and health.

There were 8,781 research papers that were published in refereed journals in 2018. About 61.7% of these were international publications. The HEIs own the lion's share of these publications at about 92%. Of the HEIs publications, 61% are from public HEIs. NCR, Western Visayas and CALABARZON have the highest numbers of publications.

While the 2018 R&D Survey paved for some methodological innovations in terms of data collection and analysis, there are still areas in the survey design and operations that need further improvement so that better quality data can be achieved. Of the three sectors covered by the R&D Survey, PNPIs have the lowest response rate at 48%. There were only 67 PNPIs that were identified and included in the sampling frame while only 32 responded and 14 of those that responded were found to be ineligible. Despite the low response rate, both the total number of R&D personnel and expenditures have considerably increased compared to 2015 indicating that coverage errors may have been reduced. Still there are 12 regions that do not have PNPIs. While it is possible that there are really no PNPIs in all these regions that undertake in-house research, it is still worth exploring possible approaches that could improve the sampling frame for PNPIs.

The management of research activities and financial reckoning systems differed widely across sampled institutions. In general, large institutions with very decentralized research management systems are likely not able to complete the R&D Survey.

Data gaps still exist because comparison across regions and across sectors is limited only on the three sectors that were covered by the R&D Survey. Questions on the profile of establishments with R&D activities, composition of their R&D personnel, nature and field of their R&D expenditures remain unanswered because there are only two questions on R&D in the current ASPBI. For example, within the business and industry sector, a sub-sector that is often neglected in the R&D Survey in many countries is the service industry (UIS, 2014) which could be the provenance of innovation activities and may account for significant levels of R&D.

The breakdowns of age group, highest educational attainment, field of specialization, by sex of R&D personnel are not possible in the current survey because the questionnaire failed to include the appropriate questions. The results of these breakdowns can guide policies and projects on gender equality.

The following recommendations are geared towards addressing the issues that were discussed above and consequently reducing the data gaps that were identified and improving further the quality of data:

The results of this survey should be disseminated well to raise the awareness of the target institutions, policy makers, the public and civil society about the importance of monitoring research and development, Research papers on the results and methodological improvements should be published. These are activities that could further enhance the participation of

institutions in the next survey rounds. Moreover, a high-profile champion must be identified to promote the next survey rounds to further increase the response rate and improve the quality of data.

The mixed survey mode that was implemented turned out to be successful. Because of this approach, and with a streamlined questionnaire and the cooperation of the DOST regional offices staff that played a critical role in implanting the mixed-mode approach, the data collection for the 2018 R&D Survey was completed at about 81% response rate. Instead of starting the data collection approach using the online mode, it may be better to send by post the sampled institutions the questionnaire, invitation to participate and endorsement letters since the majority of institutions have yet to consider emails and online surveys as official communication. The link to the online survey can be given in the letter to offer the sampled institutions an alternative way of responding to the questionnaire.

The construction of sampling frames for government, HEIs and PNPIs was one of the most challenging activities that was undertaken to ensure that the 2018 R&D Survey is a probability sample survey that can render robust estimates. To reduce this difficult burden for the next survey rounds, a centralized R&D institution database that stores information on the institutions with in-house research must be maintained. Updating of this database can be done at the point of entry – when DOST or other government agencies or PNPIs provide a grant to a research project. In this regard, the collaboration with other research-granting institutions such as CHED, DOH, DepEd, Department of Agriculture, DENR should be strengthened. Following the endorsement of DOST, CHED and DOH that were given to the 2018 R&D Survey, other government agencies can also encourage their respective research units and grantees to cooperate and participate in the next R&D Survey rounds.

The DOST regional offices as well as regional development councils must also be engaged in updating the R&D institution database. And the current two-phase design with the purpose of Phase 1 to update the R&D institution database should be retained.

DOST can develop an application software that can be used for managing research activities in government, HEIs and PNPIs. The software should enable institutions to store and manage all the information regarding their research studies. The software can also generate reports that can be used by the institutions to manage their research agenda as well as, for completing the R&D Survey. Large institutions with decentralized research management systems can use this application software to consolidate the R&D information from different reporting units and consequently, manage their research agenda more effectively.

To address data gaps in the business and industry, an R&D Survey should be conducted for this sector. The design could be two-phase such that the sampling frame of establishments that have conducted in-house research in the reference period can be constructed from the ASPBI and a second-phase sample can be drawn from it. The results of the survey would enable a more consistent comparison of R&D estimates across regions and across sectors and enrich the profile analysis of establishments with R&D activities in the business and industry sector.

The R&D Survey for business and industry should be designed such that the trend in the growth of R&D in the service industry primarily in banks, insurance, mobile telephony and ICT can be appropriately measured. There are innovations in this subsector like the construction of unique algorithms that are proprietary and could be deemed as intellectual property that can lead to commercial benefits and may be considered R&D if it results in new knowledge in the field. These are inadvertently neglected because the survey design may be focused more on manufacturing.

The survey instruments, including survey operations manuals and questionnaires can be further enhanced to reflect the recommendations above if deemed viable for implementation. The questionnaire can be expanded to enable aggregates by sex and personnel characteristics such as age group, highest educational attainment, field of specialization. Moreover, the number of graduate students, especially the number of Ph D candidates can be collected to give an indication of where are the potential sources of future researchers. The size of the graduate class can also be used in strengthening the estimation strategy. The inclusions of questions on other forms of dissemination of completed research and outputs must also be explored to enable more in-depth analysis.

More methodological research on the R&D Survey to further improve its design, conduct and analysis. An anonymized public utility file of the R&D survey rounds data should be made available for research purposes.

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APPENDIX A

Methodological Notes

This section contains brief discussions on the technical components of the planning and implementation of the 2018 R&D Survey – survey design, questionnaire design, strategies employed for data collection, data processing, estimation procedure and analysis, and dissemination. Although contents herein are mostly taken from the Survey Operations Manual and the paper of Maligalig et. al. (2019), some details were updated to correctly describe the actual operations. Additional notes that were not covered in the mentioned references are also included.

Target Population

The target population for the R&D Survey consist of all institutions in the government, higher education, and private non-profit sectors in the country that perform in-house R&D activities in 2018. Data on the R&D undertakings in the private business sector, on the other hand, are gathered by the Philippine Statistics Authority (PSA) through the Annual Survey of Philippine Business and Industry (ASPBI). Results of the R&D Surveys conducted by DOST are combined with the ASPBI to derive national R&D indicators.

Construction of the Sampling Frames

Since there was no comprehensive list of institutions that undertook in-house research in 2018 for each of these sectors, construction of the sampling frames was not straightforward. Separate sampling frame for each sector was initially constructed as the organizational structure and processes of institutions vary across sectors. Web scraping and data sets from various agencies were leveraged to complement the previous sampling frames and produce a draft list of institutions for each sector. The initial sampling frames that were used were the lists of respondents of the previous R&D surveys that were provided by DOST. These sampling frames for the sectors were then improved as follows:

i. Government — Through online search and visits on the websites of various government agencies and offices, a list of government institutions was constructed with information about their head agency, head of the office, address, telephone number, and email address;

ii. Higher Education — A list of HEIs for the academic year 2017-2018 was obtained from the Commission on Higher Education (CHED). The list, however, needed updating as some contact information like the head of the institution and email address were outdated or missing for some HEIs especially for the satellite campuses of university and college systems. Moreover, new HEIs that were identified from online searches which were not found in the list were added and HEIs found to have ceased their operations were removed from the list. Updating of the list was done by examining every HEI's website and contacting them through emails and telephone calls;

iii. Private Non-profit — List of NGOs found in the Philippine Council for NGO Certification (PCNC) website together with the list of PNPIs who responded in the previous survey round was used to construct an initial list of PNPIs. Institutions known to conduct R&D but are not part of the initial list, e.g., International Rice Research Institute (IRRI) and Quantitative Aquatics, Inc. (Q-quatics) were also added in the list.

These constructed lists were not yet the desired sampling frames for the R&D survey since not all listed institutions are known to perform R&D. It is for this reason that a two-phase survey design was implemented such that institutions that do not belong in the target population were screened out in Phase 1. The initial list constructed for each sector was used to launch Phase 1 survey, which aimed to identify the institutions that performed in-house R&D in 2018. Information on whether institutions implement centralized or decentralized reckoning systems to monitor their R&D activities was gathered in this phase. Administrative units of institutions that independently conducted R&D and the incumbent heads of these units were also obtained for some responding institutions.

Unfortunately, the Phase 1 survey resulted in lower than desired response rates. This called for exploiting ancillary data sources to impute information on the R&D activities of institutions: list of R&D performing institutions prepared by DOST, list of HEIs with approved R&D projects from CHED and DOST, and the individual websites of the institutions who have not responded. In the case of HEI, additional data on graduate enrolment size for the academic year 2017-2018 of HEIs was obtained from CHED to impute the data on graduate student size of those HEIs who failed to respond to the Phase 1 survey. This made a huge improvement in the sampling frame used for the HEI sector.

Midway through the survey operations, the sampling frames for the government and private non-profit sectors needed to be updated due to some institutions suspected to perform R&D based on the responses collected in the middle of the survey operations. Several institutions that reported to only fund R&D, mostly agencies under DOST like NRCP, PCAARRD, PCIEERD, etc., listed institutions to which they provided R&D funds in the year 2018. These listed institutions were then checked to see if they were already in the sampling frame; otherwise, they were added. Additionally, the survey team realized that the regional offices of government institutions with R&D mandates were not completely listed in the sampling frames. Examples of these government agencies are PhilRice, BPI, DA, DOH Centers for Health Development, etc. The sampling frames were then updated based on these considerations. Table below illustrates the obtained results in identifying the R&D performing institutions through Phase 1 and the imputations that were done by exploiting external data sources.

Appendix Table A1. Number of institutions that undertake R&D by sector.

Sector	Initial list	Phase 1 results		Imputations*			With R&D at the end of Phase 1	With R&D at the end of Phase 2
		Responded	With R&D	DOST R&D List	CHED/ DOST Projects	Web search		
GOV	670	73	32	88 (88)	21 (31)	14 (15)	155	263
HEI	2,354	100	66	269 (298)	43 (171)	487 (530)	865	865
PNPI	354	21	9	29 (32)	0 (0)	24 (24)	62	67

* The numbers enclosed in parentheses indicate the number of institutions found in the external data source, whereas the number above is the number of institutions in the external source that were captured in addition to the ones identified in the Phase 1 or using the previously used external source, e.g., data sources from CHED and DOST listed 171 HEIs that were granted research projects, of which 43 HEIs were found to perform R&D but were not captured in Phase 1 and the DOST R&D list.
Sources: Challenges in Designing and Implementing Research and Development Surveys in the Philippines (Maligalig et al., 2019), R&D Survey 2018

Questionnaire Design

The questionnaire design of the current round of the R&D Survey in the country was based on the recommended practices in the Frascati Manual for implementing R&D Surveys and review of the R&D Survey questionnaires of other countries. Since the survey was conducted using two-phase sampling, questionnaires for each sector were developed in both phases. The questionnaires for all three sectors in Phase 1 collected information on whether the institution performed in-house R&D during the reference year, personnel who are most knowledgeable about their R&D activities, and administrative units that independently perform in-house R&D. For the higher education sector, additional questions about the total number of graduate faculty and students were added in the Phase 1 questionnaire. This information was used in the stratification scheme in the sampling design of the higher education sector. For the government and private non-profit sectors, the Phase 1 survey collected information if the institution provided R&D funds to other institutions in 2018. In general, the information derived from Phase 1 and the records of the previous survey rounds served as basis for identifying the target institutions in Phase 2.

The Phase 2 questionnaires were designed to collect the information needed to measure the R&D indicators. Major changes applied in the design were motivated by the objective to reduce nonresponses and respondent's burden in accomplishing the questionnaire while maintaining the granularity of the R&D indicators generated in the survey. Instead of requiring the respondents to enumerate the research projects and personnel involved of institutions, summary data at the institution level became the data requirements in the survey. Although there were changes in the questions, the data collected could still measure the R&D indicators generated in the past surveys. The proposed changes of the questionnaire design from the 2015 to 2018 are summarized in the table below.

Appendix Table A2. Changes in the 2015 survey questionnaire that were implemented in the 2018 R&D Survey.

2015 Questionnaire	2018 Questionnaire
Enumeration or listing of all Personnel and profile	Headcount of personnel according to type of personnel, sex, age group, highest qualification and field of science
	Number of personnel by percent of time spent in R&D by occupation
Enumeration or listing of all research projects with their expenditure and source of funds	Total expenditures and their subcategories
	Percentage of R&D expenditure according to sources categories
	Percentage of R&D expenditure according to type of research, field of science and technology, and socio-economic objectives
Enumeration of name of agency with R&D funded by the institution	Name of institution and total amount of funds provided to other institution for R&D
Enumeration of published journals	Total number of journals published (local and international)

Source: Challenges in Designing and Implementing Research and Development Surveys in the Philippines (Maligalig et al., 2019).

Sample Selection

Since no sufficient auxiliary data was available to identify the target population, a two-phase sampling design was employed following the recommended survey. Under this design, a census of all institutions in the initial sampling frames was conducted in Phase 1 to identify which institutions undertook in-house R&D in the year 2018. At the end of Phase 1 and some supplementary imputations using various external sources, comprehensive lists of R&D performing institutions were attained, which served as the sampling frames for the probability surveys that were carried out in the next phase.

In Phase 2, a complete enumeration of all institutions was again conducted for the government and private non-profit sectors since the total number of R&D performing institutions in these sectors are small. On the other hand, a stratified random sampling design was employed for the higher education sector due to its large population size and the notion that R&D undertakings correlate to the graduate capacity of universities and colleges. In this sector, institutions were stratified according to the size of their graduate enrolment. Three strata were formed, namely, small (with less than 1,000 graduate enrolment), large (with at least 1,000 graduate enrolment), and unknown (with no information of graduate size based on the sampling frame).

Institutions in the large stratum were selected with certainty, i.e., all institutions in this stratum were included in the sample, whereas simple random samples were gathered in the small and unknown strata. In both strata, the sample sizes were determined as

$$n_{\text{SRS}} = \frac{\left(z_{\alpha/2}PQ\right)^2}{d^2 + \frac{\left(z_{\alpha/2}PQ\right)^2}{N}}$$

where $Z_{\alpha/2}$ is the abscissa of the standard normal distribution given $(1-\alpha)$ 100% confidence level; N is the population size; P is the proportion of a major characteristic of interest; $Q=1-P$; and d is the margin of error. Since that the survey team did not have full access to the previous survey rounds data, the most conservative estimate of the population variability was imposed such that *P=0.5*. Appendix Table A3 presents the tentative sample sizes for the small and unknown strata under varying confidence levels and values of margin error.

Appendix Table A3. Summary of tentative sample sizes computed for small and unknown strata.

Stratum	Level of Confidence, $1-\propto$	Margin of Error, d				
		0.10	0.07	0.05	0.03	0.01
Small	0.950	77	128	**187**	272	350
	0.975	94	151	211	289	353
	0.990	115	176	235	304	356
Unknown	0.950	80	137	**207**	316	428
	0.975	99	164	237	339	432
	0.990	122	193	268	360	436

It was then decided to consider the sample size computed with a margin of error of 0.05 and a level of confidence of 0.95 as it would give greater balance between the resources and the precision of estimates to be obtained in this survey. After sample sizes were determined for the small and unknown strata, these were then proportionally allocated to all regions to ensure that all regions were represented in the sample. Simple random samples (SRS) are then gathered for each region per stratum. The final regional sample sizes for the small and unknown strata are shown in Appendix Table A4. This is followed by Appendix Table A5 which shows the population and sample sizes at the stratum level.

Appendix Table A4. Population sizes (N_{reg}) and sample sizes (n_{reg}) per region for the small and unknown strata in the higher education sector.

Region	Small		Unknown	
	N_{reg}	n_{reg}	N_{reg}	n_{reg}
01 - Ilocos Region	19	10	19	9
02 - Cagayan Valley	19	10	16	8
03 - Central Luzon	26	14	31	15
04A - CALABARZON	34	18	70	33
04B - MIMAROPA	12	7	40	19
05 - Bicol Region	21	12	29	13
06 - Western Visayas	37	21	49	22
07 - Central Visayas	26	14	27	13
08 - Eastern Visayas	18	10	23	11
09 - Zamboanga Peninsula	12	7	46	21
10 - Northern Mindanao	19	11	16	7
11 - Davao Region	16	9	16	8
12 - SOCCSKSARGEN	13	8	24	11
National Capital Region	52	27	22	11
CAR	13	7	7	4
BARMM	7	4	8	4
Caraga	11	7	12	6
Total	363	196	447	215

Sources: INSTAT (2019) Survey Operations Manual of the 2018 Research and Development Survey; 2018 Research and Development Survey

Appendix Table A5. Population sizes (N_h) and sample sizes (n_h) per stratum.

Sector	N_h	n_h
Government	262	262
Private non-profit	67	67
Higher education	865	466
Large	55	55
Small	355	193
Unknown	455	218

Source: Survey Operations Manual of the 2018 Research and Development Survey. Institute of Statistics (2019).

Survey Operations

Various modes of data collection were employed to improve the response rates in both Phase 1 and Phase 2 of the R&D survey. When the initial sampling frames were constructed for the government, higher education, and private non-profit sectors in Phase 1, online mode through the survey platform SurveyMonkey[1] was initially rolled out in the last week of May 2019 for all institutions with available email addresses in the sampling frames. Telephone follow-ups were then conducted shortly after the launching of the online survey to improve the coverage of the online survey and to update the contact information of

[1] SurveyMonkey is a cloud-based survey platform that allows its users to design, implement, and analyze surveys through various online data collection modes.

the sampled institutions. Several rounds of telephone follow-ups were carried out to improve the collected data from Phase 1 and to generate quality sampling frames for the next phase.

Using the constructed sampling frames at the end of Phase 1, the same standards for gathering data were implemented in Phase 2. The questionnaires were also initially rolled out through SurveyMonkey in the first week of September 2019 supplemented with telephone follow-ups. In January 2020, formal letters enclosed with the hard copies of the questionnaires were sent to the institutions through post. Just as more responses were beginning to come in, the COVID-19 pandemic struck which slowed down not only the operations of the survey, but also of the sampled institutions.

The field operations began on the second week of March 2020 when select personnel from the DOST regional offices were engaged as data collectors of their respective regions. Prior to the field follow-ups, training was first conducted to orient the data collectors of some information about the current survey round, their responsibilities, and the role of INSTAT as technical support to facilitate efficient collaboration. In the training, quality practices in collecting, validating, and encoding responses in the R&D survey were outlined. Some pointers on the follow-ups that INSTAT had already made with the institutions were forwarded to the assigned data collectors so as not to disrupt the flow of communication. Illustrations of common errors and inconsistencies in the accomplished questionnaires were also given to guide them in validating the collected responses. Because of the implementation of the community quarantine restrictions in almost all the regions beginning 16 March 2020, in-person training was conducted only for CALABARZON and Zamboanga Peninsula, while virtual training was organized for the other regions.

During the field operations, a survey supervisor was designated for each region to oversee the data collectors. These survey supervisors, in close collaboration with the lead data collectors of each region, served as the focal persons in providing updates to the INSTAT survey team. Regular team meetings within the core survey team were held to discuss and address some blockers that were encountered in the field operations.

A system for monitoring the responses of the institutions was also developed to observe the number of questionnaires collected in the survey operations over time. In the monitoring form, the sampled institutions were assigned a response status to indicate if they responded to the survey or otherwise. Once an institution responded, they were then categorized as either eligible or ineligible based on their communication with the project team. Ineligible institutions are those that did not conduct any in-house research activity for the reference year. Eligible institutions submit completed questionnaire forms, whereas ineligible institutions usually submit written documents to inform the survey team of their ineligibility to the survey. During the field operations, regular updates on the status of the survey were communicated to the data collectors to ensure that all responses were accounted for in the survey. The field follow-ups closed in November 2020 but a grace period on the submission of accomplished questionnaires was set until January 2021. By then, higher than targeted response rates were achieved per region and at the national level. Appendix Table A6 below summarizes the results of the survey operations.

Appendix Table A6. Regional response rates.

Region	Sample Size	Number of Respondents		Response Rate*
		Eligible	Ineligible	
Philippines (national)	**795**	**417**	**228**	**81%**
01 - Ilocos Region	38	30	7	97%
02 - Cagayan Valley	33	23	9	97%
03 - Central Luzon	49	35	13	98%
04A - CALABARZON	75	33	22	73%
04B - MIMAROPA	30	12	17	97%
05 - Bicol Region	38	15	10	66%
06 - Western Visayas	67	46	18	96%
07 - Central Visayas	44	24	9	75%
08 - Eastern Visayas	34	27	5	94%
09 - Zamboanga Peninsula	41	13	26	95%
10 - Northern Mindanao	28	18	10	100%
11 - Davao Region	37	21	13	92%
12 - SOCCSKSARGEN	35	13	14	77%
National Capital Region	181	71	39	61%
CAR	25	14	5	76%
BARMM	14	5	3	57%
Caraga	26	17	8	96%

*Response rates were computed as the non-weighted percentages of institutions that responded either as eligible or ineligible over the sample size.
Source: 2018 R&D Survey

Data Processing

Due to the lack of comprehensive sampling frames with updated contact information of the target institutions in Phase 1, updating the sampling frames together with identifying whether the institutions perform in-house R&D were simultaneously the main undertakings in Phase 1. Institutions identified to have invalid email addresses in the initial sampling frames were easily identified when the online survey in Phase 1 was rolled out. These institutions, together with the ones that lacked contact details in the sampling frame, were targeted in the telephone follow-ups so that a more updated sampling frame is prepared for the next phase. Contact information of institutions were continuously updated in Phase 2 every time more reliable information was collected in the survey operations.

Accomplished questionnaires were immediately validated as soon as they were received by the survey team. Responding institutions were first checked if they performed in-house R&D activities during the reference period. Once identified to be eligible in the survey, their accomplished questionnaires were then reviewed for errors and inconsistencies in their overall response. Counts of R&D personnel were checked if they were consistent across various categories. Percentages in the accomplished questionnaires were checked if they correctly totaled to 100%. Logic in both Part 5 (Provided R&D Funds to Other Institutions) and Part 6 (Published Scientific Articles) of the questionnaire forms were also reviewed for consistency. Issues found in the questionnaires were clarified with the respondents to improve the quality of the collected data. The survey team was fortunate to still be accommodated by the respondents in the

clarifications. For cases, however, when the institution was no longer responsive in the clarifications, the survey supervisors then had the discretion to apply corrections that were deemed logical based on the available information. Otherwise, data on the questionnaires were left as they were.

As the online survey was the first mode implemented, the database generated in SurveyMonkey served as the main repository of all the responses received in the survey regardless of mode of data collection. Responses collected through the online survey were already found in the SurveyMonkey database. For accomplished questionnaires received via email or formal letter, the assigned supervisor of the region in which the institution belongs was responsible for encoding the accomplished questionnaire in SurveyMonkey. This system of encoding the responses was also implemented when the follow-ups were turned over to the data collectors. Web links of the online version of the questionnaires were given to them for encoding. Moreover, guidelines for encoding completed questionnaires were set for compliance to minimize coding errors.

Regular data cleaning was conducted whenever preliminary analysis of the survey was performed. With each round of data processing, gaps between the identified eligible institutions in the monitoring form and the encoded responses in the database were flagged for the appropriate action of the designated supervisors. Institutions found to have submitted their accomplished questionnaires but were still not encoded in the database were identified. Responses recorded in the database with suspicious response status in the monitoring form were clarified. Multiple responses of institutions in the database were individually cross-checked with the completed questionnaires to identify the correct entry. When all collected responses were accounted for in the database and data cleaning was completed, responses of some higher education institutions and government agencies were consolidated with their corresponding administrative units that also responded to the survey. At the end of the data cleaning process, institution-level responses were produced. Finally, design variables, like region, stratum, stratum sizes for finite population correction, and survey weights, were incorporated into the data to perform the analysis.

Determination of Survey Weights

The base weight for an institution is the inverse of its selection probability. Since all institutions in the government sector, private non-profit sector, and large stratum of the higher education sector were selected with certainty, all these institutions have base weights of 1. For the small and unknown strata in which samples were taken using SRS, the base weights w_i computed as $w_i = N_{reg_i}/n_{reg_i}$ where N_{reg_i} and n_{reg_i} are respectively the population and sample sizes of the region and stratum to which institution belongs. Due to non-response and the high number of ineligible institutions that were included in the sampled population, weighting adjustment w_{adj} due to nonresponse, which is defined as the inverse of the base weighted response rates, needed to be applied to the base weights to derive the final survey weights. That is, $w_{final_i} = w_i \times w_{adj}$.

To adjust for the nonresponse, the response rates, defined as the proportion of eligible institutions that responded among the eligible institutions that were sampled, were determined at the stratum level as shown in Appendix Table A7. Then the response rate R_h for stratum h is computed as $R_h = m_h/n_{h_e}$, where m_h is the number of eligible institutions that responded to the survey and is the number of sampled institutions that are eligible. Eligibility of institutions in the survey was determined, however, at the stage of data collection where the R&D activities of respondent institutions were closely investigated. As several institutions in the sample were left to have unknown eligibility due to nonresponse, the exact value of n_{h_e} could not be determined. However, since $n_{h_e} = p_{h_e} \times n_h$, where p_{h_e} is the eligibility rate (proportion of

eligible institutions) in stratum h, n_{h_e} was then estimated using the observed eligibility rate $p_h^* = m_h / n_{r_h}$ where n_{r_h} is the number of sampled institutions in stratum that responded to the survey, regardless of eligibility. Accordingly, the number of eligible samples was estimated by $n_h = p_h^* \times n_h$. Therefore, the weighting adjustments w_{adj} for each sector is given by

$$w_{adj_h} = \frac{n_h^*}{m_h} = \frac{p_h^* \times n_h}{m_h} = \frac{\frac{m_h}{n_{r_h}} \times n_h}{m_h} = \frac{n_h}{n_{r_h}},$$

which follows that $w_{\text{final}_i} = \frac{N_{reg_i}}{n_{reg_i}} \times \frac{n_h}{n_{r_h}}$

Appendix Table A7. Weight Adjustments

Stratum	Stratum size	Sample size	Total responses	Eligible responses	Weight adjustment
Government	263	262	230	145	1.139
Private non-profit	67	67	32	18	2.129
Higher education					
Large	55	55	48	45	1.146
Small	355	193	152	124	1.270
Unknown	455	218	183	85	1.191

Source: 2018 R&D Survey

Because a PNPI has significantly higher inputs and outputs compared to the rest of eligible PNPIs, the outlier PNPI was assigned the final survey weight of 1. The weighting adjustment applied to the other PNPIs was then computed as $w_{adj_h} = (n_h - 1) / (n_{r_h} - 1) = \frac{66}{31} = 2.129$. All regions in the government, PNPI, and large HEI have uniform final survey weights except for the outlier PNPI. The following table shows the weight of institutions in the small and unknown strata.

Appendix Table A8. Base weights (w_i) and final survey weights (w_{final_i}) of institutions per region in the small and unknown strata.

Region	Small		Unknown	
	w_i	w_{final_i}	w_i	w_{final_i}
01 - Ilocos Region	1.900	2.413	2.111	2.515
02 - Cagayan Valley	1.900	2.413	2.000	2.383
03 - Central Luzon	1.857	2.358	2.067	2.462
04A - CALABARZON	1.889	2.398	2.121	2.527
04B - MIMAROPA	1.714	2.177	2.105	2.508
05 - Bicol Region	1.833	2.328	2.154	2.566
06 - Western Visayas	1.857	2.358	2.136	2.545
07 - Central Visayas	1.857	2.358	2.077	2.474
08 - Eastern Visayas	1.800	2.286	2.091	2.491
09 - Zamboanga Peninsula	1.857	2.358	2.143	2.553
10 - Northern Mindanao	1.818	2.309	2.143	2.553
11 - Davao Region	1.778	2.257	2.000	2.383
12 - SOCCSKSARGEN	1.875	2.381	2.000	2.383
National Capital Region	1.926	2.445	2.000	2.383
CAR	1.857	2.358	1.750	2.085
BARMM	1.750	2.222	2.000	2.383
Caraga	1.714	2.177	1.833	2.184

Source: 2018 R&D Survey

Estimation Procedure and Analysis

The estimators required to achieve the target indicators in the R&D survey were mostly in the form of totals and proportions. To provide a measure of the precision of the estimates, the corresponding standard errors were also computed using Taylor Series Linearization (TSL), which is a variance estimation method that renders robust results even for nonlinear estimators, like subpopulation means and totals. TSL is the default variance estimation procedure in many reputable statistics software like R, Stata, and SAS. All computations in this survey report were executed using the 'survey' package in R.

Estimating totals

Let y_{si} be the value of the characteristic of interest *y* observed for institution *i* in sector *s* and w_{si} be its corresponding survey weight. The population total for sector s was estimated by the weighted sum $\hat{Y}_s = \sum_i w_{si} y_{si}$. Since all sectors can be presumed to be independent of each other, the total for all three sectors was estimated by $\hat{Y} = \sum_s \hat{Y}_s$ with corresponding variance computed as the direct sum of the variance estimates of the sector totals. That is, $\text{var}\left(\hat{Y}\right) = \sum_s \text{var}\left(\hat{Y}_s\right)$.

Estimating proportions

The percentage of expenditures attributed to the categories of various classifications of R&D – sources of R&D funds, types of research, field of science and technology, and socio-economic objectives – are examples of estimates of proportion. To estimate the % shares, two additional variables were first derived for each institution:

i. R&D expenditures $y_{k.si}$ that correspond to category *k* of classification *c*; and
ii. R&D expenditures $x_{c.si}$ that correspond to classification *c* as a whole. This is due to the item nonresponse and measurement error incurred in the survey, wherein the total of the percentages for each classification did not necessarily total to 100% for all institutions.

Then, using the estimation procedure for totals outlined above, the desired percentage for a category *k* at the sector level was estimated by $\hat{p}_{k.s} = \hat{Y}_{k.s} / \hat{X}_{c.s}$, where $\hat{Y}_{k.s}$ and $\hat{X}_{c.s}$ are the sector totals for $y_{k.si}$ and $x_{c.si}$, respectively. To compute for the overall % share p_k of a category *k* for all sectors, p_k was directly derived from the sector-level estimates of the percentages $p_{k.s}$ and total R&D expenditures $\hat{Y}_s$. This is given by

$$\hat{p}_k = \frac{\sum_s \hat{p}_{k.s} \hat{Y}_s}{\sum_s \hat{Y}_s} = \sum_s \frac{\hat{Y}_s}{\hat{Y}} \hat{p}_{k.s}$$

Correspondingly, its variance estimator is $\text{var}\left(\hat{p}_k\right) = \sum_s \left(\frac{\hat{Y}_s}{\hat{Y}}\right)^2 \text{var}\left(\hat{p}_{k.s}\right)$, where $\text{var}\left(\hat{p}_{k.s}\right)$ are the TSL-computed variance estimates for each sector.

Estimating the proportion of institutions that provided R&D funds to other institutions and published scientific articles is a special case of estimating $p_{k.s}$ such that the categories are either yes or no. When estimating the overall proportion for all sectors in this case, however, the proportions are weighted by the number of eligible institutions instead of the total R&D expenditures.

Estimating the total R&D expenditure and total R&D personnel

The total R&D expenditure and total R&D personnel should include the share from all sectors – government, higher education, private non-profit, and the private business. Since there is no R&D survey conducted for the private business sector for this specific purpose, the PSA included two questions about the R&D activities in the ASPBI. These questions were about the total R&D expenditure and total R&D personnel of sampled businesses and hence, results from ASPBI would have completed the compilation of total R&D expenditure. However, as of this writing, the results of the 2018 ASPBI are not yet available.

To provide an estimate of the contribution of the private business sector to the total R&D expenditure and R&D personnel, the 2018 Census of Philippine Business and Industry (CPBI) was instead utilized. While all establishments in the Philippines were enumerated in the CPBI, only the main economic activity of establishments was considered in classifying them. Hence, the in-house R&D activities that establishments performed as secondary economic activity were not accounted for in the CPBI. In this regard, the estimates derived from CPBI likely underestimate the total R&D expenditure and the total R&D personnel of the private sector, nevertheless these could be taken as preliminary estimates in lieu of the still forthcoming ASPBI results. The R&D data that were taken from CPBI are presented in Appendix Table A9.

Appendix Table A9. Summary of R&D data taken from the 2018 Census of Philippine Business and Industry

Philippine Standard Industry Code	Industry Description	Number of Establishments	Total Employed	Total Expenditure ('000 Pesos)
M721	Research and experimental development on natural sciences and engineering	37	1,618	1,875,740
M722	Research and experimental development on social sciences and humanities	13	945	767,380
M723	Research and experimental development in information technology	16	4,007	4,152,106
M724	Research and experimental development services, not elsewhere covered.	5	70	68,133
Total		71	6,640	6,863,359

Source: Comparative Statistics for Professional, Scientific and Technical Activities Establishments by Industry Group: Philippines, 2018 and 2012 Census of Philippine Business and Industry, Philippine Statistics Authority.

Appendix Table A10 shows how the data derived from the 2018 CPBI were combined with the results of the 2018 R&D Survey. Since only establishments with research as their main function were considered, the employees were assumed to be full-time in the R&D activities. Moreover, there was no available classification of employees into researchers, technicians, and other support staff.

Appendix Table A10. Combining 2018 R&D Survey and 2018 CPBI

Data field	2018 R&D Survey (HEI + Government + PNPI)	2018 CPBI (Private Business)	Total
R&D Expenditure ('000 Php)	28,546,815	6,863,359	35,410,174
Public	22,838,792	-	22,838,792
Private	5,708,023	6,863,359	12,571,382
Personnel (headcount)	54,564	6,640	61,204
Personnel FTE	24,034	6,640	30,674

Sources: 2018 CPBI and 2018 R&D Survey.

Subpopulation estimates

When estimating over subpopulations such as regions, college or university systems, government departments, etc., the observed characteristic is simply redefined such that it takes the same value for units that belong in the subpopulation of interest and zero, otherwise. For example, in the higher education sector, if the objective is to estimate the total R&D expenditure of public HEIs, then a new variable is created where the R&D expenditures of public HEIs are kept as they are, while the expenditures of private HEIs are set to zero. This new variable is then utilized for estimation that follows the discussion above. This type of analysis can be easily performed using the 'svyby' function of the 'survey' package.

Generally, the regional designation of institutions in the survey, particularly in the government sector, follows their respective physical addresses. Hence, the R&D undertakings of DA-CALABARZON and DOH-MIMAROPA, among others, were attributed to the National Capital Region as it is where these are located despite representing other regions. In the case of the Ecosystems Research and Development Bureau (ERDB), which has six research centers[2] in different regions across the country, the R&D undertakings of the whole bureau was attributed to CALABARZON since ERDB has a centralized R&D reckoning system.

Dissemination of Survey Results

This survey report is the final and major output of the 2018 R&D Survey and serves as the primary tool in disseminating the survey results and findings. As policymakers in the country are among the target users of R&D data, major indicators – R&D expenditure and number of personnel involved in R&D – as well as disaggregation according to various categories were reported at the regional and sector levels. These data will further guide the decision-makers on how resources need to be allocated and which sectors need substantial interventions. By producing statistics that can describe the status of S&T in the country, policymakers are better informed on what programs need to be implemented to drive technological innovation.

To disseminate the results and encourage better participation in this initiative, all institutions that responded in the survey will be emailed online copies of the report along with hard copies that will be sent to them through posts. Moreover, this document will also be uploaded to the official websites of INSTAT and DOST. Supplementary to this report, dissemination workshops shall be conducted through webinars where major stakeholders of the survey will be invited. Online workshops to present the national R&D indicators will first be arranged, followed by dissemination workshops at the individual regions where regional survey results will be given emphasis.

[2] The research centers ERDB are (i) Watershed & Water Resources Research, Development and Extension Center in Ilocos; (ii) Urban and Biodiversity Research, Development and Extension Center in Bicol; (iii) Coastal Resources and Ecotourism Research, Development and Extension Center in Central Visayas; (iv) Agroforestry Research, Development and Extension Center in SOCCSKSARGEN; (v) Forest and Wetland Research, Development and Extension Center in Caraga; and (vi) Toxic and Hazardous Wastes Research, Development and Extension Center in NCR.

APPENDIX B

Statistical Tables

This appendix presents the tables of computed indicators in the 2018 R&D Survey and other relevant statistics. The first digit of the table number indicates the chapter for which the table belongs.

Appendix Table B1.1 Research and Development Indicators

Indicator	2002	2003	2005	2007	2009	2011	2013	2015	2018*
R&D Personnel per million inhabitants	116	165	165	165	181	191	233	246	574
R&D Personnel full time equivalent per million inhabitants	72	115	110	108	112	117	196	138	288
Researchers per million inhabitants	90	106	125	130	142	149	184	199	336 **
Researchers full time equivalent per million inhabitants	55	72	81	79	83	85	114	104	132 **
R&D expenditures as % of GDP	0.133	0.125	0.108	0.105	0.105	0.112	0.132	0.157	0.194
Private R&D Expenditures as % of GDP	0.095	0.092	0.069	0.068	0.067	0.061	0.052	0.078	0.069
Public R&D Expenditures as % of GDP	0.037	0.034	0.039	0.037	0.037	0.051	0.080	0.083	0.125
Share of Public R&D Expenditure (%)	28.00	26.82	36.21	35.21	35.74	45.27	60.81	52.80	64.50
R&D Expenditures to Personnel	619	438	452	516	527	629	697	874	579
R&D Expenditures to Personnel full time equivalent	993	629	676	808	847	1028	827	1558	1,154
R&D expenditures to Researcher	801	667	595	658	671	803	833	1081	1,188 **
R&D expenditures to Researcher full time equivalent	1,319	1,008	923	1,086	1,154	1,408	1,426	2,071	2,029 **
Memo Items:									
Population (million)	80.16	81.88	85.26	88.57	92.2	94.82	98.20	101.56	106.60
Gross Domestic Product (million Php)	4,350,560	4,717,809	5,917,282	7,198,245	8,390,421	10,144,661	12,050,592	13,944,157	18,265,190
Total R&D Personnel	9,325	13,488	14,087	14,649	16,673	18,110	36,517	25,021	61,204
Total R&D full time equivalent	5,811	9,390	9,407	9,357	10,370	11,079	26,333	14,037	30,674
Number of Researchers	7,203	8,866	10,690	11,490	13,091	14,169	26,495	20,239	35,848 **
Number of Researchers full time equivalent	4,373	5,860	6,896	6,957	7,608	8,083	18,257	10,557	14,067 **
Total R&D Expenditures ('000 Php)	5,770	5,910	6,362	7,556	8,779	11,384	15,915	21,869	35,410
Private R&D Expenditures	4,154	4,325	4,059	4,896	5,641	6,231	6,237	10,862	12,571
Public R&D Expenditures	1,616	1,585	2,304	2,660	3,138	5,153	9,678	11,546	22,839

*2018 data and indicators include R&D data from the 2018 Census of Philippine Business and Industry.

**2018 data does not include any R&D data from business and industry.

Sources: 2015 Annual Survey of Philippine Business and Industry and previous years, Philippine Statistics Authority
2018 Research and Development Surveys and previous years, Department of Science and Technology
Philippine Statistics Authority website

Appendix Table B1.2 Regional Research and Development Indicators: Total Personnel and Researchers

Region	Indicators (per million population)				Population	Total R&D Personnel		Researchers	
	Total R&D Personnel		Researchers						
	Total	FTE	Total	FTE		Total	FTE	Total	FTE
I - Ilocos	551	206	354	119	5.14	2,833	1,057	1,818	611
II - Cagayan	749	225	481	107	3.54	2,652	797	1,704	377
III - Central Luzon	357	186	215	100	11.56	4,130	2,146	2,487	1,161
IVA - CALABARZON	393	212	216	105	14.99	5,897	3,170	3,237	1,569
IVB - MIMAROPA	315	114	233	54	3.11	979	354	725	169
V - Bicol	247	96	168	55	6.09	1,505	584	1,026	336
VI - Western Visayas	1,094	426	753	202	4.62	5,055	1,971	3,481	936
VII - Central Visayas	449	154	307	96	6.26	2,814	965	1,922	603
VIII - Eastern Visayas	625	211	397	135	4.65	2,904	981	1,845	629
IX - Zamboanga Peninsula	201	91	73	22	3.78	758	343	274	84
X - Northern Mindanao	474	203	309	112	4.84	2,296	985	1,497	542
XI - Davao	418	234	231	86	5.10	2,134	1,193	1,177	441
XII - SOCCSKSARGEN	165	73	90	25	4.75	783	346	426	117
National Capital Region	1,258	595	935	444	13.10	16,477	7,789	12,243	5,819
CAR	1,074	362	562	157	1.79	1,925	648	1,008	281
BARM	126	80	79	37	4.03	506	323	317	150
Caraga	335	140	242	88	2.73	915	384	661	242

Sources: 2018 Research and Development Surveys and previous years, Department of Science and Technology
Population projections were computed using the 2015 population and the average annual population growth rate from the 2015 Census of Population and Housing. Philippine Statistics Authority website

Appendix Table B1.3 Regional Research and Development Indicators: Public and Private Expenditures

Region	R&D Expenditures as % of GRDP			GRDP (million Php)	R& D Expenditures (Thousand Php)		
	Total	Public	Private		Total	Public	Private
I - Ilocos	0.051	0.038	0.012	547,523	277,751	209,387	68,364
II - Cagayan	0.108	0.097	0.010	303,001	325,818	294,415	31,403
III - Central Luzon	0.349	0.346	0.004	1,620,342	5,663,078	5,603,840	59,237
IVA - CALABARZON	0.198	0.068	0.130	2,571,284	5,085,584	1,737,773	3,347,811
IVB - MIMAROPA	0.029	0.029	0.000	274,305	80,063	79,748	316
V - Bicol	0.120	0.117	0.003	374,318	449,327	436,965	12,362
VI - Western Visayas	0.112	0.076	0.037	739,011	829,650	558,996	270,655
VII - Central Visayas	0.069	0.058	0.011	1,156,592	795,564	669,137	126,427
VIII - Eastern Visayas	0.082	0.080	0.001	354,551	289,844	284,788	5,056
IX - Zamboanga	0.098	0.072	0.026	342,260	333,918	245,408	88,510
X - Northern Mindanao	0.056	0.053	0.002	691,656	384,666	369,862	14,804
XI - Davao	0.057	0.036	0.021	816,874	465,082	295,520	169,563
XII - SOCCSKSARGEN	0.033	0.028	0.004	472,663	154,638	134,589	20,049
NCR	0.186	0.163	0.023	6,534,797	12,153,634	10,660,455	1,493,180
CAR	0.067	0.067	0.000	304,301	204,156	204,156	-
ARMM	0.698	0.698	0.000	128,711	898,555	898,444	111
Caraga	0.080	0.080	0.000	194014	155,485	155,309	176

Data and indicators do not include R&D data from the business and industry.
Sources: 2002, 2003, 2005, 2007, 2009, 2011, 2013, 2015, 2018 Research and Development Surveys, Department of Science and Technology
Philippine Statistics Authority Website for the Gross Regional Domestic Product

Appendix Table B1.4 Regional Research and Development Indicators: Expenditure per Type of Personnel

Region	R&D expenditure per type of personnel				Total R&D Expenditure ('000 Php)	R & D Personnel		Researchers	
	Total R&D	Total R&D FTE	Researcher	Researcher FTE		Total (Headcount)	FTE	Total (Headcount)	FTE
I - Ilocos	98	263	153	455	277,751	2,833	1,057	1,818	611
II - Cagayan	123	409	191	863	325,818	2,652	797	1,704	377
III - Central Luzon	1,371	2,639	2,277	4,878	5,663,078	4,130	2,146	2,487	1,161
IVA - CALABARZON	862	1,604	1,571	3,241	5,085,584	5,897	3,170	3,237	1,569
IVB - MIMAROPA	82	226	110	475	80,063	979	354	725	169
V - Bicol	299	770	438	1,337	449,327	1,505	584	1,026	336
VI - Western	164	421	238	887	829,650	5,055	1,971	3,481	936
VII - Central	283	824	414	1,320	795,564	2,814	965	1,922	603
VIII - Eastern	100	295	157	461	289,844	2,904	981	1,845	629
IX - Zamboanga	440	973	1,217	3,954	333,918	758	343	274	84
X - Northern	168	391	257	710	384,666	2,296	985	1,497	542
XI - Davao	218	390	395	1,055	465,082	2,134	1,193	1,177	441
XII - SOCCSKSARGEN	197	447	363	1,318	154,638	783	346	426	117
NCR	738	1,560	993	2,088	12,153,634	16,477	7,789	12,243	5,819
CAR	106	315	203	725	204,156	1,925	648	1,008	281
ARMM	1,776	2,786	2,836	5,990	898,555	506	323	317	150
Caraga	170	405	235	643	155,485	915	384	661	242

Sources: 2018 R&D Survey, Department of Science and Technology, PSA Website

Appendix Table B1.5 R&D Indicators of Selected Countries, Latest Year

Country	Latest Year	Total R&D personnel per million inhabitants		Researchers per million inhabitants		GERD (% of GDP)
		FTE	Headcount	FTE	Headcount	
Indonesia	2018	280	727	216	623	0.226
Japan	2018	7,051	9,508	5331	7,356	3.275
Malaysia	2018	2657	3913	2397	2857	1.041
Philippines	2018	288	574	132	336	0.194
Singapore	2017	7799	8636	6803	7493	1.925
Thailand	2017	2003	3139	1350	2170	1.002
Vietnam	2017	896	1825	708	1438	0.527

Sources: 2018 Census of Philippine Business and Industry
2018 R&D Survey, Department of Science and Technology
UNESCO Information System (UIS) Database, downloaded 6 March 2021

All succeeding tables are computed from the 2018 R&D Survey unless otherwise stated. The estimates are presented with their corresponding standard errors (se), which measure the precision of the estimates.

Appendix Table B2.1. Percent Distribution of R&D Expenditures by Source of Funds

Source of Funds	PNPI		GOV		HEI						Overall	
					Private HEI		Public HEI		HEI Overall			
	%	se	%	se	%	se	%	se	%	se	%	se
Institution's own funds	6.0	2.7	73.7	3.5	99.5	0.2	17.0	3.7	95.9	1.9	74.4	1.8
Other government funds	60.4	3.2	25.6	3.6	0.3	0.1	77.8	4.9	3.7	1.8	20.9	1.9
Private funds	26.6	2.3	0.3	0.1	0.0	0.0	0.2	0.1	0.0	0.0	3.5	0.3
Foreign funds	5.5	1.4	0.3	0.1	0.1	0.1	3.4	2.4	0.3	0.2	1.0	0.2
Other sources	1.5	0.4	0.2	0.1	0.0	0.0	1.6	0.9	0.1	0.1	0.3	0.1

PNPI refers to the private non-profit sector; GOV refers to the government sector; HEI refers to the higher education sector; and Overall refers to all three sectors combined.
0.0 means magnitude is less than half a unit.

Appendix Table B2.2. Source of R&D Funds by region, Private Higher Education

Region	Sources of Funds									
	Institution's Own		Government		Private		Foreign		Other Sources	
	%	se	%	se	%	se	%	se	%	se
01 - Ilocos Region	85.9	7.7	0.4	0.2	13.7	7.7	-	-	-	-
02 - Cagayan Valley	98.8	0.7	-	-	-	-	-	-	1.2	0.7
03 - Central Luzon	85.2	3.5	3.6	0.9	11.2	2.6	-	-	-	-
04A - CALABARZON	92.6	3.7	3.3	1.9	3.1	1.9	-	-	1.0	0.7
04B - MIMAROPA	80.0	-	20.0	-	-	-	-	-	-	-
05 - Bicol Region	100.0	-	-	-	-	-	-	-	-	-
06 - Western Visayas	28.6	5.8	69.3	7.1	1.6	1.2	0.6	0.6	-	-
07 - Central Visayas	100.0	0.0	0.0	0.0	0.0	0.0	-	-	-	-
08 - Eastern Visayas	100.0	-	-	-	-	-	-	-	-	-
09 - Zamboanga Peninsula	89.6	3.3	10.4	3.3	-	-	-	-	-	-
10 - Northern Mindanao	76.0	10.5	13.3	3.3	10.7	8.1	-	-	0.0	0.0
11 - Davao Region	75.7	2.8	20.8	2.4	3.5	0.4	-	-	-	-
12 - SOCCSKSARGEN	100.0	-	-	-	-	-	-	-	-	-
National Capital Region	47.5	6.6	27.7	3.3	2.3	0.2	16.1	3.5	6.5	3.0
CAR	-	-	-	-	-	-	-	-	-	-
ARMM	100.0	-	-	-	-	-	-	-	-	-
Caraga	100.0	-	-	-	-	-	-	-	-	-

- means not applicable or no data was observed for the cell; 0.0 means magnitude is less than half a unit.

Appendix Table B2.3. Source of R&D Funds by region, Public Higher Education

Region	Sources of Funds									
	Institution's Own		Government		Private		Foreign		Other Sources	
	%	se	%	se	%	se	%	se	%	se
01 - Ilocos Region	94.5	2.2	4.3	2.2	1.3	0.6	-	-	-	-
02 - Cagayan Valley	57.1	5.9	42.9	5.9	-	-	-	-	-	-
03 - Central Luzon	79.4	5.4	19.7	5.2	0.1	0.0	-	-	0.9	0.8
04A - CALABARZON	8.9	3.0	90.3	2.9	0.6	0.2	-	-	0.2	0.2
04B - MIMAROPA	57.2	13.3	42.8	13.3	-	-	-	-	-	-
05 - Bicol Region	30.1	9.0	58.7	10.9	0.8	0.4	-	-	10.3	6.6
06 - Western Visayas	77.0	12.1	17.1	10.9	0.9	0.7	-	-	5.0	2.2
07 - Central Visayas	36.3	4.4	45.3	13.5	-	-	-	-	18.4	10.6
08 - Eastern Visayas	55.1	14.0	37.4	15.1	0.9	0.5	6.3	3.3	0.3	0.3
09 - Zamboanga Peninsula	69.3	3.8	30.7	3.8	-	-	-	-	-	-
10 - Northern Mindanao	12.7	2.5	86.2	3.4	0.3	0.3	0.1	0.1	0.8	0.9
11 - Davao Region	14.7	5.0	79.9	5.0	1.8	0.5	3.1	0.8	0.5	0.6
12 - SOCCSKSARGEN	25.9	9.4	73.5	9.4	0.7	0.6	-	-	-	-
National Capital Region	4.4	1.0	95.3	1.1	0.1	0.0	-	-	0.2	0.1
CAR	54.4	6.1	29.0	9.2	0.0	0.0	0.7	0.3	15.9	11.1
ARMM	5.8	0.9	59.6	0.5	-	-	34.6	0.4	-	-
Caraga	100.0	-	-	-	-	-	-	-	-	-

- means not applicable or no data was observed for the cell; 0.0 means magnitude is less than half a unit.

Appendix Table B2.4. Source of R&D Funds by region, Higher Education Overall

Region	Sources of Funds									
	Institution's Own		Government		Private		Foreign		Other Sources	
	%	se	%	se	%	se	%	se	%	se
01 - Ilocos Region	89.8	4.7	2.2	1.2	8.1	4.9	-	-	-	-
02 - Cagayan Valley	76.1	7.9	23.4	8.0	-	-	-	-	0.5	0.3
03 - Central Luzon	80.1	4.6	17.6	4.4	1.5	1.1	-	-	0.7	0.7
04A - CALABARZON	13.4	4.0	85.6	4.0	0.7	0.2	-	-	0.2	0.2
04B - MIMAROPA	57.3	13.2	42.7	13.2	-	-	-	-	-	-
05 - Bicol Region	43.1	10.1	47.8	11.2	0.7	0.3	-	-	8.4	5.3
06 - Western Visayas	57.3	12.5	38.4	12.7	1.2	0.6	0.3	0.2	2.9	1.3
07 - Central Visayas	99.8	0.1	0.2	0.1	0.0	0.0	-	-	0.0	0.0
08 - Eastern Visayas	56.0	13.8	36.6	14.9	0.9	0.5	6.2	3.2	0.3	0.3
09 - Zamboanga Peninsula	85.0	5.0	15.0	5.0	-	-	-	-	-	-
10 - Northern Mindanao	16.2	5.0	82.1	6.2	0.9	0.8	0.1	0.1	0.7	0.8
11 - Davao Region	23.4	8.7	71.5	8.5	2.0	0.4	2.6	0.9	0.5	0.5
12 - SOCCSKSARGEN	28.9	9.2	70.4	9.2	0.7	0.5	-	-	-	-
National Capital Region	13.9	4.6	80.4	6.4	0.6	0.2	3.5	1.6	1.6	0.8
CAR	54.4	6.1	29.0	9.2	0.0	0.0	0.7	0.3	15.9	11.1
ARMM	5.8	0.9	59.6	0.5	-	-	34.6	0.4	-	-
Caraga	100.0	-	-	-	-	-	-	-	-	-

- means not applicable or no data was observed for the cell; 0.0 means magnitude is less than half a unit.

Appendix Table B2.5. Source of R&D Funds by region, Government

Region	Sources of Funds									
	Institution's Own		Government		Private		Foreign		Other Sources	
	%	se	%	se	%	se	%	se	%	se
01 - Ilocos Region	76.6	13.5	23.4	13.5	-	-	-	-	-	-
02 - Cagayan Valley	92.6	4.1	7.4	4.1	-	-	-	-	-	-
03 - Central Luzon	67.3	1.6	32.0	1.9	0.3	0.2	0.1	0.0	0.3	0.2
04A - CALABARZON	89.3	4.0	9.7	3.8	0.4	0.2	0.6	0.4	-	-
04B - MIMAROPA	80.0	0.0	20.0	0.0	-	-	-	-	-	-
05 - Bicol Region	37.9	7.7	61.9	7.6	-	-	-	-	0.2	0.0
06 - Western Visayas	89.6	4.9	9.7	4.8	-	-	0.6	0.4	0.0	0.0
07 - Central Visayas	93.6	0.3	5.9	0.2	0.2	0.2	0.3	0.3	-	-
08 - Eastern Visayas	92.5	1.3	-	-	-	-	-	-	7.5	1.3
09 - Zamboanga Peninsula	95.7	2.4	4.3	2.4	-	-	-	-	-	-
10 - Northern Mindanao	95.6	2.0	0.6	0.1	1.9	1.3	-	-	1.9	1.5
11 - Davao Region	75.0	11.9	22.1	11.4	-	-	2.8	2.1	-	-
12 - SOCCSKSARGEN	100.0	-	-	-	-	-	-	-	-	-
National Capital Region	76.6	7.1	22.6	7.1	0.2	0.1	0.6	0.3	0.0	0.0
CAR	92.5	1.2	7.5	1.2	-	-	-	-	-	-
ARMM	14.0	-	86.0	0.0	-	-	-	-	-	-
Caraga	70.4	5.8	29.6	5.8	-	-	-	-	-	-

- means not applicable or no data was observed for the cell; 0.0 means magnitude is less than half a unit.

Appendix Table B2.6. Source of R&D Funds by region, Private Non-Profit

Region	Sources of Funds									
	Institution's Own		Government		Private		Foreign		Other Sources	
	%	se	%	se	%	se	%	se	%	se
01 - Ilocos Region	-	-	-	-	-	-	-	-	-	-
02 - Cagayan Valley	-	-	-	-	-	-	-	-	-	-
03 - Central Luzon	-	-	-	-	-	-	-	-	-	-
04A - CALABARZON	2.4	0.6	64.5	0.6	26.0	1.9	5.5	1.5	1.6	0.4
04B - MIMAROPA	-	-	-	-	-	-	-	-	-	-
05 - Bicol Region	-	-	-	-	-	-	-	-	-	-
06 - Western Visayas	78.9	18.1	-	-	6.4	6.6	14.7	12.6	-	-
07 - Central Visayas	-	-	-	-	-	-	-	-	-	-
08 - Eastern Visayas	-	-	-	-	-	-	-	-	-	-
09 - Zamboanga Peninsula	-	-	-	-	-	-	-	-	-	-
10 - Northern Mindanao	-	-	-	-	-	-	-	-	-	-
11 - Davao Region	34.5	2.6	5.6	0.4	56.8	4.2	3.2	3.6	-	-
12 - SOCCSKSARGEN	20.0	-	-	-	30.0	-	50.0	-	-	-
National Capital Region	61.2	18.7	25.2	18.1	12.4	11.0	1.3	0.7	-	-
CAR	-	-	-	-	-	-	-	-	-	-
ARMM	-	-	-	-	-	-	-	-	-	-
Caraga	-	-	-	-	-	-	-	-	-	-

- means not applicable or no data was observed for the cell; 0.0 means magnitude is less than half a unit.

Appendix Table B2.7. Source of R&D Funds by region, Overall

Region	Sources of Funds							
	Government		Private		Foreign		Other Sources	
	%	se	%	se	%	se	%	se
01 - Ilocos Region	75.2	10.5	24.8	2.7	-	-	-	-
02 - Cagayan Valley	90.4	4.8	9.5	0.1	-	-	0.1	0.1
03 - Central Luzon	98.3	2.3	1.3	0.2	0.1	0.0	0.3	0.2
04A - CALABARZON	75.6	1.2	19.7	1.3	3.6	1.0	1.1	0.3
04B - MIMAROPA	99.7	16.0	0.3	-	-	-	-	-
05 - Bicol Region	95.7	9.4	2.9	0.1	-	-	1.4	0.8
06 - Western Visayas	81.9	6.4	14.8	2.2	1.6	1.1	1.8	0.8
07 - Central Visayas	72.0	9.3	15.9	0.0	0.1	0.1	12.0	6.9
08 - Eastern Visayas	90.8	17.3	2.5	0.5	5.3	2.8	1.3	0.3
09 - Zamboanga Peninsula	76.3	2.4	23.7	0.9	-	-	-	-
10 - Northern Mindanao	94.7	2.8	4.1	0.7	0.1	0.1	1.1	0.7
11 - Davao Region	63.8	4.3	33.2	1.5	2.8	1.1	0.3	0.3
12 - SOCCSKSARGEN	86.6	8.4	8.4	0.4	5.0	-	-	-
National Capital Region	90.6	4.6	6.4	0.8	2.2	0.4	0.8	0.4
CAR	90.8	6.1	0.0	0.0	0.4	0.2	8.8	6.1
ARMM	66.5	1.0	0.0	-	33.5	0.4	-	-
Caraga	99.9	3.6	0.1	-	-	-	-	-

Overall refers to the government, higher education, and private non-profit sectors combined.
- means no data was observed for the cell; 0.0 means magnitude is less than half a unit.

Appendix Table B3.1. R&D Personnel by Occupation

Occupation	PNPI		Government		HEI						Overall	
					Private HEI		Public HEI		HEI Overall			
	Total	se	Total	se	Total	se	Total	se	Total	se	Total	se
Researcher	1,073	469	9,337	2,547	6,382	851	19,056	2,016	25,438	2,459	35,848	3,571
Technicians	576	238	3,528	415	1,734	289	2,846	249	4,580	398	8,684	622
Other support staff	931	345	3,879	487	2,092	373	3,130	231	5,221	437	10,032	740
Total R&D personnel	2,580	973	16,744	2,785	10,208	1,294	25,031	2,202	35,239	2,757	54,564	4,038

PNPI refers to the private non-profit sector; HEI refers to the higher education sector; and Overall refers to all three sectors combined.

Appendix Table B3.2. R&D personnel by Occupation and Sex, Private vs. Public Higher Education

Sex	Private HEI						Public HEI					
	Researcher		Technician		Support staff		Researcher		Technician		Support staff	
	Total	se	Total	se	Total	se	Total	se	Total	se	Total	se
Male	2,660	354	789	132	625	135	7,856	859	1,313	111	1,357	114
Female	3,762	532	813	166	1,042	208	10,817	1,153	1,421	153	1,451	111

Appendix Table B3.3. R&D Personnel by Occupation and Sex, Higher Education

Sex	Researcher		Technician		Support staff	
	Total	se	Total	se	Total	se
Male	10,516	1,048	2,102	179	1,982	185
Female	14,579	1,420	2,233	242	2,493	234

Appendix Table B3.4. R&D Personnel by Occupation and Sex, Government

Sex	Researcher		Technician		Support staff	
	Total	se	Total	se	Total	se
Male	2,597	301	1,766	174	2,064	245
Female	3,391	409	1,651	251	1,429	192

Appendix Table B3.5. R&D Personnel by Occupation and Sex, Private Non-Profit

Sex	Researcher		Technician		Support staff	
	Total	se	Total	se	Total	se
Male	500	210	371	168	533	229
Female	592	259	205	76	379	124

Appendix Table B3.6. R&D Personnel by Occupation and Highest Education Qualification, Private vs. Public Higher Education

Highest Educational Attainment*	Private HEI						Public HEI					
	Researcher		Technician		Support staff		Researcher		Technician		Support staff	
	Total	se	Total	se	Total	se	Total	se	Total	se	Total	se
Doctoral level or equivalent	2,012	231	34	11	91	30	5,379	343	341	65	91	14
Master level or equivalent	2,919	406	445	139	380	88	8,247	504	840	97	478	53
Bachelor level or equivalent	934	253	1,126	224	940	158	4,763	1,756	1,430	179	1,678	133
Short-cycle tertiary education (2 to 3 years)	-	-	-	-	17	7	211	76	93	56	316	60
Post-secondary non-tertiary education (6 months to 2 years)	-	-	3	2	44	30	-	-	9	6	54	9
Upper secondary education (Grade 11 to 12)	434	350	-	-	147	117	-	-	2	1	100	20
Lower secondary education (Grade 7 to 10) and below	97	78	1	0	72	58	-	-	5	2	95	28
Primary education (Grade 1 to 6)	-	-	-	-	-	-	-	-	-	-	-	-
Early childhood education	-	-	-	-	-	-	-	-	-	-	-	-

* Based on the Philippine Standard Classification of Education (PSCED), Philippine Statistics Authority.
- means not applicable or no data was observed for the cell; 0 means magnitude is less than half a unit.

Appendix Table B3.7. R&D Personnel by Occupation and Highest Education Qualification, Higher Education

Highest Educational Attainment*	Researcher		Technician		Support staff	
	Total	se	Total	se	Total	se
Doctoral level or equivalent	7,391	433	376	80	181	34
Master level or equivalent	11,166	659	1,286	179	859	106
Bachelor level or equivalent	5,697	2,104	2,556	307	2,617	211
Short-cycle tertiary education (2 to 3 years)	211	87	93	67	333	75
Post-secondary non-tertiary education (6 months to 2 years)	-	-	12	8	98	31
Upper secondary education (Grade 11 to 12)	434	350	2	2	247	119
Lower secondary education (Grade 7 to 10) and below	97	78	6	2	168	68
Primary education (Grade 1 to 6)	-	-	-	-	-	-
Early childhood education	-	-	-	-	-	-

* Based on the Philippine Standard Classification of Education (PSCED), Philippine Statistics Authority.
- means not applicable or no data was observed for the cell.

Appendix Table B3.8. R&D Personnel by Occupation and Highest Education Qualification, Government

Highest Educational Attainment*	Researcher		Technician		Support staff	
	Total	se	Total	se	Total	se
Doctoral level or equivalent	1,207	244	73	26	83	38
Master level or equivalent	1,805	270	230	37	244	47
Bachelor level or equivalent	3,139	397	2,852	368	1,879	212
Short-cycle tertiary education (2 to 3 years)	39	10	178	28	345	46
Post-secondary non-tertiary education (6 months to 2 years)	18	9	98	22	342	67
Upper secondary education (Grade 11 to 12)	-	-	47	12	376	76
Lower secondary education (Grade 7 to 10) and below	7	4	26	7	570	132
Primary education (Grade 1 to 6)	-	-	-	-	-	-
Early childhood education	-	-	-	-	-	-

* Based on the Philippine Standard Classification of Education (PSCED), Philippine Statistics Authority.
- means not applicable or no data was observed for the cell.

Appendix Table B3.9. R&D Personnel by Occupation and Highest Education Qualification, Private Non-Profit

Highest Educational Attainment*	Researcher		Technician		Support staff	
	Total	se	Total	se	Total	se
Doctoral level or equivalent	627	368	9	7	15	6
Master level or equivalent	187	86	66	31	41	19
Bachelor level or equivalent	249	116	276	115	576	290
Short-cycle tertiary education (2 to 3 years)	1	1	39	18	14	6
Post-secondary non-tertiary education (6 months to 2 years)	3	2	61	36	21	9
Upper secondary education (Grade 11 to 12)	-	-	114	92	23	12
Lower secondary education (Grade 7 to 10) and below	-	-	-	-	245	192
Primary education (Grade 1 to 6)	-	-	-	-	-	-
Early childhood education	-	-	-	-	-	-

* Based on the Philippine Standard Classification of Education (PSCED), Philippine Statistics Authority.
- means not applicable or no data was observed for the cell.

Appendix Table B3.10. R&D Personnel by Occupation and Field of Science and Technology, Private vs. Public Higher Education

Field of Science and Technology	Private HEI						Public HEI					
	Researcher		Technician		Support staff		Researcher		Technician		Support staff	
	Total	se	Total	se	Total	se	Total	se	Total	se	Total	se
Natural Sciences	1,042	277	258	51	135	32	2,513	187	576	103	282	37
Engineering and Technology	1,294	268	640	148	151	30	3,074	237	772	97	463	62
Medical and Health Sciences	904	183	139	46	251	86	3,872	1,808	169	74	97	19
Agricultural Sciences	63	14	29	10	13	5	2,154	180	571	66	588	82
Social Sciences	2,059	392	316	95	510	98	4,870	329	379	48	777	72
Humanities	940	206	82	24	147	62	1,089	152	124	26	91	16
Others	122	62	16	10	392	183	1,184	214	56	12	275	41

Appendix Table B3.11. R&D Personnel by Occupation and Field of Science and Technology, Higher Education

Field of Science and Technology	Researcher		Technician		Support staff	
	Total	se	Total	se	Total	se
Natural Sciences	3,555	343	834	138	417	55
Engineering and Technology	4,368	373	1,412	184	614	81
Medical and Health Sciences	4,776	2,158	308	99	348	89
Agricultural Sciences	2,217	219	599	82	601	101
Social Sciences	6,929	522	695	110	1,287	125
Humanities	2,030	272	206	40	238	64
Others	1,306	264	72	17	668	189

Appendix Table B3.12. R&D Personnel by Occupation and Field of Science and Technology, Government

Field of Science and Technology	Researcher		Technician		Support staff	
	Total	se	Total	se	Total	se
Natural Sciences	862	151	523	129	223	46
Engineering and Technology	938	187	449	92	337	77
Medical and Health Sciences	1,364	298	296	151	142	48
Agricultural Sciences	1,328	143	1,362	164	731	118
Social Sciences	734	186	457	92	666	166
Humanities	321	176	22	7	60	31
Others	435	143	166	33	790	130

Appendix Table B3.13. R&D Personnel by Occupation and Field of Science and Technology, Private Non-Profit

Field of Science and Technology	Researcher		Technician		Support staff	
	Total	se	Total	se	Total	se
Natural Sciences	106	38	30	17	28	17
Engineering and Technology	43	12	34	13	23	9
Medical and Health Sciences	15	13	28	19	6	5
Agricultural Sciences	839	454	435	246	476	300
Social Sciences	64	20	28	9	119	63
Humanities	6	4	2	2	21	18
Others	-	-	17	15	247	202

- means not applicable or no data was observed for the cell.

Appendix Table B3.14. R&D Personnel by Occupation and Age, Private vs. Public Higher Education

Age Group	Private HEI						Public HEI					
	Researcher		Technician		Support staff		Researcher		Technician		Support staff	
	Total	se	Total	se	Total	se	Total	se	Total	se	Total	se
Below 20 years old	546	428	17	7	128	97	204	76	12	6	38	23
20-30 years old	1,062	221	766	189	421	74	4,289	1,003	1,117	141	855	67
31-40 years old	1,513	200	394	105	513	109	5,387	660	599	66	865	83
41-50 years old	1,626	217	241	66	382	80	4,366	267	351	49	497	56
51-60 years old	1,119	179	130	56	210	47	3,246	226	228	39	364	42
Above 60 years old	327	63	39	12	48	16	862	82	90	22	86	13

Appendix Table B3.15. R&D Personnel by Occupation and Age, Higher Education

Age Group	Researcher		Technician		Support staff	
	Total	se	Total	se	Total	se
Below 20 years old	750	437	30	10	166	101
20-30 years old	5,351	1,208	1,883	252	1,276	104
31-40 years old	6,899	794	993	128	1,378	142
41-50 years old	5,992	349	592	87	879	101
51-60 years old	4,365	304	358	73	574	67
Above 60 years old	1,189	112	129	29	135	22

Appendix Table B3.16. R&D Personnel by Occupation and Age, Government

Age Group	Researcher		Technician		Support staff	
	Total	se	Total	se	Total	se
Below 20 years old	8	5	2	1	1	1
20-30 years old	2,185	290	1,632	289	930	116
31-40 years old	1,576	263	755	85	996	142
41-50 years old	955	127	484	56	742	116
51-60 years old	1,110	132	476	97	835	115
Above 60 years old	359	44	104	18	211	33

Appendix Table B3.17. R&D Personnel by Occupation and Age, Private Non-Profit

Age Group	Researcher		Technician		Support staff	
	Total	se	Total	se	Total	se
Below 20 years old	-	-	-	-	2	2
20-30 years old	283	127	73	20	196	70
31-40 years old	350	170	216	87	328	146
41-50 years old	310	158	185	102	262	107
51-60 years old	94	43	92	55	133	55
Above 60 years old	36	13	6	4	11	4

- means not applicable or no data was observed for the cell.

Appendix Table B3.18. Full-time Equivalent of R&D Personnel by Occupation

Type of R&D Personnel	PNPI		GOV		HEI						Overall	
					Private HEI		Public HEI		HEI overall			
	Total	se	Total	se	Total	se	Total	se	Total	se	Total	se
Researcher	923	414	4,195	542	2,097	306	6,852	1,722	8,949	2,063	14,067	2,172
Technicians	464	223	2,453	376	587	105	1,796	197	2,383	259	5,300	508
Other support staff	732	251	1,826	249	548	104	1,562	120	2,110	169	4,667	392
Total R&D personnel	2,119	809	8,474	922	3,232	441	10,209	1,827	13,442	2,197	24,034	2,516

PNPI refers to the private non-profit sector; HEI refers to the higher education sector; and Overall refers to all three sectors combined.

Appendix Table B3.19. R&D Personnel by Occupation and Region, Private vs. Public Higher Education

Region	Private HEI								Public HEI							
	Researcher		Technician		Support staff		Total R&D Personnel		Researcher		Technician		Support staff		Total R&D Personnel	
	Total	se	Total	se	Total	se	Total	se	Total	se	Total	se	Total	se	Total	se
01 - Ilocos Region	821	493	69	36	399	249	1,288	746	745	210	145	48	182	41	1,071	260
02 - Cagayan Valley	624	305	46	17	232	173	903	487	983	329	106	39	127	46	1,216	387
03 - Central Luzon	182	68	57	23	48	19	287	107	1,609	475	182	100	263	95	2,054	619
04A - CALABARZON	655	304	212	134	112	49	979	413	1,378	374	305	98	425	114	2,109	554
04B - MIMAROPA	20	16	9	7	13	11	41	33	697	248	94	43	97	35	889	289
05 - Bicol Region	74	43	39	19	48	24	161	76	819	313	127	80	60	22	1,005	345
06 - Western Visayas	1,069	365	150	58	166	81	1,386	457	2,176	553	247	81	203	56	2,627	624
07 - Central Visayas	605	209	153	50	238	120	996	318	927	257	122	39	137	56	1,186	335
08 - Eastern Visayas	59	47	10	7	7	3	76	56	1,724	430	369	112	585	205	2,678	692
09 - Zamboanga Peninsula	38	21	33	16	29	14	99	49	184	76	48	29	58	23	290	126
10 - Northern Mindanao	363	147	107	59	236	102	706	226	863	406	183	105	95	44	1,141	549
11 - Davao Region	185	128	5	2	5	2	194	130	852	274	312	176	111	41	1,274	467
12 - SOCCSKSARGEN	60	41	14	7	14	11	88	49	339	90	101	37	105	33	544	149
National Capital Region	1,616	409	827	241	545	147	2,988	733	3,917	2,186	133	73	282	80	4,332	2,263
CAR	-	-	-	-	-	-	-	-	950	364	245	97	279	99	1,474	543
ARMM	2	2	2	2	-	-	4	4	304	206	87	53	51	32	442	265
Caraga	9	7	2	2	-	-	11	9	589	244	42	16	68	20	699	261

- means not applicable or no data was observed for the cell.

Appendix Table B3.20. R&D Personnel by Occupation and Region, Higher Education

Region	Researcher		Technician		Support staff		Total R&D Personnel	
	Total	se	Total	se	Total	se	Total	se
01 - Ilocos Region	1,565	534	213	60	580	252	2,359	787
02 - Cagayan Valley	1,608	445	152	43	360	179	2,119	617
03 - Central Luzon	1,791	478	239	102	312	97	2,342	625
04A - CALABARZON	2,034	480	517	165	537	123	3,088	686
04B - MIMAROPA	717	248	103	44	110	37	930	291
05 - Bicol Region	892	316	166	82	108	33	1,166	352
06 - Western Visayas	3,245	654	397	99	370	98	4,012	762
07 - Central Visayas	1,532	328	275	62	375	131	2,183	456
08 - Eastern Visayas	1,783	432	379	112	592	205	2,754	693
09 - Zamboanga Peninsula	222	78	81	33	87	27	390	135
10 - Northern Mindanao	1,226	429	290	120	331	110	1,846	588
11 - Davao Region	1,037	301	316	176	115	41	1,468	483
12 - SOCCSKSARGEN	398	98	115	38	119	34	632	156
National Capital Region	5,533	2,221	960	251	827	166	7,319	2,373
CAR	950	364	245	97	279	99	1,474	543
ARMM	307	206	89	53	51	32	447	265
Caraga	597	244	44	16	68	20	710	261

Appendix Table B3.21. R&D Personnel by Occupation and Region, Government

Region	Researcher		Technician		Support staff		Total R&D Personnel	
	Total	se	Total	se	Total	se	Total	se
01 - Ilocos Region	253	72	165	61	56	17	474	132
02 - Cagayan Valley	97	42	285	133	151	72	533	229
03 - Central Luzon	696	267	370	109	723	332	1,789	685
04A - CALABARZON	381	164	203	93	528	272	1,112	524
04B - MIMAROPA	8	5	40	27	1	1	49	33
05 - Bicol Region	133	51	72	29	134	60	339	127
06 - Western Visayas	172	49	219	81	182	75	573	177
07 - Central Visayas	389	158	140	62	102	51	632	210
08 - Eastern Visayas	61	24	38	19	51	26	150	69
09 - Zamboanga Peninsula	52	27	118	44	198	92	369	146
10 - Northern Mindanao	271	127	85	33	93	54	450	168
11 - Davao Region	59	25	65	35	367	144	491	199
12 - SOCCSKSARGEN	26	15	59	29	25	17	110	53
National Capital Region	6,606	2,543	1,247	356	1,107	201	8,959	2,707
CAR	58	25	309	128	84	29	451	141
ARMM	10	7	27	18	22	14	59	40
Caraga	64	24	88	38	54	23	205	68

Appendix Table B3.22. R&D Personnel by Occupation and Region, Private Non-Profit

Region	Researcher		Technician		Support staff		Total R&D Personnel	
	Total	se	Total	se	Total	se	Total	se
01 - Ilocos Region	-	-	-	-	-	-	-	-
02 - Cagayan Valley	-	-	-	-	-	-	-	-
03 - Central Luzon	-	-	-	-	-	-	-	-
04A - CALABARZON	822	483	416	247	459	301	1696	999
04B - MIMAROPA	-	-	-	-	-	-	-	-
05 - Bicol Region	-	-	-	-	-	-	-	-
06 - Western Visayas	64	43	51	30	356	223	471	288
07 - Central Visayas	-	-	-	-	-	-	-	-
08 - Eastern Visayas	-	-	-	-	-	-	-	-
09 - Zamboanga Peninsula	-	-	-	-	-	-	-	-
10 - Northern Mindanao	-	-	-	-	-	-	-	-
11 - Davao Region	81	48	36	21	57	35	175	103
12 - SOCCSKSARGEN	2	2	17	15	21	16	40	24
National Capital Region	104	42	55	23	38	15	198	67
CAR	-	-	-	-	-	-	-	-
ARMM	-	-	-	-	-	-	-	-
Caraga	-	-	-	-	-	-	-	-

- means not applicable or no data was observed for the cell.

Appendix Table B3.23. FTE R&D Personnel by Occupation and Region, Private vs. Public Higher Education

Region	Private HEI								Public HEI							
	Researcher		Technician		Support staff		Total R&D Personnel		Researcher		Technician		Support staff		Total R&D Personnel	
	Total	se	Total	se	Total	se	Total	se	Total	se	Total	se	Total	se	Total	se
01 - Ilocos Region	303	195	15	12	126	85	444	281	207	49	70	20	75	23	352	78
02 - Cagayan Valley	78	31	10	3	30	18	117	50	229	69	64	28	50	18	343	106
03 - Central Luzon	94	38	31	15	21	9	146	60	480	165	58	29	118	49	655	215
04A - CALABARZON	213	95	96	66	51	24	360	156	512	140	292	96	354	100	1,158	305
04B - MIMAROPA	14	11	4	4	7	5	25	20	147	47	83	42	51	23	280	100
05 - Bicol Region	31	16	23	10	16	7	70	31	196	69	37	25	17	5	249	79
06 - Western Visayas	315	133	82	40	65	25	462	176	444	109	97	30	97	33	638	160
07 - Central Visayas	187	67	68	25	50	19	305	109	262	71	101	34	72	22	434	118
08 - Eastern Visayas	23	17	3	2	3	1	29	19	570	162	146	53	167	61	883	264
09 - Zamboanga Peninsula	11	5	9	4	8	4	28	14	37	20	19	10	21	8	77	36
10 - Northern Mindanao	138	57	27	18	51	32	216	84	285	129	171	105	82	41	538	256
11 - Davao Region	48	30	3	1	3	2	54	31	267	97	272	170	78	30	617	290
12 - SOCCSKSARGEN	27	17	11	6	12	11	50	28	69	18	48	14	56	15	173	43
National Capital Region	614	160	204	65	105	35	924	233	2,581	2,034	117	70	95	21	2,793	2,110
CAR	-	-	-	-	-	-	-	-	234	90	132	45	152	51	518	156
ARMM	1	1	1	1	-	-	1	1	139	100	76	45	47	30	262	157
Caraga	1	1	0	0	-	-	1	1	192	76	13	4	33	10	239	87

- means not applicable or no data was observed for the cell; 0 means magnitude is less than half a unit.

Appendix Table B3.24. FTE R&D Personnel by Occupation and Region, Higher Education

Region	Researcher		Technician		Support staff		Total R&D Personnel	
	Total	se	Total	se	Total	se	Total	se
01 - Ilocos Region	510	201	85	23	201	88	795	291
02 - Cagayan Valley	307	75	74	28	80	25	461	117
03 - Central Luzon	574	169	89	33	139	49	802	222
04A - CALABARZON	725	169	388	116	405	102	1,518	340
04B - MIMAROPA	161	48	87	42	57	24	305	101
05 - Bicol Region	227	70	60	27	32	9	319	85
06 - Western Visayas	760	171	179	49	161	41	1,100	235
07 - Central Visayas	449	97	169	42	122	29	739	159
08 - Eastern Visayas	593	163	149	53	169	61	912	264
09 - Zamboanga Peninsula	48	21	28	11	29	9	105	39
10 - Northern Mindanao	423	140	198	106	133	52	754	268
11 - Davao Region	315	101	275	170	81	30	671	291
12 - SOCCSKSARGEN	96	25	59	15	68	19	223	51
National Capital Region	3,195	2,039	322	95	200	40	3,717	2,122
CAR	234	90	132	45	152	51	518	156
ARMM	140	100	76	45	47	30	263	157
Caraga	193	76	14	4	33	10	240	87

Appendix Table B3.25. FTE R&D Personnel by Occupation and Region, Government

Region	Researcher		Technician		Support staff		Total R&D Personnel	
	Total	se	Total	se	Total	se	Total	se
01 - Ilocos Region	101	28	127	55	35	12	262	85
02 - Cagayan Valley	71	35	215	100	50	24	336	152
03 - Central Luzon	587	263	328	100	429	181	1,344	529
04A - CALABARZON	116	61	49	19	71	34	237	113
04B - MIMAROPA	8	5	40	27	1	1	49	33
05 - Bicol Region	109	46	61	24	94	41	265	100
06 - Western Visayas	122	40	202	81	147	73	470	165
07 - Central Visayas	154	73	53	24	19	8	226	86
08 - Eastern Visayas	36	14	20	11	13	5	69	29
09 - Zamboanga Peninsula	36	17	94	39	108	64	238	94
10 - Northern Mindanao	119	46	72	29	39	22	231	82
11 - Davao Region	52	23	63	35	254	127	369	184
12 - SOCCSKSARGEN	20	12	59	29	17	12	97	46
National Capital Region	2,557	489	933	344	457	86	3,947	768
CAR	48	21	33	10	50	21	130	41
ARMM	10	7	27	18	22	14	59	40
Caraga	49	20	76	37	19	8	144	51

Appendix Table B3.26. FTE R&D Personnel by Occupation and Region, Private Non-Profit

Region	Researcher		Technician		Support staff		Total R&D Personnel	
	Total	se	Total	se	Total	se	Total	se
01 - Ilocos Region	-	-	-	-	-	-	-	-
02 - Cagayan Valley	-	-	-	-	-	-	-	-
03 - Central Luzon	-	-	-	-	-	-	-	-
04A - CALABARZON	727	423	367	228	321	196	1416	824
04B - MIMAROPA	-	-	-	-	-	-	-	-
05 - Bicol Region	-	-	-	-	-	-	-	-
06 - Western Visayas	54	39	32	19	314	19	400	246
07 - Central Visayas	-	-	-	-	-	-	-	-
08 - Eastern Visayas	-	-	-	-	-	-	-	-
09 - Zamboanga Peninsula	-	-	-	-	-	-	-	-
10 - Northern Mindanao	-	-	-	-	-	-	-	-
11 - Davao Region	74	48	30	20	49	35	153	102
12 - SOCCSKSARGEN	1	1	5	4	20	16	26	17
National Capital Region	67	35	30	14	27	13	124	49
CAR	-	-	-	-	-	-	-	-
ARMM	-	-	-	-	-	-	-	-
Caraga	-	-	-	-	-	-	-	-

- means not applicable or no data was observed for the cell.

Appendix Table B3.27. R&D Personnel by Occupation and Sex per Region, Higher Education

Region	Researcher				Technician				Support Staff				Total R&D Personnel			
	Male		Female		Male		Female		Male		Female		Male		Female	
	Total	se	Total	se	Total	se	Total	se	Total	se	Total	se	Total	se	Total	se
01 - Ilocos Region	620	204	945	331	106	32	73	26	257	102	313	151	984	230	1,332	364
02 - Cagayan Valley	511	143	933	247	74	24	78	22	143	67	217	112	728	160	1,227	272
03 - Central Luzon	809	202	982	279	131	41	108	67	155	47	156	53	1,096	211	1,246	291
04A - CALABARZON	687	159	1,129	283	192	75	232	88	161	56	156	42	1,040	185	1,517	300
04B - MIMAROPA	277	92	440	158	55	27	47	19	55	20	55	19	388	98	543	160
05 - Bicol Region	403	143	490	173	78	34	88	50	37	16	70	19	518	148	648	181
06 - Western Visayas	1,191	249	2,067	426	218	56	177	54	145	48	225	53	1,554	260	2,469	432
07 - Central Visayas	642	135	895	197	140	29	132	41	135	41	191	59	917	143	1,218	210
08 - Eastern Visayas	782	202	973	232	207	64	158	50	236	97	256	98	1,225	233	1,387	257
09 - Zamboanga Peninsula	120	39	102	39	32	12	48	23	46	13	41	15	198	43	191	48
10 - Northern Mindanao	533	186	690	244	118	56	159	74	78	31	125	40	730	197	974	258
11 - Davao Region	499	141	538	162	137	61	179	117	54	21	62	23	690	155	779	201
12 - SOCCSKSARGEN	164	42	234	62	64	28	84	38	39	12	68	22	266	52	386	76
National Capital Region	2,518	963	3,077	1,265	389	110	492	147	239	58	359	83	3,146	971	3,928	1,276
CAR	383	151	567	215	92	41	113	53	154	55	127	47	629	166	808	226
ARMM	118	78	178	120	42	24	47	30	18	10	33	22	178	82	258	125
Caraga	259	122	338	125	26	10	18	7	30	10	38	12	315	122	395	126

Appendix Table B3.28. R&D Personnel by Occupation and Sex per Region, Government

Region	Researcher				Technician				Support Staff				Total R&D Personnel			
	Male		Female		Male		Female		Male		Female		Male		Female	
	Total	se	Total	se	Total	se	Total	se	Total	se	Total	se	Total	se	Total	se
01 - Ilocos Region	101	28	151	46	83	32	82	30	30	10	24	9	214	44	257	55
02 - Cagayan Valley	59	25	38	18	140	66	145	67	97	45	55	29	296	83	237	75
03 - Central Luzon	312	123	384	145	235	71	135	42	428	182	295	151	975	231	814	214
04A - CALABARZON	67	38	97	40	35	14	33	11	76	29	51	21	179	50	181	47
04B - MIMAROPA	2	2	6	4	26	18	14	9	-	-	1	1	28	18	20	10
05 - Bicol Region	55	26	80	30	32	15	40	19	90	41	44	21	176	50	164	41
06 - Western Visayas	79	25	92	25	114	42	105	40	134	56	55	20	327	75	252	51
07 - Central Visayas	162	66	228	92	94	41	46	22	61	35	41	17	318	85	314	96
08 - Eastern Visayas	19	8	42	17	17	8	20	12	38	20	18	9	74	23	81	23
09 - Zamboanga Peninsula	26	13	26	14	64	24	57	21	142	67	56	26	232	73	139	36
10 - Northern Mindanao	102	47	167	80	38	15	48	19	64	39	30	15	204	63	245	84
11 - Davao Region	27	10	31	14	31	19	32	16	295	119	72	27	353	121	134	34
12 - SOCCSKSARGEN	17	9	9	5	28	14	31	15	17	11	8	5	63	21	48	16
National Capital Region	1,506	278	1,970	384	639	140	631	226	498	89	615	118	2,643	323	3,215	461
CAR	18	9	40	16	112	42	197	87	41	18	43	17	171	46	280	90
ARMM	8	5	2	2	24	16	3	2	13	8	9	6	44	19	15	7
Caraga	35	14	28	10	55	22	33	17	41	19	13	6	131	32	74	21

- means not applicable or no data was observed for the cell.

Appendix Table B3.29. R&D Personnel by Occupation and Sex per Region, Private Non-Profit

Region	Researcher				Technician				Support Staff				Total R&D Personnel			
	Male		Female		Male		Female		Male		Female		Male		Female	
	Total	se	Total	se	Total	se	Total	se	Total	se	Total	se	Total	se	Total	se
01 - Ilocos Region	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
02 - Cagayan Valley	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
03 - Central Luzon	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
04A - CALABARZON	370	217	452	267	280	173	137	79	269	190	189	114	919	336	778	301
04B - MIMAROPA	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
05 - Bicol Region	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
06 - Western Visayas	23	14	13	29	19	15	32	19	230	152	126	75	273	153	170	82
07 - Central Visayas	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
08 - Eastern Visayas	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
09 - Zamboanga Peninsula	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
10 - Northern Mindanao	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
11 - Davao Region	43	24	38	24	34	19	2	2	19	15	38	21	96	34	79	32
12 - SOCCSKSARGEN	9	7	13	9	13	11	4	4	-	-	2	2	21	13	19	10
National Capital Region	55	30	49	17	26	11	30	13	15	7	23	9	96	33	102	23
CAR	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ARMM	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Caraga	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

- means not applicable or no data was observed for the cell.

Appendix Table B3.30. FTE R&D Personnel per Sector, 2002 to 2018

Sector	Year								
	2002	2003	2005	2007	2009	2011	2013	2015	2018
Government	2,225	2,594	2,775	2,544	2,356	2,391	2,713	2,681	8,474
Public HEI	115	161	64	64	153	65	125	296	2,119
Private HEI	250	308	622	756	492	714	642	647	3,232
Private Non-Profit	1,587	1,815	1,638	1,647	2,273	2,324	4,012	2,957	10,209
Total	4,177	4,878	5,099	5,011	5,274	5,494	7,492	6,581	24,034

Sources: 2018 R&D Survey and previous years

Appendix Table B3.31. FTE Researcher per Sector, 2002 to 2018

Sector	Year								
	2002	2003	2005	2007	2009	2011	2013	2015	2018
Government	1,704	1,937	2,193	1,973	1,745	1,829	2,131	1,814	4,195
Public HEI	1,364	1,525	1,436	1,479	2,027	2,021	3,748	2,377	6,852
Private HEI	214	257	536	733	440	694	597	557	2,097
Private Non-Profit	62	93	40	55	111	50	99	217	923
Total	3,344	3,812	4,205	4,240	4,323	4,594	6,575	4,965	14,067

Sources: 2018 R&D Survey and previous years

Appendix Table B3.32. Percentage of Time Spend on R&D per Sector, 2002 to 2018

Sector	Year							
	2003	2005	2007	2009	2011	2013	2015	2018
Government	75.75	78.41	79.56	75.28	76.50	71.87	69.10	44.93
Public HEI	53.40	45.09	40.07	39.66	35.61	52.46	32.19	35.96
Private HEI	30.02	38.12	37.96	28.12	36.84	25.25	17.46	32.86
Private Non-Profit	55.03	35.71	32.16	34.15	58.82	55.31	56.66	86.02

Sources: 2018 R&D Survey and previous years

Appendix Table B4.1. R&D Expenditures by Accounting Category (in million Php)

Accounting Category	PNPI		Government		HEI						Overall	
					Private HEI		Public HEI		HEI Overall			
	Total	se	Total	se	Total	se	Total	se	Total	se	Total	se
Personnel services	1,503	997	4,809	1,128	697	113	6,732	1,836	7,429	2,121	13,741	2,601
MOOE	1,909	1,170	5,340	1,068	1,017	237	1,621	206	2,638	337	9,887	1,619
Capital outlay	115	78	2,919	697	337	95	1,209	191	1,547	251	4,581	745
Imputed rental cost	30	18	194	53	100	29	14	6	114	30	337	64
Total expenditures	3,557	2,232	13,262	2,765	2,151	390	9,576	1,926	11,727	2,246	28,547	4,203

PNPI refers to the private non-profit sector; HEI refers to the higher education sector; and Overall refers to all three sectors combined.

Appendix Table B4.2. Percent Distribution of R&D Expenditures by Type of Research

Type of Research	PNPI		Government		HEI						Overall	
					Private HEI		Public HEI		HEI Overall			
	%	se	%	se	%	se	%	se	%	Se	%	se
Basic research	17.1	15.3	17.7	2.4	35.2	4.1	36.9	3.0	36.5	2.6	25.3	2.5
Applied research	81.1	16.7	71.5	3.3	44.3	3.6	47.9	2.8	47.2	2.3	62.7	2.8
Experimental development	1.8	1.4	10.8	1.4	20.6	1.9	15.3	2.1	16.3	1.9	11.9	1.0

PNPI refers to the private non-profit sector; HEI refers to the higher education sector; and Overall refers to all three sectors combined.

Appendix Table B4.3. Percent Distribution of R&D Expenditures by Field of Science and Technology

Field of Science and Technology	PNPI		Government		HEI						Overall	
					Private HEI		Public HEI		HEI Overall			
	%	se	%	se	%	se	%	se	%	se	%	se
Natural sciences	8.4	6.6	17.4	5.3	21.5	4.2	38.9	6.4	35.7	5.7	23.8	3.5
Engineering and technology	4.5	4.0	21.5	6.2	28.2	2.7	15.3	1.3	17.7	1.6	17.8	3.0
Agricultural sciences	80.4	15.5	50.2	10.7	7.4	1.1	16.7	3.1	15.0	2.4	39.5	5.4
Medical sciences	0.3	0.3	2.9	1.2	9.6	0.9	8.6	1.3	8.8	1.1	5.0	0.7
Social sciences	4.6	4.0	4.5	1.4	24.8	2.4	17.0	3.4	18.5	2.9	10.3	1.5
Humanities	1.0	1.0	1.2	0.6	7.7	0.9	2.6	0.9	3.5	0.9	2.1	0.5
Others	0.7	0.8	2.3	1.4	0.8	0.3	0.9	0.5	0.9	0.4	1.5	0.7

PNPI refers to the private non-profit sector; HEI refers to the higher education sector; and Overall refers to all three sectors combined.

Appendix Table B4.4. Percent Distribution of R&D Expenditures by Socioeconomic Objective

Socioeconomic Objective	PNPI		Government		HEI						Overall	
					Private HEI		Public HEI		HEI Overall			
	%	se	%	se	%	%	se	%	se	se	%	se
Exploration and exploitation of the earth	0.0	0.0	2.8	1.5	0.9	0.2	26.0	5.5	21.3	5.2	10.1	2.2
Environment	8.6	6.6	9.5	4.2	15.9	1.5	21.1	2.2	20.2	1.9	13.8	2.3
Exploration and exploitation of space	-	-	0.0	0.0	0.4	0.2	0.0	0.0	0.1	0.0	0.0	0.0
Transport, telecommunication and other infrastructures	4.5	4.0	1.0	0.5	10.5	1.3	4.0	1.6	5.2	1.5	3.2	0.8
Energy	0.0	0.0	4.2	2.6	7.5	1.7	2.2	0.2	3.2	0.5	3.3	1.2
Industrial production and technology	0.0	0.0	9.9	2.3	7.8	1.1	3.5	1.0	4.3	1.0	6.4	1.2
Health	0.4	0.4	5.1	1.7	18.7	4.4	9.5	1.2	11.2	1.2	7.0	0.9
Agriculture	80.5	15.5	58.2	7.9	4.3	1.2	15.7	3.8	13.6	2.9	42.7	4.3
Education	4.4	3.9	1.4	0.5	8.6	1.3	4.7	1.4	5.4	1.3	3.4	0.8
Culture, recreation, religion and mass media	1.4	1.1	0.6	0.2	9.2	1.4	2.7	0.9	4.0	0.9	2.1	0.4
Political and social systems, structures and processes	0.1	0.1	1.5	0.5	8.0	1.1	8.6	2.7	8.5	2.2	4.2	0.9
Defense	0.0	0.0	0.5	0.2	1.8	0.4	0.1	0.1	0.4	0.1	0.4	0.1
Information Communications Technology	0.1	0.1	5.2	3.3	6.2	0.9	1.7	0.5	2.6	0.6	3.5	1.5

PNPI refers to the private non-profit sector; HEI refers to the higher education sector; and Overall refers to all three sectors combined.
- means not applicable or no data was observed for the cell; 0.0 means magnitude is less than half a unit.

Appendix Table B4.5. R&D Expenditures by Region (in million Php)

Region	PNPI		Government		HEI						Overall	
					Private HEI		Public HEI		HEI Overall			
	%	se	%	se	%	%	se	%	se	se	%	se
01 - Ilocos Region	-	-	153	64	68	35	56	23	125	41	278	76
02 - Cagayan Valley	-	-	264	122	31	12	31	12	62	17	326	123
03 - Central Luzon	-	-	5,231	2,616	59	33	373	130	432	134	5,663	2,620
04A - CALABARZON	3,285	2,246	651	265	62	22	1,087	380	1,149	380	5,086	2,293
04B - MIMAROPA	-	-	11	8	0	0	68	27	69	27	80	28
05 - Bicol Region	-	-	383	208	12	5	54	23	67	23	449	210
06 - Western Visayas	69	47	267	94	201	114	292	99	493	150	830	183
07 - Central Visayas	-	-	150	96	126	46	519	175	645	180	796	204
08 - Eastern Visayas	-	-	42	21	5	5	243	88	248	88	290	90
09 - Zamboanga Peninsula	-	-	220	103	89	66	26	9	114	66	334	122
10 - Northern Mindanao	-	-	121	52	15	7	249	190	264	190	385	197
11 - Davao Region	133	106	76	29	36	14	219	129	255	129	465	170
12 - SOCCSKSARGEN	15	13	36	19	5	4	98	26	103	26	155	35
National Capital Region	53	26	5,469	999	1,440	365	5,191	2,081	6,631	2,100	12,154	2,325
CAR	-	-	91	30	-	-	113	40	113	40	204	50
ARMM	-	-	30	20	0	0	868	693	868	693	899	693
Caraga	-	-	67	26	0	0	88	45	88	45	155	52

PNPI refers to the private non-profit sector; HEI refers to the higher education sector; and Overall refers to all three sectors combined.
- means not applicable or no data was observed for the cell; 0 means magnitude is less than half a unit.

Appendix Table B4.6. Percent Distribution of R&D Expenditures by Type of Research per Region, Higher Education

Region	Basic Research		Applied Research		Experimental Development	
	%	se	%	se	%	se
01 - Ilocos Region	51.0	10.7	36.8	9.1	12.1	2.6
02 - Cagayan Valley	54.5	5.2	24.5	4.1	21.0	3.3
03 - Central Luzon	18.4	3.7	59.9	4.7	21.7	3.4
04A - CALABARZON	13.6	2.5	58.7	5.7	27.7	6.1
04B - MIMAROPA	55.0	3.0	31.8	2.9	13.2	1.1
05 - Bicol Region	36.0	7.9	41.3	5.9	22.8	4.5
06 - Western Visayas	56.0	11.4	23.2	7.5	20.8	5.0
07 - Central Visayas	35.3	4.5	43.1	6.1	21.6	10.5
08 - Eastern Visayas	31.8	9.3	54.1	13.2	14.1	4.9
09 - Zamboanga Peninsula	10.6	6.6	32.2	1.4	57.2	6.3
10 - Northern Mindanao	7.5	2.2	68.2	1.8	24.3	0.7
11 - Davao Region	23.2	3.5	59.0	7.3	17.8	7.9
12 - SOCCSKSARGEN	62.4	3.0	26.2	3.9	11.4	2.6
National Capital Region	43.4	1.9	43.1	1.1	13.4	1.1
CAR	48.1	7.0	32.7	5.2	19.1	3.1
ARMM	25.6	0.7	74.3	0.8	0.1	0.1
Caraga	10.2	6.1	19.0	10.8	70.7	15.0

Appendix Table B4.7. Percent Distribution of R&D Expenditures by Type of Research per Region, Government

Region	Basic Research		Applied Research		Experimental Development	
	%	se	%	se	%	se
01 - Ilocos Region	2.7	1.2	79.4	11.5	18.0	10.7
02 - Cagayan Valley	3.5	2.1	44.0	7.7	52.5	9.7
03 - Central Luzon	13.4	1.9	77.3	3.0	9.3	1.2
04A - CALABARZON	20.9	9.3	71.0	11.3	8.1	2.8
04B - MIMAROPA	100.0	-	-	-	-	-
05 - Bicol Region	9.2	5.5	82.0	10.8	8.7	5.3
06 - Western Visayas	11.3	5.2	85.0	5.5	3.6	1.1
07 - Central Visayas	80.6	1.3	15.1	0.3	4.3	1.6
08 - Eastern Visayas	13.2	8.0	83.8	10.0	3.0	2.4
09 - Zamboanga Peninsula	21.0	3.2	53.5	6.6	25.5	5.1
10 - Northern Mindanao	9.3	5.5	81.2	9.0	9.5	6.5
11 - Davao Region	7.8	2.3	73.6	6.4	18.6	4.9
12 - SOCCSKSARGEN	21.1	15.7	72.8	14.5	6.1	1.2
National Capital Region	21.9	4.9	67.4	6.8	10.8	2.8
CAR	23.8	6.7	68.6	4.7	7.6	2.6
ARMM	11.0	-	89.0	0.0	-	-
Caraga	-	-	95.8	2.0	4.2	2.0

- means not applicable or no data was observed for the cell; 0.0 means magnitude is less than half a unit.

Appendix Table B4.8. Percent Distribution of R&D Expenditures by Type of Research per Region, Private Non-profit

Region	Basic Research		Applied Research		Experimental Development	
	%	se	%	se	%	se
01 - Ilocos Region	-	-	-	-	-	-
02 - Cagayan Valley	-	-	-	-	-	-
03 - Central Luzon	-	-	-	-	-	-
04A - CALABARZON	16.8	16.4	81.7	17.8	1.5	1.4
04B - MIMAROPA	-	-	-	-	-	-
05 - Bicol Region	-	-	-	-	-	-
06 - Western Visayas	52.2	6.8	39.4	9.0	8.3	8.9
07 - Central Visayas	-	-	-	-	-	-
08 - Eastern Visayas	-	-	-	-	-	-
09 - Zamboanga Peninsula	-	-	-	-	-	-
10 - Northern Mindanao	-	-	-	-	-	-
11 - Davao Region	4.1	4.2	95.9	4.2	-	-
12 - SOCCSKSARGEN	30.0	-	20.0	-	50.0	-
National Capital Region	21.0	14.6	65.9	21.6	13.1	7.4
CAR	-	-	-	-	-	-
ARMM	-	-	-	-	-	-
Caraga	-	-	-	-	-	-

- means not applicable or no data was observed for the cell.

Appendix Table B4.9. Percent Distribution of R&D Expenditures by Field of S&T per Region, Higher Education

Region	Natural Sciences		Engineering and Technology		Agricultural Sciences		Medical Sciences		Social Sciences		Humanities		Others	
	%	se	%	se	%	se	%	se	%	se	%	se	%	se
01 - Ilocos Region	8.0	2.7	19.9	5.4	6.6	4.1	11.4	2.5	36.5	7.7	17.0	5.3	0.5	0.3
02 - Cagayan Valley	18.9	3.1	11.2	2.6	22.9	10.5	5.2	2.1	26.3	5.0	13.0	4.3	2.6	1.2
03 - Central Luzon	7.9	2.0	33.7	6.2	29.0	8.9	10.2	3.3	13.7	2.5	4.9	1.2	0.5	0.2
04A - CALABARZON	5.5	1.3	16.1	2.2	51.1	4.4	1.4	0.7	25.0	7.6	0.8	0.4	-	-
04B - MIMAROPA	19.4	6.0	13.8	2.1	19.1	3.6	1.2	0.9	43.6	6.8	2.9	1.3	-	-
05 - Bicol Region	17.8	2.6	11.9	1.5	29.6	7.1	2.4	1.1	25.0	4.7	4.0	1.2	9.3	5.2
06 - Western Visayas	39.7	14.8	14.8	5.7	6.7	2.8	2.1	1.0	29.9	12.9	2.9	1.2	3.9	1.5
07 - Central Visayas	31.0	4.4	20.4	5.6	8.7	2.7	9.5	0.8	21.6	3.7	8.8	1.0	-	-
08 - Eastern Visayas	16.2	3.0	28.1	6.0	9.8	4.1	1.6	0.7	21.8	2.4	2.9	0.9	19.5	11.4
09 - Zamboanga Peninsula	3.9	2.6	33.1	1.3	30.0	2.6	4.2	3.3	27.9	3.3	1.0	0.7	-	-
10 - Northern Mindanao	17.8	0.4	39.1	1.1	14.2	0.7	11.9	0.9	16.0	1.7	0.7	0.6	0.3	0.3
11 - Davao Region	27.7	2.6	27.7	2.5	23.8	3.6	0.3	0.3	18.3	2.6	1.9	0.9	0.4	0.3
12 - SOCCSKSARGEN	22.2	7.2	3.9	1.2	31.9	2.6	4.9	2.7	35.5	5.0	1.5	0.7	-	-
National Capital Region	52.5	4.2	15.8	2.1	5.9	0.3	12.4	0.4	11.2	1.6	2.1	0.8	0.1	0.1
CAR	9.9	1.3	13.1	2.8	20.8	2.5	17.9	8.1	27.4	7.5	2.0	1.0	9.0	4.5
ARMM	3.5	0.8	15.3	0.2	24.3	0.3	0.0	0.0	45.1	0.4	11.8	0.0	0.0	0.0
Caraga	7.3	4.3	5.6	3.5	65.7	18.0	0.2	0.1	14.3	8.8	6.9	5.2	-	-

- means not applicable or no data was observed for the cell; 0.0 means magnitude is less than half a unit.

Appendix Table B4.10. Percent Distribution of R&D Expenditures by Field of S&T per Region, Government

Region	Natural Sciences		Engineering and Technology		Agricultural Sciences		Medical Sciences		Social Sciences		Humanities		Others	
	%	se	%	se	%	se	%	se	%	se	%	se	%	se
01 - Ilocos Region	25.6	14.8	3.7	2.2	68.6	17.4	0.3	0.2	1.9	1.2	-	-	-	-
02 - Cagayan Valley	19.1	6.2	7.3	1.9	73.3	8.0	0.3	0.3	-	-	-	-	-	-
03 - Central Luzon	10.4	7.0	2.4	1.7	78.2	13.8	0.2	0.1	1.7	1.1	1.8	1.3	5.3	3.9
04A - CALABARZON	54.1	15.7	10.4	3.8	21.6	7.1	0.3	0.2	13.6	5.8	-	-	-	-
04B - MIMAROPA	-	-	-	-	100.0	-	-	-	-	-	-	-	-	-
05 - Bicol Region	4.7	3.7	1.2	0.9	94.1	4.6	-	-	-	-	-	-	-	-
06 - Western Visayas	7.8	5.6	3.5	1.4	83.1	7.1	3.5	2.6	2.1	1.1	-	-	-	-
07 - Central Visayas	-	-	0.4	0.3	96.4	2.7	-	-	1.7	1.6	-	-	1.5	1.4
08 - Eastern Visayas	-	-	-	-	97.1	2.4	0.9	0.7	2.0	1.7	-	-	-	-
09 - Zamboanga Peninsula	-	-	44.6	14.0	52.8	13.6	2.6	1.7	-	-	-	-	-	-
10 - Northern Mindanao	1.9	1.3	5.7	3.9	77.0	11.1	12.8	9.2	1.0	0.3	-	-	1.6	1.2
11 - Davao Region	-	-	57.2	17.7	35.7	16.5	3.4	2.6	1.1	0.9	-	-	2.5	1.9
12 - SOCCSKSARGEN	-	-	-	-	100.0	-	-	-	-	-	-	-	-	-
National Capital Region	23.3	8.2	44.8	9.2	16.8	6.1	6.1	2.6	7.4	2.5	1.1	0.6	0.5	0.2
CAR	0.9	0.6	7.9	5.8	81.9	6.5	-	-	9.3	4.0	-	-	-	-
ARMM	-	-	-	-	100.0	-	-	-	-	-	-	-	-	-
Caraga	-	-	4.3	3.2	91.5	3.5	-	-	4.2	2.0	-	-	-	-

- means not applicable or no data was observed for the cell.

Appendix Table B4.11. Percent Distribution of R&D Expenditures by Field of S&T per Region, Private Non-profit

Region	Natural Sciences		Engineering and Technology		Agricultural Sciences		Medical Sciences		Social Sciences		Humanities		Others	
	%	se	%	se	%	se	%	se	%	se	%	se	%	se
01 - Ilocos Region	-	-	-	-	-	-	-	-	-	-	-	-	-	-
02 - Cagayan Valley	-	-	-	-	-	-	-	-	-	-	-	-	-	-
03 - Central Luzon	-	-	-	-	-	-	-	-	-	-	-	-	-	-
04A - CALABARZON	5.4	5.3	4.4	4.2	84.8	14.7	0.0	0.0	4.3	4.2	1.1	1.1	-	-
04B - MIMAROPA	-	-	-	-	-	-	-	-	-	-	-	-	-	-
05 - Bicol Region	-	-	-	-	-	-	-	-	-	-	-	-	-	-
06 - Western Visayas	2.0	0.5	6.7	7.1	77.9	14.8	3.8	4.0	8.4	6.2	1.3	1.3	-	-
07 - Central Visayas	-	-	-	-	-	-	-	-	-	-	-	-	-	-
08 - Eastern Visayas	-	-	-	-	-	-	-	-	-	-	-	-	-	-
09 - Zamboanga Peninsula	-	-	-	-	-	-	-	-	-	-	-	-	-	-
10 - Northern Mindanao	-	-	-	-	-	-	-	-	-	-	-	-	-	-
11 - Davao Region	88.6	2.2	0.9	0.9	4.0	0.7	-	-	6.5	0.6	-	-	-	-
12 - SOCCSKSARGEN	-	-	70.0	-	30.0	-	-	-	-	-	-	-	-	-
National Capital Region	3.4	3.0	19.5	14.5	-	-	16.2	12.7	13.2	9.7	-	-	47.7	26.8
CAR	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ARMM	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Caraga	-	-	-	-	-	-	-	-	-	-	-	-	-	-

- means not applicable or no data was observed for the cell; 0.0 means magnitude is less than half a unit.

Appendix Table B4.12. Total R&D Expenditure (in million Php) per Sector, 2002 to 2018

Sector	Year								
	2002	2003	2005	2007	2009	2011	2013	2015	2018
Government	976	1,130	1,175	1,334	1,393	1,749	4,732	5,303	13,262
Public HEI	640	455	1,093	1,326	1,745	3,403	4,811	6,243	9,576
Private HEI	122	202	257	430	367	655	555	1,791	2,151
Private Non-Profit	122	105	96	162	228	46	131	465	3,557
Total	1,860	1,892	2,622	3,253	3,734	5,854	10,229	13,803	28,547

Sources: 2018 R&D Survey and previous years

Appendix Table B4.13. Total R&D Expenditure (in thousand Php) per FTE R&D Personnel per Sector, 2002 to 2018

Sector	Year								
	2002	2003	2005	2007	2009	2011	2013	2015	2018
Government	438	435	424	524	591	732	1,744	1,978	1,565
Public HEI	403	251	667	805	768	1,464	1,199	2,111	938
Private HEI	490	657	414	569	747	917	865	2,769	665
Private Non-Profit	1,058	650	1,503	2,534	1,493	709	1,048	1,572	1,679

Sources: 2018 R&D Survey and previous years

Appendix Table B5.1. Institutions that Provided R&D Funds to Other Institutions

Provided R&D funds to other institutions	PNPI		Government		HEI						Overall	
					Private HEI		Public HEI		HEI Overall			
	%	se	%	se	%	se	%	se	%	se	%	se
Yes	31.3	9.6	22.2	2.3	3.9	1.5	3.2	1.1	3.4	0.9	8.7	0.9
No	68.7	9.6	77.8	2.3	96.1	1.5	96.8	1.1	96.6	0.9	91.3	0.9

PNPI refers to the private non-profit sector; HEI refers to the higher education sector; and Overall refers to all three sectors combined.

Appendix Table B5.2. Institutions that Published Scientific Articles

Published scientific articles	PNPI		Government		HEI						Overall	
					Private HEI		Public HEI		HEI Overall			
	%	se	%	se	%	se	%	se	%	se	%	se
Yes	37.0	10.0	33.6	2.7	70.2	4.2	76.9	2.9	74.7	2.4	64.2	1.9
No	63.0	10.0	66.4	2.7	29.8	4.2	23.1	2.9	25.3	2.4	35.8	1.9

PNPI refers to the private non-profit sector; HEI refers to the higher education sector; and Overall refers to all three sectors combined.

Appendix Table B5.3. Scientific Articles Published in Local and International Journals

Publication	PNPI		Government		HEI						Overall	
					Private HEI		Public HEI		HEI Overall			
	Total	se	Total	se	Total	se	Total	se	Total	se	Total	se
Local	20	7	326	98	1,209	304	1,805	236	3,014	371	3,360	383
International	232	187	146	29	1,934	370	3,110	381	5,044	508	5,421	542

PNPI refers to the private non-profit sector; HEI refers to the higher education sector; and Overall refers to all three sectors combined.

Appendix Table B5.4. Institutions that Published Scientific Articles per Region

Region	PNPI		Government		HEI						Overall	
					Private HEI		Public HEI		HEI Overall			
	%	se	%	se	%	se	%	se	%	se	%	se
01 - Ilocos Region	-	-	55.6	11.1	74.7	13.8	76.2	10.1	75.7	8.2	69.8	6.7
02 - Cagayan Valley	-	-	14.3	8.9	62.7	17.2	91.0	7.7	83.5	7.6	63.3	6.0
03 - Central Luzon	-	-	54.5	10.1	45.8	14.8	85.8	7.5	71.8	8.2	66.5	6.5
04A - CALABARZON	19.0	16.6	25.0	10.3	70.3	12.3	38.2	11.2	53.1	9.1	42.8	6.7
04B - MIMAROPA	-	-	100.0	-	100.0	-	78.6	11.9	80.4	11.0	83.4	9.3
05 - Bicol Region	-	-	25.0	14.6	100.0	-	51.4	16.3	69.7	12.5	60.7	10.4
06 - Western Visayas	33.3	24.0	23.1	7.9	100.0	-	81.4	8.4	88.4	5.5	65.0	4.5
07 - Central Visayas	-	-	33.3	12.9	49.4	15.7	77.0	12.4	66.0	10.2	58.3	8.4
08 - Eastern Visayas	-	-	33.3	12.9	68.5	21.5	81.6	8.5	80.5	7.9	70.7	6.8
09 - Zamboanga Peninsula	-	-	-	-	28.0	19.2	100.0	-	57.6	15.7	30.7	8.4
10 - Northern Mindanao	-	-	40.0	14.7	83.3	12.3	83.6	12.2	83.5	8.7	71.4	7.5
11 - Davao Region	50.0	22.0	66.7	12.9	50.0	19.7	68.1	15.8	62.4	12.5	61.7	8.4
12 - SOCCSKSARGEN	-	-	-	-	50.0	30.2	71.0	18.2	63.3	16.2	40.9	10.5
National Capital Region	50.0	18.0	40.9	5.0	88.7	8.5	100.0	-	93.4	5.1	60.7	4.2
CAR	-	-	14.3	8.9	-	-	100.0	-	100.0	-	58.6	3.7
ARMM	-	-	-	-	-	-	100.0	-	75.0	17.5	58.3	13.6
Caraga	-	-	-	-	-	-	58.0	13.8	52.5	13.1	35.0	8.7

PNPI refers to the private non-profit sector; HEI refers to the higher education sector; and Overall refers to all three sectors combined.
- means not applicable or no data was observed for the cell.

Appendix Table B5.5. Number of Published Scientific Articles per Region, Local Publication

Region	PNPI		Government		HEI						Overall	
					Private HEI		Public HEI		HEI Overall			
	Total	se	Total	se	Total	se	Total	se	Total	se	Total	se
01 - Ilocos Region	-	-	137	87	17	10	95	33	112	35	248	94
02 - Cagayan Valley	-	-	2	2	55	21	64	54	120	58	122	58
03 - Central Luzon	-	-	24	9	12	8	197	79	209	80	233	80
04A - CALABARZON	3	3	2	1	143	69	114	48	257	83	262	83
04B - MIMAROPA	-	-	2	2	15	12	42	21	58	24	60	24
05 - Bicol Region	-	-	-	-	27	16	21	7	47	18	47	18
06 - Western Visayas	6	5	8	3	257	118	251	90	508	147	522	147
07 - Central Visayas	-	-	2	1	21	10	73	33	94	34	96	34
08 - Eastern Visayas	-	-	3	2	2	2	182	81	185	81	188	81
09 - Zamboanga Peninsula	-	-	-	-	38	30	56	32	94	44	94	44
10 - Northern Mindanao	-	-	3	2	81	35	83	34	164	48	168	48
11 - Davao Region	4	2	2	1	73	32	40	26	112	41	119	41
12 - SOCCSKSARGEN	-	-	-	-	-	-	19	10	19	10	19	10
National Capital Region	6	4	139	45	468	268	203	89	671	283	816	286
CAR	-	-	-	-	-	-	267	146	267	146	267	146
ARMM	-	-	-	-	-	-	62	38	62	38	62	38
Caraga	-	-	-	-	-	-	35	15	35	15	35	15

PNPI refers to the private non-profit sector; HEI refers to the higher education sector; and Overall refers to all three sectors combined.
- means not applicable or no data was observed for the cell.

Appendix Table B5.6. Number of Published Scientific Articles per Region, International Publication

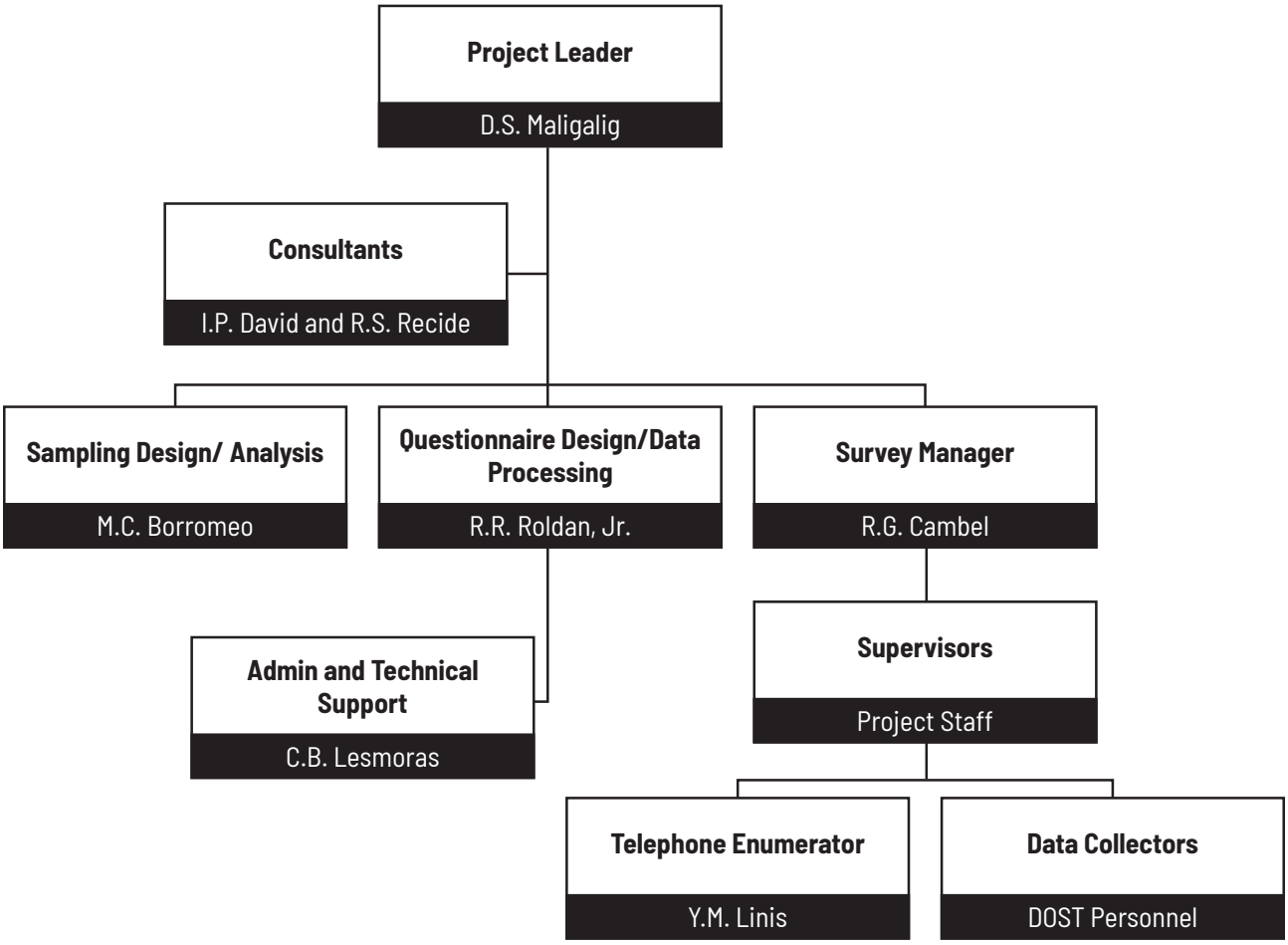
Region	PNPI		Government		HEI						Overall	
					Private HEI		Public HEI		HEI Overall			
	Total	se	Total	se	Total	se	Total	se	Total	se	Total	se
01 - Ilocos Region	-	-	3	2	46	24	307	163	353	165	357	165
02 - Cagayan Valley	-	-	-	-	51	28	168	55	220	61	220	61
03 - Central Luzon	-	-	38	19	57	25	220	58	278	62	315	65
04A - CALABARZON	219	187	-	-	126	51	229	114	355	125	574	225
04B - MIMAROPA	-	-	-	-	-	-	112	43	112	43	112	43
05 - Bicol Region	-	-	2	2	16	10	14	5	30	11	32	11
06 - Western Visayas	-	-	3	2	98	37	171	47	270	60	273	60
07 - Central Visayas	-	-	-	-	94	34	183	56	278	65	278	65
08 - Eastern Visayas	-	-	1	1	2	2	228	87	230	88	231	88
09 - Zamboanga Peninsula	-	-	-	-	5	4	67	29	71	30	71	30
10 - Northern Mindanao	-	-	1	1	53	22	240	123	293	124	295	124
11 - Davao Region	4	2	1	1	56	21	125	76	181	79	187	79
12 - SOCCSKSARGEN	-	-	-	-	7	6	43	14	50	15	50	15
National Capital Region	9	7	94	23	1,322	363	721	268	2,043	448	2,146	449
CAR	-	-	1	1	-	-	97	40	97	40	98	40
ARMM	-	-	-	-	-	-	102	74	102	74	102	74
Caraga	-	-	-	-	-	-	81	37	81	37	81	37

PNPI refers to the private non-profit sector; HEI refers to the higher education sector; and Overall refers to all three sectors combined.
- means not applicable or no data was observed for the cell.

APPENDIX C

Survey Organization

Appendix Figure C1 shows the survey organization that designed, conducted, and analyzed the 2018 R&D Surveys. The project leader, Dalisay S. Maligalig, spearheaded the planning and implementation of the R&D Surveys and supervised a team of three INSTAT faculty and a research associate. Each of the INSTAT faculty was assigned to lead major components in the survey. Maurice C. Borromeo led the sampling design and analysis, Roldan R. Roldan, Jr. led the questionnaire design and data process, and Ramoncito G. Cambel led the survey operations as the survey operations manager. The research associate, Clifford B. Lesmoras, was engaged to provide technical and administrative support to all project activities. Two consultants assisted the project: Dr. Isidoro P. David and Mr. Romeo S. Recide reviewed the survey designs and operations strategies developed by the survey team. Mr. Recide also acted as conduit with the Philippine Statistics Authority.



Appendix Figure C1. Organization of the R&D Survey

Telephone correspondence was essential throughout the survey operations due to the lack of complete and updated contact information of the respondents. As such, Yonie M. Linis was employed as telephone enumerator to conduct telephone follow-ups on the institutions that had not yet responded to the survey and to assist the survey team in completing the sampling frames. During the Phase 2 field operations, personnel from the regional offices of DOST helped the survey team in following up the respondents in their respective regions. To assist them and to closely monitor the status of the regional operations, one INSTAT project staff was designated as survey supervisor for each region.

Region 1 – Ilocos
Supervisor: *R.G. Cambel*
Data Collectors:
Princess P. Abuan
Edison M. Acosta (Lead)
Arthur Aubrey R. Alviar
Jennifer C. Fernandez
Benjamin S. Mercado, Jr.
Edward E. Ugale

Region 2 – Cagayan Valley
Supervisor: *M.C. Borromeo*
Data Collectors:
Virginia G. Bilgera (Lead)
Raquel B. Santos
Lydia B. Turingan

Region 3 – Central Luzon
Supervisor: *R.G. Cambel*
Data Collector:
Maria Gemma B. Arante

Region 4A – CALABARZON
Supervisor: *D.S. Maligalig*
Data Collectors:
Jan Kimwell G. Alpay
Matthew Henry G. Camitan
Niña Sherylle S. Giron (Lead)
John Maico Hernandez
Charles Andrew M. Reyes

Region 4B – MIMAROPA
Supervisor: *R.R. Roldan, Jr.*
Data Collectors:
Phyllicia Anne M. Baguyo
Keith Paolo A. Buenaventura
Mae Angelica F. Famini
Vincent S. Labindao
Rachel B. Montero (Lead)

Region 5 – Bicol
Supervisor: *M.C. Borromeo*
Data Collectors:
Jacinto Alexis B. Elegado
Patrocinio N. Felizmenio (Lead)
Jorge Pedro V. Villanea

Region 6 – Western Visayas
Supervisor: *R.G. Cambel*
Data Collectors:
Juafe M. Abareles
Keithlyn Sarah B. Bernardino (Lead)
Allan Francis P. Dara-ug
Antonette U. Donato

Region 7 – Central Luzon
Supervisor: *M.C. Borromeo*
Data Collectors:
Marichu D. Baclay
Vivian S. Cabando
Samuel A. Parcon (Lead)

Region 8 – Eastern Visayas
Supervisor: *R.R. Roldan, Jr.*
Data Collectors:
Arnaldo T. Amosco, Jr.
Rosella L. Gopo
Veronica A. Laguitan
John Glenn D. Ocaña (Lead)
Florita M. Santiago

Region 9 – Zamboanga Peninsula
Supervisor: *C.B. Lesmoras*
Data Collectors:
Jeyzel P. Aparri
Ricardo J. Apolinario III (Lead)
Merilyn M. Cadag
Gerardo F. Parot

Region 10 – Northern Mindanao
Supervisor: *C.B. Lesmoras*
Data Collectors:
Aidel Melissa M. Bajao
Rubie Mae D. Fernandez
Hadassah Lois G. Matito
Ella B. Nadela
Gerrylou Sweet M. Pia
Junelyn Louvena B. Ruiz (Lead)
Eufresnie Anne D. Simbajon

Region 11 – Davao
Supervisor: *C.B. Lesmoras*
Data Collectors:
Laarnie D. Albacite
Sharon M. Alegado
Leslie Pearl M. Cancio
Nema Freya D. Cebritas
Maria Victoria I. Dado (Lead)
Vicente S. Dagangon
Mayan Jane J. Inni
Just D. Magallanes
Judy Donna D. Nueva Ecija

Region 12 – SOCCSKSARGEN and ARMM
Supervisor: *C.B. Lesmoras*
Data Collectors:
Engr. Mahdali R. Alonto (Lead)
Nasiba B. Daguit
Crisostomo C. Ibarra
Engr. Normina P. Pahm

National Capital Region
Supervisor: *C.B. Lesmoras*
Data Collectors:
Deuvyn C. Bautista
Raniza A. Camid
Kristan Diane B. Canta
Kevin R. De Ramos
Angelica Joi E. del Mindo (Lead)
Rose Ann C. Fernandez
Julius A. Ferrando
Camille Rose A. Nacar
Andrea A. Palima
Ramon R. Pio Roda
Charlene Joyce F. Pon-an
Anna Liza A. Predo
Jaime M. Sebastian Jr.

Cordillera Administrative Region
Supervisor: *R.R. Roldan, Jr.*
Data Collectors:
Melecio F. Balangen
Dexy M. Catacutan
Max Bernardo M. Codamon
Aileen Myrna P. Malangen
Daisy Lou S. Quinio (Lead)
Minirva D. Songaben

Caraga
Supervisor: *C.B. Lesmoras*
Data Collectors:
Kris Kimberly A. Baliña
Meriam B. Bouquia
Marie Kris P. Delarmente
Caressa Leanne V. Lim
Ricardo N. Varela (Lead)
Gladys Mae B. Yeke