

14 Vigorously Advancing Science, Technology, and Innovation

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Building the foundation for a globally competitive knowledge economy through Science, Technology, and Innovation (STI) is important to sustain and further increase the country's growth potential. It is for this reason that the Philippine Development Plan (PDP) 2017-2022 identified the following challenges in the STI sector and aimed to address them: low level of innovation, limited investment in research and development (R&D), lack of resources for technology transfer, weak intellectual property culture, lack of STI infrastructure, weak linkages among innovation actors, and inadequate human resources engaged in STI R&D.

To address these gaps and advance STI, the PDP 2017-2022 outlined two sector outcomes that need to be achieved: (a) promote and accelerate technology adoption; and (b) stimulate innovation.

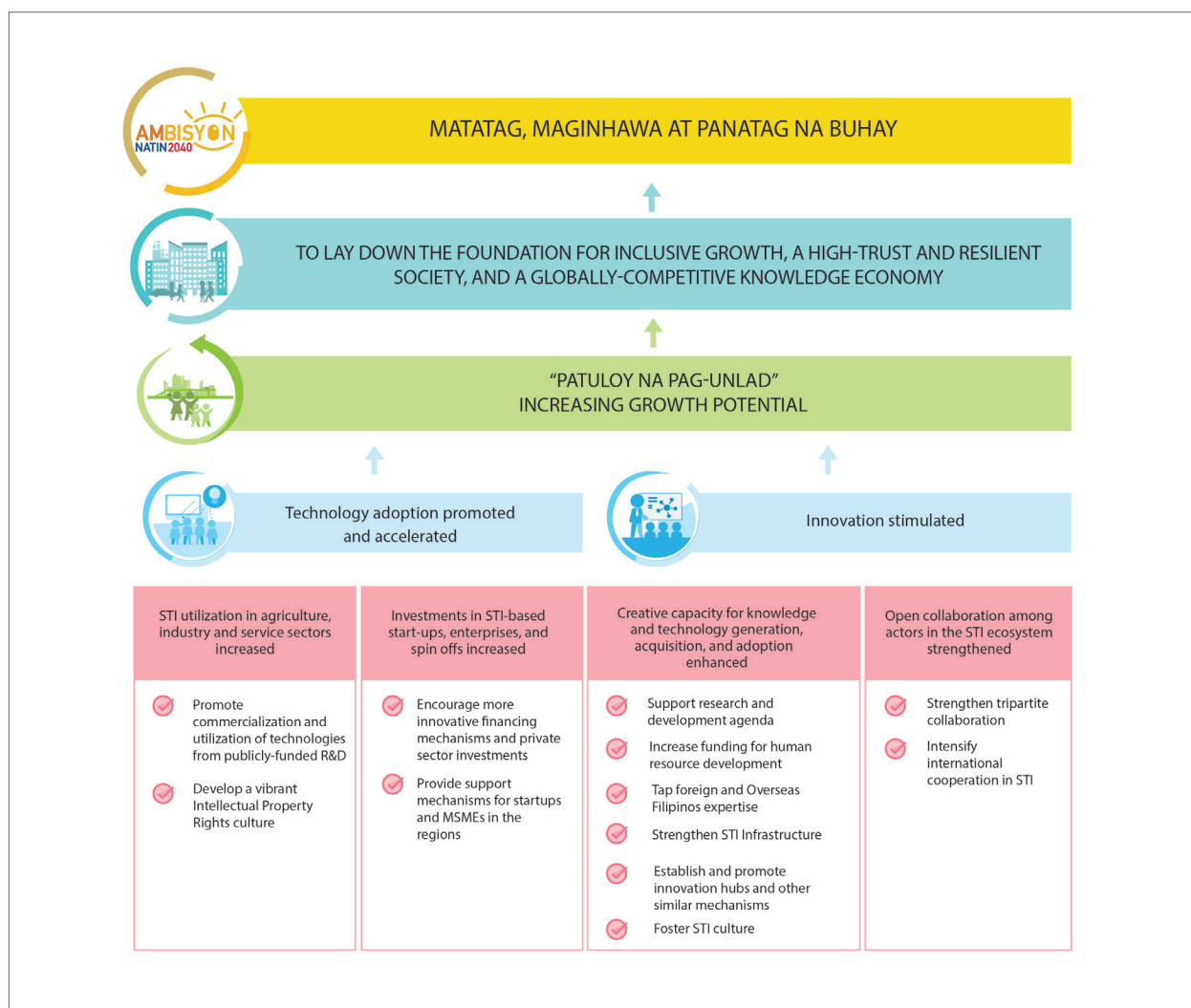
Increasing STI in the agriculture, industry, and services sectors (Subsector Outcome 1) as well as investments in technology-based start-ups, enterprises and spin-offs (Subsector Outcome 2) will result in the promotion and acceleration of technology adoption. On the other hand, enhancing the creative capacity for knowledge and technology generation, acquisition, and adoption (Subsector Outcome 3), and strengthening open collaboration among actors in the STI ecosystem (Subsector Outcome 4) will stimulate innovation.

Figure 14.1 shows the different strategies that will gear the country in achieving the sector and subsector outcomes.

LINKAGE WITH PDP AND ITS RESULTS MATRICES

There are a total of 75 programs and projects (PAPs) under Chapter 14 for the period 2017-2022, with a total investment targets of ₱101,152.13 million. More than three quarters (84.70%) of investment targets will contribute to enhancing the creative capacity for knowledge and technology generation, acquisition, and adoption. About 7.49 percent of the total investment targets will support the increase in STI utilization in agriculture, industry, and services sectors. The remaining portion of the total investments will support technology-based start-ups, enterprises, and spin-offs (7.15%), and strengthen collaboration among actors in the STI ecosystem (0.67%). Other investments in STI are reflected in the PAPs of other chapters (e.g., Chapters 8, 9, and 19, etc.) in recognition of the role of STI in attaining the development goals of these sectors.

Figure 14.1. Strategic Framework to Vigorously Advance Science, Technology, and Innovation



Technology adoption promoted and accelerated

STI utilization in agriculture, industry, and services sectors increased

Transfer and commercialization of technologies generated from the Department of Science and Technology (DOST) will be accelerated to benefit the agriculture, aquatic, and natural resources, as well as the industry and energy sectors, among others.

To support innovation and increase the diffusion of science and technology in the industry sector, DOST will implement programs such as the Business Innovation through Science and Technology for Industry, and the Industry-based Invention Development. These programs are also expected to open opportunities for start-up and spin-off companies which will create new industries and capture emerging market niches, while generating employment in the regions.

Intellectual property protection is also a vital component of the innovation ecosystem. To increase patent applications and develop an intellectual property rights culture, incentives will be given to encourage inventors to protect their inventions by applying for patents, trademarks, and industrial designs. Total investment targets for 2017-2022 under this subsector outcome amount to ₱7,571.50 million.

Investments in STI-based start-ups, enterprises, and spin-offs increased

To increase the commercialization of R&D products, innovative financing schemes and investments must be made available for STI-based start-ups, enterprises, and spin-offs. The Small Enterprise Technology Upgrading Program will be expanded to enable more micro, small, and medium enterprises to adopt technological innovations that will increase their productivity and competitiveness. Venture financing will continue to be implemented to provide the necessary funding support for capacity building of start-ups and scale-up science and technology projects.

The Department of Trade and Industry (DTI) will develop high-growth and high-impact initiatives that will nurture innovation, sustain economic growth, and generate large-scale employment opportunities through the implementation of the Start-up Ecosystem Development Program. The Department of Information and Communications Technology (DICT) through its Seed.PH (ICT Enabled Start-up Development Program), will promote the creation of digital start-ups and increase the local technopreneurs in the country.

PAPs under this subsector outcome have total investment targets for 2017-2022 of ₱7,228.42 million.

Innovation stimulated

Creative capacity for knowledge and technology generation, acquisition, and adoption enhanced

To build an efficient system of knowledge creation and technology generation, the government will implement the Harmonized National R&D Agenda. The agenda defines the country's priorities and guides public investment in R&D. Basic and applied researches will be pursued, including those that will enhance our capabilities in new and emerging fields, such as artificial intelligence and data science, space technology applications, human security, and creative industries.

To boost R&D capacity and promote regional development, DOST will implement the R&D Leadership Program which will enable regions to tap the services of experts in the Philippines and abroad to assist in setting up regional R&D centers, implementing, and generating resources for research projects.

Science and Technology Human Resource Development Programs will be continued and expanded to increase the number of highly-trained researchers, scientists, and engineers in the country.

STI infrastructure will be strengthened, and innovation hubs will be promoted and established through the following PAPs, among others:

1. Establishment of an Accelerator Facility (Phase 1: Conduct of Feasibility Study) (Phase 2: Establishment of the Accelerator Facility);
2. Establishment of a Research Reactor (Phase 1: Conduct of Feasibility Study) (Phase 2: Conduct of Siting Study) (Phase 3: Construction of Research Reactor);
3. ICT and Electronics R&D for Resilient Infrastructures; and
4. Science and Technology Innovation Center for Green Composites.

Overall, 2017-2022 investment targets for PAPs under this subsector outcome amount to ₱85,674.43 million.

Open collaboration among actors in the STI ecosystem strengthened

Collaboration in R&D among the industry, academe, and government will be strengthened, and international cooperation in STI will be intensified. Collaboration R&D to Leverage Philippine Economy will be implemented to bridge the academe and the industry sector, and create a seamless flow from research outputs to practical applications. Leaders in Innovation Fellowship Program will be continued to build the entrepreneurship capacity of researchers in commercializing their innovations. The Technical Education and Skills Development Authority (TESDA), with development assistance from South Korea, will construct a Vocational Training Center to provide training opportunities in various technology skills and upgrade the training of vocational-technological professionals to meet the required standards of the industry. The total investment targets over the medium term for these projects amount to ₱677.78 million.

HIGHLIGHTS OF THE PIP CHAPTER

The bulk of the Public Investment Program (PIP) total investment targets (99.50%) for 2017-2022 will be under DOST, while the remaining (0.50%) will be implemented by the Commission on Higher Education (CHED), DICT, DTI, and TESDA (*refer to Table 14.2.A*). A total of ₱19,383.92 million accounted for Core Investment Programs/Projects (CIP) under DOST (*refer to Table 14.2.B*).

In terms of spatial coverage, nationwide PAPs amount to ₱93,995.02 million (92.92%) of the total investment targets for 2017-2022, while interregional and region-specific PAPs amount to ₱146.59 million (0.14%) and ₱7,010.52 million (6.93%), respectively, as indicated in Table 14.3.A.

Tables 14.4.A and 14.4.B show the mode of implementation of PAPs under the PIP and CIP, respectively. Bulk of the PAPs are proposed to be carried out using local funds amounting to ₱98,979.48 million (97.86%), followed by those proposed to be implemented using official development assistance (ODA) amounting to ₱225.00 million (0.22%), and through other mode of implementation amounting to ₱132.56 million (0.13%). The mode of implementation of the remaining portion of the total investments amounting to ₱1,815.09 million (1.79%) is yet to be determined.

In terms of status/project readiness, ongoing PAPs amount to ₱77,051.24 million, representing 76.17 percent of the total investment targets for 2017-2022, while Level 1 (approved) and Level 2 (undergoing approval process) PAPs amount to ₱32.69 million (0.03%) and ₱22,593.07 million (22.34%), respectively. PAPs amounting to ₱1,475.12 million (1.46%) are currently undergoing various stages of project preparation prior to submission to the approving body¹ (refer to Table 14.5).

SUMMARY TABLES

Table 14.1.A. PIP Investment Targets by Outcome

SECTOR OUTCOME	NO. OF PAPS	INVESTMENT TARGETS (IN ₱ MILLION)						2017-2022	TOTAL PROJECT COST*
		2017	2018	2019	2020	2021	2022		
Sector Outcome 1: Technology adoption promoted and accelerated									
Subsector Outcome 1: STI utilization in agriculture, industry, and services sectors increased	27	227.45	1,733.10	1,359.95	3,257.70	628.40	364.90	7,571.50	7,695.69
Subsector Outcome 2: Investments in STI-based start-ups, enterprises, and spin-offs increased	6	903.62	1,359.69	1,659.69	1,960.92	621.00	723.50	7,228.42	7,254.67
Sector Outcome 2: Innovation stimulated									
Subsector Outcome 1: Creative capacity for knowledge and technology generation, acquisition, and adoption enhanced	39	4,051.68	5,548.14	9,683.29	15,912.61	19,860.64	30,618.07	85,674.43	98,079.77
Subsector Outcome 2: Open collaboration among actors in the STI ecosystem strengthened	3	7.00	127.00	372.00	171.78	-	-	677.78	677.78
TOTAL	75	5,189.75	8,767.94	13,074.93	21,303.00	21,110.04	31,706.47	101,152.13	113,707.91
Total excluding cross-ref PAP in Chapter 10	74	5,189.75	8,752.94	13,074.93	21,303.00	21,110.04	31,706.47	101,137.13	113,692.91

* May not be equal to the '2017-2022 investment targets' as total project cost may include investments prior to or after the 2017-2022 Plan period.

¹ These include PAPs with Level 3, Level 4, and Deferred status.

Table 14.1.B. CIP Investment Targets by Outcome

SECTOR OUTCOME	NO. OF PAPS	INVESTMENT TARGETS (IN ₱ MILLION)							TOTAL PROJECT COST*
		2017	2018	2019	2020	2021	2022	2017-2022	
Sector Outcome 1: Technology adoption promoted and accelerated									
Subsector Outcome 1: STI utilization in agriculture, industry, and services sectors increased	1	-	375.00	500.00	2,625.00	-	-	3,500.00	3,500.00
Subsector Outcome 2: Investments in STI-based start-ups, enterprises, and spin-offs increased	1	80.00	300.00	400.00	500.00	600.00	700.00	2,580.00	2,580.00
Sector Outcome 2: Innovation stimulated									
Subsector Outcome 1: Creative capacity for knowledge and technology generation, acquisition, and adoption enhanced	2	-	123.92	799.03	3,789.74	2,993.34	5,597.89	13,303.92	19,465.51
TOTAL	4	80.00	798.92	1,699.03	6,914.74	3,593.34	6,297.89	19,383.92	25,545.51

* May not be equal to the '2017-2022 investment targets' as total project cost may include investments prior to or after the 2017-2022 Plan period.

Table 14.2.A. PIP Investment Targets by Implementing Agency

AGENCY	NO. OF PAPS	INVESTMENT TARGETS (IN ₱ MILLION)							TOTAL PROJECT COST*
		2017	2018	2019	2020	2021	2022	2017-2022	
CHED	5	25.00	89.00	10.00	30.00	-	50.00	204.00	204.00
CSU	2	-	35.00	-	-	-	-	35.00	35.00
NORSU	1	-	19.00	-	-	-	-	19.00	19.00
SSU	1	-	10.00	10.00	30.00	-	50.00	100.00	100.00
USEP	1	25.00	25.00	-	-	-	-	50.00	50.00
DICT	1	-	5.09	-	-	-	-	5.09	5.09
DOST	67	5,164.75	8,653.85	12,814.93	21,243.00	21,110.04	31,656.47	100,643.03	113,198.82
DOST (Main)	7	1,777.18	2,115.40	2,439.70	4,871.41	600.00	700.00	11,903.68	12,003.93
ASTI	3	613.39	643.30	744.40	710.00	495.00	545.00	3,751.09	3,751.09
ITDI	5	22.69	179.58	92.78	75.70	24.97	-	395.72	395.72
MIRDC	11	-	381.18	902.76	380.94	327.54	27.00	2,019.41	2,019.41
PCAARRD	23	112.30	992.27	116.57	78.55	65.53	72.78	1,438.00	1,491.57
PCIEERD	1	25.00	30.00	34.50	40.00	-	-	129.50	133.75
PNRI	10	296.88	634.12	1,349.64	4,391.46	3,666.34	6,270.89	16,609.33	22,870.92
SEI	2	2,904.30	3,661.51	7,113.90	10,670.85	15,902.26	24,009.40	64,262.21	70,364.59
TAPI	5	13.00	16.50	20.70	24.10	28.40	31.40	134.10	167.84
DTI	1	-	20.00	25.00	30.00	-	-	75.00	75.00
OCS	1	-	-	225.00	-	-	-	225.00	225.00
TESDA	1	-	-	225.00	-	-	-	225.00	225.00
TOTAL	75	5,189.75	8,767.94	13,074.93	21,303.00	21,110.04	31,706.47	101,152.13	113,707.91
Total excluding cross-ref PAP in Chapter 10	74	5,189.75	8,752.94	13,074.93	21,303.00	21,110.04	31,706.47	101,137.13	113,692.91

* May not be equal to the '2017-2022 investment targets' as total project cost may include investments prior to or after the 2017-2022 Plan period.

Table 14.2.B. CIP Investment Targets by Implementing Agency

AGENCY	NO. OF PAPS	INVESTMENT TARGETS (IN ₱ MILLION)							TOTAL PROJECT COST*
		2017	2018	2019	2020	2021	2022	2017-2022	
DOST	4	80.00	798.92	1,699.03	6,914.74	3,593.34	6,297.89	19,383.92	25,545.51
DOST (Main)	2	80.00	675.00	900.00	3,125.00	600.00	700.00	6,080.00	6,080.00
PNRI	2	-	123.92	799.03	3,789.74	2,993.34	5,597.89	13,303.92	19,465.51
TOTAL	4	80.00	798.92	1,699.03	6,914.74	3,593.34	6,297.89	19,383.92	25,545.51

* May not be equal to the '2017-2022 investment targets' as total project cost may include investments prior to or after the 2017-2022 Plan period.

Table 14.3.A. PIP Investment Targets by Spatial Coverage

SPATIAL COVERAGE	NO. OF PAPS	INVESTMENT TARGETS (IN ₱ MILLION)							TOTAL PROJECT COST*
		2017	2018	2019	2020	2021	2022	2017-2022	
Nationwide	33	4,161.24	7,253.07	11,044.35	20,139.36	20,292.53	31,104.47	93,995.02	106,432.7
Interregional	11	39.80	40.14	39.15	27.5	-	-	146.59	156.54
Region-specific	31	988.71	1,474.72	1,991.44	1,136.14	817.5	602.00	7,010.52	7,118.63
NCR	21	926.01	1,350.69	1,720.94	1,103.64	817.5	552.00	6,470.78	6,573.65
Region II	2	-	35.00	-	-	-	-	35.00	35.00
CALABARZON	4	37.71	35.03	35.50	2.50	-	-	110.74	115.98
Region VII	2	-	19.00	225.00	-	-	-	244.00	244.00
Region VIII	1	-	10.00	10.00	30.00	-	50.00	100.00	100.00
Region XI	1	25.00	25.00	-	-	-	-	50.00	50.00
TOTAL	75	5,189.75	8,767.94	13,074.93	21,303.00	21,110.04	31,706.47	101,152.13	113,707.91
Total excluding cross-ref PAP in Chapter 10	74	5,189.75	8,752.94	13,074.93	21,303.00	21,110.04	31,706.47	101,137.13	113,692.91

* May not be equal to the '2017-2022 investment targets' as total project cost may include investments prior to or after the 2017-2022 Plan period.

Table 14.3.B. CIP Investment Targets by Spatial Coverage

SPATIAL COVERAGE	NO. OF PAPS	INVESTMENT TARGETS (IN ₱ MILLION)							TOTAL PROJECT COST*
		2017	2018	2019	2020	2021	2022	2017-2022	
Nationwide	4	80.00	798.92	1,699.03	6,914.74	3,593.34	6,297.89	19,383.92	25,545.51
TOTAL	4	80.00	798.92	1,699.03	6,914.74	3,593.34	6,297.89	19,383.92	25,545.51

* May not be equal to the '2017-2022 investment targets' as total project cost may include investments prior to or after the 2017-2022 Plan period.

Table 14.4.A. PIP Investment Targets by Mode of Implementation

MODE OF IMPLEMENTATION	NO. OF PAPS	INVESTMENT TARGETS (IN ₱ MILLION)							TOTAL PROJECT COST*
		2017	2018	2019	2020	2021	2022	2017-2022	
LFP (RA 9184)	60	5,167.06	8,233.66	11,964.40	20,954.36	20,980.53	31,679.47	98,979.48	111,535.26
ODA	1	-	-	225.00	-	-	-	225.00	225.00
Others (including ICG)	2	22.69	34.97	24.97	24.97	24.97	-	132.56	132.56
TBD	12	-	499.31	860.57	323.68	104.54	27.00	1,815.09	1,815.09
TOTAL	75	5,189.75	8,767.94	13,074.93	21,303.00	21,110.04	31,706.47	101,152.13	113,707.91
Total excluding cross-ref PAP in Chapter 10	74	5,189.75	8,752.94	13,074.93	21,303.00	21,110.04	31,706.47	101,137.13	113,692.91

* May not be equal to the '2017-2022 investment targets' as total project cost may include investments prior to or after the 2017-2022 Plan period.

Table 14.4.B. CIP Investment Targets by Mode of Implementation

MODE OF IMPLEMENTATION	NO. OF PAPS	INVESTMENT TARGETS (IN ₱ MILLION)							TOTAL PROJECT COST*
		2017	2018	2019	2020	2021	2022	2017-2022	
LFP (RA 9184)	4	80.00	798.92	1,699.03	6,914.74	3,593.34	6,297.89	19,383.92	25,545.51
TOTAL	4	80.00	798.92	1,699.03	6,914.74	3,593.34	6,297.89	19,383.92	25,545.51

* May not be equal to the '2017-2022 investment targets' as total project cost may include investments prior to or after the 2017-2022 Plan period.

Table 14.5. PIP Investment Targets by Status/Level of Readiness

PROJECT READINESS	NO. OF PAPS	INVESTMENT TARGETS (IN ₱ MILLION)							TOTAL PROJECT COST*
		2017	2018	2019	2020	2021	2022	2017-2022	
With Total Project Cost above ₱2.5 Billion									
Ongoing	3	4,291.81	5,107.26	8,806.22	12,385.85	16,247.16	24,280.24	71,118.54	77,153.69
Undergoing Approval Process (Level 2)	3	80.00	715.00	915.00	6,234.96	3,593.34	6,297.89	17,836.19	23,997.78
Subtotal	6	4,371.81	5,822.26	9,721.22	18,620.81	19,840.50	30,578.13	88,954.73	101,151.47
With Total Project Cost of ₱1 Billion - ₱2.5 Billion									
Ongoing	2	217.94	321.46	420.00	470.00	520.00	520.00	2,469.40	2,469.40
Undergoing Approval Process (Level 2)	1	-	83.92	784.03	679.78	-	-	1,547.73	1,547.73
Subtotal	3	217.94	405.38	1,204.03	1,149.78	520.00	520.00	4,017.13	4,017.13
With Total Project Cost below ₱1 Billion									
Ongoing	36	552.31	699.03	613.54	676.05	394.03	528.34	3,463.31	3,822.35
Approved (Level 1)	1	22.69	10.00	-	-	-	-	32.69	32.69
Undergoing Approval Process (Level 2)	23	25.00	939.16	1,143.00	743.02	328.97	30.00	3,209.15	3,209.15
For Submission to the Approving Body (Level 3 and Level 4) ^a	6	-	892.10	393.15	113.34	26.54	50.00	1,475.12	1,475.12
Subtotal	66	600.00	2,540.29	2,149.69	1,532.41	749.54	608.34	8,180.27	8,539.31
TOTAL	75	5,189.75	8,767.94	13,074.93	21,303.00	21,110.04	31,706.47	101,152.13	113,707.91
Total excluding cross-ref PAP in Chapter 10	74	5,189.75	8,752.94	13,074.93	21,303.00	21,110.04	31,706.47	101,137.13	113,692.91

* May not be equal to the '2017-2022 investment targets' as total project cost may include investments prior to or after the 2017-2022 Plan period.

^a This includes PAPs with Level 3, Level 4, and Deferred status.

