

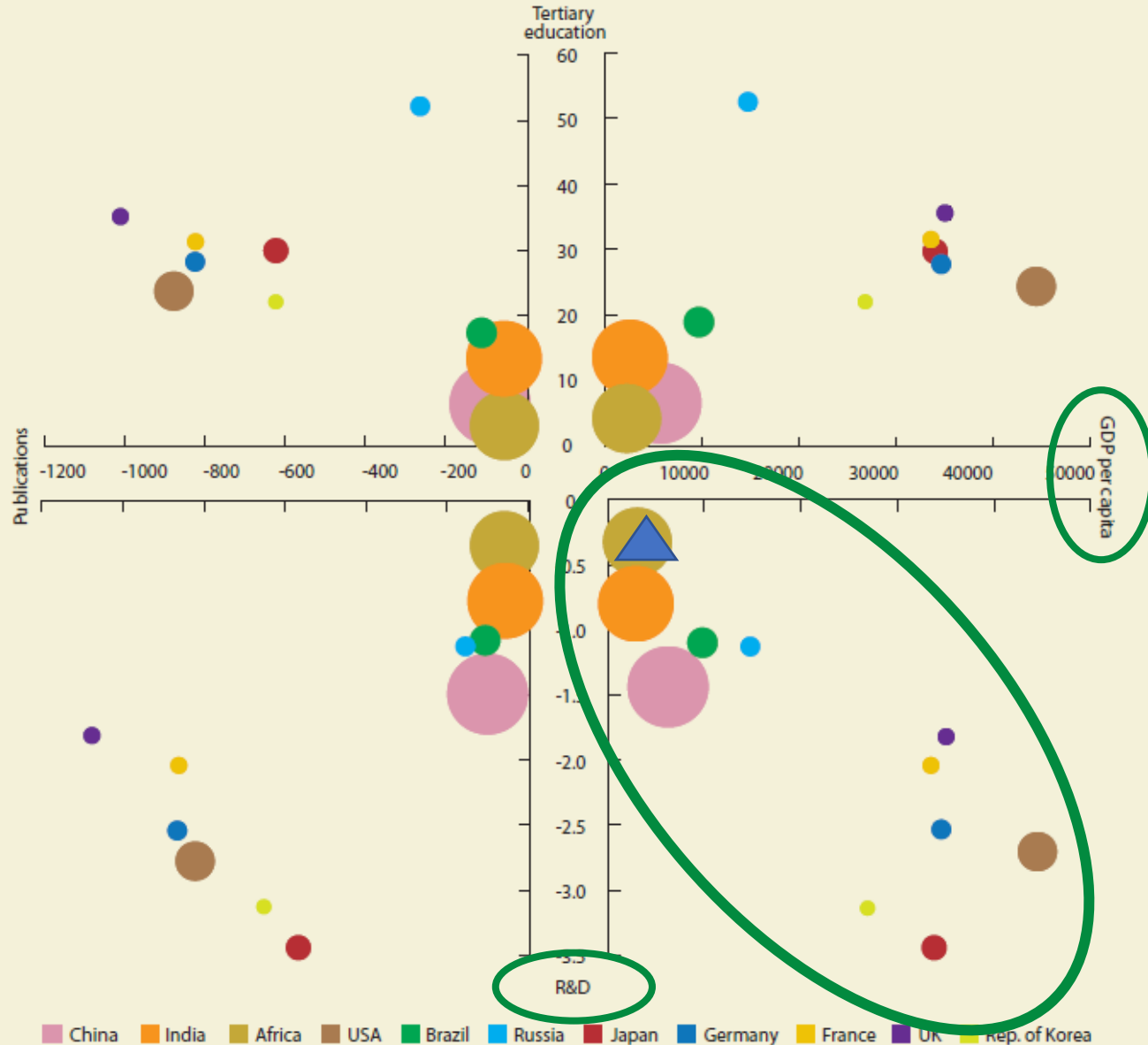
Innovation Concept Note: Building the Suprastructure

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representing the Scientific Community

Presentation to Professor Jose V. Camacho, Jr.
Chancellor, U.P. Los Baños
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Figure 5. The systemic matching between key S&T indicators
Selected countries and regions



Note: The size of the circles reflects the population size for each country or region studied.

Source: UNU-MERIT based on data from the UNESCO Institute for Statistics and World Bank

Why should research (R&D) be a top national priority?

There is a strong correlation between R&D and GDP per capita.

 - Philippines

UNESCO
SCIENCE
REPORT 2010

Figure 2

NIASD CORE TARGETS

GII Sub-Indices/Indicator	Baseline (2022)	2028	2032*	2040*
Overall GII ranking GII score	59th 30.7	43rd 35	34th 41	25th 47
1. Institutions				
1.2.1 Regulatory Quality (rank)	72	53	49	40
1.3.1 Policies for doing business (rank)	96	76*	66	43
2. Human Capital and Research				
2.3.1 Researchers, FTE/mn pop.	174 (2018)	500	1,000	1,500
2.3.2 Gross expenditure on R&D, % GDP	0.32 (2018)	1.0	1.6	1.8
3. Infrastructure				
3.1.1 ICT access (rank)	100	71*	53	40
3.1.2 ICT use (rank)	95	71*	53	40
4. Market Sophistication				
4.1.1 Finance for startups and scaleups ^a	0 (2021)	3*	5	7
4.2.2 Number of venture capital deals invested in (per billion PPP\$ GDP, three-year average)	0 (2021)	0.1*	0.2	0.3
5. Business Sophistication				
5.1.2 Firms offering formal training, %	59.8	75	80	85
5.2.1 University-industry R&D collaboration ^b	3.7	4	4.5	6
5.3.4 FDI net inflows, % GDP	2.7 (2021)	3-5	6-8	9-12

*proposed targets

GII Indicators that are monitored in the PDP 2023-2028

^a Five-year average perception scores (1 = completely false; 10 = completely true)

^b Average perception scores [1 = not at all; 7 = to a great extent]

NIASD CORE TARGETS

GII Sub-Indices/Indicator	Baseline (2022)	2028	2032*	2040*
Overall GII ranking	59th	43rd	34th	25th
GII score	30.7	35	41	47
6. Knowledge and Technology Outputs				
6.1.1. Patents by origin/bn PPP\$ GDP ^a	0.5	1.0*	2.0	4.0
6.1.3. Utility models by origin/bn PPP\$ GDP ^b	0	0.5*	0.7	1.0
6.2.2. New businesses/th pop.	0.2	1.3	1.5	4.0
6.2.5. High-tech manufacturing, % total manufacturing output	38.7	45	50.0	60.0
6.3.3. High-tech exports, % total trade	39.7	46.9*	50	55
7. Creative Outputs				
7.1.2 Trademark by Origin/bn PPP\$ GDP	33.6	40*	48	68.0
7.1.3 Global Brand Value, top 5,000, %GDP	41.8	50*	62	78.0
7.2.1 Cultural and Creative Export, % total trade	0.1	2.0*	3.0	4.0
7.2.5 Creative Goods Export, % total trade	6.3	7.3*	8.0	10.0

*proposed targets

GII Indicators that are monitored in the PDP 2023-2028

^a Number of resident patent applications filed (per billion PPP\$ GDP)

^b Number of resident utility model applications filed (per billion PPP\$ GDP)

Table 2. 2022 Innovation Inputs and Innovation Outputs of ASEAN countries

GII Indicators		Brunei Darussalam	Cambodia	Indonesia	Japan	Malaysia	Myanmar	Philippines	Republic of Korea	Singapore	Thailand	Viet Nam
Innovation Inputs	1.1.2 Government Effectiveness	1.4	-0.4	0.4	1.6	1	-1	0.1	1.4	2.3	0.3	0.2
	1.2.1 Regulatory Quality	0.9	-0.6	0.1	1.4	0.8	-0.6	0	1	2.2	0.2	-0.1
	1.3.1 Policies for doing business	4.1	2.6	4.9	4.9	4.7	2.9	2.4	4.2	6.2	3.6	4.5
	2.2.2 Graduates in Science and Engineering, %	38.4	23.2	19.4	19.7	38.9	33.7	22.8	29.6	35.4	27.9	22.7
	2.3.1. Researchers, FTE/mn pop.	0	30.4	395.7	5454.7	2184.7	31.9	173.6	8713.6	7287.3	1790.2	756.7
	2.3.2. Gross Expenditure on R&D, % GDP	0.3	0.1	0.3	3.3	1	0.1	0.3	4.8	1.9	1.1	0.5
	2.3.4. QS university ranking, top 5	23.4	0	55.7	80.7	58	0	20.3	75.7	69.4	35.7	4.1
	3.1.1 Information and Communication Technology (ICT) Access	8.3	7.1	8.9	9.2	9.4	0	6.9	9.5	10	9.2	9.1
	3.1.2 ICT Use	7.4	5.4	5.8	7.9	7.4	0	4.8	8.7	7.6	7.3	6.2
	4.1.1 Finance for Startups and Scale-ups	0	0	6.2	5.1	6.5	0	0	5.2	0	5.5	4.4
	4.2.2 Venture Capital Investors, deals/bn PPP\$ GDP	0	0.1	0	0.1	0	0	0	0.1	1	0	0
	5.1.2 Firms Offering Formal Training, %	0	22.2	7.7	0	18.5	5.9	59.8	0	0	18	22.2
	5.2.1 University-industry R&D Collaborations	4.1	3.3	5	4.5	4.2	2.3	3.7	4.9	5.1	4.2	4.5
	5.3.4 Foreign Direct Investments (FDI) Net Inflows, % GDP	3.8	13.6	1.9	0.8	2	2.5	2.3	0.6	26.7	0.8	6.1
	5.3.5 Research Talent, % in businesses	0	4.3	7.5	74.7	15.8	0	51.8	81.8	52.2	60.8	24.1
	Innovation Outputs	6.1.1. Patents by Origin/bn PPP\$ GDP	0.2	0	0.4	42.8	1.1	0	0.5	77.9	3.2	0.7
6.1.3. Utility Models by Irigin/bn PPP\$ GDP		0	0	0.7	0.8	0.1	0	1.5	2	0	2.6	0.4
6.2.2. New Businesses/th pop.		1	0.5	0.3	0.5	2.1	0.4	0.2	0	10	1.3	1.7
6.2.5. High-tech Manufacturing, %		3.3	0	29.9	55.2	45.5	17.7	38.7	56.3	74.7	44	29.9
6.3.3. High-tech Exports, % total trade		0.2	1.5	3.8	13.1	46.9	1.4	39.7	28.8	29.4	18.6	37.3
7.1.2. Trademarks by origin/bn PPP\$ GDP		8.2	39.5	24.4	64.6	20.4	24	33.6	116.2	22.9	26.1	72.4
7.1.3. Global Brand Value, top 5,000, % GDP		0	0	36.1	154.6	141.9	5.7	41.8	203.4	134.9	71.9	88.2
7.2.1. Cultural and Creative Services Exports, %		0	0	0	0.4	0.3	0.3	0.1	0.8	4.6	0	0
7.2.5. Creative goods exports, % total trade		0.1	0.6	2.3	1.8	9.3	0.7	6.3	5	3.8	8.4	7.8
7.3.4. Mobile App Creation/bn PPP\$ GDP	0	0.2	0.2	0.5	0.1	0	0.2	1.2	5.3	0.2	2.6	

Source: World Intellectual Property Organization (WIPO), 2022

- To grow and sustain high-level innovation, NIASD recognizes the need to increase the number of **Filipino scientists from 174 pmp (per million population) at present to 500 pmp in 2028 to 1000 pmp in 2032**, to catch up with Thailand and Vietnam with ten times and four times more scientists than us, respectively, at the present time.
- Also among NIASD's core targets is to increase **GERD (Gross Expenditure for R&D) from 0.3% of GDP at present, to 1% of GDP by 2028, to 1.6% of GDP by 2032.**



*Gisela P. Concepcion, Closing Remarks
NIASD Launch, Sept. 27, 2023*

*What good is Infrastructure
without the Suprastructure?*

Philippine GDP in 2022 was ~USD 400 billion, and it grew larger in 2023.

Current GERD of 0.3% of GDP translates to USD1.2 billion. We need to spend **at least USD2.8 billion more for GERD by 2028.**

To our entrepreneurs, startups, venture capitalists, MSMEs and future innovators among our youth, we wish to see you transform your ideas into reality, we hope many more will pursue and invest in higher value **agri-tech, aqua-tech, bio-tech, food-tech, health-tech, energy-tech, materials-tech, climate-tech, recycling-tech**, aside from **fin-tech, digi-tech, space-tech** and **AI-IT**.

And, may enterprises engaged in **social innovation** be the prime movers of **socio-economic transformation of communities** through the growth of **circular economies in rural areas of our country**.

*G.P. Concepcion, Closing Remarks
NIASD Launch, Sept. 27, 2023*

The GDP of the Philippines in 2022 was ~USD400 billion.

At a population of ~115 million, the ~GDP per capita is ~USD3,500.

~35% of the Philippine GDP or USD140 billion is contributed by 1.9 million MSMEs. This translates to ~USD74,000 GDP per MSME.

Assuming an MSME spends 50% for employee wages and an MSME has 15 employees, each employee earns ~USD2,500 a year (or ~USD210 or ~P12,000 a month).

MARGINALIZED COMMUNITIES IN THE PHILIPPINES DO NOT EARN ENOUGH INCOME. COCONUT FARMERS UNTIL TODAY EARN ~P5,000 a month. FARMERS AND FISHERFOLK ARE THE POOREST COMMUNITIES IN OUR COUNTRY.

Productivity (quality and quantity of produce/products) of MSMEs and farmer and fisherfolk communities can be significantly improved with advanced innovative technologies.

Philippine *Suprastructure* Development – Building the Philippine Advanced Technology Innovation Institute for Industry (PATIII - PATICube) and the Innovation Workforce*

Through a definitive, massive investment in Suprastructure - advanced S&T human capital development, recognizing its singular, most critical role in driving and sustaining over the long term, innovation-based competitiveness of Philippine industries.

Aligned with the top priorities of the Asian Development Bank and the administration of President Ferdinand R. Marcos, Jr.: Agriculture and Food Security, and Climate Change

***HERE WE PROPOSE THE ESTABLISHMENT OF**

1) AN INNOVATION INSTITUTE, AND

2) A MASSIVE POSTGRADUATE STUDY ABROAD PROGRAM.

BACKGROUND AND RATIONALE

INVESTING IN THE HUMAN TALENT POOL

National problems and challenges being addressed are poverty and hunger, malnutrition and undernutrition, resulting in physical stunting, mental disabilities of children, youth and adults in the regions, which can be traced to marginal agricultural productivity and food insecurity, exacerbated by the adverse impacts of climate change; a vicious cycle of many decades of the inability to develop agriculture and natural resources into high value, competitive commercial products leading to stagnation of the manufacturing industry sector that could otherwise provide massive jobs and livelihoods, alleviate poverty and raise the GDP per capita of the poorest of the poor – the farmers and fisherfolk.

Major reasons these problems exist today are lack of investments in S&T-based knowledge, R&D, innovation and governance. The Philippines has direly lagged behind in these investments in comparison with other countries in the ASEAN region in the last half century. Coping with competition among nations, and at present, seeking out cooperation and resource-sharing among them, to address shared global and regional threats, requires that the Philippines be at par with its neighbors in terms of scientific and technological capabilities.

The critical role of S&T human capital development (S&T HCD) to sustain technological development and economic progress over the long term, improve the quality of life of a population, is recognized in all technologically advanced countries. The single most important, definitive investment for sustained progress is in the development of its human workforce or human capital resources – the advanced education and training of its brightest youth.

All advanced countries of the world have this as their top priority. Data from WIPO, UNESCO, World Bank, Global Competitiveness Index, Global Innovation Index, show a strong positive correlation between GEHE, GERD and economic prosperity, global competitiveness and innovation rankings of nations.

MODELS

Asian countries such as Japan, South Korean, China, Taiwan, India, Pakistan and ASEAN countries such as Singapore, Thailand, Malaysia, Indonesia, Vietnam have been investing heavily in S&T HCD sending THOUSANDS of their brightest students to the U.S. and Europe for advanced studies.

The challenge in the Philippines is to directly link the creation of S&T knowledge and innovation with utilization, commercialization and economic prosperity.

This can be met if successful models of such linkages found in foreign countries in Asia and Europe can be followed. There are Taiwan universities patterned after technological universities in Germany, where large innovation hubs are built within the university, and MS and PhD graduates are directly hired by major industries such as the semiconductor industry.

In the Fraunhofer model of a public-private partnership for applied research in business innovation in Germany, the link between scientific research and entrepreneurial growth is very close and well-structured. Every euro of public expenditure invested yields 3-4 euros in GDP.

In Taiwan, Japan and South Korea, science start-up and industrial parks are located near universities, and start-up labs are found within universities.

Postgraduate studies, thesis and dissertations, and R&D programs can be modelled after those in the Humboldt Universities and Max Planck Research Institutes in Germany, RIKEN in Japan and Academia Sinica in Taiwan done in partnership with universities.

For recruitment and support for scholars for foreign postgraduate studies and ensuring their return and reintegration to the sending country, there are successful models of Australian scholarship programs that can be adopted.

ANTECEDENTS IN THE PHILIPPINES:

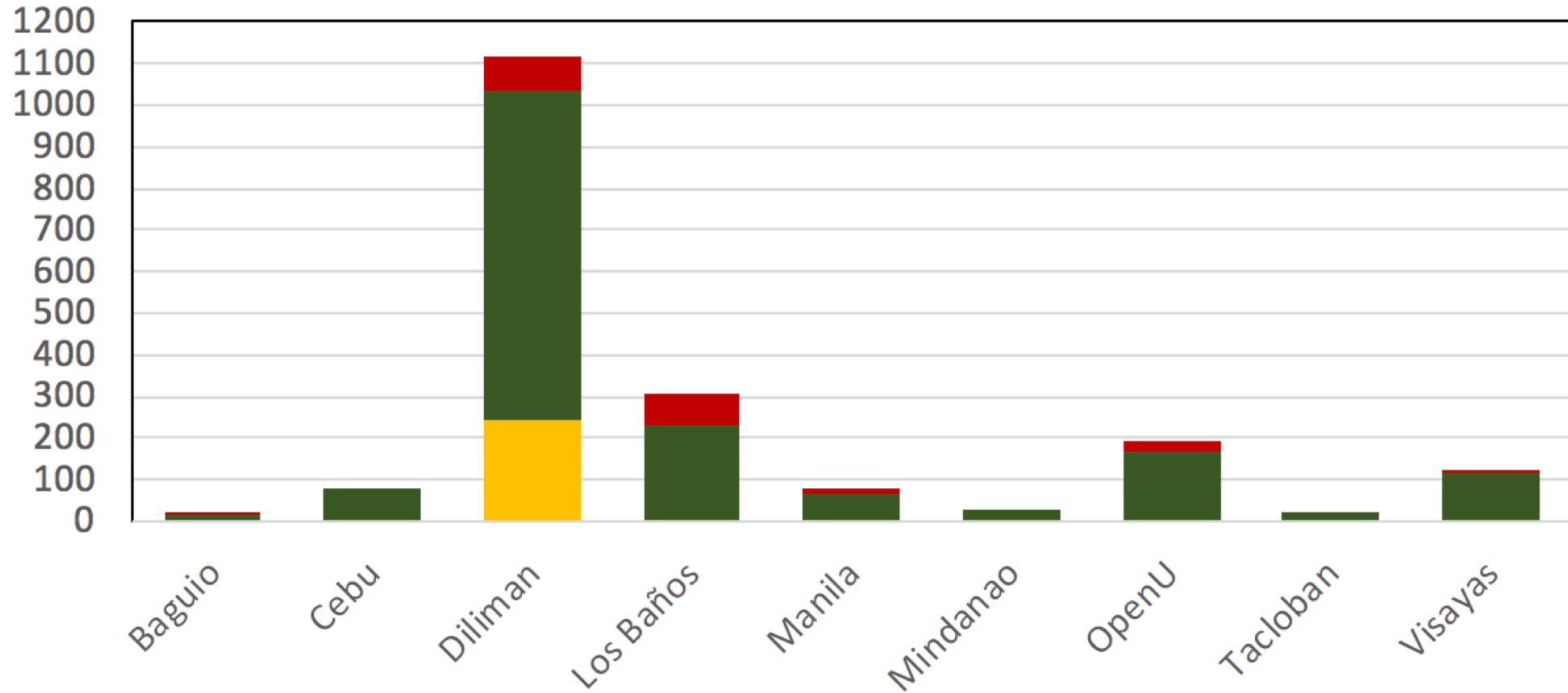
- No massive investment of the Philippine government in postgraduate studies abroad of its best and brightest youth from the 1960s and through the decades
- Instead, reliance on relatively few Rockefeller, Ford Foundation, Fulbright, World Bank, East-West scholarships.
- A significant number of these PhD graduates in the '70s and '80s did not come home for good.

Programs that did not make a lasting, significant impact on knowledge creation in the country:

- ESEP Foreign PhD Scholarship Program in the '80s-'90s
- PhD Consortium of UP, ADMU, DLSU and UST in the '80s-'90s
- Establishment of the National Science Complex in UP Diliman and the National Science Consortium in the mid-2000s
- Establishment of the ERDT (Engineering R&D and Technology) program in the mid-2000s

Graduation Data of the UP Graduate Programs, 2023

■ Diploma (244) ■ Masteral (1517) ■ Doctoral (193)



2024 National budget is P5.768 trillion (~USD100 billion)

<https://www.philstar.com/headlines/2023/12/21/2320399/marcos-jr-signs-p5768-trillion-national-budget-2024>

**PROPOSED BUDGET FOR BUILDING THE SUPRASTRUCTURE:
~USD 1 billion**

To address NIASD Core Targets by 2028 and beyond:

- additional USD400 billion X (1.0% - 0.3%) = USD2.8 billion
- additional FTE researchers per million population to produce:
500 – 174 = 326 FTE researchers per million population

with a population of ~115,000,000:

we need ~115 X 326 = 37,490 FTE researchers (MS and PhD level)

FOREIGN MODELS

The most innovative centers in the world are found in the United States, i.e., MIT-Harvard nexus and Silicon Valley-Stanford-UC System nexus.

Small Business Innovation Research (SBIR) grants to researchers are a major investment in innovation of the U.S. government which has yielded numerous commercialization success stories. The explosive growth of the biotechnology industry from the nascent stage in the last decades is attributed in large part to SBIRs.

Successful cases of engagement of leading private U.S. universities with universities in foreign countries are well documented, e.g., NYU Genomics Institute in Abu Dhabi, UAE led by world-renowned Filipino plant genomics expert *Michael Purugganan, PhD.*

Singapore's USD30M investment in the MIT SMART group in Singapore eventually led to the establishment of the highly successful Singapore University of Technology and Design (SUTD) currently graduating hundreds of engineers annually, with SUTD topping MIT's list of emerging engineering schools.

New intellectual property (IP) regimes in some U.S. research institutes and Australian universities of outright sale of IP to industry without attachment of royalty have spurred commercialization and generated significant revenues for universities which in turn continue to receive more research funding from the government. This demonstrates a direct link between R&D and innovation and economic growth and prosperity.

OPEN INNOVATION REQUIRES NEW IP REGIMES.

Philippine Advanced Technology Innovation Institute for Industry (PATIII)

PROPOSAL

Focus on the following priority areas of innovation to produce new materials and products, and improve production efficiency:

1. Agriculture and fisheries technologies for food productivity and security
2. Renewable and nuclear energy technologies for clean, cheap and continuous energy
3. Metallurgical and materials technologies for metal industries (stainless steel, iron, other metals), for energy storage/batteries and semi-conductors (green metals), for industrial machinery (additive manufacturing/3D printing for replacement of machine parts), and for chemical and health industries (petrochemicals and organic chemicals)

Each of the above will be pursued in the context of environmental sustainability and digital/AI-enabling automation technologies and other cross-cutting technologies.

Direct beneficiaries would be MSMEs and large industries.

UNIQUE FEATURES OF PATIII:

1. Build the Philippine Advanced Technology Innovation Institute for Industry (PATIII) as an **attached unit of the DTI focused on serving industry** (MSMEs and large industries)⁴, to grow the economy, trade and industry in the priority areas of development indicated above.

2. Build PATIII infrastructure in a **PEZA zone centrally located in the fastest-growing concentration of local and foreign industry locators, and surrounded by several leading universities**⁵.

3. Support high-level R&D and innovation with **enabling procurement and hiring terms, tax exemptions and export incentives under PEZA and BOI**.

4. Establish a **new intellectual property (IP) regime** in PATIII **supported by IPOPHL**, of outright sale of IP to industries that would generate significant revenues for PATIII, with good ROI serving as basis for receiving new funding, thus establishing a productive, sustainable innovation and commercialization cycle⁶.

5. Recruit a **world-renowned Filipino expatriate scientist-engineer and innovation management expert**, to lead PATIII and attract the best Filipino expatriate and foreign research teams to join PATIII.

6. Recruit **world-class Filipino expatriate and foreign scientist-led RESEARCH TEAMS, not individuals, in the priority areas above**.

7. Build **world-class R&D facilities** with state-of-the art laboratories, instrumentation, spaces for ideation and field-based prototype models⁷; also provide **facilities for education and training**, and for hosting of **regular high-level competitions** to present innovations to industry for adoption and investment.

8. Undertake **contract research** to address needs of MSMEs and big industries; **pursue world-class R&D making use of local natural resources to produce competitive, high value-added materials and products attractive to export-oriented industries**.

FEATURES

9. Provide **competitive, international-standard compensation and incentives packages** to the R&D and innovation teams.

10. Build **housing and community facilities** for resident researchers, postgraduate students and staff to ensure high quality of life.

11. Offer **joint Master's and PhD degree programs with leading private and public universities**; pursue industry-focused thesis and dissertations⁸; offer postdoctoral fellowships to young faculty; help build innovation hubs, provide small business innovation startup grants to universities⁹ and serve as their link to industries.

12. Solicit financial support from foreign and local universities, industries and foundations as counterpart to government support to **create a sustainable Public-Private Partnership**^{8,10}.

- **Modeled after German Technological Universities and Research Institutes: Fraunhofer model – INDUSTRY-CENTRIC.**
- **Fraunhofer Technological Universities closely linked with Humboldt Universities and Max Planck Research Institutes**
- All innovation work including theses and dissertations is done as components of RDI program that must be utilized by industry.
- All government funds spent for RDI must translate to ROI, and a significant increase in GDP of the concerned industry sector.
- S&T Park industry locators surrounding Technological Universities in Taiwan and South Korea are patterned after the Fraunhofer model.
- Open innovation is strongly encouraged in Germany, South Korea and Taiwan.
- A new IP sharing regime to support open or group innovation is adopted.
- Symbiosis or sharing of resources and IP exists between industries and with academe.

FEASIBILITY

1. **Dr. Rigoberto Advincula, PhD, a world-renowned, multi-awarded U.S.-based Filipino materials scientist-engineer and research mentor, with innovation management expertise, will come home for good to lead PATIII.** He has strong links with local and foreign industries, UP and Philippine universities, and universities in the U.S., Europe and Asia.
2. As PATIII leader, Dr. Advincula will **serve as a strong magnet to recruit world-class research teams from the U.S., Europe, South Korea and Japan to work in PATIII.**
3. PATIII arrangement similar to the original CHED-PCARI plan which was to build two mirror institutes (engineering and health) of UC Berkeley (UCB) in U.P. Diliman (UPD) where UCB professors would establish teams of UCB researchers in UPD, and UP faculty and researchers would opt in to pursue PhDs and postdoctoral fellowships in the mirror institutes. UCB professors would divide their time between UCB and UPD.
4. **Dr. Michael Purugganan, PhD, NYU professor and former NYU Science Dean, world-renowned plant genomics expert, successfully established the NYU Genomics Laboratories in Abu Dhabi, UAE, shuttling between NYU in NY and NYU in Abu Dhabi,** similar to the CHED-PCARI model.
5. Universities and research institutes in Thailand host foreign professors and their research teams under a similar arrangement.
6. DTI and NDC have received expressions of interest from Japanese and Indian research teams to work in the Philippines full-time.

Materials Science and Engineering

Rigoberto Advincula

UT-ORNL Governor's Chair of Advanced and Nanostructured Materials

Biography

Rigoberto "Gobet" Advincula is a leading figure in the realm of advanced materials, polymers, and nanomaterials.

His areas of research include utilizing the structure and functionalities of materials on a near-atomic scale, characterizing and developing new materials sensors, optics, biotechnology, biomedicine, energy production, and advanced manufacturing.

At UT, Advincula joins Thomas Zawodzinski and Arthur Ragauskas as the third Governor's Chair in the Department of Chemical and Biomolecular Engineering, and he is the 15th Governor's Chair overall.

Under his dual appointment at Oak Ridge National Laboratory, Advincula will lead ORNL's macromolecular nanomaterials group in the Center for Nanophase Materials Sciences, which specializes in the conception and design of new materials.

He joins UT and ORNL after serving as a professor at Case Western Reserve University's Department of Macromolecular Science and Engineering.



Contact Information

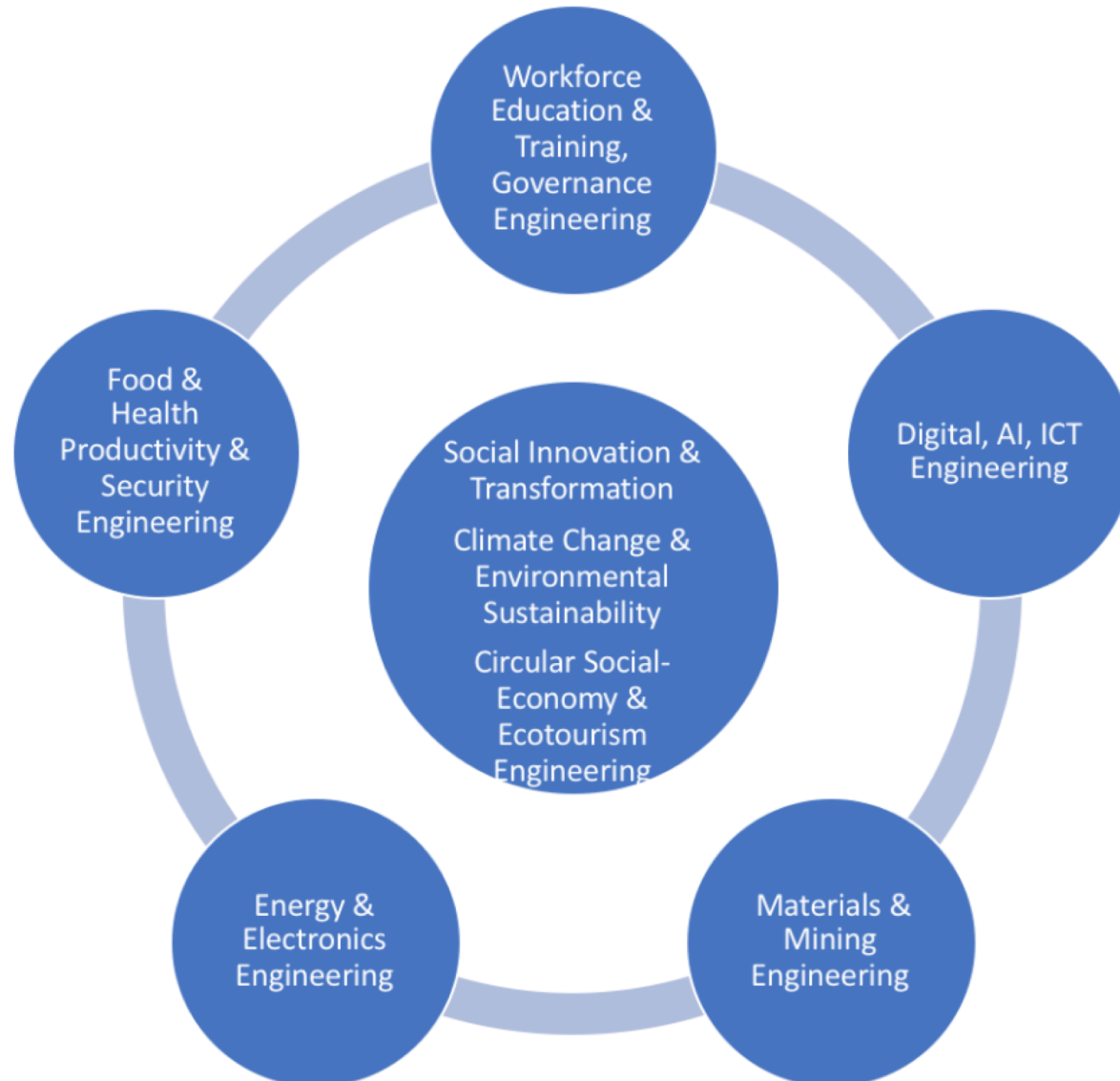
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[Personal Website](#)

7. **Singapore's A-STAR and universities provide a successful model for hosting foreign world-class research teams.**
8. **Singapore invested USD30M in MIT's SMART program** which led to the establishment of the Singapore University of Technology and Design (SUTD) now producing hundreds of engineers each year.

SUSTAINABILITY - REVENUE SOURCES OF PATIII:

1. CONTRACT RESEARCH FEES
2. OUTRIGHT SALE OF IP
3. ROYALTY FROM IP SHARING
4. INDUSTRY TRAINING FEES
5. MASTERS THESIS AND PHD
DISSERTATION RESEARCH FEES
FROM SUCS AND HEIS

CONCEPTUAL FRAMEWORK OF PHILIPPINE ADVANCED TECHNOLOGY INNOVATION INSTITUTE FOR INDUSTRY (PATIII)

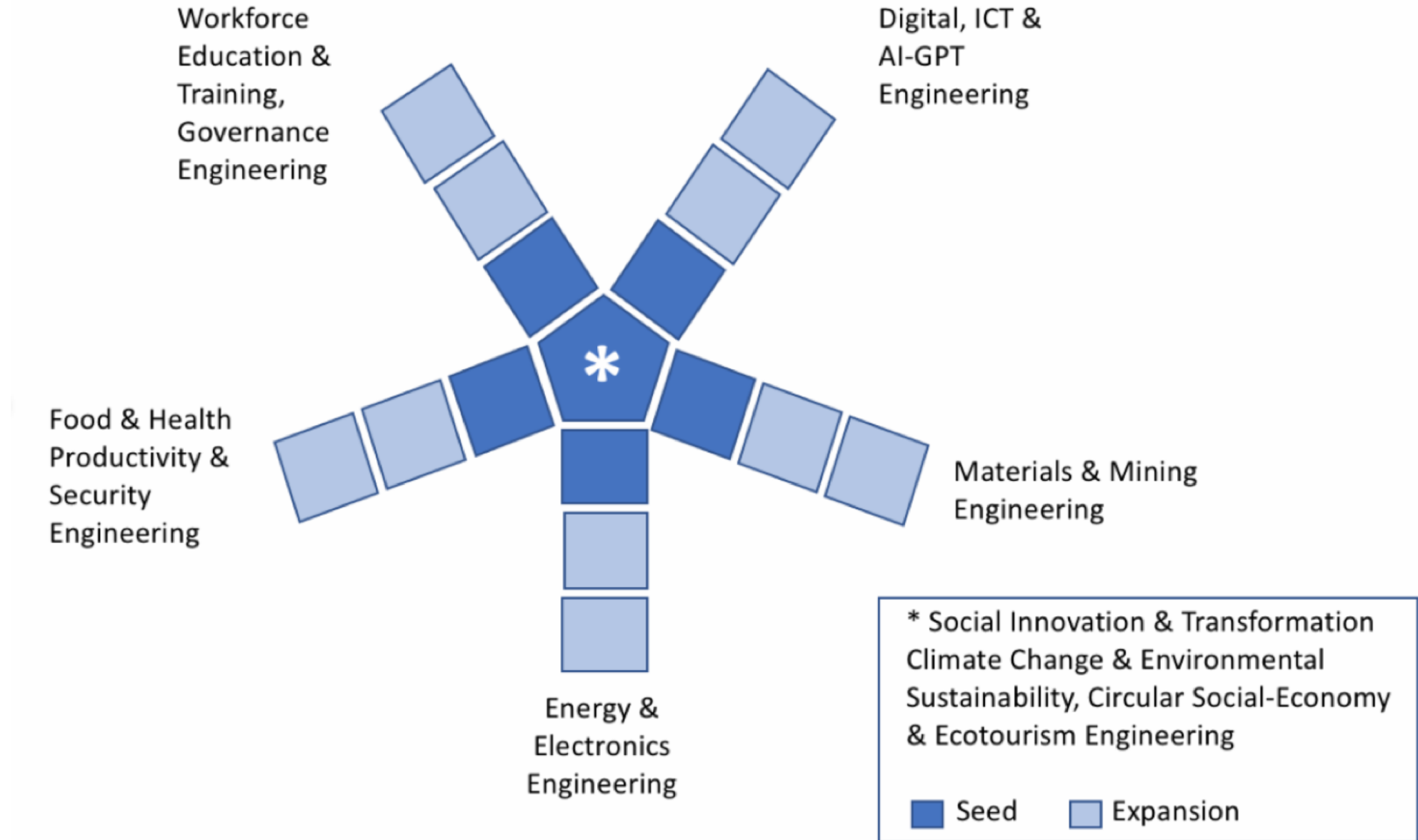


INNOVATION TOWN

- PATIII surrounded by universities and industry locators
- living and open spaces provided for the RDI community

- Embark on advanced technology and innovation projects aligned with the priorities of the Philippine Development Plan and the Asian Development Bank, namely: agricultural productivity and food security, in the context of climate change and environmental sustainability; establishing agricultural biotechnology and industrial parks that provide models for corporate farming and fisheries, that can be adapted to the surrounding region and other parts of the country, with an end in view to alleviating poverty, hunger, malnutrition and mental disabilities in poor, far-flung communities, and significantly increasing the GDP per capita in the agriculture, livestock and fisheries sectors in the regions.
- Integrate the above supply chain innovation with a plan to develop a culturally and environmentally sustainable, efficient circular social economy, focused on waste reduction and recycling, aimed at net zero carbon emissions through increased use of renewable energy; anchored on the creation of a nationwide niche-based creative ecotourism industry (with unique ethnic-cultural-historical-biodiversity-food-health niches in various localities, using technological innovations to help preserve Culture and Nature and create ecotourism niches of high international standards) that would satisfy discriminating local and foreign tourists.
- Pursue advanced technology and cutting-edge innovation projects in the fundamental research fields of energy, electronics and ICT/AI engineering, and metallurgical and materials engineering, adding high value to extracted Philippine natural resources, which would serve as underlying critical technologies to support the growth and ensure the long-term sustainability of agricultural and other manufacturing industries.
- Create new social innovation paradigms to pursue a unique, holistic approach to the development of Philippine regional communities (to satisfy simple aspirations of *matatag, maginhawa at panatag na buhay*) and undertake technology-empowering training for people-centered, regional-level governance and management of large industries linked to local supply chains with MSMEs and cooperatives, and with local and foreign markets through digital and material/real connectivity; prioritize production of high-quality, high-value niche exports produced in large quantities by large industries and MSMEs from a region, and at the same time balance out to provide for local consumption, ensuring self-sufficiency in food and other products for local communities.
- Manage, monitor, evaluate projects according to key performance productivity indicators and outcomes; benchmark would be significant increases in GDP per capita of marginalized sectors (poverty alleviation) directly impacted by the PATIII technologies, GDP per MSME sector and GDP per large industry sector (moving to middle-to upper-income country category).

Philippine Advanced Technology Innovation Institute for Industry (PATIII) SEED AND EXPANSION PLAN



BUDGET ESTIMATE

PATI³:

4 industry priority areas X 6 research teams/priority area = 24 research teams

Suprastructure:

Recruitment, management, monitoring team, 5 years \$ 10,000,000

24 research teams X \$5M/yr. X 5 yrs. \$600,000,000
(salaries, equipment, consumables, MOOE)

Infrastructure:

PATI³ building:
24 research teams X 1,000 sqm/team X \$1,500/sqm \$ 36,000,000

Central administration, management, conference facilities,
storage, power, computing, maintenance and shared
R&D facilities 1,500 sqm X \$1,500/sqm \$. 2,250,000

Living spaces: residences and community facilities:
At ~10 persons per research team plus family members, total ~300 persons

300 persons X 150 sqm/person X ~\$1,000/sqm
(residences, indoor and outdoor common facilities) \$ 45,000,000
\$693,250,000

**FUNDING AUGMENTED
THROUGH PPPs & FDIs**

Land requirements:

PATI³ building total floor area, total 2.55 hectares; for 2 storey building, estimated total 1.275 hectares footprint

PATI³ requires surrounding open spaces for expansion and for field-based pilot/prototypes, e.g., agribiotech setups, estimated total of 2 hectares

Living spaces total floor area, total 4.5 hectares; for a mix of single detached bungalow, 2-3 storey residences, and acceptable FAR (floor-to-area) or building-to land ratio, estimated total 3.5 hectares

Estimated total land requirement: 1.275 + 2 + 3.5 hectares = ~7 hectares.

What is the ~rental cost of 7 hectares in Green City?

Symbiosis or sharing of resources among industries and with technological universities and research institutes in Southern Taiwan:

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Industrial Symbiosis in Taiwan: Case Study on Linhai Industrial Park

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Innovation Hubs in Southern Taiwan universities:

- National Kaohsiung University of Science and Technology
- Yun Lin Technological University

PATIII complemented by massive postgraduate Master's and PhD STUDY-ABROAD program:

1. Massive investment in Master's and PhD education and training program of teams of Filipino researchers in leading universities and RDI centers in the world, principally in the U.S.
2. Competitive selection from best tertiary level graduates from best SUCs from a region in the priority areas of development indicated above³
3. Rational plan for scholarships provided to teams of postgraduate students instead of to individual students, to specialize in complementary disciplines required in the priority areas of development of a region or province
4. Attractive scholarship package with incentives with assurance of employment in university, research institute, private industry upon return to the region of origin
5. Completion of studies, return and reintegration secured through the foreign mentors, DFA, Philippine-foreign country governments' S&T education and training agreements

FEASIBILITY OF MASSIVE POSTGRADUATE FOREIGN STUDIES PROGRAM

- Is the equal allocation of slots among 17 regions feasible?
- SUCs with MS programs can participate.
- MS and PhD sandwich programs: foreign study time and cost reduced, i.e., used only for thesis: MS: 1 year, PhD: 2 years
- U.S.: full PhD, 4.5 to 5 years; Europe, Australia, Japan: full MS, ~2 years, full PhD by research, ~3 years, requires MS degree
- Industry-focused MS and PhD studies, thesis/dissertation: Industry representative at the scholar recruitment, thesis proposal, thesis defense stages, i.e. to implement industry contract research, industry could provide scholarship and ensure employment
- Send scholars in teams for complementarity and redundancy of expertise.
- Provide the appropriate incentives and assurance of employment to ensure completion of studies and return to region.

BUDGET ESTIMATE FOR ~2000 SCHOLARS:

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Massive Masters/PhD foreign studies program:

17 regions x top 4 SUCs/HEIs X 8 top BS graduates X 4 industry priority areas = 2,176 or
~2,000 scholars

2,000 scholars X ~\$35,000*/yr. X 5 yrs.	\$350,000,000
Recruitment, management and monitoring, 5 yrs.	<u>\$ 5,000,000</u>
*U.S. universities	\$355,000,000

The Indonesian LPDP Scholarship

<https://lpdp.kemenukeu.go.id/en/>

Overview of LPDP

Indonesia has several programs aimed at sending students abroad for graduate studies, with the most notable being the **LPDP Scholarship (Lembaga Pengelola Dana Pendidikan)** under the Ministry of Finance. The LPDP Scholarship aims to finance higher education in master's and doctoral programs for Indonesian citizens in top universities worldwide. The program aims to develop future leaders and professionals who will contribute to Indonesia's development.

The scholarship covers **tuition fees, living expenses, health insurance, and travel costs**. It is highly competitive and targets areas of study that align with Indonesia's development priorities. Recipients are **required to return to Indonesia** after completing their studies to contribute their knowledge and skills to the country's development.

Other government agencies and ministries might also offer scholarships or support for overseas graduate studies, **targeting specific fields such as science and technology, education, health, etc.** Additionally, **Indonesian universities** and **private foundations** provide opportunities for graduate students to study abroad.

Applicants for these programs typically need to **demonstrate academic excellence, leadership potential, and a strong commitment to contributing to Indonesia's development**. The application process usually involves submitting academic records, a proposal for study, and undergoing interviews.

The LPDP Scholarship program has benefited thousands of Indonesian students since its inception in 2011. The exact number of beneficiaries varies each year as the program continues to award new scholarships for master's and doctoral studies. By 2023, the LPDP had **awarded scholarships to over 25,000 Indonesians** to pursue higher education both domestically and abroad in various fields of study aligned with Indonesia's development priorities.

Indonesian Endowment Fund for Education (LPDP)

The Indonesian Endowment Fund for Education (LPDP), a significant program by the Indonesian Government for sending students abroad for graduate studies, was established in 2011. The LPDP is managed by the Ministry of Finance and aims to develop future leaders and enhance the professional workforce in various fields to contribute to the nation's development.

The funding for the LPDP has been substantial, reflecting the Indonesian Government's commitment to education and human capital development. Initially, the fund was endowed with a significant amount of capital, and over the years, the Government has continued to allocate funds to support this initiative. The exact amount of funding allocated can vary each year, depending on the Government's budget priorities and fiscal capacity. To date, the fund has received hundreds of trillions of Indonesian Rupiah (**tens of billions of US Dollars**) over its operation period, but specific annual allocations may differ.

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THANK YOU