

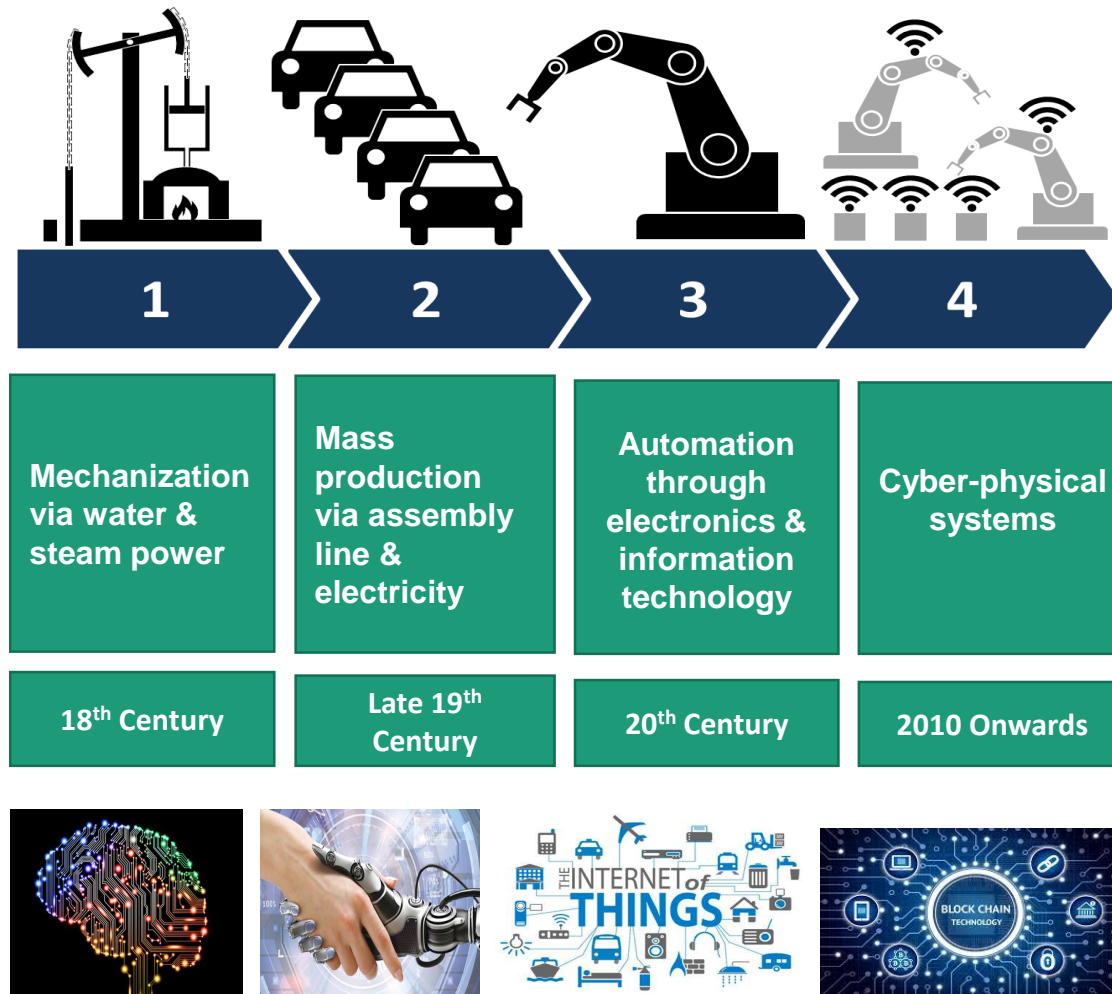
Industry 4.0: Are We There Yet?

i³S inclusive innovation industrial strategy

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4th Industrial Revolution: impact on industries



- spur development of new production techniques & business models that would transform global production systems
- drive new, more distributed & connected value chains
 - trigger selective reshoring, nearshoring & other structural changes in GVC
 - certain skills & capabilities will be required at each stage of the GVC
- add another layer of complexity to the challenging tasks of developing globally competitive industries
 - put at risk the viability of low cost manufacturing & services exports as source of growth & development



Some Philippine industries in 3.0, many are still transitioning from Industry 2.0 to 3.0



IT-BPM: strong in voice, to move up the value chain, non-voice high value knowledge process outsourcing



Automotive: completely-knocked-down (CKD) assembly & parts manufacturing like large plastic and metal body parts, strategic parts



Electronics: mainly semi conductor manufacturing services particularly in labor-intensive, back-end assembly process & test



Agriculture still in mechanization phase





A Glimpse of Existing Processes in
Philippine Industries

Garments, Shipbuilding, Electronics



Painting, welding,
assembly



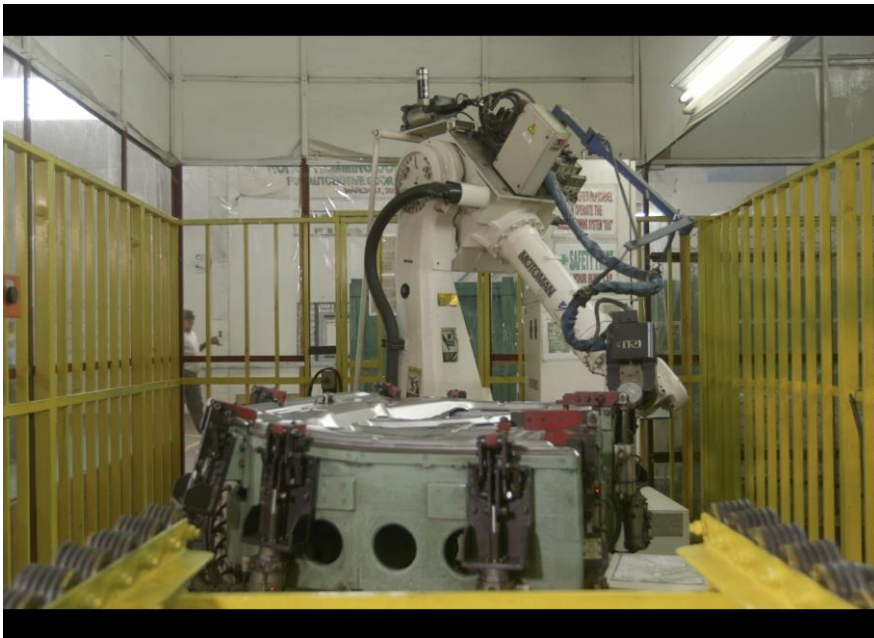
Radiator assembly line



Steel Manufacturing



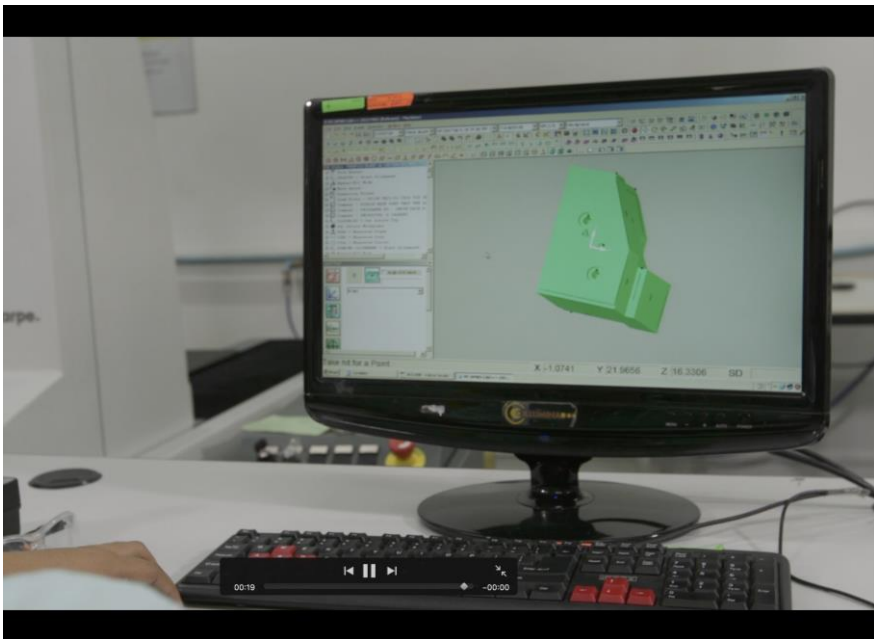
Food processing: cacao,
coffee, shrimp, fish



Auto Parts Manufacturing



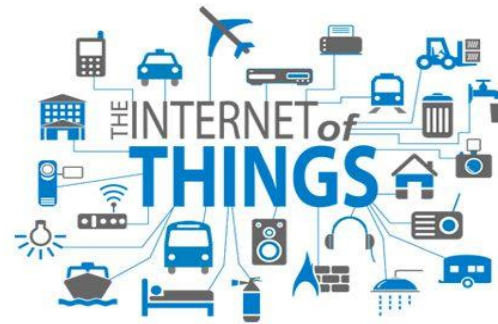
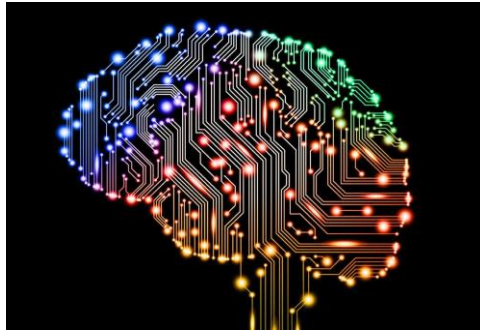
Auto Parts Processing &
assembly, injection molding



IT-BPM Knowledge Process Outsourcing

New Industrial Strategy GLOBAL & DOMESTIC CONTEXT

Industry 4.0 disrupting business models at an accelerated pace, is PH ready?



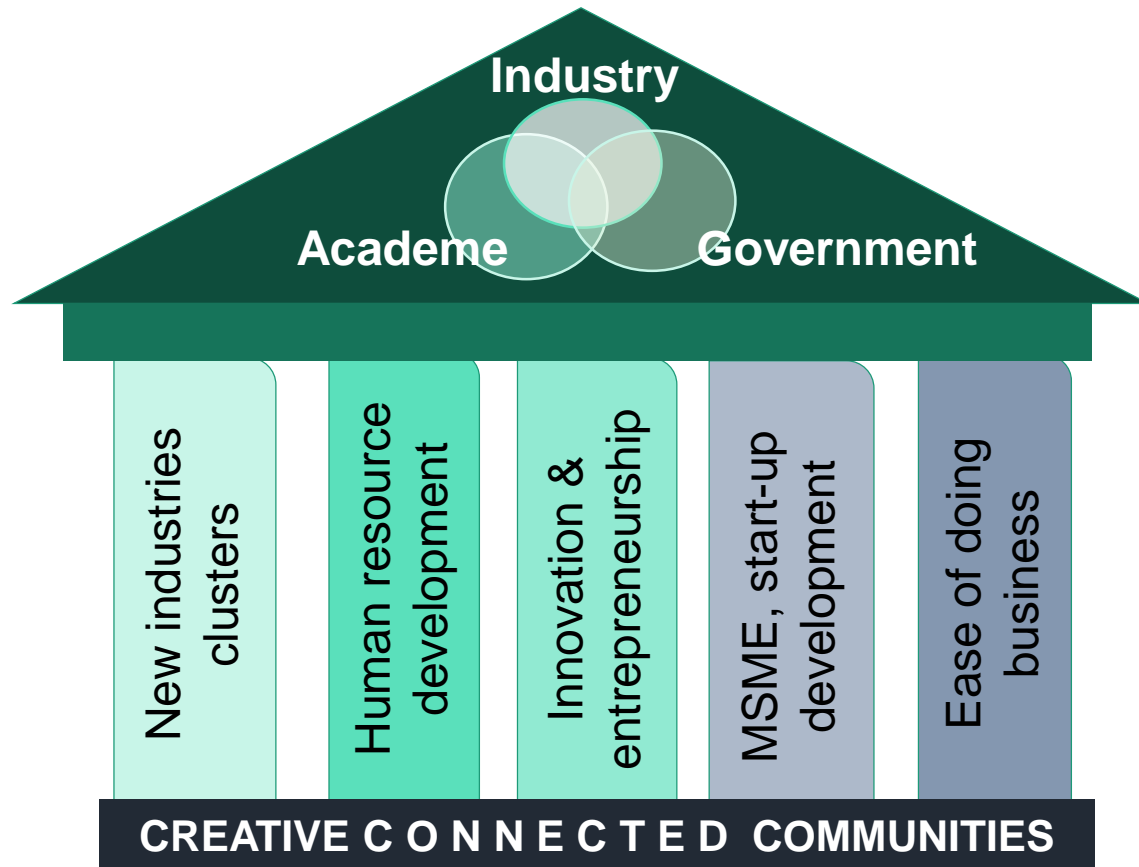
PH: considered a “Legacy Country”, strong production base but low level of readiness for future production, at risk

Weak institutional framework, human capital, technology & innovation (WEF 2018)

Upgrade technology platform, reskill/up- skill workers

Innovation: animating force behind the future of production

New Industrial Strategy is innovation-centered

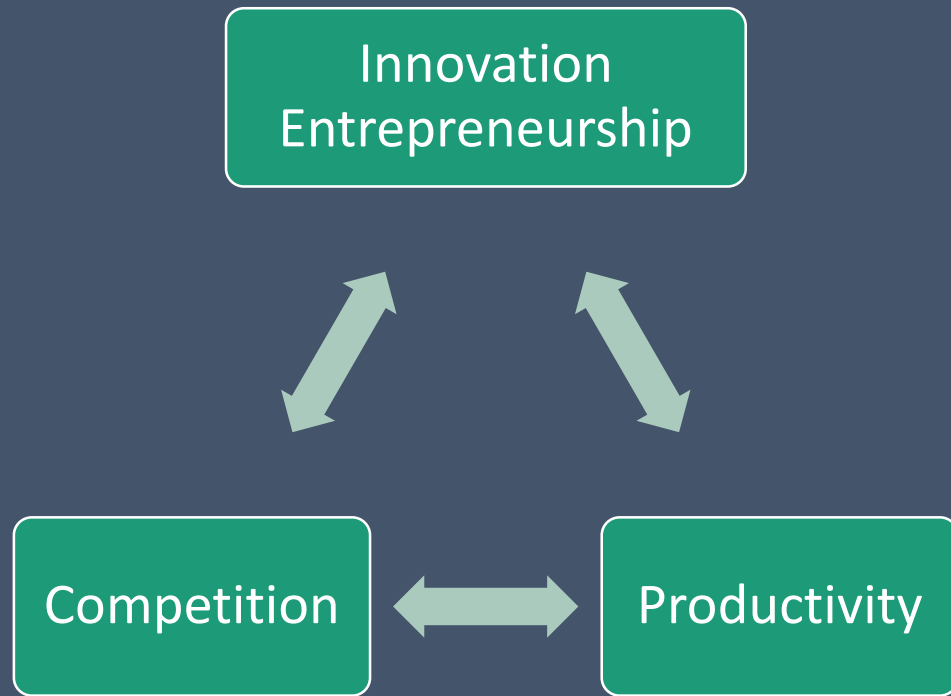


i³S Major Pillars



i³S Major Goals

Innovation is at the front & center of our new industrial policy



Underlying Framework of PH industrial strategy
COMPETITION- INNOVATION-PRODUCTIVITY NEXUS



Global Innovation Index 2018

ASEAN

5. Singapore
35. Malaysia
45. Viet Nam
44. Thailand
57. India
- 73. Philippines**
85. Indonesia

PH scored lowest

- **Creative outputs:** intangible assets, creative goods & services
- **Human capital:** education, R&D spend

- **Market sophistication:** ease of getting credit, ease of protecting minority investors, venture capital deals
- **Innovation linkages, ICT infrastructure**

PROBLEM: WEAK state of innovation ecosystem

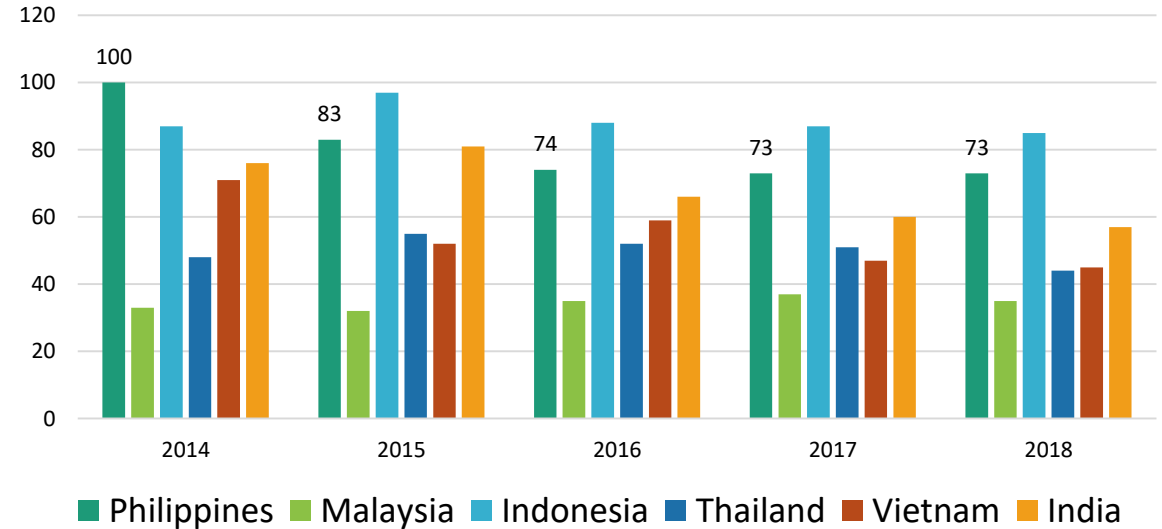
STRENGTHS

graduates in science & engineering (#17)
gross capital formation, % of GDP (#32)
market capitalization, % of GDP (#17)
trade, competition & market scale (#30)
firms offering formal training (#9)
research talent (#7)
Trade, competition & scale (#30)
high & medium high-tech manufactures (#27)
ICT services exports (#8)

WEAKNESSES

political stability and safety (#117)
ease of starting a business (#121)
expenditure on education, % of GDP (#109)
pupil-teacher ratio, secondary (#95)
ease of getting credit (#111)
ease of protecting minority investors (#112)

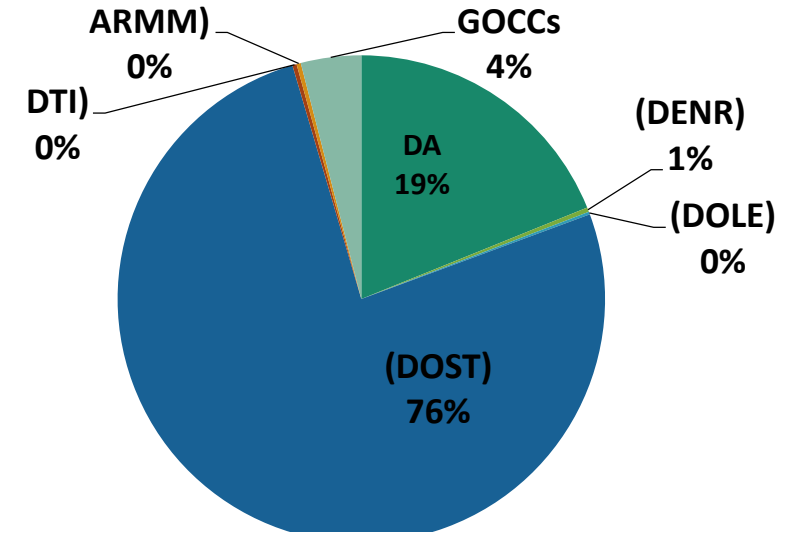
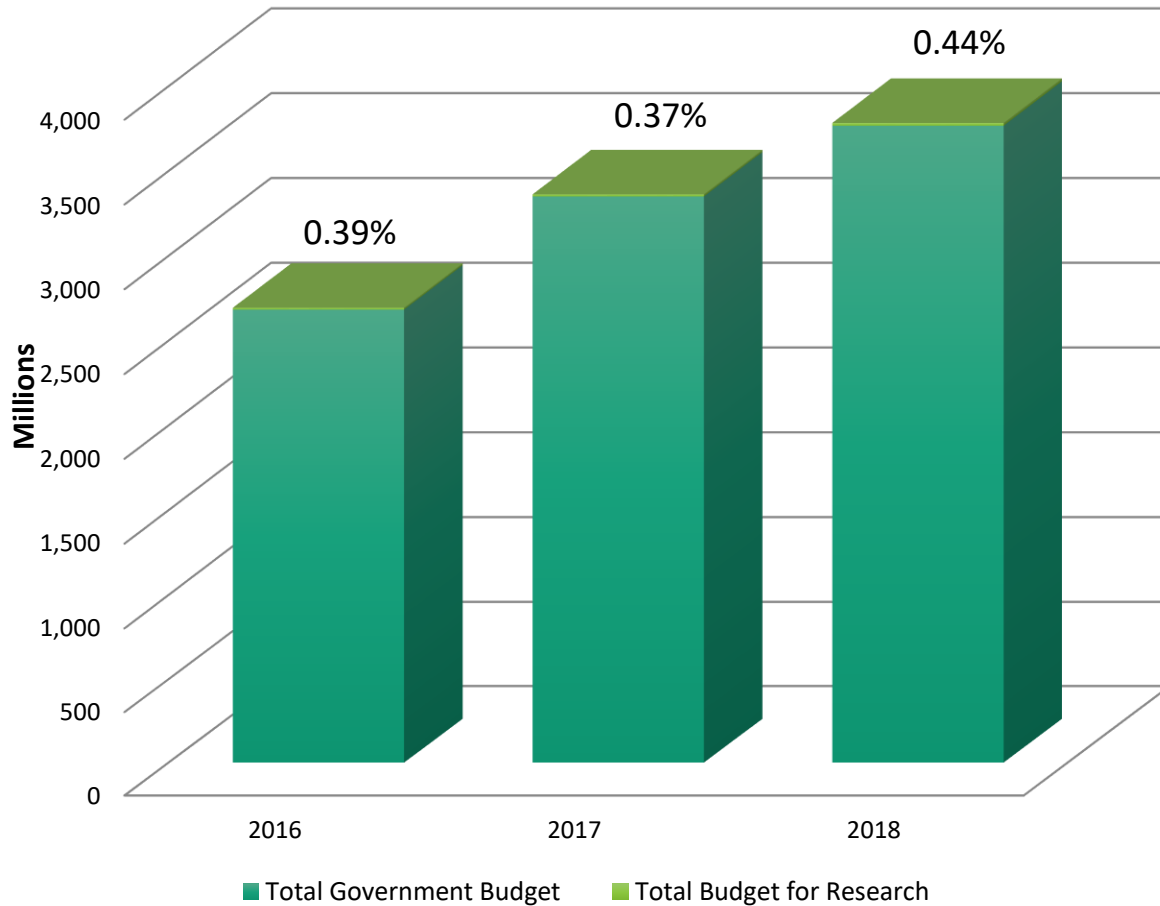
Global Innovation Index Rankings 2014-2018



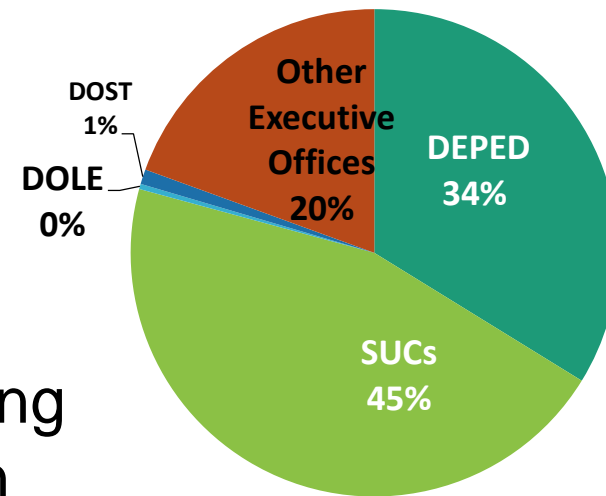
WEAKNESSES

science & technical articles (#120)
Institutions (#93)
Market sophistication (#100)
Creative outputs (#92)
ICT access (#86)
ICT use (#83)
Innovation linkages (#93)

Low Government Research Budget



R&D Economic Affairs 2018

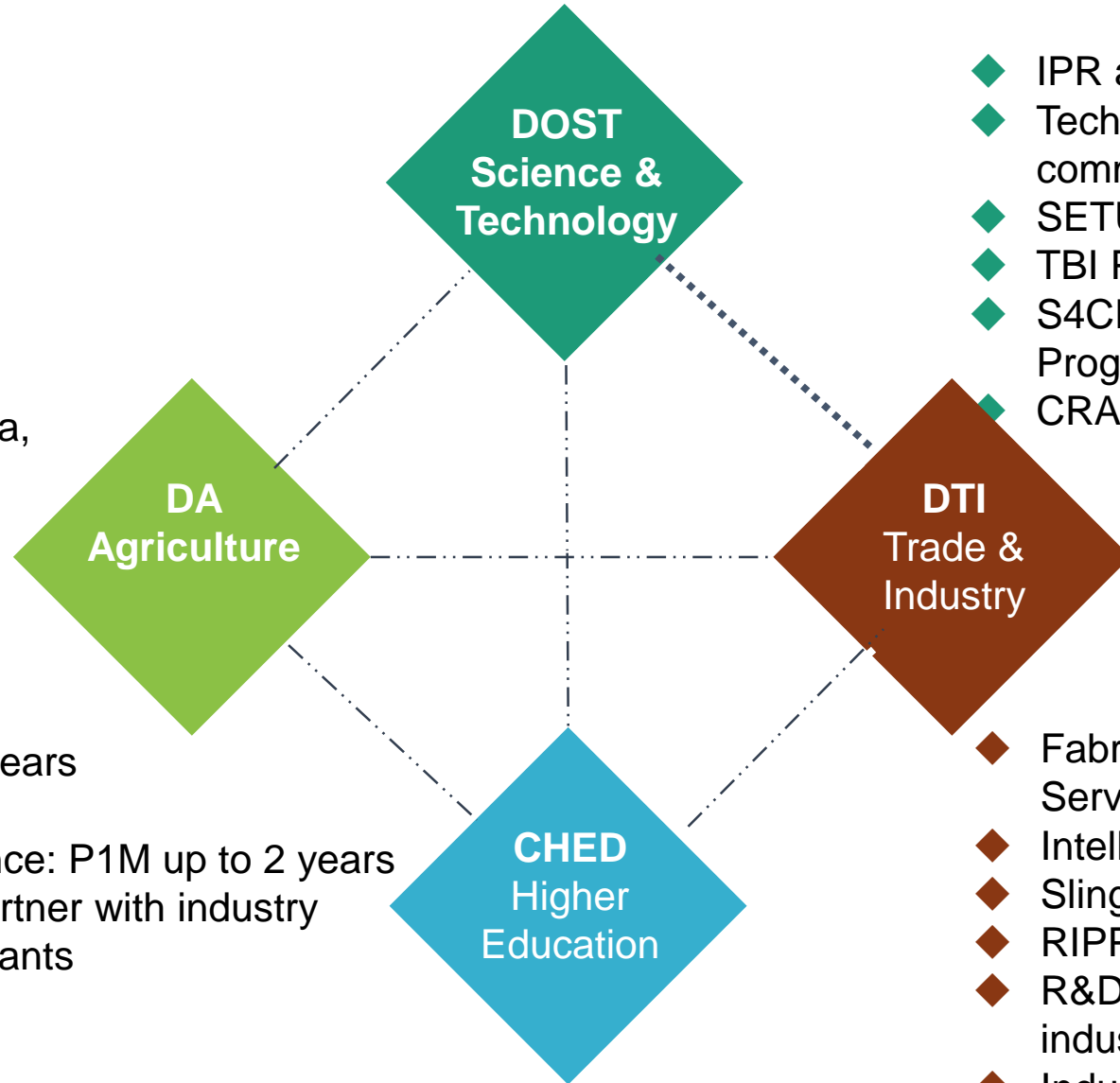


R&D Education 2018

Positive momentum, university capacity, existing Government support for research & innovation

Limited coordination among research-granting agencies

- ◆ Community-based participatory action research (CPAR)
- ◆ National Technology Commercialization Program (NTCP)
- ◆ National Commodity Programs: rice, corn, cassava, HVCs
- ◆ National thematic programs: organic agriculture, climate change, biotechnology



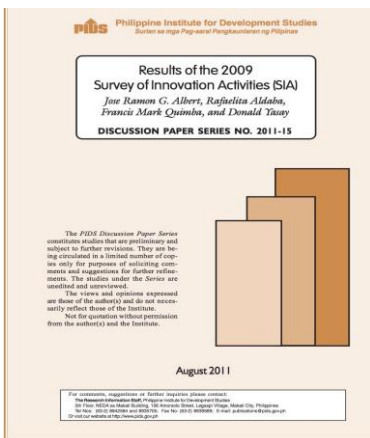
- ◆ IPR assistance thru TAPI
- ◆ Technicom: technology innovation for commercialization
- ◆ SETUP
- ◆ TBI Program: diffusion of technology
- ◆ S4CP: NICER, R&D Leadership Program
- ◆ CRADLE, BIST

..... **with MOU**
 -.-.-.- **limited coordination**

- ◆ Block Grants: P10M up to 2 years
- ◆ Regular GIA: P500-P10M
- ◆ Frontiers in research excellence: P1M up to 2 years
- ◆ Industry 4.0 grants: HEI to partner with industry
- ◆ International Collaborative Grants
- ◆ Masters or Doctoral Theses
- ◆ REALM: capacity building

- ◆ Fabrication Laboratories, Shared Services Facilities, Negosyo Centers
- ◆ Intellectual Property Protection
- ◆ Slingshot, Funding: SBCorp
- ◆ RIPPLES
- ◆ R&D incentives & incentives for new industries, technologies
- ◆ Industry development & roadmaps

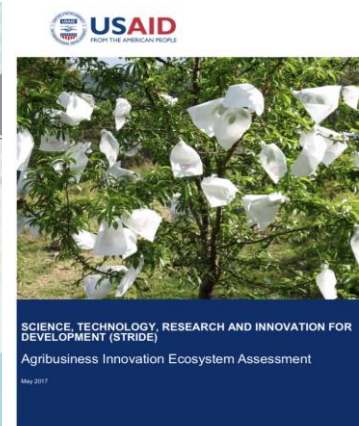
Weak linkage between industry & academe



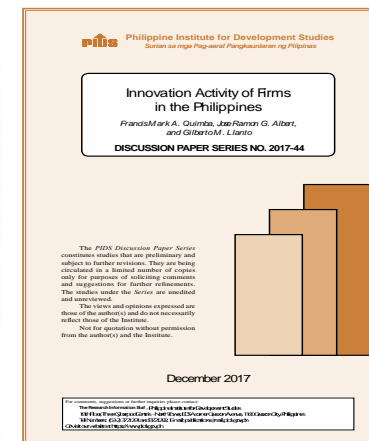
2011



2014



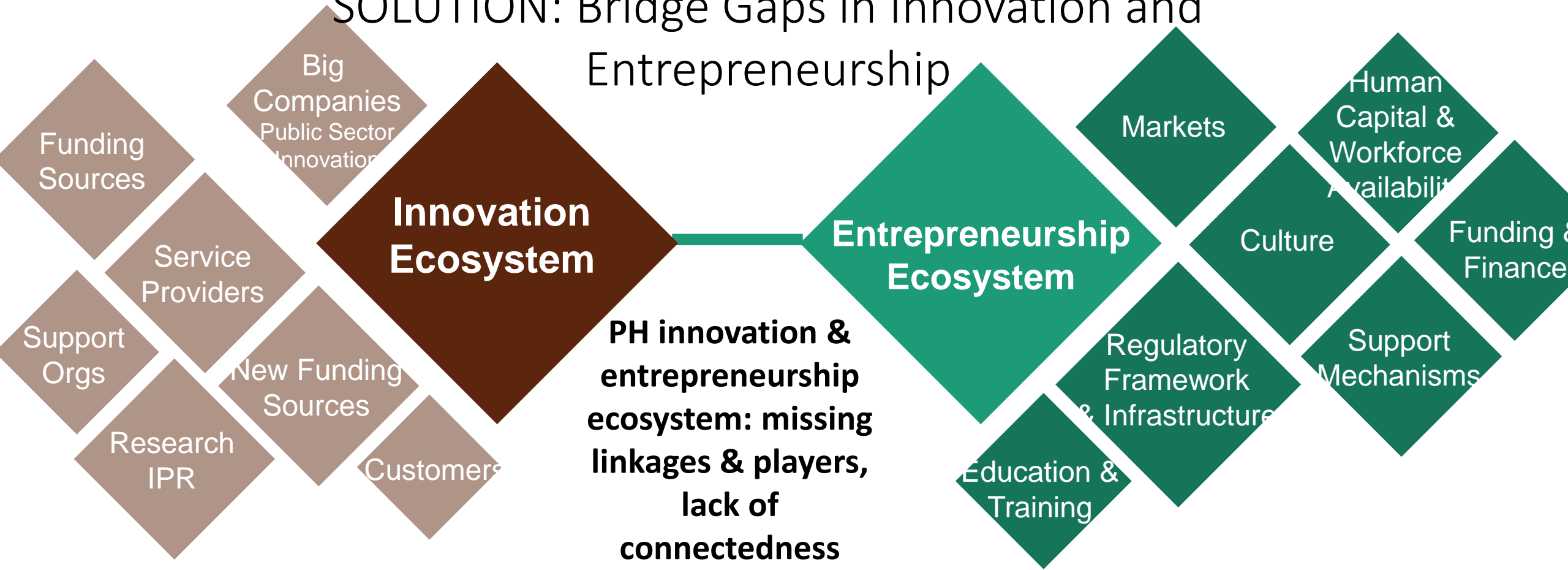
2017



- Low GERD due to limited resources
- 42.9% of surveyed firms are innovation active
- Lack of appropriate incentives to produce competitive & relevant research at universities
- Widespread mistrust between university & industry communities, more competition than collaboration
- Lack of strong culture of research in universities

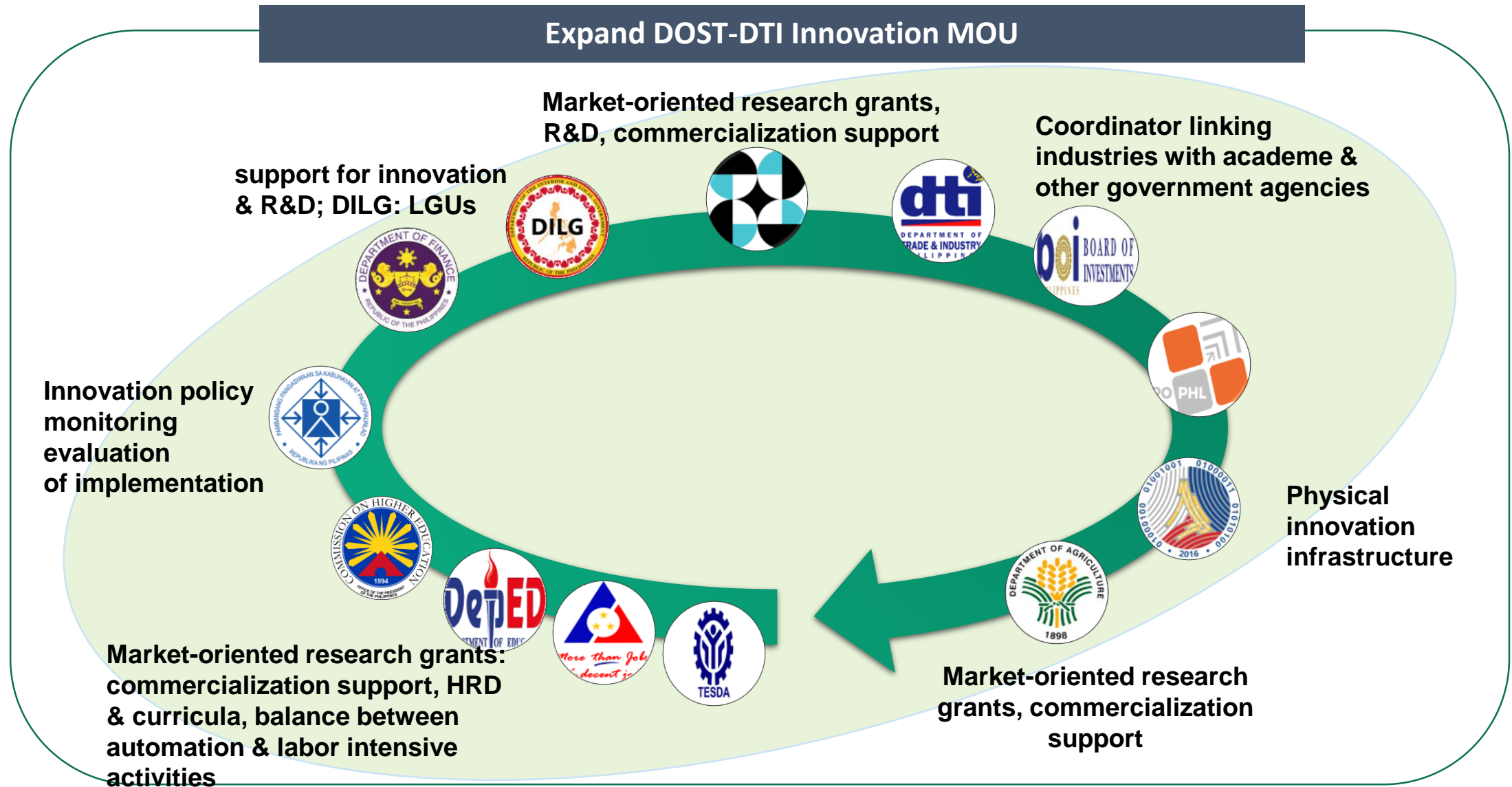
- Open innovation exist in the supply chain but not with academe
- Lack of STEM-oriented PhD programs, limited post-doctoral research training
- No critical mass in terms of volume of research
- Difficulties in procurement laws

SOLUTION: Bridge Gaps in Innovation and Entrepreneurship

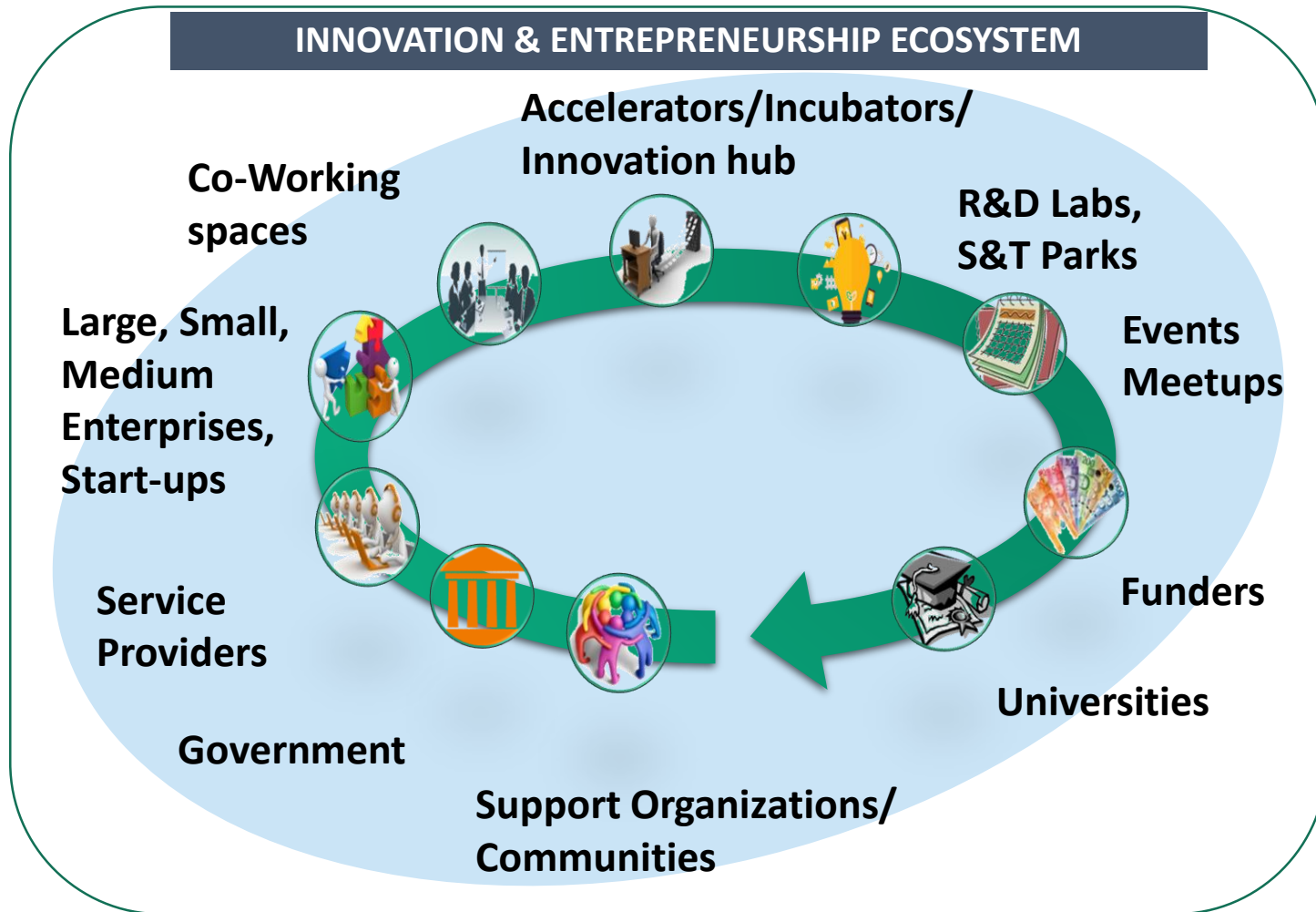


- ◆ **Strong collaboration among government, academe, industry** → **connected country**
 - ◆ **Strong business & policy environment** → **sustainable growth**
 - ◆ **Creative talent pool: critical mass**
- poverty reduction**

To promote collaboration & closer coordination within government



Regional Inclusive Innovation Centers (RIIC)



- RIICs: cornerstone of i3S, lie at the heart of our economic transformation
 - Bridge gap between industry & academe
 - Create regional ecosystem: **virtual & physical** made up of universities, R&D labs, S&T parks, incubators, fab labs, co-working spaces, investors, & LGUs, start-ups, SMEs, LEs
- Innovation focus on electronics, auto, aerospace, chemicals, IT-BPM, agribusiness

Upgrading Trajectories for Priority Industries

R&D, IC design, facilities for advanced products & technologies (IoT, robotics, drones, AR, cognitive cloud, 3D printing), auto electronics (GPS, infotainment, wireless communication modules, telematics, autonomous vehicle sensors, VR systems, onboard computers, microprocessors), aerospace electronics, batteries, consumer electronics

ESO, data analytics, legal process outsourcing, health information management (preventive health, remote), animation & game development, IT services, global-in-house, services embedded in manufacturing (R&D, design)



Agribusiness

mangoes, bananas, nuts, coffee, cacao, coconut, & other high value crops



IT-BPM



Aerospace parts



Automotive



Electronics & electrical

Auto electronics, ADAS components, engineering services outsourcing, R&D, sensors, electric motor powertrains like battery, EV, metal casting, machining, forging

Flight control actuation systems, servo actuators, servo valves, galley inserts, structures & equipment, seat parts, lavatories, interior fit-out, panel assembly, electronics, airframes & sub-assemblies; MRO: base & line maintenance



Upgrading Trajectories for Priority Industries

Industry Upgrading Short to Medium-run

- Close supply/value chain gaps
 - Auto: metal casting, forging, machining
 - High value added parts: Auto electronics, ESO, R&D, sensors, ADAS
- Accumulation of labor-intensive industries
- Products with good balance of semi-automation & labor-intensive work
 - Assembly & mid-inspection require labor-intensive work



Chemicals

Petrochemicals, oleo chemicals, basic chemicals, plastics



Parts & Components

intermediate parts & components supply especially by SMEs



Iron & steel

Integrated steel manufacturing



Shipbuilding

RORO as well as small- & medium-sized vessels



Furniture, garments

Manufacturing & design



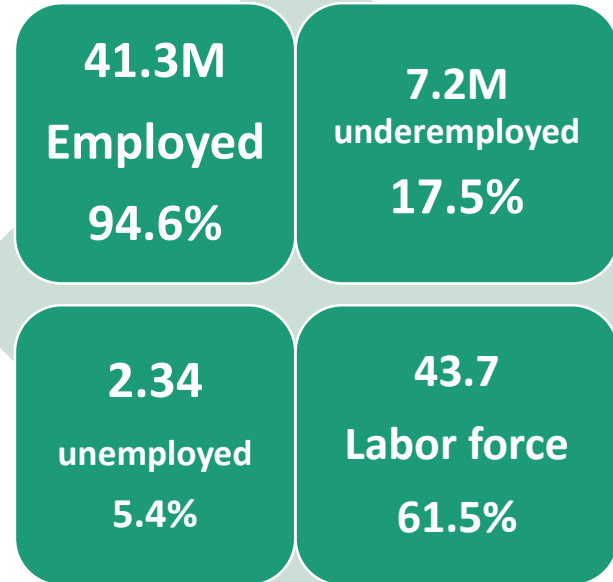
**Construction
Transport,
Logistics**

Mass housing, land, air, & water transport, airports & seaports

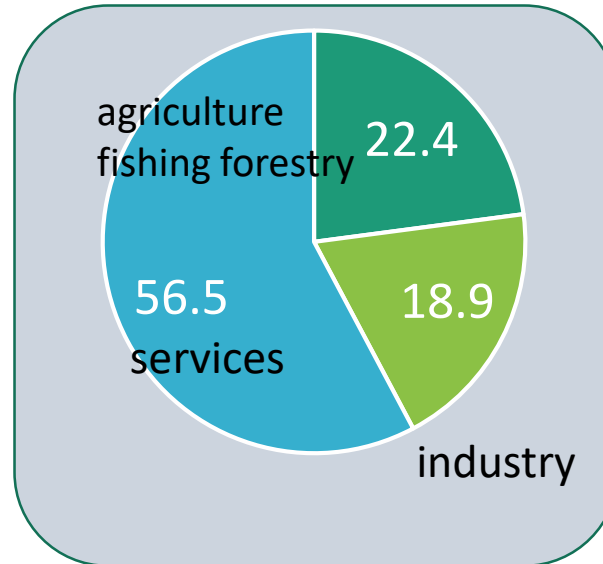


Find the right balance between skills & technologies

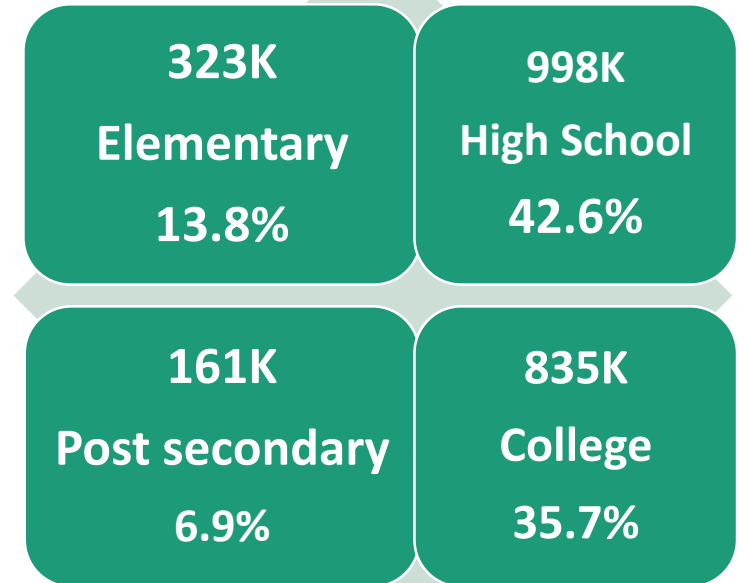
Labor & Employment Profile



Structure of Employment



Characteristics of the Unemployed



Skilled workers: 30M, 73% of total
Unskilled: 11M, 27%

Skilled: Managers 16%, service & sales 15%, skilled agricultural 13%, craft & related traders 8%, plant & machine operators, assemblers 6%

STEM graduates declined from 235K (37%) in 2015 to 214K (30%) in 2017

Business Administration & Education & teacher training graduates increased from 296K (47%) to 341K (49%)



i3S is vital for sustainable & inclusive development

Transforming the Philippine Economy in the New Digital Age



- **PH industrial policy is innovation-focused**

- Link Manufacturing with Agriculture & Services
- Productivity leads to inclusive & sustainable growth
- Innovation crucial to productivity



- **Innovation & Entrepreneurship strategy**

- Creative, connected communities
- Government-academe-industry: basic & applied research providing solutions to societal issues & industry needs



- **Regional inclusive innovation centers**

- Bridge gap between innovation & entrepreneurship
- No one size fits all approach: regional/local conditions
- Industry clusters, strong business environment: jobs, investments, poverty reduction



i3S Transforming the Philippine Economy in the New Digital Age

Propel Jobs, Investments, Shared Prosperity for all

- Human capital is crucial for innovation & entrepreneurship
- knowledge production, technology adoption, productivity growth

- Educational system to produce the quality of human capital that can advance innovation & entrepreneurship
- basic, secondary, tertiary: values, skills & competencies

- Government-Industry-Education collaboration: policies & training programs that are more responsive to the fast changing dynamics of industry & avoid mismatch between technology & skills

- Low-skilled, low-educated & routinized jobs are the most vulnerable to the adverse effect of technological change

- Provide safety nets through innovation & R&D with education and training

- Secure “PH Industry 4.0 Innovation Program” budget
- Relax regulations on procurement, restrictions on employment of foreigners & other innovation-related services

