

# Policy Briefs

Series No. 2018-04



## *The Philippines' Innovation Efforts: Department of Trade and Industry Perspective*

### **I. Introduction**

The Philippines recognizes the role of innovation in sustaining economic growth and uplifting the quality of life of its citizens. Several government initiatives such as the Philippine Development Plan (PDP) 2017-2022, Republic Act 10005 (Technology Transfer Act of 2009) and the 2017 Investments Priorities Plan (IPP), among others, demonstrate efforts in building the inclusive innovation system of the country.

Consistent with national objectives, the Department of Trade and Industry (DTI) has similarly placed innovation at the core of its Comprehensive National Industrial Strategy (CNIS). The CNIS primarily aims to integrate the manufacturing, agriculture, and services sectors to address supply chain gaps, and to enhance the country's participation in global value chains (Department of Trade and Industry, 2012). Overall, the DTI seeks to take advantage of the opportunities brought about by new technologies, information and knowledge, by enhancing the country's innovation capacity and raising efficiency and productivity of micro, small and medium enterprises (MSMEs).

Additionally, the DTI has embarked on pursuing an innovation policy called the Inclusive Innovation Industrial Strategy (i3S). The goal of the i3S is to develop innovative and globally competitive industries with strong linkages to domestic and global value chains. This innovation policy prioritizes 12 sectors namely aerospace; agribusiness; auto & auto parts; chemicals; construction; electrical & electronics; furniture, garments & creatives; Information Technology - Business Processing Management (IT-BPM) & e-commerce; shipbuilding & roll-on roll-off (RORO); tool & die iron & steel; transport & logistics; and tourism.

#### **Industry 4.0**

Advanced technology such as autonomous robots, augmented reality, internet of things (IoT), cloud computing, among others; have begun to alter the norms and processes across industries around the world. These changes characterize the Fourth Industrial Revolution or Industry 4.0. Prior to Industry 4.0, three other industrial revolutions significantly changed the way people and organizations work.

► *Advancement in technology ... have begun to alter the norms and process across industries around the world.*

The introduction of steam- and water-powered mechanical equipment in the 18th century marked the first industrial revolution. By the first half of the 19th century, electrical energy was discovered and utilized for mass production, denoting the second industrial revolution. Meanwhile, the use of electronics and information technology has led to automation of production in various sectors and industries during the third industrial revolution. Today, cyber physical systems drive the activities of manufacturers, automotive makers, logistics, technology, and other businesses. This marks the beginning of the Industry 4.0 era. It remains to be seen however, if industry 4.0 will be fully realized as many enterprises such as the MSMEs, as well as industries are just beginning to benefit from the changes introduced in the third industrial revolution. In fact, some businesses are still transitioning from the second to the third industrial revolution era.

There are valid concerns regarding the threats that come with the transition to Industry 4.0, especially in the areas of data security, intellectual property, fear for human employment and infrastructure need, among others. However, the imminent change is also accompanied by some opportunities that would benefit businesses in the long-run. Largely, investments spent in shifting to industry 4.0 can result to less material wastes and quality issues, more efficient use of human resources and reduced overhead costs. Industry 4.0 will also enable faster, data-enabled decisions that will ultimately improve the way businesses work. In addition, industry 4.0-enable processes will provide opportunities for companies to utilize wide-range information about the customers such as product use, behaviour, interaction, complaints, issues, and other feedbacks. The end result would be overall productivity and efficiency of business processes.

## II. State of Philippine Innovation

The Organisation for Economic Cooperation and Development (OECD) has defined innovation as “*the implementation of a new or significantly improved product (goods or services) or process, a new marketing method, or a new organizational method in business practices, workplace organizations or external relations*” (OECD, 2005). In recognition of its importance in driving economic growth; most countries include fostering innovation as a priority goal. Economies that promote innovation have enormous advantages in addressing global challenges, sustainability issues, market uncertainties, productivity and business constraints, as well as development concerns.

Like most countries, the Philippines is challenged to create an enabling environment that will allow multiple stakeholders including industries, MSMEs, the academe, and even the government to successfully pursue innovative efforts. The 2017 Global Innovation Index Report shows that the Philippines ranked 73rd out of 127 economies. Despite being far behind ASEAN neighbours like Singapore (7th), Malaysia (37th), Vietnam (47th) and Thailand (51st), the country’s performance has gradually improved over the past four years. In 2014, the Philippines was at the 100th position; improving to the 83rd position in 2016 and finally, reaching the 73rd position in 2017.

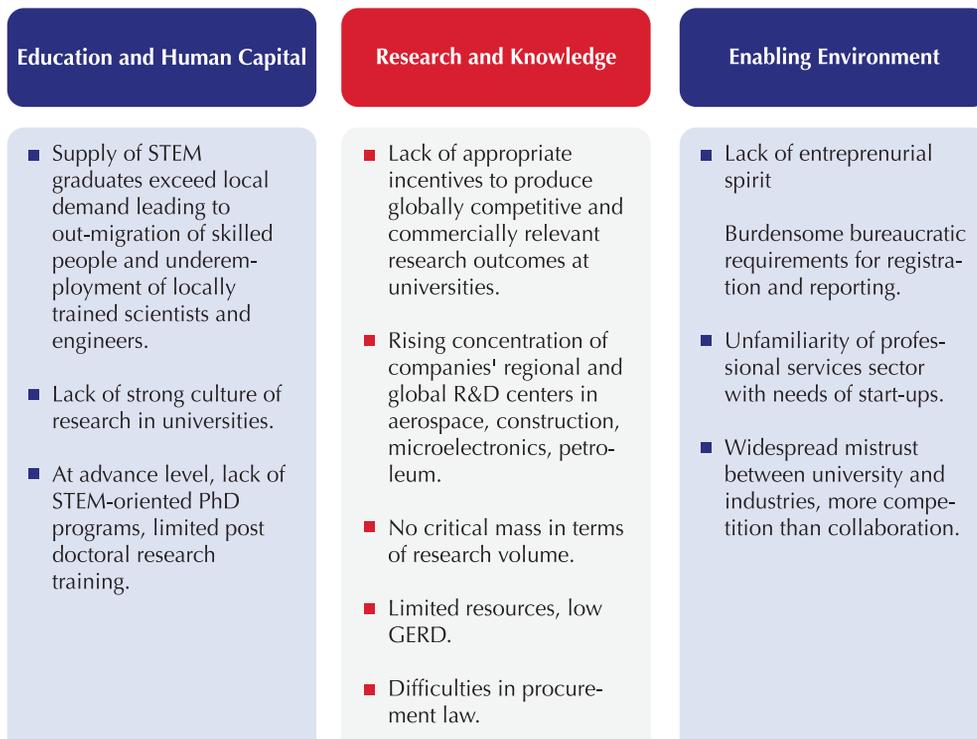
The country’s performance is relatively better in some sub-indexes namely: Knowledge & Technology Outputs at the 42nd position and Business Sophistication at the 45th position. However, it also ranked low in the following sub-indexes: Institutions (89th), Market Sophistication (92nd), Creative Outputs (94th) and Human Capital & Research (95th). Lastly, the Philippines ranked 72nd in terms of the infrastructure sub-index.

▶ Today, cyber physical systems drive the activities of manufacturers, automotive makers, logistics, technology, and other businesses ... [that] marks the beginning of the Industry 4.0 era.

**Assessment of the Philippine Innovation System**

An assessment of the Philippine Innovation Ecosystem by the United States Agency for International Development - Science, Technology, Research and Innovation for Development (USAID-STRIDE) in 2015 reveals three major factors affecting the country’s innovation activities. These factors include: (1) Education and Human Capital, (2) Research & Knowledge Creation, and (3) Enabling Environment. The assessment suggested that the issues faced relative to these factors must be addressed to increase innovation-related activities in the Philippines. Likewise, it showed that even with the increase in new technologies and knowledge, innovation occurs only among large enterprises and multi-national companies; mostly in a very limited number of industries. The USAID-STRIDE’s assessment for each major factor is summarized in Figure 1 below.

▶ *The assessment suggested that the issues faced relative to these factors [Education and Human Capital, Research and Knowledge and Enabling Environment] must be addressed to increase innovation-related activities in the Philippines*



**Figure 1. Assessment of the Philippine Innovation Ecosystem**

**Company Level Innovation**

A recent study (Albert et al., 2017) reveals that less than half (42.9%) of firms surveyed in the country are innovation-active in 2015. The survey included 891 firms from food manufacturing, other manufacturing, Information and Communications Technology (ICT), and Business Process Outsourcing (BPO) industries. Findings of the study indicate that innovation occurs more in the ICT industry, with 57% of firms appear to be innovation-active. In addition, large firms (almost 2/3) are more innovation-active than MSMEs. These large enterprises are found to spend a total of PHP30 million on innovation-related activities; this value is ten times the average spending of the rest of the firms covered in the survey. In comparison, those in the BPO/BPM industry spend the most at PHP12.5 Million, followed by other manufacturing industries (PHP4.2 Million), ICT industry (PHP3.7 Million), and food manufacturing (PHP900,000).

It was also found that both large companies and MSMEs engage in several innovation-related activities. Approximately half of the companies cited training

programs as their innovation activity (56%) while acquisition of machinery, equipment, and software was cited by the other half. Around forty-six percent (46%) of the companies surveyed conduct in-house R&D activities.

Finally, there appears to be very little awareness on the government's innovation policy and programs. Based on the survey results, only 20% of the firms said they are aware of it while 3% have availed of financial support for innovation.

Three drivers of innovation were identified from the survey:

**1. Knowledge management.** Firms that have such practice are likely to conduct product and process innovation.

**2. Human resources.** Firms with at least 20 percent of its employees having post-baccalaureate degrees are likely to innovate.

**3. Gross sales.** Firms with higher gross sales are likely to innovate.

In terms of barriers to innovation, cost is the most cited factor. Large enterprises mentioned that innovation costs are way too high. MSMEs on the other hand, shared that they lack the funds for innovation. Another barrier cited is the knowledge/market factor. MSMEs explained that they do not have qualified human resources that are able to perform innovation-related activities. Conversely, some firms reported that they found difficulty in innovating because the market is already dominated by established enterprises.

### III. Building an Inclusive Innovation and Entrepreneurship Ecosystem

The DTI organized four conferences aimed to contribute to the growth and advancement of innovation in the country. The *Manufacturing Summit*, held in November 2016, was the first of a series of forums the DTI organized. During the summit, stakeholders from the government, academe, and industries (Innovative Industries Group) recommended the need to work towards: (a) fostering a dynamic innovation ecosystem; (b) promoting collaborative agreements among industries, government, and academe in support of advanced manufacturing; (c) providing incentives for innovative research and development (R&D) and purchase of equipment for advanced manufacturing; (d) pursuing market-driven research guided by Philippine innovation rankings; and (e) forging technical collaboration among foreign and local industries.

Following this successful summit, the DTI convened the Inclusive Innovation Conference to explore and discuss ways to encourage innovation across the country and maximize the opportunities presented by Industry 4.0. The conference culminated with the DTI and Department of Science and Technology (DOST) signing a Memorandum of Understanding (MOU) to further pursue dialogues on inclusive innovation.

A Round Table Discussion (RTD) on Developing an Innovation-Driven Economy for MSMEs was convened to prepare for the 2017 ASEAN MSME Development Summit where three (3) recommendations were endorsed: (1) nurture an innovative and entrepreneurial culture among Filipinos through the Philippine education system; (2) establish innovation hubs near universities or within industry clusters; and (3) implement meaningful mentoring for MSMEs.

► ... the DTI convened the Inclusive Innovation Conference to explore and discuss ways to encourage innovation across the country and maximize the opportunities presented by Industry 4.0.

Gearing Up the Regions for Industry 4.0 was a series of regional inclusive innovation conference to determine stakeholder perception and understanding of the current innovation landscape, as well as stakeholder needs and recommendations to drive inclusive innovation across the country.

Five (5) regional inclusive innovation conference were also held from 15 August 2017 to 13 December 2017, covering the islands of Luzon, Visayas and Mindano. The consultative process involved three (3) major steps - Needs Identification, Needs Analysis and Prioritization, and Action Planning – integrated into workshop sessions or break-out group exercises to gather inputs on what the participants consider as imperatives to strengthen innovation in the Philippines.

The DTI adopted the USAID-STRIDE’s Philippine Industry Innovation Needs Assessment framework in collecting and analyzing stakeholder inputs. The framework’s four pillars are: (1) increase R&D in the Philippines and with foreign partners; (2) improve/ Bolster local supply chain and stop the import-export-import cycle; (3) increase shared R&D infrastructure, only if there is a direct link to use by both the academe and industries; and (4) improve workforce for innovation.



**Figure 2. The Road to Building an Inclusive Innovation and Entrepreneurship Ecosystem**

**Highlights of the Regional Inclusive Innovation Conference**

Leaders from the private sector, government and academe underscored the role of innovation to support the growth and competitiveness of Filipino companies amid global competition. Industries were enjoined to pursue innovation at various levels – firm level to product development, and in the overall process of doing business i.e., shift from traditional marketing strategies to modern platforms, use of social media, etc.

Business associations in the technology industry consider the country’s human capital as its foremost strength in an innovation-led economy. The Philippines has a 96.3% literacy rate, a young population, and strong global presence. With Industry 4.0 and the country’s shift to electronic manufacturing services, there is a wide perception that opportunities are available for Philippine industries to accelerate towards more innovation.

Recommendations from the private sector include developing programs to move people in manual labor towards jobs requiring support, development, and hardware and software maintenance. On the other hand, the private sector

**▶ Business associations in the technology industry consider the country’s human capital as its foremost strength in an innovation-led economy.**

has volunteered to contribute its expertise and inherent knowledge of market/customer needs and industry trends for the academe to map out succeeding studies and R&Ds, and to provide inputs for the government as it develops roadmaps and initiates policies toward industry development and innovation.

While government's role is to craft policies that will strategically direct the Philippine inclusive innovation roadmap, it is also expected to initiate, drive, implement, and fund various projects that will help stakeholders, especially MSMEs, become more innovative. Government reiterated its commitment that innovation is at the "heart of the government's industrialization strategy" and is central in achieving competitiveness and maximizing Industry 4.0 opportunities. Given this goal, the DTI's Inclusive Innovation and Entrepreneurship Roadmap seeks to develop innovation policies that would create opportunities for sustained and inclusive growth.

With the academe serving as the source of knowledge and implementers of R&D, collaboration between Higher Educational Institutions (HEIs) and industries is imperative, particularly in the conduct of R&D, innovation, and expansion. Members of the academe recommended the adoption of "Work Integrated Learning," which refers to increased exposure of students in enterprises/industries during internship, faculty immersion in industries, university-industry collaboration, and research contracts with industries, among others.

Key findings from the regional inclusive innovation conference summarize the challenges the country faces in terms of innovation. These include the need to increase MSME (particularly for start-ups) access to funds and risk capital, skills mismatch between industry and the Filipino workforce, unresponsive government policies, low translation rate of R&D activities into commercialization, and the need to strengthen the country's intellectual property regime.

### **Main Findings Regional Inclusive Innovation Conference**

#### **1. The Philippine innovation landscape is gradually improving but a lot of work remains to be done.**

As previously mentioned, the Philippines' ranking in the Global Innovation Index has been gradually improving from 2014 to 2016. Moreover, the USAID-STRIDE Program has put forward the agreement of stakeholders across industries - particularly aerospace, automotive, and electronics & semiconductors - on the need to address several concerns and hindrances to becoming more innovative. Major constraints in pursuing innovation in the Philippines include the lack of funding, lack of a culture of innovation and entrepreneurship among Filipinos, MSMEs' low awareness, limited access to and utilization of, government innovations programs and assistance, lack of trust among academe, industries, and government, among others.

#### **2. Most Filipino MSMEs are yet to be industry 4.0-ready.**

Majority of Philippine enterprises, most of which are MSMEs, are neither aware nor ready for Industry 4.0. Most are still transitioning from Industry 2.0 to Industry 3.0 since they are only beginning to automate their production and business processes. There is also a need for government personnel, including those maintaining shared services facilities (SSFs), to facilitate better understanding of Industry 4.0 and use this knowledge to train MSMEs in building their capacities; in light of maximizing the opportunities from Industry 4.0.

▶ *Government reiterates its commitment that innovation is at the "heart of the government's industrialization strategy" and is central in achieving competitiveness and maximizing the Industry 4.0 opportunities.*

**3. Stakeholders consider capability building as a priority in driving innovation.**

Stakeholders agree that various capability building programs must be implemented to help MSMEs, government personnel, academicians, other institutions and individuals become more innovative. These include training courses in local supply chain management, digital and online marketing, use of new technologies, intellectual property, etc. Mentoring courses have also been recommended, encouraging large enterprises to mentor, guide and support MSMEs.

More importantly, schools are considered training grounds to develop an innovative and entrepreneurial culture among Filipinos. Suggested priority intervention in education includes the integration of innovation and entrepreneurship courses, activities, and methods in the curriculum.

**4. Stakeholders agree that shared services infrastructure, particularly innovation hubs or centers, are needed to accelerate R&D and innovation in the Philippines**

Most of the proposed projects or action plans are focused on the need to establish innovation hubs and centers through tri-partite collaborations among the academe, government, and industries. Given the high costs to procure, access, use, and maintain equipment and facilities needed for innovation activities, it was agreed that authorities must work together to establish more innovation centers that will run R&D activities across the entire value chain – from materials experimentation to product development, testing, production, commercialization, etc. Moreover, it was suggested that these innovation centers be located inside the universities.

**5. Higher educational institutions (HEIs) have to go beyond being mere “teaching universities”**

Higher education institutions (HEIs) in the Philippines could significantly contribute to driving innovation by conducting (a) research that help generate ideas for designs, products, and new processes; (b) trainings for the current and future workforce of R&D, and science and technology; and, (c) collaborations with industries and the government that will enable innovation.

Representatives from the academe highlighted the academe’s expanding role - beyond teaching and passing on knowledge - and acknowledged that HEIs and faculty members must escalate efforts to foster more R&D and innovation inside and outside the campus.

HEIs are also being challenged to transition from “teaching” and/or “research universities” to becoming “entrepreneurial universities.” This means that the role of HEIs will include leading R&D initiatives, being sources of knowledge leading to product and services development, becoming partners for innovation projects, and establishing innovation hubs to spur technology-based start-ups.

**6. Collaboration among the government, industry, and academe is essential in cultivating an innovation and entrepreneurship ecosystem in the Philippines.**

Finally, cutting across all proposed action plans is the need for increased and meaningful collaboration among government, industry, and academe as co-champions/co-project proponents. While it is recognized that each sector plays a specific role in achieving the country’s desired innovation and entrepreneurship ecosystem, collaboration among these three institutions will ensure a healthy and thriving innovative and entrepreneurial environment.

▶ Most of the proposed projects or action plans are focused on the need to establish innovation hubs and centers through the tri-partite collaborations among the academe, government and industries.

## References

Albert, Jose Ramon G., Quimba, Francis Mark A., Serafica, Ramonette B., Llanto, Gilberto M, Vizmanos, Jana Flor V., and Bairan, Jose Carlos Alexis C. (2017). Measuring and Examining Innovation in Philippine Business and Industry. PIDS Discussion Paper Series 2017-28. Philippine Institute for Development Studies: Quezon City.

DEPARTMENT OF TRADE AND INDUSTRY

# Policy Briefs

Series No. 2018-04



 [www.dti.gov.ph](http://www.dti.gov.ph)  [DTI.Philippines](https://www.facebook.com/DTI.Philippines)  [@DTIPhilippines](https://twitter.com/DTIPhilippines)  [@DTI.Philippines](https://www.instagram.com/DTI.Philippines)  [DTIPhilippines](https://www.youtube.com/DTIPhilippines)

This policy brief was prepared by the Bureau of Trade and Industrial Policy Research of the Department of Trade and Industry. The can be downloaded at [www.industry.gov.ph](http://www.industry.gov.ph).

The views and opinions expressed in this policy brief are of the author/s and do not necessarily reflect Philippine government policy.

The DTI Policy Briefs is a series publication published by the Department of Trade and Industry – Bureau of Trade and Industrial Policy Research (BTIPR), with email address at [BTIPR@dti.gov.ph](mailto:BTIPR@dti.gov.ph).