Institute of Policy Studies

IPS Corporate Associates Lunch: "A*STAR, Driving Innovation and Being Future-Ready"

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On 26 August 2016, Dr Raj Thampuran, Managing Director of A*STAR (Agency for Science, Technology and Research), spoke to IPS Corporate Associates on research and innovation trends in Singapore.

Helming A*STAR since 2012, Dr Thampuran has spearheaded efforts to develop the research blueprint for Singapore's Science and Technology 2015 Plan.

At the lunch, Dr Thampuran described some global megatrends that are expected to generate challenges and opportunities in Singapore's innovation landscape. These include the rise of the digital world, mass customisation, population booms and urbanisation, resource scarcity, ageing, rising global mobility and the growth of the Asian middle class. With increased consumption in Asia, there will be a need for companies to conduct research here on the phenotypes and preferences of Asians.

Speaking on the rise of the digital world, Dr Thampuran noted that the Internet of Things — where everyday objects such as cars and buildings have network connectivity — will eventually extend to all objects and create the "Internet of Everything". As an example, trends in Big Data, and 3D manufacturing will continue to accelerate and lead to the re-innovation of manufacturing processes. Such trends will advance a wave of new growth industries, ranging from Cloud services and software integration to cybersecurity.

One thread that ties these industry developments is the "Cambrian explosion of digital processes" that will transform the way that people make, sell, transmit and exchange goods and services. Existing business models will undergo significant transformations. Already, we are witnessing the growth of asset-light business models — the shift from products to platforms and services, where companies expand across traditional sectoral boundaries. Online transport network Uber, as well as Apple Health and S Health by Samsung, are some examples. There is also a shift towards greater personalisation for products and services, emphasising direct consumer engagement.

Strong government support for R&D

Dr Thampuran added that governments around the world recognise that R&D and innovation are a crucial part of economic development. Countries are leveraging Research, Innovation and Enterprise (RIE) strategies to transform and push manufacturing up the value chain. In particular, public-private partnerships to encourage open innovation are a growing phenomenon in the RIE landscape. In the model of open innovation, firms use in-house resources or external collaborations to advance their technology and bring about new innovations and products. This free flow of ideas between research institutes, firms and other stakeholders leads to several benefits; such as improved efficiency through scale economics, greater access to innovation, arbitrage on R&D that is riskier or that may not have an immediate application and opportunities to adapt innovations that are closer to the market.

For example, the US launched the Advanced Manufacturing Partnership, a national level plan that brings together industry, universities and the federal government to invest in the emerging technologies that will create high quality manufacturing jobs. It has also developed a National Network for Manufacturing Innovation, a network of research institutes to serve as translational and commercialisation platforms.

In Singapore, the government has launched successive innovation initiatives, the latest being the Research, Innovation & Enterprise Plan (2016–2020) with funding of S$19 billion. The RIE Plan aims to develop excellent science and build a robust and diverse innovation base and workforce to impact Singapore's economy and society. Such initiatives have supported the growth of the R&D ecosystem, from the institutes

of higher learning such as NUS, NTU and SUTD, to the co-location of public research institutes and innovation-intensive companies at One-North.

For A*STAR, industry engagements can take several forms, such as strategic partnerships (many public agencies to one company), consortia (one agency to many firms, or many-to-many) and partnerships/projects (one-to-one collaborations). Dr Thampuran said A*STAR also develops public-public partnerships with other government agencies for non-economic outcomes such as creating good jobs and improving the lives of Singaporeans. These collaborations have generated substantial economic impact. As compared to the previous Science and Technology 2010, the number of industry projects under RIE 2015 has increased six-fold to over 8,900. In 2014, the amount that businesses spent on R&D reached an all-time high of S$5.2 billion.

Question and Answer Session

IPS Adjunct Senior Research Fellow Manu Bhaskaran moderated the Q&A. He questioned why Singapore ranked highly on innovation inputs and spending on the Global Innovation Index published by INSEAD, but less so on outputs, leading to a poor innovation efficiency rating.

Dr Thampuran observed that Singapore had been improving on the same index and explained that the private sector in Singapore was generally very focused on downstream activities. However, there has been a shift upstream. In addition, unlike other countries, Singapore does not have large domestic MNCs. The economy is

dominated by foreign MNCs, and the location of their R&D centres, which may be outside Singapore, affects the ranking of the index. In Singapore, 80% of total business expenditure on R&D comes from over 110 companies; this is compared to a few companies in Finland. Having more stakeholders make rallying companies to move upstream in terms of innovation more challenging.

Mr Bhaskaran asked about the obstacles to scaling, as Singapore start-ups tend to opt to sell their businesses as opposed to growing and scaling up the business. Dr Thampuran said that more could be done to help companies who aspire to internationalise — from developing their business savvy so they can operate in this region, to encouraging them to have the ambition to scale up. Scaling up is the "x-factor" that will shift the game for the innovation landscape, he added.

Questions were raised about the balance to be struck between a top-down and bottom-up innovation ecosystem. The concerns were that a top-down approach may lead to over-reliance on government assistance. Dr Thampuran noted that Singapore has many excellent companies that grew in a bottom-up way, like Razer. The growth of incubators and accelerators in Singapore has created a thriving start-up scene, rekindling the entrepreneurial spirit that was last seen before 2000. From the experience of countries like Finland and Japan, it takes a nation to create enterprises — no enterprise can do it alone.

Participants also asked about the possibility of artificial intelligence (AI) leading to job destruction. Dr Thampuran replied that jobs would not stay constant, and new ones would be created as old ones are replaced. New skills to perform these jobs, such as the ability to handle and control machines, analyse and interpret data, or manipulate and develop software code, will be required. Jobs that are non-routine are growing, while routine cognitive and manual jobs would be disrupted.

Mr Bhaskaran added that professions consist of multiple functions, of which some will be disrupted, while others would be augmented by, and complementary to, the use of technology. In addition, new industries and businesses would in-turn be created to support new technological infrastructure. Nevertheless, the policy challenge is to handle the short-run displacements that would occur.

One participant noted the critical need to cultivate people who have deep knowledge and creativity, and who are willing and able to create new things in Singapore. Dr Thampuran agreed, noting that young people worldwide are increasingly less interested in engineering and technical fields, which could be attributed to salary, the absence of role models and low visibility of successes from the field. This is partly "the fault of us engineers," he noted, who have not been as good as the medical and legal fields in nurturing the interest of the young. Thus, while policy efforts are underway to encourage the growth of engineering talent, Singapore must remain open to such talents from overseas to support its innovation imperative.

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