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SPEECH BY MR S ISWARAN, MINISTER FOR TRADE AND INDUSTRY (INDUSTRY), AT THE PRESIDENT'S SCIENCE AND TECHNOLOGY AWARDS 2016, ON 18 OCTOBER 2016 AT 1930HRS AT THE ISTANA

President Tony Tan and Mrs Tan,

Distinguished Guests,

Ladies and Gentlemen,

Good evening.

Introduction

1. It gives me great pleasure to join all of you at this year's President's Science and Technology Awards (PSTA) presentation ceremony.

2. Tonight, we celebrate the passion, commitment and achievements of our research scientists and engineers (RSEs). Their relentless pursuit of scientific excellence and discoveries have spawned partnerships and achieved results that benefit our economy and society. Our congratulations to all the award recipients on this well-deserved recognition.

R&D remains critical to position Singapore for the future

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3. Singapore began investing in our science and technology capabilities 25 years ago. Today, Singapore is well-regarded as a vibrant, international R&D hub with a strong research community spanning the Physical Sciences and Engineering, to Biomedical Sciences. In the 2016 edition of the Global Innovation Index (GII), Singapore is ranked as the sixth most innovative economy in the world, topping Asia ahead of other research-intensive economies like South Korea and Japan[1].

4. Our efforts to spur innovation taken on added significance given the gathering pace of technological advances and the significant challenge of disruption to industries, business models and jobs. As a result, there will be keener competition -

[1] Published by the World Intellectual Property Organisation (WIPO), Cornell University and INSEAD. Report available at http://www.globalinnovationindex.org/gii-2016-report

for our companies, not just from traditional rivals but also from start-ups and up-starts; for our economy, not just from the immediate region, but also from the more developed economies such as USA and Germany.

5. Technological change also offers opportunities. Be it new healthcare solutions and service delivery models to better serve patients; omni-channel retail to reach new customers and markets; or advanced manufacturing with robotics, 3-D printing and IOT – they enable industries to re-invent themselves and businesses to enhance their competitiveness, thereby creating value for our economy.

6. Hence, we must be willing to innovate to seize these emerging opportunities; to be the disruptors and not the disrupted. That is why our innovation eco-system is a key focus of the Committee on the Future Economy. The CFE has brought together stakeholders from the public and private sectors to recommend strategies to better harness innovation for economic competitiveness and future growth. To that end, the Government has two high-level initiatives: the Research, Innovation and Enterprise 2020 Plan (RIE2020) and the Industry Transformation Programme (ITP).

7. RIE2020 is our sixth science and technology plan since 1991, and at S$19 billion, it is our largest budget allocation to-date. RIE2020 signifies our continued commitment to research, innovation and enterprise, to strengthen public-private collaborations and enhance our companies' innovation capacity, and to translate research into valuable societal and economic outcomes.

8. The ITP, announced at Budget 2016, is an integrated approach to industry development. The Government will work with industry partners to implement sectoral strategies for productivity improvement, skills development, innovation and internationalisation. Industry Transformation Maps (ITMs) will be developed for 23 sectors, including Precision Engineering, Chemicals, Aerospace, Electronics and Healthcare. Aligned with our RIE2020 strategies, the ITMs emphasise innovation and R&D to deepen capabilities in these sectors.

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9. The success of both RIE2020 and ITP hinges on the building of close partnerships across all stakeholders in Singapore's research community. In particular, the focus of RIE2020 and the ITMs will be on helping SMEs better collaborate with public sector research agencies to tap on technology for growth.

10. One model is the A*STAR Singapore Institute of Manufacturing's (SIMTech) Collaborative Industry Project (CIP) on Printed Electronics for the Print and Media Industry. Launched in Oct 2015, 11 companies, mostly SMEs from the two industry sectors participated in this CIP. The project helped printing companies to use printed electronics to expand and enhance their product offerings, and media and advertising companies to provide innovative advertising solutions. In addition to technical support and guidance from SIMTech, companies participating in the CIP

were also assisted by the Employment and Employability Institute (e2i), which provided training grants to help PMETs upgrade their skillsets and adopt these new technologies.

11. The recent Zika outbreak further exemplifies the importance of close partnerships within the research community. When news broke of the first Zika cases in Singapore, A*STAR researchers across various disciplines swiftly formed a "Zika Alliance" to improve understanding of the virus and develop diagnostic and therapeutic tools. The Zika Alliance worked in close consultation with local and global partners to develop a diagnostic kit that can simultaneously test for and differentiate between the Zika, Chikungunya and Dengue viruses within two hours.

12. Researchers from A*STAR's Bioinformatics Institute (BII) and MOH's National Public Health Laboratory (NHPL) also discovered that Zika strains from recent local transmissions had, in fact, been circulating in Southeast Asia since the 1960s and were different from the strains circulating in South America. Such collaborations in the biomedical and healthcare sectors are key to driving the research and development of preventive and treatment strategies for Zika and other healthcare challenges in Singapore and around the world.

We need to continue to nurture a dynamic talent pool with deep expertise to support our innovation efforts

13. All this progress would not have been possible without the deep research talent pool that we have in Singapore. Since 1991, the number of research scientists and engineers (RSEs) has grown nearly seven-fold to reach 33,000 in 2014. The local talent core of up to 70 per cent is complemented by world-class international researchers from countries as diverse as Italy and South Africa who enrich our ecosystem.

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14. Our younger researchers are also increasingly recognised as global innovators. Dr Desmond Loke from SUTD was named in MIT Technology Review's global "35 Innovators under 35 List" (TR35) this year, while Dr Yue Wan from A*STAR, and Dr Raye Yeow from NUS, were named in the Asian edition. Under RIE2020, we will continue to build on this strong talent base that we have nurtured over the past 25 years.

The PSTA recognise Singapore's top scientific and engineering talent, who serve as role models to inspire future generations of scientists and engineers.

15. Tonight, we recognise Singapore's scientists and engineers who have made exceptional contributions to our R&D landscape, pushed technological frontiers, and made discoveries that have an impact on our quality of life and the economy.

President's Science and Technology Medal – Professor Bertil Andersson

16. The President's Science and Technology Medal is the nation's top scientific honour that recognises individuals who have made outstanding and sustained contributions to Singapore's R&D development. This year's award is presented to Professor Bertil Andersson, President of the Nanyang Technological University.

17. Prof Andersson has played an instrumental role in advancing academic excellence and the development of Singapore's R&D landscape. He led the transformation of NTU from a practice-oriented engineering and teaching institution to a world-class research-intensive global university. In 2016, NTU led top Asian universities in terms of normalised citation impact in research[2].

18. Prof Andersson's efforts have redefined education and research at NTU. He championed new programmes in cross-cutting domains spanning sustainability, healthcare and innovation to ensure relevance to global issues. Prof Andersson was instrumental in the establishment of Singapore's third medical school, the Lee Kong Chian School of Medicine, jointly established by NTU and Imperial College London.

19. Prof Andersson has also forged deep ties within and beyond the Singapore's R&D ecosystem. Under his leadership, NTU has actively fostered partnerships across academia, industry and the public sector, building and deepening partnerships with companies like Rolls-Royce to provide students with industry exposure and new opportunities to researchers.

President's Science Award (PSA)

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20. The President's Science Award recipient is Associate Professor Liu Xiaogang from the National University of Singapore and A*STAR's Institute of Materials Research and Engineering, for his work on luminescent nanomaterials. Dr Liu and his research team developed innovative methods for the synthesis of rare-earth-doped nanocrystals that can emit a range of visible colours. They further discovered that these luminescent nanomaterials could be readily attached to cells to aid visualisation. His discoveries have enabled tremendous improvements in our ability to study complex biological systems, such as in the imaging of cancer cells or malignant tissues.

President's Technology Award (PTA)

[2] Source: www.topuniversities.com/university-rankings/asian-university-rankings

21. This year's President's Technology Award is jointly awarded to Professor Liu Bin from the National University of Singapore and A*STAR's Institute of Materials Research and Engineering, and the TeLEOS-1 Satellite Team.

22. Prof Liu is honoured for her research on organic nanomaterials for environmental and biomedical applications. Prof Liu's research is focused on a unique luminescent material with aggregation-induced emission (AIE) which has revolutionised the field of fluorescent probes. In 2014, she co-founded the NUS spin-off Luminicell to commercialise her research as a technology platform that allows real-time, non-invasive and long-term tracking and monitoring of cellular processes. Her discoveries have opened up avenues in the study of cancers, neuron diseases and cell-based therapies. Luminicell is also working with potential international and local bio-tech companies to further develop and advance its technology. Prof Liu is an excellent role model of a scientist-entrepreneur, who has brought excellent science to the market, to benefit the economy and society.

23. The development team for the TeLEOS-1 Satellite is also being honoured today. The team, comprising engineers from ST Electronics, DSO National Laboratories, NUS and NTU, designed and built the first Made-In-Singapore commercial satellite. Launched on 16 December 2015, TeLEOS-1 has provided high resolution images of the equatorial belt more frequently and under more varied sun-lit conditions than other satellites of its class. This is a remarkable achievement for Singapore and underscores the excellence of our engineers whose collaboration across the public and private sectors, has allowed Singapore to break new grounds in engineering.

Young Scientists Awards (YSA)

24. The Young Scientist Awards recognise the ingenuity of young researchers who have shown the potential to scale greater heights. These young researchers represent the future of scientific discovery and underscore the importance of investing in and nurturing our talent pool. This year's award recipients are Dr Benjamin Tee from A*STAR's Institute of Materials Research and Engineering, for his work in self-healing electronic skins that can sense mechanical forces; Dr Guo Huili from A*STAR's Institute of Molecular And Cell Biology, for her research on microRNA regulation and how it affects human health; and Dr Lim Xinhong from A*STAR's Institute of Medical Biology, for his examination of the molecular mechanisms involved in hair loss and acne.

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Conclusion

25. Let me extend my congratulations once again to all the recipients of this year's awards. Your dedication and commitment to science and technology serves

to inspire our scientists and engineers to pursue scientific excellence and innovative solutions for a better world.

26. I wish you every success in your endeavours.

27. Thank you.

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