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# A City in Time for the Future

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Singapore's 50-year transformation to a vibrant global city is a testament to leaders who had the foresight and political will to see their visions through. However, the present unique challenges demand shifts in planning processes for Singapore to continue to grow sustainably, bearing in mind the impact that economic progress and population growth have on our urban environment. Integral to these shifts will be our ability to leverage research and development (R&D) to push the boundaries of what it means to maintain Singapore as an endearing home. Three aspects are discussed.

## **Leadership & Organisation**

R&D will play a growing role in developing solutions to meet our national needs. PUB's water story was our national archetype for R&D success: Long-standing water security concerns spurred R&D efforts that established Singapore's international reputation for water reclamation and desalination. However, future urban challenges are less likely to be defined by discrete needs. Instead, they comprise a system of interconnected issues that span the urban and socioeconomic problem-space. Given the increased complexity, Singapore will transit to a R&D strategy coordinated at the ministerial level to address our resource constraints while enhancing urban liveability and sustainability. Our R&D planning teams will ensure cross-domain integration to safeguard against silos and duplicative efforts, while engaging the relevant government bodies to ensure technologies have agency and industry receptacles for deployment. With input from technology roadmaps and stakeholders from industry and academia, Singapore's leadership will spearhead a whole-of-government approach towards strategising our R&D initiatives while ensuring solutions remain impactful.

## **Human Capital**

Singapore will grow local R&D manpower to anchor our core capabilities and hone our entrepreneurial edge. Recognising the need to accelerate capability-building, the

concept of a Campus for Research Excellence and Technological Enterprise (CREATE) was endorsed by the National Research Foundation (NRF) Board. CREATE brings together world-class research institutions in one location in Singapore and establishes institutional partnerships so that a strong pipeline of ideas, talent and research capabilities from partner universities increases the vibrancy and diversity of Singapore's R&D ecosystem. Today, CREATE co-locates 16 research programmes where researchers from outstanding universities conduct interdisciplinary research. Additionally, Singapore will engage our scientists, entrepreneurs, venture capitalists and large local enterprises to define pathways to capture economic and societal value. By developing individuals with relevant skills along the innovation value chain, we can extract the benefits from our intellectual property.

## Tools

Computer modelling and simulations (M&S) will complement and guide Singapore's R&D thrusts. M&S has traditionally been a tool to study phenomena in isolation. Moving forward, M&S will evolve into a "test tube" for investigating system-of-systems type problems. This will enable us to study non-trivial interactions between nascent technologies, public policy and social behaviour. Resources will then be allocated to develop suitable technologies that deliver results within Singapore's socioeconomic and urban context. A case in point is Singapore's push for solar energy: increasing the share of solar energy requires that we change the way we harness and consume electricity. Planners can leverage the Virtual Singapore 3D platform that is being co-developed by NRF, the Singapore Land Authority (SLA) and the Infocomm Development Authority (IDA), to optimise our solar deployment strategies given our land constraints and dense urban profile. Similarly, economic modelling can shed light on how real-time dynamics of electricity demand and supply can influence consumer behaviour so as to accommodate the intermittency of solar energy. M&S will allow us to holistically assess novel ideas and bring together our best engineers, social scientists and policy makers early in the planning process.

Since independence, science and technology have been integral to Singapore's prosperity. To win the future, Singapore must transform from a technology taker to a technology driver and global thought-leader. The role of government will be to actively nurture a vibrant R&D community capable of meeting national needs where there are no existing solutions, and providing policy makers with indigenous options for sustainable development.