

Smart Nation Update

# Developing key capabilities is key to staying relevant

As the Smart Nation initiative enters its third year, Minister-in-charge Dr Vivian Balakrishnan discusses its progress, the ongoing challenges, and the role universities and institutes of higher learning can play in this national strategy.

Written by Grace Chng

Technical expertise in the civil service is being raised by building new engineering and infocomm technology solutions in-house.

Instead of outsourcing these technical projects to third-party vendors, engineers, software developers and other technologists in the civil service can pick up new skills like agile development faster.

Foreign Minister Dr Vivian Balakrishnan says this effort adds another layer of capability development needed to drive Singapore's Smart Nation initiative – where people are empowered by technology to lead meaningful lives – several rungs upwards.

Digital technologies that underpin Smart Nation activities are strategic capabilities which must be developed and retained in-house, adds Dr Balakrishnan, who oversees the Smart Nation initiative.

He stresses he is not against outsourcing technical work, but the Government must know what goes "under the hood" of the tech systems so that it can also improve on them.

The Government is also willing to work with independent software developers through a scheme like govBuy, where government employees post small scale infocomm technology projects and tasks on the auction-based e-marketplace and anyone can bid for the projects, with bids capped at \$5,000. Current projects on the portal (<https://buy.gds.gov.tech>) are priced around \$100.

"If they work to address a need or problem we want to solve, then it's good. This is another opportunity where needs-driven projects, grounded in real-life problems, can result in co-creation of new systems," says Dr Balakrishnan in an exclusive interview with the National University of Singapore (NUS).

Another layer of capability development is about imbuing the future workforce with tech savviness. In schools, students are learning computational thinking so that they can solve problems and design solutions that draw on concepts fundamental to computer science. Students can also take computer science as an O-level subject.

All these efforts in capability development mean that there is also a role for NUS and other institutes of higher learning



because they can bring their research and domain expertise to the table. One such area is cyber security.

Because Singapore is so well wired up, "we want to continue to be obsessive about security, and look at security by design rather than as afterthought", says Dr Balakrishnan.

"There's a whole realm of R&D opportunities in cyber security that our universities can take part in. The recent hacks which also impacted companies here show that cyber security is clearly the present challenge for us."

In R&D, the Government has earmarked about \$19 billion over the next five years to develop deep domain expertise in many areas including biomedical sciences and engineering.

"Beyond that, we're hoping that the research findings will be translated into commercial products."

A new organisation called SG-Innovate which will be launched later this month will help deep technology innovators and entrepreneurs commercialise their products and nurture their companies into potential global ones.

## Smart Nation launch

Two years ago in November 2014, Prime Minister Lee Hsien Loong launched the Smart Nation initiative with the vision of making people's lives better, providing new jobs and creating a more cohesive society through harnessing digital technologies.

Singapore has had a flying start because of the leading digital infrastructure here. Nine out of 10 homes have broadband connections. More than one million people have fibre subscriptions. Mobile phone penetration is almost 150 per cent.

Want to pay bills on your tablet? You can do that anywhere because nationwide, there are now 10,000 Wireless@SG hotspots to tap on.

The digital infrastructure is also being expanded. For example, Wi-Fi communications are being enhanced with the installation of more wireless equipment in mass rapid transit (MRT) stations – especially in the tunnels and lift shafts – and other transport nodes.

Dr Balakrishnan emphasises that capability development will enhance the innovation

“The success of Smart Nation is when technology recedes into the background”

Dr Balakrishnan

## Singapore's digital infrastructure

Household Internet access: 88% (2014)  
Fibre penetration: 1.1 million subscriptions  
Wireless@SG: 10,000 hotspots at speeds up to 5Mbps  
Mobile phone penetration: 149.1% (2016)  
Wireless subscriptions: 10.7 million (2016)  
Total international Internet capacity: 2.95 million Mbps (2014)

ecosystem and create more unicorns – start-ups who grow to a market value of more than US\$1 billion (S\$1.38 billion).

Singapore already has a vibrant start-up ecosystem located primarily at Block 71 in the LaunchPad @ one-north in the Buona Vista area. The start-up hub at Block 71, Ayer Rajah Crescent, began in 2011 as a collaboration between NUS Enterprise, Singtel Innov8 and the then Media Development Authority.

About three years ago, two more buildings were added to Block 71, considered to be the start-up headquarters here. More buildings are being added to cater to the fast-growing start-up community.

## Challenges ahead

But change brings challenges. Dr Balakrishnan is most concerned about how the coming digital disruption will profoundly impact the economy, society and jobs.

He says that people need to prepare for the digital tsunamis that will surely come.

"We need to get ahead of the curve. We need to be masters of the new technologies rather than trying in vain to compete for the lower-value parts of the chain which are being transformed."

Capturing new opportunities requires new skills. The challenge is for people to adopt an innovative mindset and focus on learning new skills to stay relevant because what they learnt in schools and universities may have become obsolete.

Working adults can sign up for new IT and engineering courses at the School of Continuing and Lifelong Education (SCALE) set up by NUS (see Upgrading skills the bite-sized way).

Mid-career professionals who want to switch jobs can also renew their capabilities through new schemes such as TechSkills Accelerator.

These schemes can help working adults learn new skills through bite-sized portions of education, either in modules or

short-term courses that can be stacked up to lead to degree or certificate programmes.

Universities also have to change the way they teach. They have to go beyond the transmission of skills. They need to offer more short-term targeted courses that address capability needs of the current and near future economy.

They have to also inculcate in students new attitudes on lifelong learning.

Young people should be exposed early to working life and the brutal demands of real-world problems. The NUS Overseas Colleges (NOC) programme, he says, has placed many students in strategic entrepreneurial hubs around the world since 2002.

As interns, they are gaining invaluable experience working alongside entrepreneurs in start-up hubs, including those in Silicon Valley, Shanghai, Stockholm, New York, Tel Aviv, Beijing, Lausanne and Munich.

While the Smart Nation initiative has strong implications for capability development, innovation and lifelong learning, the benefits must also be felt by all parts of the community including the elderly and low-income families.

The Government therefore subsidises the cost of personal computers and other equipment purchases as well as Internet subscriptions for low-income families.

One successful Smart Nation application that has benefited people is the availability of real-time bus arrival and loading information accessible on LTA's MyTransport mobile app as well as many third-party applications.

Bus commuters can find out when their bus is arriving with more than 95 per cent accuracy.

With that information, they don't have to rush to the bus stop or endure too long a wait.

"The success of Smart Nation is when technology recedes into the background," says Dr Balakrishnan.

## Get ready for the challenges of the digital economy

It has been two years since the Smart Nation initiative was launched in November 2014 by Prime Minister Lee Hsien Loong. Much has been achieved in the building of digital infrastructure. Fibre penetration to homes and offices and nationwide Wi-Fi access have increased. However, other issues remain.

The Minister-in-charge of the Smart Nation initiative, Dr Vivian Balakrishnan, said the digital revolution that underpins the Smart Nation initiative movement has disrupted life, society and industries. Singapore must prepare for the revolution which has already started, he said.

This is an edited excerpt of the interview with Dr Balakrishnan on the importance of creating jobs for the digital economy, bite-sized learning and the need for Singaporeans to adopt lifelong learning.



## Is it just technical jobs that are needed?

It's not just technical jobs (because) at the end of the day, we don't need everyone to be programmers. Some skills like how to write well, communicate effectively, create art and cultural forms that resonate with minds and hearts ... they are more unique and less amenable to automation.

Artists, sculptors, communicators, builders, (people) working with their hands to create something unique – there will be more opportunities for these skills.

## What are you most concerned about?

I'm most concerned about jobs and the coming digital disruption. We need to understand and prepare ourselves (for the digital) waves and tsunamis that the new opportunities will bring. We can't wall ourselves off. We've to change faster to keep up with the challenge.

People must realise that 'the job I'm doing now is likely to change in profound ways in the next five to 10 years, (and ask) what do I need to do, what skills and new networks do I need to build, how do I prepare myself for this?'

## What is the role of the universities?

The universities and the private education sector can help with the building of these skills.

They have to go beyond the transmission of skills. They need to provide more of the short-term, targeted courses that address the capability needs of the current and near future economy.

There are many issues to think about. What qualifications do you need when you take a three-year or a three-month course on a focused, targeted skill? How old should you be, how often (should you) upgrade, "what will be the courses and skills, who will conduct them? There is a role here for universities and the private education sector.

The way we teach has got to change; even the way we conduct examinations must also change. I'm waiting for the day when universities allow all exams to be open Internet. Bring in whatever (device). The whole world's data is at your fingertips.

This simulates the real world. How many of us do our work without ever referring to the internet? So shouldn't our teaching and examining be based on this real world?

## Upgrading skills the bite-sized way

In an ever-evolving economy, working adults need to stay abreast of industry developments by upgrading their skills continually.

They can do this at the School of Continuing and Lifelong Education (SCALE), which will offer special courses that will allow them to deepen their skills to stay relevant in their workplace.

Currently, there are about 1,000 learners pursuing part-time engineering degrees offered by SCALE. Located at the National University of Singapore (NUS), the school will also offer graduate diploma courses and master's degree programmes as well as short courses and executive programmes.

Dr Vivian Balakrishnan, who oversees the Smart Nation initiative, said in an interview with NUS that digital technologies are transforming industries, and may result in some job losses.

But digital disruptions also create new job opportunities. People must be ready to take on new challenges, said Dr Balakrishnan.

Lifelong learning in bite-sizes, he said, is one way Singaporeans can upgrade their skills.

NUS President Professor Tan Chorh Chuan said SCALE will offer differentiated opportunities for adult learners to acquire new knowledge and skills from the university; help Singapore's companies and industries stay competitive with industry-

relevant professional development; and support national manpower needs.

"SCALE will leverage on NUS' top-quality broad-based education, state-of-the-art facilities and rich networks of industry partners and influential alumni in Singapore and beyond," said Prof Tan.

"We believe that the multi-disciplinary, real-world, and best-in-class expertise that NUS is known for will enable SCALE students to advance and contribute even more in their careers."

Working adults can sign up for bite-sized certificate programmes, which can be "stacked up" towards earning degrees. Some of the skills-based courses, each consisting of six modules, are on topics such as microelectronics and automation.

The \$12-million SCALE initiative aims to offer at least 10 degrees and more than 30 certificate programmes in the next few years. It will also work closely with government agencies, companies and industry to design professional courses and offer enriching lifelong learning experiences for employees.

SCALE will be a key node in a network of national SkillsFuture centres that promote and enable lifelong learning.

Prof Tan added that NUS is keen to use the new NUS Institute of Data Science to systematically identify the most important skills needs, as well as critical mismatches between skills demand and supply.

The university is looking to partner SkillsFuture Singapore to identify skills and competency gaps and opportunities in the development of the Singapore workforce.