



Subra Suresh Force for change

Ranked second among Nature Index's Young universities, Nanyang Technological University is moving at an accelerated pace.

Nanyang Technological University (NTU) is one of Singapore's top research institutes, and in recent years has emerged as a global leader in driving the 'fourth industrial revolution', a period defined by disruptive technologies such as the Internet of Things, robotics, virtual reality and artificial intelligence.

Established in 1991, and now the second-most prolific young university in the Nature Index, NTU has climbed the global rankings in research output and reputation.

Nature Index spoke with its president, Subra Suresh.

How does NTU seek to engage with industry?

NTU is engaging with some of the top industries from around the world. British jet-engine manufacturer, Rolls-Royce, for example, has partnerships with 29 universities globally and their largest partnership is with NTU. This year we renewed a five-year contract with them, worth \$88 million Singapore dollars (US\$63.5 million) to look at next-generation aircraft engines, 3D printing, digital manufacturing and many other topics.

Chinese retail and e-commerce company, Alibaba, established a joint AI research institute with NTU on our campus. It involves 25 Alibaba employees working with 25 professors here. And last year, American software company, Hewlett-Packard (HP), established its largest university partnership with NTU, with \$84 million Singapore dollars in funding over four years for digital manufacturing technologies.

We also collaborate with Volvo. We converted its electric buses into fully self-driving vehicles, which are now being piloted on our campus. We're working with Singapore's Land Transport Authority and other government organizations to explore different types of autonomous vehicles.

We have more than 180 companies from around the world on campus. These provide opportunities for faculty and students to connect research and education to industrial practice, and job opportunities for our students once they graduate.

How has NTU's location contributed to its growth?

China and India, the two most populous countries in the world, are culturally represented in the Singaporean population, which attracts Indian and Chinese students because of cultural affiliations, geographical proximity and the familiarity of living in Asia. We have more than 20,000 NTU alumni who occupy prominent positions in China today. This representation gives us a natural connection to China.

Indonesia and Malaysia are also close to us and have historical ties to Singapore. Many top US companies have regional headquarters in Singapore, including HP and Procter & Gamble. This helps us to connect with industry.

English is the primary language of Singapore, and our primary language of instruction. We have all the practices, policies and procedures of a Western university. Being located at the crossroads of Asia as a multicultural, multiracial society, but with a very strong Western focus, makes us unique.

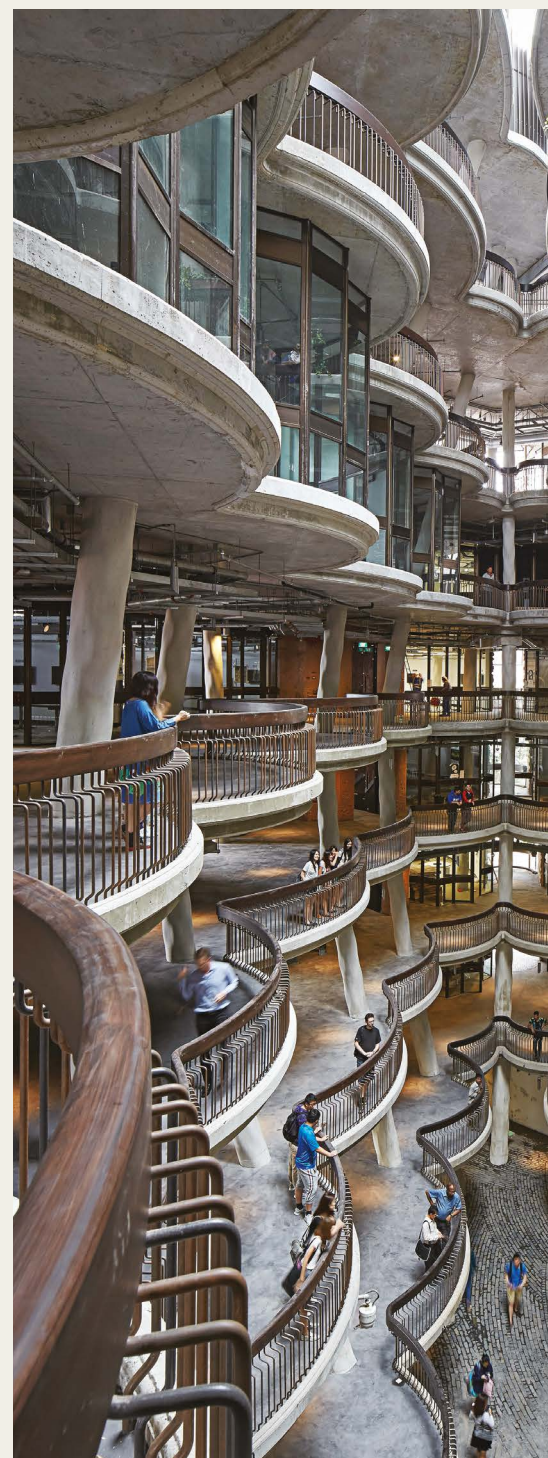
NTU was founded in 1991. How has it grown in such a short amount of time?

Twenty years ago, the Singapore government took a long-term view on the importance of having world-class universities here, making Singapore a destination for academic, industrial, entrepreneurial and innovation talent.

They created new funding to make this possible and invested in university buildings, labs and facilities. At the same time, the Economic Development Board of Singapore aimed to attract companies to do high-end research.

What advantages do young universities have?

Six years ago, NTU set up the Lee Kong Chian School of Medicine in partnership with Imperial College London. We developed



More than 180 companies on NTU's campus connect research to industrial practice.



a modern curriculum using the latest technology, online learning and continuous assessment. We're using virtual and augmented reality to teach subjects such as cardiology and anatomy. That's hard to do in an established medical school because you have to retrain your medical doctors and professors before you can educate your students.

It's also easier for a new medical school to leapfrog old technologies and equipment and go straight to the latest ones, while older universities have to abandon old labs to create new spaces.

What are the challenges?

Even in a relatively young country such as the United States, most of its well-known highly ranked universities have been around for a hundred years or more. There have been many experiments around the world to establish new universities, but most have not been able to make it into the global top 50 or 100, even those with lots of funding.

Many universities whose glory days are in the past are still highly ranked. It takes a long time for word to get around that you have reached your peak. This time lag applies in both directions, as it's very difficult for young universities to crack the rankings. But NTU has consistently delivered, and now word is getting around. This year more than 430 papers were published by NTU faculty in the top ten journals in the world.

It's difficult for young universities to compete with well-established institutions, but they see the value of partnering with us. We have strong partnerships with Massachusetts Institute of Technology (MIT) and Imperial College London, and we have a very strong partnership with the Technical University of Munich, Germany, in the area of robotics. In 2018, the Wallenberg Foundation of Sweden gave an endowment to NTU to support postdoctoral researchers.

How do global metrics affect your strategies?

We look at all of them, and at other metrics, such as where our faculty publish, the quality of the faculty we recruit and where they come from. In the past 18 months, for example, we've recruited from the University of Cambridge in the UK, American Ivy

League schools and from top institutions in Europe and Asia.

In January 2018, a couple of months after I started as president, we launched the presidential postdoctoral fellows programme to attract the brightest young postdocs. This year we had 894 applications from 74 countries for 12 positions.

About a year ago, the US Institute of Electrical and Electronics Engineers listed the top ten rising stars in artificial intelligence around the world. According to their assessment, three are NTU faculty.

Good performance in a ranking can be a motivator, but one cannot take it as the only metric and the only reason to do well.

What are your priorities from here?

We are doing our best to attract top talent from Singapore and from all over the world. This includes students, postdocs, faculty and staff. Our commitment to excellence in education and research comes second. It's not research versus education. The two have to be integrated. To have impact we need to make sure that research and education connect with both societal and industrial impact. That's why government and industry partnerships are so important.

Some demographic trends will affect all of the universities in Singapore in the next ten to 15 years. Our birth rate has been declining for many years, and because funding is tied to undergraduate student involvement, this decline will affect us all. We have an obligation to deliver value for the resources we get from the Singapore government. As a young university, we had access to significant new resources to help grow the university, but this upwards trajectory cannot be sustained forever.

We have significant momentum and we will continue to grow in stature and impact in our output in education, research and innovation, but that doesn't mean that the level of annual increase in funding will be the same over the next ten years. So, one priority we have is to continue our growth in excellence without necessarily continuing to grow in numbers.

Interview by Catherine Armitage

This interview has been edited for clarity and length.