

SPEECH BY DR TONY TAN KENG YAM, CHAIRMAN OF NATIONAL RESEARCH FOUNDATION, AT THE TECHNOLOGY COMMERCIALISATION FORUM “INNOVATION AND ENTERPRISE IN SINGAPORE” HELD ON FRIDAY, 21ST NOVEMBER 2008 AT 9.00AM, SUNTEC CITY CONVENTION CENTRE

Dr Jon Soderstrom
President, Association of University Technology Managers

Dr Lily Chan
Chief Executive Officer
NUS Enterprise

Distinguished Guests

Ladies and Gentlemen

I would like to thank the organisers for inviting me to address all of you at the Technology Commercialisation Forum 2008.

Among those attending the forum today are researchers, who work at the frontiers of science and technology, making new discoveries that can potentially benefit mankind.

Others are technology transfer professionals, who manage, market, and license the intellectual know-how derived from research.

There are also investors and entrepreneurs at this Forum who will look at the technologies coming out from the labs, and explore ways to transform research into new products and services that will revolutionise lives.

The whole process of making new discoveries and then translating them into products and services for the marketplace is only made possible when the players in this process work together in an integrated eco-system.

This Forum provides a platform to bring together all the players in this complex network.

The theme of my remarks this morning is how R&D drives economic growth in this country.

R&D drives economic growth

Conventional economic growth is achieved by accumulating the factors of production – land, labour, and capital stock.

For most countries, land resources are fixed, except maybe in Singapore, where we do land reclamation, or you may expand underground. But there is a limit to how much land resources may be expanded. Thus, economists usually concentrate on increasing the labour and capital stock.

To grow the economy, we can increase the labour force or invest in more capital goods (machinery and infrastructure and so on).

Established industries take these productive factors and produce goods and services which are then sold in the marketplace, and consequently create wealth for the economy.

Thus far, Singapore has relied mainly on established industries, such as logistics for sea port and airport, tourism and property development, to sustain our economic growth.

These are important industries and we should continue to encourage and foster their development.

However, it is becoming harder to sustain Singapore's growth by relying on factor accumulation alone.

Regional and global competition for labour and foreign investments are pushing up labour and other costs in Singapore and making it more difficult to attract investors to Singapore.

Another way to drive economic growth is to increase the factor productivity – that is to enable each unit of labour or capital to produce more wealth for the economy.

Economists attribute the increases in factor productivity to largely to technological progress.

This is where new knowledge through R&D can lead to significantly higher productivity.

According to Professor Paul Romer's New/Endogeneous Growth Theory, advancements in technology lie at the heart of economic growth in the long term.

New knowledge, through high-tech research gets translated into much sought-after products and services in the marketplace.

We may even see entire new market sectors being created in the process, and which proceed to become new growth drivers for the industry.

Another example is the mobile phone industry, which has grown by several orders of magnitude in a matter of decades, and propelled companies like Nokia into the multi-billion companies that they are today. In the case of Nokia and mobile phones, this has transformed the whole economy of Finland into the high-value and high-tech country they are today.

For Singapore to grow, we need to ride on new waves of technology to create new drivers of growth for our economy.

For this reason, we must continue to invest in R&D and to continue to build up and strengthen our R&D ecosystem.

R&D in Singapore

R&D is not new to Singapore.

In 1991, the National Science and Technology Board (NSTB) was formed to raise the level of research in Singapore.

This organisation was subsequently re-named Agency for Science, Technology and Research (A*STAR), and along with Ministry of Education, Ministry of Health and other agencies provided funding for basic and applied research at our universities, polytechnics, and research institutes.

Today, the institutions of higher learning, Biopolis, and the recently launched Fusionopolis, house thousands of researchers in diverse areas of life sciences, natural sciences, physical sciences and engineering.

Singapore's R&D spending has increased dramatically. In 2007, our Gross Domestic Expenditure on R&D (GERD) was \$6.3 billion, representing 2.61% of GDP, three times the 0.85% level of expenditure achieved in 1990. Our objective is to achieve R&D spending of 3% of GDP by 2010.

We are constantly seeking to grow R&D.

The National Research Foundation (NRF) was set up in 2006 to coordinate and initiate and launch new R&D initiatives.

To date, the NRF has committed close to \$4 billion in three strategic programmes to develop the following areas:

- i) Biomedical Sciences (BMS)
- ii) Interactive and Digital Media (IDM)
- iii) Environmental and Water Technologies (EWT) including the two major areas of Clean Water and Clean Energy

A number of schemes has also been launched to encourage good research ideas to surface.

The Biomedical Sciences programme is actively building up the hardware and software for translational and clinical research.

Five flagship programmes in gastric cancer, infectious diseases, eye diseases, neurosciences and cardiovascular/metabolic diseases have been started.

The programme attracted a number of world class international and local researchers to do translational and clinical research through its Singapore Translational Research Investigator Awards (STaR) and Clinician Scientist Awards (CSA).

It expects to nurture many more clinician scientists in the near future.

There has been encouraging developments in the IDM sector.

Three international research centres involving collaborations with MIT, the Chinese Academy of Sciences and Keio University in Japan have been set up.

Five "FutureSchools" have also been identified that will work with local industry consortia on the innovative use of IDM technology in teaching and pedagogy.

Some 200 entrepreneurs in 62 startup projects are being supported through a microfunding scheme.

Recently, the computer game Carnyvale, developed by a team working in the Singapore-MIT GAMBIT Gamelab, beat 350 other competitors to win the top prize in a game development competition organised by Microsoft Corporation in the US. I understand that this game is now being commercialised.

The Clean Water and Clean Energy Initiatives are shaping a more vibrant R&D landscape for the water and energy industries in Singapore.

Research centres have been established jointly with renowned international institutions to conduct research in clean water and clean energy.

Graduate scholarships and research funding will further build up the capacity for R&D in the EWT sector.

A number of large industrial projects have also been secured both locally and overseas.

For example, the Renewable Energy Corporation of Norway is building the world's largest solar panel manufacturing facility in Singapore with an investment of \$6.3b, while local corporation Keppel Seghers has secured a water contract worth \$1.5 billion in Qatar.

Collectively the three strategic programmes have built up the R&D capabilities and capacities in the respective industry sectors.

NRF has also initiated several bottom-up programmes.

These include a research fellowship award to bring in bright young scientists, a competitive research grant scheme to support sizeable research programmes, the establishment of three research centres in our universities and the development of a campus – the CREATE campus – to draw in top universities to carry out research in Singapore.

Commercialisation of R&D and the National Framework for Innovation and Enterprise (NFIE)

Singapore has invested significant sums in R&D over the years.

To ensure that Singapore reaps the returns from these investments, in the form of economic growth for the country, we have to ensure that the results of research are commercialised effectively.

This commercialisation of research does not happen naturally or effortlessly.

Many research results remain in the form of publications in technical and scientific journals. This is of course valuable in their own right.

Their impact on society and the economy remains minimal and far below what is possible.

New discoveries and technologies when translated into beneficial products and services will have a great impact on society and the economy.

However, this would not be possible if there were no entrepreneurs to innovate and think up new products or services to exploit new technologies from the labs.

Only when all these factors come together can we begin to realise the economic potential and promise of R&D.

The process of taking technology from the lab to the marketplace, however, is one fraught with many challenges and pitfalls.

We must, therefore, create a supportive environment for those who undertake the risky business of commercialising R&D, particularly for innovative entrepreneurs who take new technology out of the labs to start high-tech ventures.

As noted by Dr Carl Schramm of the US Kauffman Foundation for Entrepreneurship, such innovative startups are an essential part of a healthy economy as they bring new innovations to the marketplace.

Large, and more established firms, can then refine and mass-produce the innovations from these startups, bringing them to a larger segment of the market by lowering costs and wider distribution.

The Technopreneurship 21 (T21) initiative in 1999 sought to create such a supportive environment.

This initiative helped to build up the hardware and software for R&D and its commercialisation, creating a strong base to encourage the formation of more high-tech startups.

Building on T21, NRF introduced the National Framework for Innovation and Enterprise (NFIE) in March this year.

The various schemes under the NFIE framework will put in place support structures for those who wish to commercialise the results of R&D, particularly in the universities and other educational institutions.

Following NFIE's launch, NRF has rolled out a number of schemes.

A total of \$75 million has been allocated for the Proof-of-Concept grant scheme, administered by both NRF and SPRING Singapore.

The scheme provides funding of up to \$250,000 for researchers to demonstrate the feasibility of their ideas.

NRF's call for proposal for this scheme has attracted over 130 proposals from our universities and polytechnics.

A parallel scheme administered by SPRING Singapore recently supported 17 projects from private companies.

The Early Stage Venture Fund scheme seeded 6 early stage venture funds with a 1:1 matching investment of \$10 million each to provide startups in Singapore access to needed venture capital in their formative stages.

The awarded fund managers are in the process of raising matching funds.

In addition, a \$10 million Disruptive Innovation Incubator Fund has been established to select promising companies with disruptive innovation¹ characteristics, and provide them funding and mentoring support.

A National Framework for IP Policies has been developed to facilitate the flow of IP created from publicly-funded research.

This is intended to greatly speed up the technology transfer process from our universities and polytechnics to the private sector, as has happened in the US.

A sum of \$50 million has been allocated to support a University Innovation Fund (UIF) in each of our 3 universities – NUS, NTU and SMU.

The UIF will help the universities build up its own innovation eco-system.

Research to Market Platform

I am therefore very happy to see NUS launching the Research to Market Platform today.

This initiative will provide a platform to bring together stakeholders in the whole technology transfer value chain to have closer interaction.

This will increase the effectiveness and efficiency of translating technologies to the marketplace.

Conclusion

We have achieved much since we first embarked on the journey to make R&D play a more significant role in the economy in Singapore.

¹ Disruptive Innovation (DI) was developed by Prof Clayton Christensen of Harvard Business School, and described in his book "The Innovator's Dilemma".

We need to continue this journey, and maintain investment in R&D despite the unfavourable global financial situation we currently face, because ultimately, we need to remain competitive in the global economy.

To this end, our universities and research institutes must continue to do high quality research, developing technologies that will become new drivers for our economy.

Researchers should also apply their minds to address major global challenges, like climate change, so as to achieve greater societal and economic impact.

With the numerous incentives and initiatives in place, we can expect a truly vibrant R&D and innovation landscape in Singapore in the coming years.

I urge all of you to take advantage of the many exciting opportunities that will be presented to participate actively in the process of transforming Singapore's economy.

I wish you a fruitful and engaging Technology Commercialisation Forum 2008.
