



Technology Transfer: The Singapore Experience . .

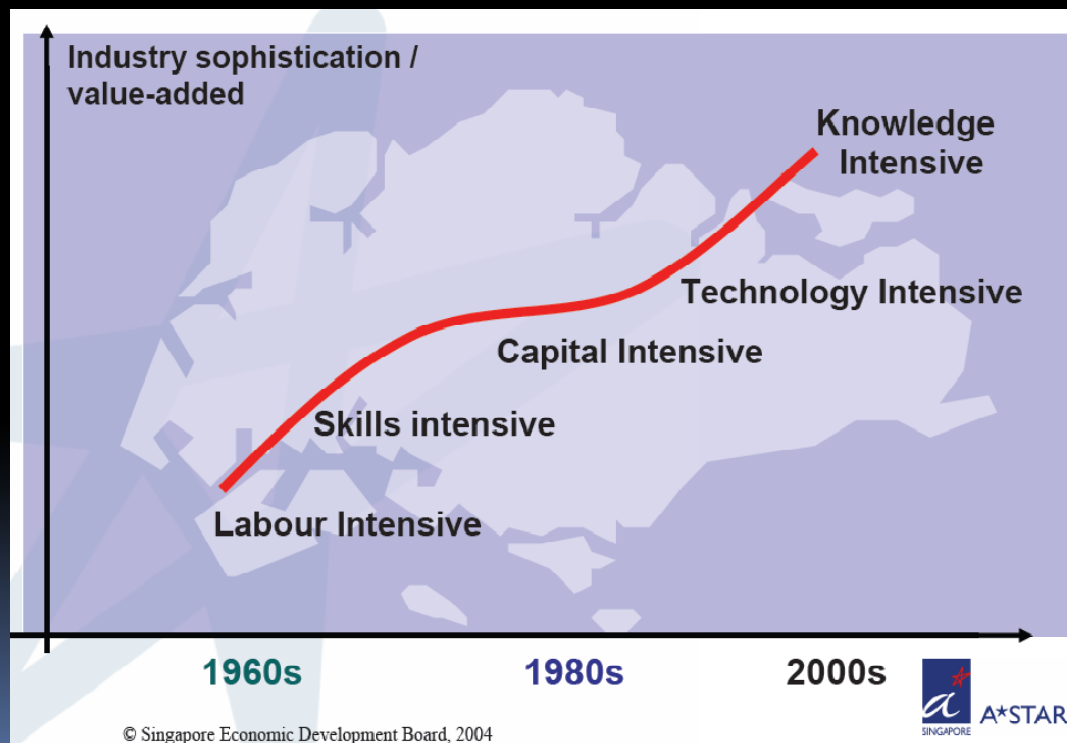
Presented by Dr Peter Kew and Dr Ian Law

*WIPO Regional Seminar on Technology Transfer by universities and
public research institutions through the strategic use of the patent system
Colombo, Sri Lanka, December 9 – 11, 2009*

Outline

- *Transformation of the Singapore Economy*
- *National Framework for Innovation and Enterprise*
- *Successes and Challenges*
 - *From IHL perspective*
 - *From Polytechnic perspective*

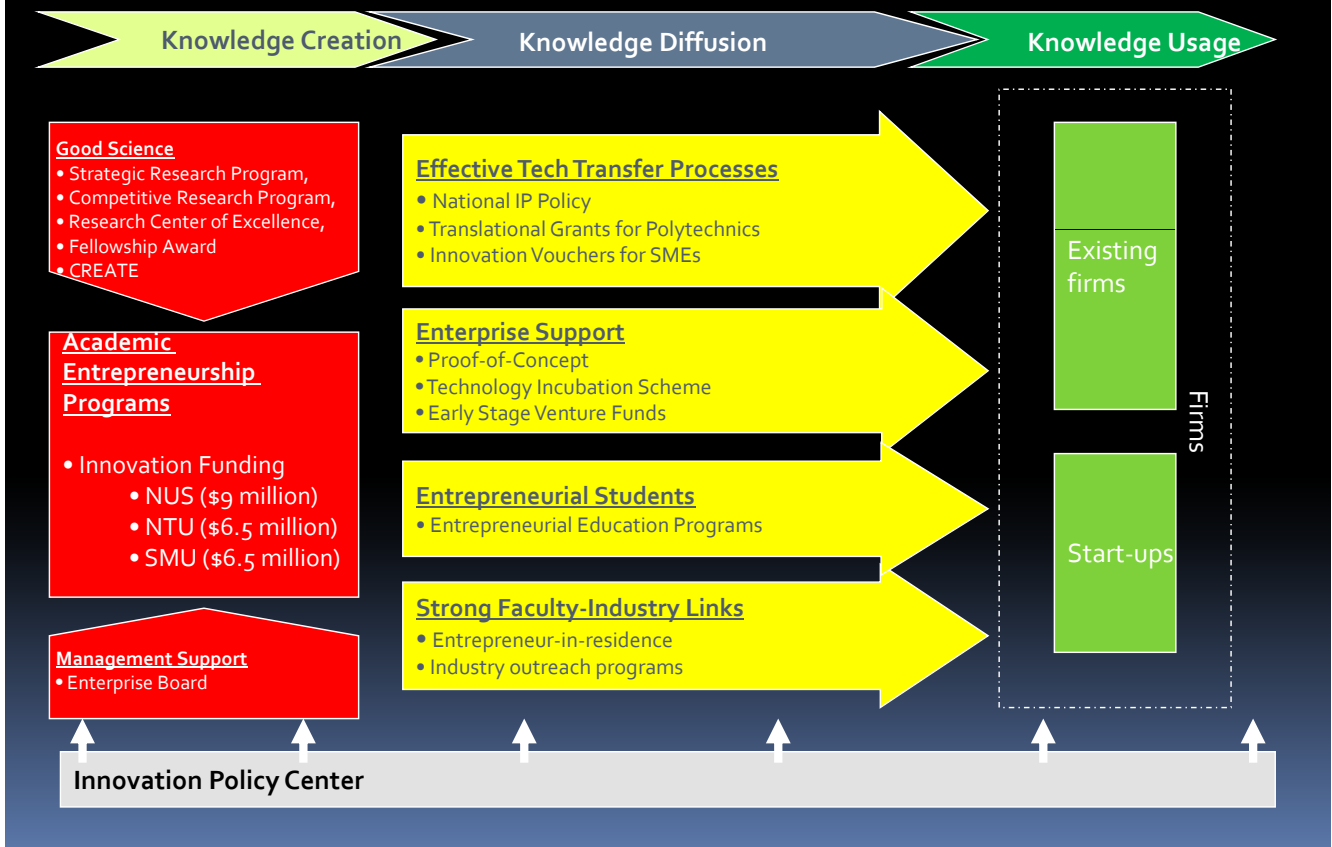
Transformation of the Singapore Economy



Prime Minister's National Rally Speech, 2005

- “... two major thrusts that would characterise Singapore's economy in the next 15 to 20 years. One is to foster **innovation and enterprise** and the other to exploit **research and development**.....human imagination and enterprise were what Singapore would need to stay ahead”

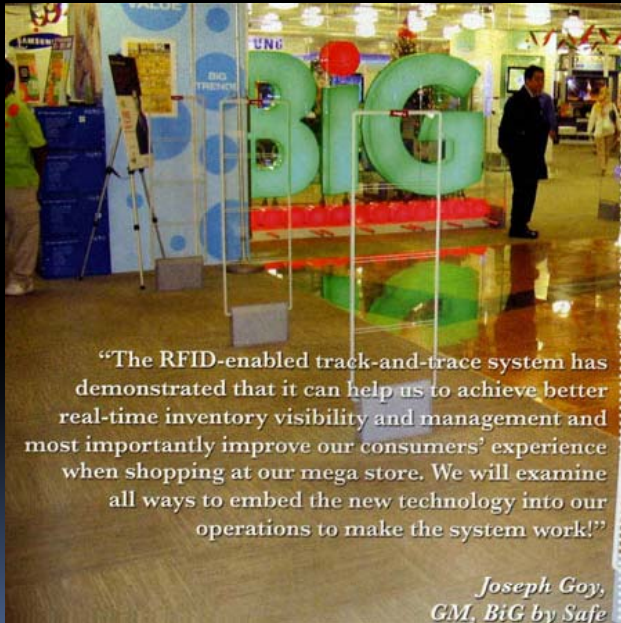
National Framework for Innovation and Enterprise



Strengthening links between Research & Industry

- Singapore Government encourages nexus between R&D and business as well as develop Singapore innovation capacities in downstream, problem-solving research
- Singapore Universities/Research Institutes/Polytechnics maintain strong links with industry to ensure research outputs will translate into products or services to benefit society

Transferring A*STAR Technologies to Industry



“The RFID-enabled track-and-trace system has demonstrated that it can help us to achieve better real-time inventory visibility and management and most importantly improve our consumers’ experience when shopping at our mega store. We will examine all ways to embed the new technology into our operations to make the system work!”

*Joseph Goy,
GM, BiG by Safeway*

Source: Exploit Technologies Pte Ltd

Smart tagging, that is, the use of radio frequency identification (RFID) is creating waves in the way products could be tracked and traced in real time at any location.

Leveraging on the extensive RFID development expertise and experience of Singapore, Exploit Technologies will invest \$10 million over three years to execute solicited proof of concept (POC) proposals for A*STAR's comprehensive suite of RFID technologies with industry partners. The POCs are aimed at helping at local companies and end users in deploying and implementing RFID solutions quickly.



“With well protected intellectual property available from Exploit Technologies, we are able to adopt world class cutting edge research to develop immediate products for a quick market launch.”
*Dr Rosemary Tan,
CEO, Veredus Laboratories*

28 July 2005

Virus Detectives

Veredus’ aim was to make one of the world’s first commercially available Avian Influenza diagnostic kit. In July 2005, Veredus achieved its goal and announced that it was ready with a Kit that detects a gene specific to the H5N1 strain within four hours. Veredus utilized the proprietary nucleic acid diagnostic primers developed by the Genome Institute of Singapore (GIS). The kit has been tested in avian samples in Vietnam and Malaysia with excellent results showing no cross reactivity to other pathogens.

Source: Exploit Technologies Pte Ltd

From NTU . . .

- Amaranth Medical Inc. is a Delaware C-corporation incorporated in August 2006 to **commercialize biodegradable stents to treat peripheral vascular disease (PVD)**. The company is a research and development stage firm with offices in Palo Alto, California and in Singapore. **Amaranth has obtained US\$ 7.5M of financing through a Series A investment** led by Charter Life Sciences of Palo Alto, and Bio*One Capital of Singapore. The funds will be used to advance the technology into proof-of-concept studies in man.

Amaranth's core technology was developed in Singapore, at the **Nanyang Technological University's School of Material Science & Engineering**. The Dean of the School of Material Science & Engineering, Prof Freddy Boey, and the school's Vice Dean, Prof Subbu Venkatraman, have worked together over the last decade on novel materials. Amaranth is now focused on progressing its stents to the preclinical/clinical stages in the United States. «Less



**NANYANG
TECHNOLOGICAL
UNIVERSITY**

THE STRAITS TIMES, SATURDAY, 9 JUNE 2007, PAGE S10

New method that mines info in fingerprints may aid police

NTU spin-off working with British firm on nanotechnology project

By MELISSA TAN

WHEN someone leaves fingerprints behind, he is also leaving a chemical calling card that reveals critical information such as his drug habits.

A homegrown company has discovered how to mine information from trace materials left on fingerprints, and is working with the police here to use its techniques for crime-busting.

NanoFrontier, a Nanyang Technological University (NTU) spin-off, is

also working with British nanotech company Roar Particles to develop this technology.

"A fingerprint is not just a fingerprint," explained Professor Freddy Boey, chairman of the board of directors at NanoFrontier.

"There are a whole lot of molecules left behind when someone touches something. The new method uses tiny chemical particles called nanoparticles to pick up sweat and natural oils on the fingerprint. Chemical tests done on these substances will allow investigators to determine the person's sex and find out whether he is a smoker, a drug user or has handled explosives.

Dr Ma Jan, associate chair of the School of Materials Science and Engineering at NTU, said: "In the past, in-

vestigators could only collect physical patterns from fingerprints, but now they can even get DNA. This could revolutionise forensic protocols."

The nanoparticles will be put to the test in mid-2008 by the forensic department of the police, said Prof Boey, and he hopes the detection system will be accurate enough to be used as court evidence.

Set up by NTU and the Economic Development Board, NanoFrontier aims to help other companies use nanotechnology - the science of very small particles - to develop new products and services, by providing the necessary equipment, facilities and consultation.

The company received a \$4 million boost yesterday, after signing two separate research agreements with Roar Particles and its sister company Analytical NanoTechnologies (ANTnano), also based in Britain.

Both companies share the same chief executive officer, Mr Joe Arend.

Both companies were set up to exploit the nanotechnology developed by Professor Fred Rowell of the University of Sutherland. While Roar Particles focuses on applications like fingerprint mining, ANTnano's research focuses on real-time detection of biochemicals.

The two-year agreements were announced on the London Stock Exchange yesterday.

Under the agreement with ANTnano, NTU will provide facilities and manpower for research into systems



DATA MINING: Investigators can find out a suspect's habits by using tiny nanoparticles on his fingerprint.

which can, for example, use nanoparticles to detect traces of toxins or other harmful substances in places such as chemical plants, or in the environment.

Mr Arend said working with a Singapore company will help it "fast track its research and development programmes" and help it take strategic advantage of growing Asian markets.

NTU will share ownership of any new intellectual property developed as a result of this collaboration.

melissat@sph.com.sg

Source: Singapore Straits Times

NUS Start-ups as a Pull for Industry Partnerships



- NUS Spin-off
- Software to tackle mobile phone thefts
- WaveSecure locks phone by remote control, backs up personal data to secure server and wipe out sensitive data on the phone
- Industry partnership with Nokia (symbian phones) and Windows (mobile phones)
- Launched in India and Pakistan through telcos



Mozat Pte Ltd



Initiative by Ph.D research scholar and faculty members since 2003

Provides solutions to bridge mobile devices and backend data sources

They created 'Morange', an integrated mobile office service platform which is extremely good for carriers and service providers to provide value-added services to individuals and enterprises.

Awards: Red Herring Award 2008, Golden Oliver Award from Sony-Ericsson in Beijing, "Featured Application of the Week" by Nokia, nominated "Top Innovator" in GSMA, Barcelona, Asia-Pacific ICT Award 2004

Grants/Funds: MDA/IDA Research Grant, EDB Seeds Capital, partner with Microsoft In Mobile Enterprise Solutions

- Signed an agreement with STC, the largest Telco in Saudi Arabia, to launch Morange in the local market in February 2008
- Signed an agreement with Etisalat, Egyptian Telco, to launch Morange



MOZAT PTE LTD won the Red Herring 100 Asia Award in 2008



Classic licensing

Pioneer Fibredrain

"Over the last 20 years, about 15 million metres of Fibredrain have been used in soil improvement projects in East and Southeast Asia, generating about \$600,000 in royalties."

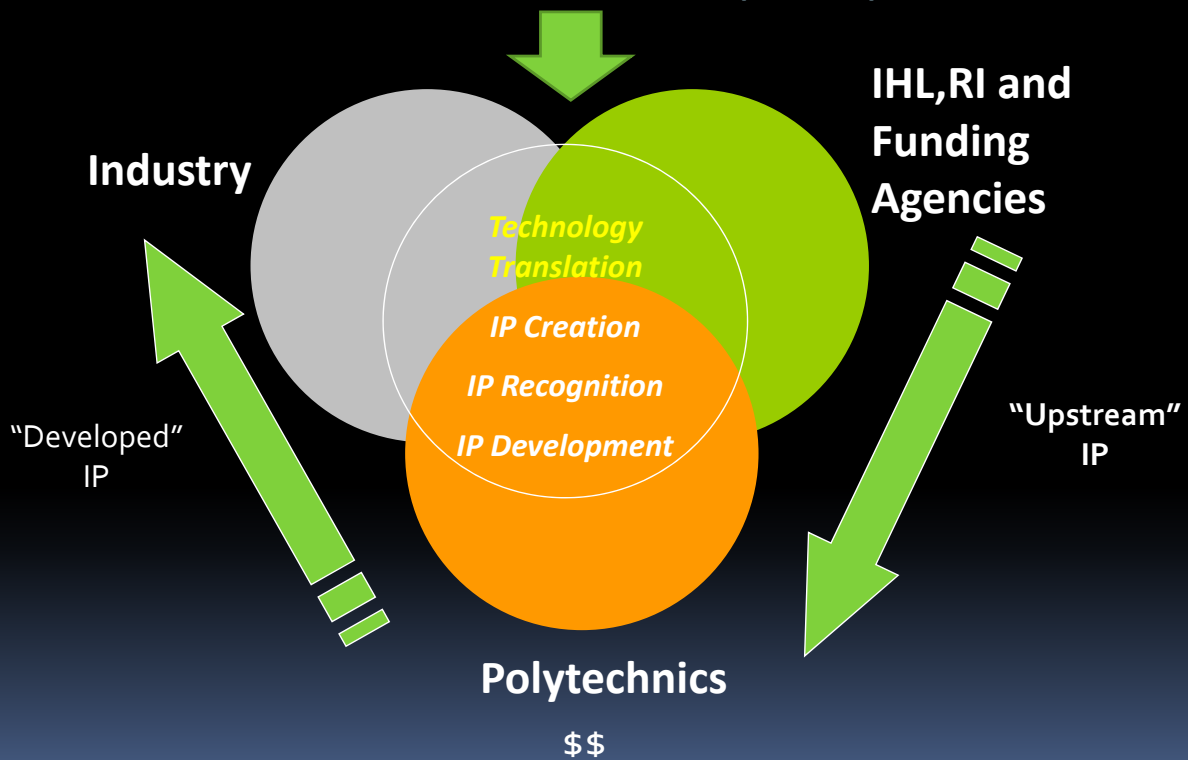
Emeritus Prof Lee Seng Lip and colleagues



From IHL perspective - Some of the Challenges . . .

- *Limited patent budget \$\$ - need to identify & build value asap*
- *Evaluating more complex early stage technologies*
- *Recruiting, motivating and retaining good technology transfer officers*
- *Managing Conflict of Interest*
- *Skepticism in Home grown technologies from spin-offs or startups*
- *Nurturing more spin-offs into successful SMEs for Singapore*
- *Managing expectations of stakeholders; Researchers, Management, Govt Agencies & Industry*

NRF's Translational R&D (TRD) Fund



Courtesy of Republic Polytechnic, Singapore

The Polytechnics in Singapore

- Five Polytechnics – same but different!
- **Republic Polytechnic** is Singapore's newest polytechnic (Formed August 2002)
- 30 diploma programmes; 13,000 students (rising)
- Problem Based Learning (PBL) curriculum
- Applied R&D for capability development, to assist local industry and to enrich curriculum
- Use "upstream IP" from Universities or A*STAR, or create new IP, so IP Management is a necessity.

Courtesy of Republic Polytechnic, Singapore

Polytechnics have Different Challenges

- Main purpose is to teach and develop workforce
- May have R&D Centres, but no “Profs”
- Almost all research is done part -time
- Very well equipped, good links to Industry and Business, as well as to IHLs and RIs
- Many PhD and Masters level staff
- Time is the main challenge
- Perceived value of applied research

Courtesy of Republic Polytechnic, Singapore

Translational R&D - Example

TRD Fund provides \$\$ for manpower

- New Project with NUS - patent on producing “enhanced silk” (stronger – technical textiles)
- Great interest from Industry but ***“too far away from market...need more proof on scale-up, applications and specifications”***
- RP’s **New Materials TDC** work on scale-up, R&D on **yarn and fabric**, new **composite materials** and rigorous testing

Courtesy of Republic Polytechnic, Singapore

Book Vending Kiosk Electronic Control System

Developed in conjunction with a local SME

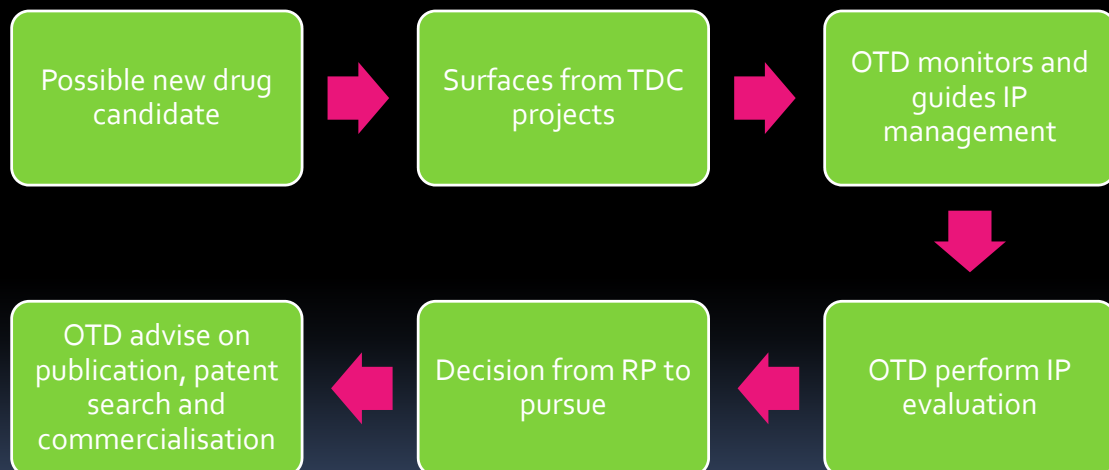
- IP mostly “know-how” - captured as circuit diagrams, component lay-outs, calibration and operations manuals, etc (copyright)
- Licensed to the SME for a one-off fee
- Retained rights to continue to develop similar (but not identical systems)
- Branding and recognition for RP

Courtesy of Republic Polytechnic, Singapore

High-End IP (pharma)

Active Early Engagement from OTD is key!

New IP created in-house - patentable



Courtesy of Republic Polytechnic, Singapore

IP Policy

IP Ownership:

IP developed by staff will be owned by RP when:

- as part of his duties;
 - in fulfillment of his contract of employment;
 - through the course of his participation in a research project of RP;
- or
- with the use of RP's Resources.

Revenue Sharing for Staff Members: 1/3 revenue share for inventors

**Recently reviewed and revised with assistance
of IPOS / SPRING Singapore SCOPE-IP®
initiative**

Courtesy of Republic Polytechnic, Singapore

Thank You For Your Attention

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