

## **PRESS RELEASE**

28 March 2008

### **RESEARCH, INNOVATION AND ENTERPRISE COUNCIL LAUNCHES A COMPREHENSIVE NATIONAL FRAMEWORK TO GROW INNOVATION AND ENTERPRISE**

- *The Research, Innovation and Enterprise Council (RIEC) approved the National Framework for Innovation and Enterprise to grow innovation and entrepreneurship in Singapore, especially academic entrepreneurship in the institutes of higher learning.*
- *The RIEC endorsed several programmes to strengthen Singapore's research capabilities, including two new Research Centres of Excellence and the development plan for Campus for Research Excellence And Technological Enterprise (CREATE) to house research centres from top universities in the world.*
- *The RIEC noted that the three strategic research programmes – Biomedical Sciences Translational and Clinical Research, Environmental and Water Technologies (Clean Water and Clean Energy), and Interactive and Digital Media – made remarkable progress over the last year.*
- *RIEC members also noted the success of the inaugural awards for the Competitive Research Programme Funding Scheme and NRF Research Fellowship.*
- *The RIEC approved more than S\$1 billion to support these initiatives for strengthening research, and growing innovation and enterprise.*

Chairman of the Research, Innovation and Enterprise Council (RIEC), Prime Minister Lee Hsien Loong, announced a comprehensive framework for advancing R&D-based innovation and enterprise in Singapore. The RIEC, which concluded its third meeting today, approved the S\$350 million National Framework for Innovation and Enterprise (or NFIE). This will support the government's efforts to make innovation and enterprise pervasive in Singapore. The framework will

encourage institutes of higher learning (IHLs) – universities and polytechnics – to engage actively in innovation and academic entrepreneurship<sup>1</sup> to bring their R&D results from the lab to the market.

2 RIEC Chairman, Mr Lee, said: “To develop a dynamic economy with a vibrant entrepreneurial sector, we need to make innovation a pervasive culture. We must generate and exploit a continuing stream of new ideas, especially from R&D. We have already made a strong start promoting R&D. Now we are taking the next step to create an innovation-driven economy. This framework will reinforce Singapore’s standing as a vibrant R&D hub, and help to make us a centre for innovation and enterprise.”

### **Growing Innovation and Enterprise through Academic Entrepreneurship**

3 The RIEC recognised that the National Research Foundation (NRF) has invested heavily to strengthen the research capacity and capability of Singapore’s IHLs, as well as develop indigenous R&D talent. The next step is to exploit the knowledge created from these research efforts to benefit our society and economy. The RIEC saw the need to develop within our IHLs a culture of innovation and academic entrepreneurship, which has made universities like Stanford and Berkeley vital parts of the enterprise eco-system in Silicon Valley. This is also how in Israel the Hebrew University and Technion have contributed to the rapid development of Israel’s high-tech industry.

4 To grow innovation and enterprise through academic entrepreneurship in Singapore, the RIEC approved a five-year (2008-2012) budget of S\$350 million to support initiatives set out under the NFIE. These are described as follows (see **Annex A** for more details):

- a. An **Innovation Fund** will be set up in the National University of Singapore (NUS), Nanyang Technological University (NTU) and Singapore Management University (SMU) to support activities related to innovation and enterprise. These could include establishing entrepreneurship education programmes, setting up technology incubators, and having experienced entrepreneurs-in-residence on campus to interact with students and faculty. The use of the Innovation Fund will be governed by a high-level **Enterprise Board**, which will be formed to drive academic entrepreneurship efforts in the universities.
- b. To spur the formation of start-up companies, funding will be provided for various **enterprise support structures**, such as proof-of-concept studies and technology incubator programmes, which will bridge the gap between university research and market needs. In addition, several early stage

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<sup>1</sup> Academic entrepreneurship is broadly defined as the involvement of academics, scientists and researchers in innovative activities with economic or societal impact.

- venture capital (VC) funds, managed by professional VCs, would be set up with matching investments from the government. These funds would invest in technology-based start-up companies in Singapore, particularly those linked to the IHLs.
- c. A **translational R&D grant** will be created to encourage polytechnics to build on technologies from the universities and public research institutes, and bring these closer to commercialisation.
  - d. An **Innovation Vouchers Scheme** will be set up for SMEs to procure R&D and other services from IHLs and public research institutes.
  - e. An **Innovation Policy Centre** will be set up to carry out studies in innovation for the government and industry.
  - f. A **national framework of intellectual property (IP) principles** for publicly-funded R&D will be developed to support the process of technology transfer.

### **Need for sustained support for R&D efforts**

5 While the NFIE will help push innovation as a driver for economic growth, the RIEC noted that it was important to continue to strengthen Singapore's research capabilities. Two new Research Centres of Excellence (RCEs) – the Cancer Research Centre of Excellence, hosted at NUS, and the Earth Observatory of Singapore (EOS), hosted at NTU – will be established. A total of S\$256 million has been committed to the Cancer RCE over seven years, with S\$172 million from NRF and the Ministry of Education (MOE). For the EOS, S\$287 million has been committed over a 10-year period, with S\$150 million from NRF and MOE. (See **Annex B** for more details on the RCEs.)

6 The RIEC endorsed the development plan for the Campus for Research Excellence And Technological Enterprise (CREATE) to house research centres of top universities from around the world. A sum of S\$360 million has been set aside for the design and construction of CREATE, which will pioneer the use of energy efficient technologies for buildings in the tropics. (See **Annex C** for more details on CREATE.)

7 The RIEC noted the remarkable progress made in the three strategic research programmes – Biomedical Sciences Translational and Clinical Research (BMS TCR), Environmental and Water Technologies (EWT – Clean Water and Clean Energy), and Interactive and Digital Media (IDM). The RIEC also noted the success of the inaugural awards for the Competitive Research Programme Funding Scheme and NRF Research Fellowship, and suggested that Singapore should redouble its effort to attract and retain young capable research

scientists from around the world, including Singapore researchers overseas.  
(See **Annex D** for more details.)

8 The RIEC will meet in 2010 for its fourth meeting in Singapore.

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**Initiatives under the National Framework for Innovation and Enterprise**

***Overview of Framework***

1. The National Framework for Innovation and Enterprise (NFIE) will build on the strong R&D foundation established through earlier investments in R&D to develop innovation and enterprise in Singapore. A key focus of the framework is on developing academic entrepreneurship in the IHLs. A sum of S\$350 million over five years (2008 – 2012) is allocated to fund the initiatives under NFIE.

***NFIE Initiatives***

2. The NFIE initiatives are tabulated below. These initiatives will be launched over the course of the year. Details of each initiative will be available then.

<b>Establishing Support for Academic Entrepreneurship in Universities (S\$50 million)</b>	
<b>Initiative</b>	<b>Details</b>
<b>Establishment of University Enterprise Boards</b>	<ul style="list-style-type: none"><li>• A high-level Enterprise Board will be set up in each university to drive innovation.</li><li>• The Enterprise Board will be formed from a subset of the university's Board of Trustees and may include other members with relevant experience.</li><li>• The Enterprise Board will manage the university's Innovation Fund.</li></ul>
<b>Innovation Funds for Universities</b>	<ul style="list-style-type: none"><li>• An Innovation Fund will be established in each university to supplement the universities' internal funding for innovation and entrepreneurship activities.</li><li>• The Innovation Fund will fund entrepreneurship education, technology incubators, entrepreneurs-in-residence and other programmes, to promote commercialisation of university technologies.</li><li>• Universities will propose the activities that are to be funded by the Innovation Fund.</li></ul>

<b>Creating Enterprise Support Structures (S\$160 million)</b>	
<b>Initiative</b>	<b>Details</b>
<b>Proof-of-Concept Grants</b>	<ul style="list-style-type: none"> <li>• A proof-of-concept is generally needed to show that a technology works and has potential for commercialisation.</li> <li>• The grant provides funding for researchers based in IHLs to develop such proofs-of-concept for their technology ideas.</li> <li>• Each grant will be up to a maximum of S\$250,000.</li> </ul>
<b>Technology Incubation Scheme</b>	<ul style="list-style-type: none"> <li>• Technology incubators provide the environment for the systematic nurturing of young companies before they are ready for venture capital funding.</li> <li>• The scheme provides 85% co-funding, up to S\$500,000, for companies accepted into technology incubators set up in the IHLs, in exchange for equity stake in the company.</li> <li>• Co-investors have the option to buy out NRF's share of the company at the next round of financing.</li> </ul>
<b>Early-Stage Venture Funding</b>	<ul style="list-style-type: none"> <li>• There is a dearth of VCs to fund early-stage companies.</li> <li>• The scheme will seed the development of a number of early-stage VC funds to plug this gap.</li> <li>• NRF will match 1:1 the funds raised by VCs.</li> <li>• Funds will be managed by professional VCs, and will invest only in Singapore-based high-tech start-ups.</li> </ul>
<b>Disruptive Innovation (DI) Incubator</b>	<ul style="list-style-type: none"> <li>• An incubator, based on the disruptive innovation<sup>2</sup> (DI) methodology of Prof Clayton Christensen, will be set up to identify companies that have the potential to disrupt a current industry and create new ones.</li> <li>• NRF will support the incubator on a 1:1 co-funding basis.</li> <li>• The investment committee will evaluate the start-ups based on disruptive innovation criteria. The start-ups will be nurtured using the DI methodology.</li> <li>• A significant proportion of start-ups will be sourced from IHLs.</li> </ul>

<sup>2</sup> *The Innovator's Dilemma* by Clayton M Christensen.

<b>Enhancing Technology Transfer (S\$125 million)</b>	
<b>Initiative</b>	<b>Details</b>
<b>Translational R&amp;D Grants for Polytechnics</b>	<ul style="list-style-type: none"> <li>• Polytechnics play an important role in technology transfer to bring university research closer to market.</li> <li>• The grant will support polytechnics to perform translational research on the R&amp;D output from universities and research institutes (RIs).</li> <li>• It will encourage universities and RIs to work with polytechnics as strategic partners to bring research breakthroughs to the marketplace.</li> </ul>
<b>National IP Principles for Publicly-funded R&amp;D</b>	<ul style="list-style-type: none"> <li>• A set of principles, guidelines and best practices will be provided for the identification, ownership, protection and exploitation of intellectual property arising from publicly-funded research.</li> <li>• These principles serve to promote the use of IP from publicly-funded research; encourage participation of local businesses and promote industry-IHL collaboration.</li> </ul>
<b>Innovation Vouchers Scheme</b>	<ul style="list-style-type: none"> <li>• Innovation Vouchers will be given to SMEs to procure R&amp;D and other services from IHLs and public research institutions.</li> <li>• A list of services that could be procured with these vouchers will be released when the scheme is launched later this year.</li> <li>• The scheme will encourage SMEs upgrade their operations through R&amp;D projects with IHLs and public research institutes.</li> </ul>
<b>Industry Proof-of-Concept and Technology Incubation Scheme</b>	<ul style="list-style-type: none"> <li>• These are similar to the schemes above but are not restricted to the IHLs.</li> </ul>

<b>Supporting Innovation Policy Studies (S\$15 million)</b>	
<b>Initiative</b>	<b>Details</b>
<b>Innovation Policy Centre</b>	<ul style="list-style-type: none"> <li>• A national centre for innovation studies will be set up.</li> <li>• It will propose policies and initiatives to encourage innovation in both private and public sectors.</li> <li>• Some examples of projects that the centre could undertake are: Setting up a National Innovation Index, technology forecasting, IP mapping, etc.</li> </ul>

**(1) Fact sheet on the Cancer Centre of Excellence**

***Aim***

1. The Cancer Research Centre of Excellence (RCE) at the National University of Singapore (NUS) will adopt a multifaceted and coordinated approach to cancer research, extending from basic cancer studies all the way to experimental therapeutics. The vision is to make the Cancer RCE one of the top cancer research centres in the world, with highly interrelated programmes leading to an integrated approach to better understand and treat cancer.

***Background***

2. Established with a total funding of \$256m over seven years, the Cancer RCE will focus on five key areas – cancer stem cells, cancer biology, cancer epigenetics, cancer genomics and experimental therapeutics.
3. Although the Cancer RCE will focus on cancers endemic to Asian populations such as gastric, colorectal, leukaemia and breast cancers, these advances will be applicable to cancers around the world, thereby providing an opportunity for Singapore to be a world leader in cancer biology and treatment. In addition, the Cancer RCE will play a critical role in linking up the various cancer research efforts within Singapore at the NUS, National University Hospital (NUH), National Cancer Centre (NCC), Genome Institute of Singapore (GIS), the Institute of Molecular & Cell Biology (IMCB), the Experimental Therapeutics Centre (ETC), the Johns Hopkins Singapore International Medical Centre, Duke-NUS Graduate Medical School and the Ludwig Institute of Cancer Research (LICR). The RCE will also play a significant role in education at the NUS.

***Centre Director***

4. The Cancer RCE will be led by Professor Daniel Tenen from Harvard Medical School. Professor Tenen is a leader in the field of transcriptional regulation, hematopoiesis and cancer. A team of distinguished scientists from top academic institutions worldwide has been recruited to lead programmes at the RCE.

**(2) Fact sheet on the Earth Observatory of Singapore**

***Aim***

1. The Earth Observatory of Singapore (EOS), a Research Centre of Excellence (RCE) at the Nanyang Technological University (NTU), aims to be a pre-eminent world institution for understanding and addressing several of civilisation's most serious environmental threats.

***Background***

2. We suffer increasingly from earthquakes, tsunamis, volcanic eruptions, and climate change because we continue to have both fundamental misunderstandings of, and a general indifference toward, how the planet works. Many Southeast Asian cities are, for example, expanding unwittingly on coastal plains that are prone to tsunamis, powerful storm surges or sea-level rise. Earthquake faults like the ones that plunge into the earth from the sea floor at the Sunda and Manila trench threaten millions of people in the coastal cities of Sumatra and the South China Sea. Chains of active volcanoes that arc through Indonesia and the Philippines are slumbering menaces to the region and in some cases even to the world at large. Sea level rise and changes in precipitation, temperature and seasonality, all due to global warming, pose threats to the large cities. Most of these hazards are at present very poorly characterised.
3. Established with a total funding of S\$287m over a period of 10 years, the EOS' three main arenas of basic and applied research are tectonic, volcanic and climatic. Through fundamental knowledge of Southeast Asia's dynamic oceans, atmosphere and tectonic plates, the Observatory will inspire and enable new approaches to ensure the stability, prosperity, sustainability and vitality of Southeast Asia through the coming decades and centuries.

***Centre Director***

4. Professor Kerry Sieh will be the founding Director of the EOS. He is currently a chaired professor in Caltech's Tectonics Observatory and is a member of the US National Academy of Sciences. Professor Sieh will become a full-time NTU professor from July 2008. Twenty NTU faculty members will form the core academic base of the EOS. Most of these will be earth scientists, but several will be experts in related disciplines such as computer and earthquake engineering, public policy and economics.

**Update on CREATE**

***Aim***

1. The Campus for Research Excellence And Technological Enterprise (CREATE) aims to be a world-class research facility in a tropical garden setting. Co-located with NUS' University Town at the former Warren golf course, CREATE will host research centres which will undertake cutting-edge research in areas that are aligned to Singapore's strategic interest and those of the research institutions.

***Design of CREATE***

2. As a magnet for global research talent, the architecture of CREATE will focus on the core values of collaboration and sustainability. The campus would be designed to inspire interaction beyond the laboratories by weaving form, space and light into places to foster teamwork and communication. There will be purpose-built labs grouped together in research themes to encourage interaction and collaboration. Flexibility in design will also be sought to allow these labs to support different research programmes, research group size and configurations. As a whole, the campus will have facilities which will be managed centrally and shared by all the entities in CREATE.
3. The design of CREATE will pioneer the use of environmental sustainability and energy efficient technologies in buildings in the tropics. CREATE will push the boundaries of conventional lab design. Traditional labs are wide and divided by building cores and internal central corridors. At CREATE, where the buildings are very narrow, the cores and corridors will be located at the perimeter to maximise daylight. The use of photovoltaic panels on building facades and roofs is being explored to potentially provide an opportunity for test-bedding the latest solar technologies. Dependence on municipal water will partly be reduced by the collection, storage and treatment of both rainwater and grey water from showers and lavatories.

***Architect for CREATE***

4. Perkins+Will's San Francisco office in California, USA, led by managing director Russell Drinker, is behind the planning and architectural design services. The firm is renowned for its sustainable design and laboratory design. It has won over 100 design awards in the last five years and five Lab of the Year awards from R&D magazine. Perkins+Will will work with Singapore partner DP Architects.

**ANNEX C**



Figure 1: Aerial view of CREATE

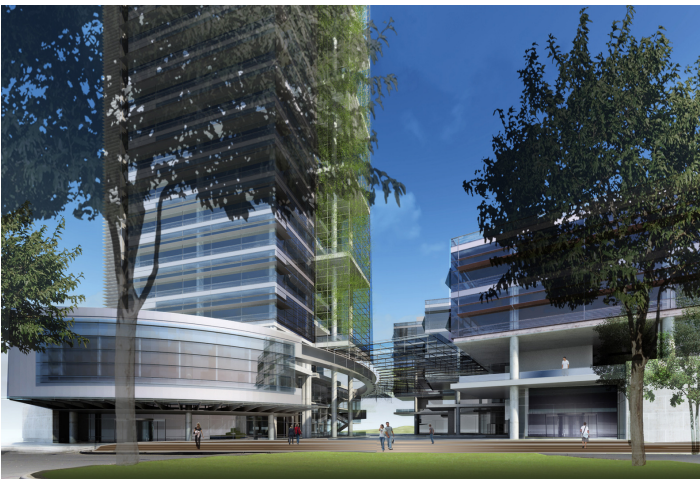


Figure 2: View North from bus-stop



Figure 3: Lab image

**Progress made in Biomedical Sciences Translational and Clinical Research**

1. The BMS Exco has taken several approaches to develop our Translational and Clinical Research (TCR) capabilities. These include building world-class research programmes in strategic disease areas, attracting top talent and developing a pipeline of research manpower, and ensuring sufficient range and volume of research infrastructure sited at key medical campuses.
2. To develop a critical mass of high-quality human capital for TCR, a career path for clinician-scientists has been developed by means of several schemes. These include the Singapore Translational Research (STaR) Investigatorship Award which aims to identify and recruit world-class clinician scientists; the Clinician-Scientist Award (CSA) which buys out time for outstanding individuals to conduct research; and the NRF-MOH Healthcare Research Scholarship which funds PhD training for selected specialist trainees.
3. To establish Singapore as a leader in a number of strategic disease-oriented areas, the TCR Flagship Programme was launched to support research that facilitates the translation of basic science advances into clinical applications. The inaugural TCR grant was awarded in July 2007 to the Singapore Gastric Cancer Consortium. The other four flagship programmes on neurosciences, eye diseases, infectious diseases and cardiovascular/metabolic disorders are expected to be awarded in 2008.
4. To encourage exploratory research and provide opportunities for young investigators to carry out independent work, an Exploratory/Developmental Grant Programme was established. This grant enables clinician researchers to obtain preliminary data as the basis for applying for larger grants. A sub-category of the programme – New Investigator Grant – targets young investigators who have not held a national grant before.
5. To bridge the gaps in research infrastructure for TCR, funding support was provided to develop the necessary infrastructure in the Kent Ridge and Outram Campuses. This includes co-funding each Campus to develop one new research building, enhancing and expanding animal research facilities and developing an Investigational Medicine Unit to provide supporting infrastructure for clinician investigators.
6. To facilitate success in the BMS initiative, it is crucial to establish best enabling resources for TCR, such as in the area of Bioethics. The Centre for Biomedical Ethics in NUS headed by eminent bioethicist Prof Alastair Campbell was given funding support to achieve this. Key initiatives include strengthening clinical ethics training and support, educating the public, and creating a regional and international centre of excellence.

**Progress made in Environmental and Water Technologies**

***Clean Energy***

1. Since its inception in 2007, the Clean Energy Programme Office (CEPO) has launched various initiatives aimed at kick-starting the growth of the CE industry (with an emphasis on solar energy) and encouraging R&D in new CE technologies for the market. The target is to achieve S\$1.7 billion of value-added and 7,000 jobs in the CE sector by 2015.
2. The S\$50 million Clean Energy Research Programme was launched in October 2007 to fund outstanding research proposals in CE. Open to both the public and private sectors, this competitive funding scheme will build local R&D capabilities in CE.
3. Under the S\$84 million Research Centres for Clean Energy scheme, world-class research centres specialising in cutting-edge CE technologies will be established in Singapore. These would advance the three interlinked activities of performing R&D, training skilled manpower as well as collaborating with the industry. In doing so, they will become a main attraction factor for international companies and research institutes in the CE space to set up in Singapore. The first institute in the scheme, the Solar Energy Research Institute of Singapore (SERIS) was launched in February 2008. Professor Joachim Luther, ex-Director of renowned Fraunhofer Institute for Solar Energy Systems (ISE) in Germany, will head the centre.
4. To support young talents interested in pursuing graduate studies and careers in the CE sector, S\$25 million has been set aside for graduate scholarships to support about 120 students in local and overseas universities. NUS and NTU will begin to offer specialised CE courses for final-year engineering students from mid-2008, while Singapore, Ngee Ann, Nanyang and Temasek Polytechnics will offer Clean Energy Diploma courses in 2008 or 2009.
5. There has also been considerable success in attracting investments to Singapore across the entire CE value chain. For upstream research, Bosch has selected Singapore for its corporate laboratory specialising in organic photovoltaics R&D, while Oerlikon, a leading Swiss solar equipment company, has decided to set up a global manufacturing and R&D hub for solar manufacturing equipment in Singapore. A strategic solar project was also secured when Renewable Energy Corporation (REC), a fully integrated solar company from Norway, selected Singapore to build the world's largest integrated solar manufacturing complex with a S\$6.3 billion investment. This project catapulted Singapore onto the world solar industry map and generated strong worldwide interest in the Singapore solar industry.

***Clean Water***

1. The aim of the Environment and Water Industry Development Council (EWI) is to develop Singapore as a global hydro-hub. With S\$330 million funding from the National Research Foundation, the target is for value-added (VA) contribution from the water sector to reach S\$1.7 billion and jobs in the water sector to reach 11,000 by 2015.
2. To expedite EWT R&D in Singapore, the S\$100 million Environment & Water Research Programme (EWRP) was launched. In the 1st EWRP open grant call, 18 projects were awarded total funding support of S\$11 million in April 2007. The first grant call saw proposals from a diverse range of research areas, from water quality monitoring and sensing, to membrane technology, water and used water treatment.
3. The first recruitment exercise for the NRF (EWT) PhD Scholarships in May 2007 saw two candidates out of 22 applicants being awarded local PhD scholarships. The number of applications has risen to more than 60 for the second recruitment exercise which closed in January 2008, as a result of a widened outreach to the international community and overseas Singaporeans, and heightened awareness in career opportunities in the local water industry.
4. To meet the needs of a growing EWT industry, three world-class water R&D centres were secured in 2007, namely the Singapore-Delft Water Alliance (SDWA), the DHI-NTU Water & Environment Research Centre and Education Hub and the Singapore Membrane Technology Centre (SMTC). These centres will train research and professional manpower for the water industry in Singapore.
5. In the past year, EWI also worked together with the Economic Development Board of Singapore to successfully secure commitments from international companies to locate or expand their R&D centres or regional headquarters in Singapore. This included Black & Veatch's Global Design Centre and the Siemens Water R&D Centre. Besides anchoring foreign industry players in Singapore, local water companies like Hyflux and Keppel have also invested extensively in R&D to boost their engineering capabilities and technologies to sustain their competitive advantage in a heavily technology-driven industry.
6. On the export front, Singapore-based water companies have made significant headway in their overseas ventures. China and Singapore also signed a pact to build a joint eco-city in Tianjin, Northern China, which will be developed by consortia from China and Singapore, with Singapore's Keppel Corporation taking a leading role.

**Progress made in Interactive and Digital Media**

1. Since the IDM Strategic Programme commenced in 2006, the IDM R&D Programme Office (IDMPO) as well as other partner agencies have put in place various schemes and initiatives to realise the goal of creating a thriving IDM R&D ecosystem as the source of innovation for the IDM sector. This S\$500 million investment in IDM R&D aims to help the IDM sector grow from a base of S\$4.2 billion in 2005 to \$10 billion in value-added by 2015, with 10,000 new jobs created.
2. In 2007, the IDMPO funded 94 projects started by four groups – Institutes of Higher Learning (IHLs) and research institutes, schools, industry, and individuals and start-ups. Collectively, they are expected to deliver some 100 new products and services, and engage about 900 researchers and engineers. These research projects focus on three broad areas: Animation, Games & Effects; Intermediary services (which refer to technical capabilities in the organisation, distribution and security of digital media); and On-the-Move Technologies (which identify new ways of reaching and interacting with mobile-connected people who are always on the move).
  - a. IHLs, research institutes and schools  
Over the last year and half, most of the local IHLs have established centres, initiatives and courses focusing on IDM. In FY07, IDMPO awarded these institutions funding for 21 projects. The goal of attracting a network of international research centres from the US, Europe and Asia doing cutting-edge IDM R&D is also taking shape. In addition to the GAMBIT Game Laboratory with MIT, the Chinese Academy of Sciences has also established its first overseas R&D institute in Singapore. The objective is to have about eight centres eventually.
  - b. Industry  
In 2007, IDMPO, through the efforts of EDB, IDA and MDA, secured 23 industry IDM R&D projects with an estimated Total Business Spending<sup>3</sup> of some S\$126 million. Although it is still in the early stage, several industry R&D companies are receiving attention for their work.

International companies such as EON Reality and Motorola have also set up media R&D activities. Local flagship media companies such as SPH and MediaCorp are also engaging in IDM R&D and are beginning to build up their capabilities through R&D partnerships with local and overseas research institutes.

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<sup>3</sup> Total Business Spending refers to (Total Operating Costs) – (Work Subcontracted Out to Foreign Parties) – (Royalties Payments to Foreign Parties). In addition, TBS excludes any business spending incurred outside of Singapore.

c. Individuals and Start-Ups

A flurry of grassroots innovation has been unleashed through IDM efforts with individuals. In FY07, 10 incubators collectively committed to help incubate more than 400 projects over the next three years. Their efforts are expected to provide more than 1000 individuals with hands-on experience in running start-ups, and also help draw talent from a diverse pool of individuals going even beyond Singapore.

d. Education

For IDM in Education, MOE has awarded nine research-based projects with a total budget of S\$9.1 million. An example is the National Institute of Education's collaboration with California-based SRI International on a collaborative tool for teaching and learning called Group Scribbles. MOE has selected five FutureSchools – two of which have been awarded NRF funding, namely, Beacon Primary and Jurong Secondary. S\$11.5 million has been committed to these two projects.

3. IDM has attracted increasing grassroots interest and buzz, with numerous reports in both local and international media. There was also a marked increase in the number of high-profile international and regional IDM-related events. This vibrancy will be sustained in FY08, with the foremost IDM technical conference SIGGRAPH Asia and the International Symposium of Electronic Arts, gracing our shores.
4. With the strategic thrusts established, the focus in FY08 would be on execution, drawing out the talents and building up the R&D capacity. The IDM Strategic Programme will explore new strategies to better interlock the various pieces of the IDM R&D ecosystem to deliver the vision of Singapore as a global IDM capital.
5. The [Advisory Council on the Impact of New Media on Society \(AIMS\)](#) was formed in April 2007 by the Ministry of Information, Communications and the Arts (MICA), to study the far-reaching social, ethical, legal and regulatory implications of a rapidly-growing IDM sector. AIMS is committed to delivering its recommendations to the government by the end of 2008.

**Update on Competitive Research Programme Funding Scheme**

1. The Competitive Research Programme (CRP) Funding Scheme complements the existing top-down approach of Strategic Research Programmes, by funding a broad base of research ideas, through a competitive bottom-up approach. This will help to identify potential strategic research areas which Singapore can invest in to develop core capabilities for industries in the future.
2. The CRP Funding Scheme supports R&D programmes, each comprising multiple related projects under a unifying theme. Each award is for a maximum of S\$10 million per programme, over three to five years. Open to both public and private sector participants, the CRP Funding Scheme aims to encourage collaboration and partnerships between academia and industry.
3. The CRP Funding Scheme involves a two-stage proposal submission process. Proposals submitted are evaluated by an NRF-appointed Local Evaluation Panel in the first stage and sent for international peer review before the final confirmation of awards. The final evaluation of proposals will be made by an eminent CRP International Evaluation Panel (IEP).
4. The inaugural grant call, launched in April 2007, attracted 124 applications submitted by Singapore-based researchers from local universities, public sector research entities as well as private sector companies. The proposals ranged across various disciplines of science and technology. Seventeen preliminary proposals were selected to be developed into full proposals. These full proposals were internationally peer-reviewed. The IEP met to review the full proposals and recommended six for funding.
5. The six programmes awarded funding by NRF are (in alphabetical order):
  - Artificial mesoscopic structures for next generation electronic and photonic technology (PI: A/Prof Ting Mei, NTU);
  - Combined-cycle solar energy self-sustaining membrane distillation (MD) and membrane distillation bioreactor (MDBR) water production and recycling system (PI: A/Prof. Fook Hoong Choo, NTU);
  - Graphene related materials and devices (PI: A/Prof Kian Ping Loh, NUS);
  - Lipidomics: Novel tools and applications (PI: A/Prof Marcus Wenk, NUS);
  - Molecular engineering of membrane materials research and technology for energy development: Hydrogen, natural gas and syngas (PI: Prof Tai-Shung Neal Chung, NUS); and
  - Multi-functional spintronic materials and devices (PI: A/Prof Jun Ding, NUS).

**Update on NRF Research Fellowship**

1. The NRF Research Fellowship provides attractive funding to brilliant, young scientists from all over the world to carry out independent, cutting-edge research in Singapore. This will build up a pool of bright, passionate researchers in various fields to augment Singapore's research talent pool.
2. Open to all areas of science and technology with no quota on specific disciplines, the NRF Research Fellowship provides appointed Fellows with a research grant of up to US\$1.5 million over three years with the option of a second round of three-year funding provided at the discretion of NRF to support projects that exhibit a high likelihood of a research breakthrough.
3. Each appointed Fellow can choose the host organisation to work in. His/her salary will be covered over and above the research grant, pegged to that of an Assistant Professor at a local university.
4. A Review Panel comprising representations of local research organisations will shortlist applicants who qualify. Short-listed candidates will be invited to Singapore to present their proposals and visit local research organisations to identify potential hosts. The NRF Scientific Advisory Board (SAB) will interview the short-listed candidates and make the final selection of applicants.
5. The inaugural grant call, launched in May 2007, received a total of 136 applications worldwide. After two stringent rounds of selection, 18 candidates were short-listed to come to Singapore for an interview. The SAB finally selected 10 as the inaugural group of NRF Research Fellows.
6. The candidates (listed in alphabetical order by last name) are:
  - Dr Chen Hong (China, Associate Research Scientist at Yale);
  - Dr Jose Dinneny (USA, Post-doctoral research fellow at Duke);
  - Dr Gijsbert Grotenbreg (Netherlands, Post-doctoral research fellow at MIT);
  - Dr He Yingxin (China, Assistant Professor at NUS);
  - Dr Hong Soon Hyeok (South Korea, Post-doctoral researcher at UCLA, now at Materia Inc.);
  - Dr Eugene Makeyev (Russia, Post-doctoral research fellow at Harvard);
  - Dr Barbaros Özyilmaz (Germany, Assistant Professor at NUS);
  - Dr Christos Panagopoulos (Greece, Royal Society University Research Fellow at Cambridge);
  - Dr Yeo Yee Chia (Singapore, Assistant Professor at NUS); and
  - Dr Steve Zhou Jian Rong (China, Post-doctoral associate at University of Illinois at Urbana-Champaign).