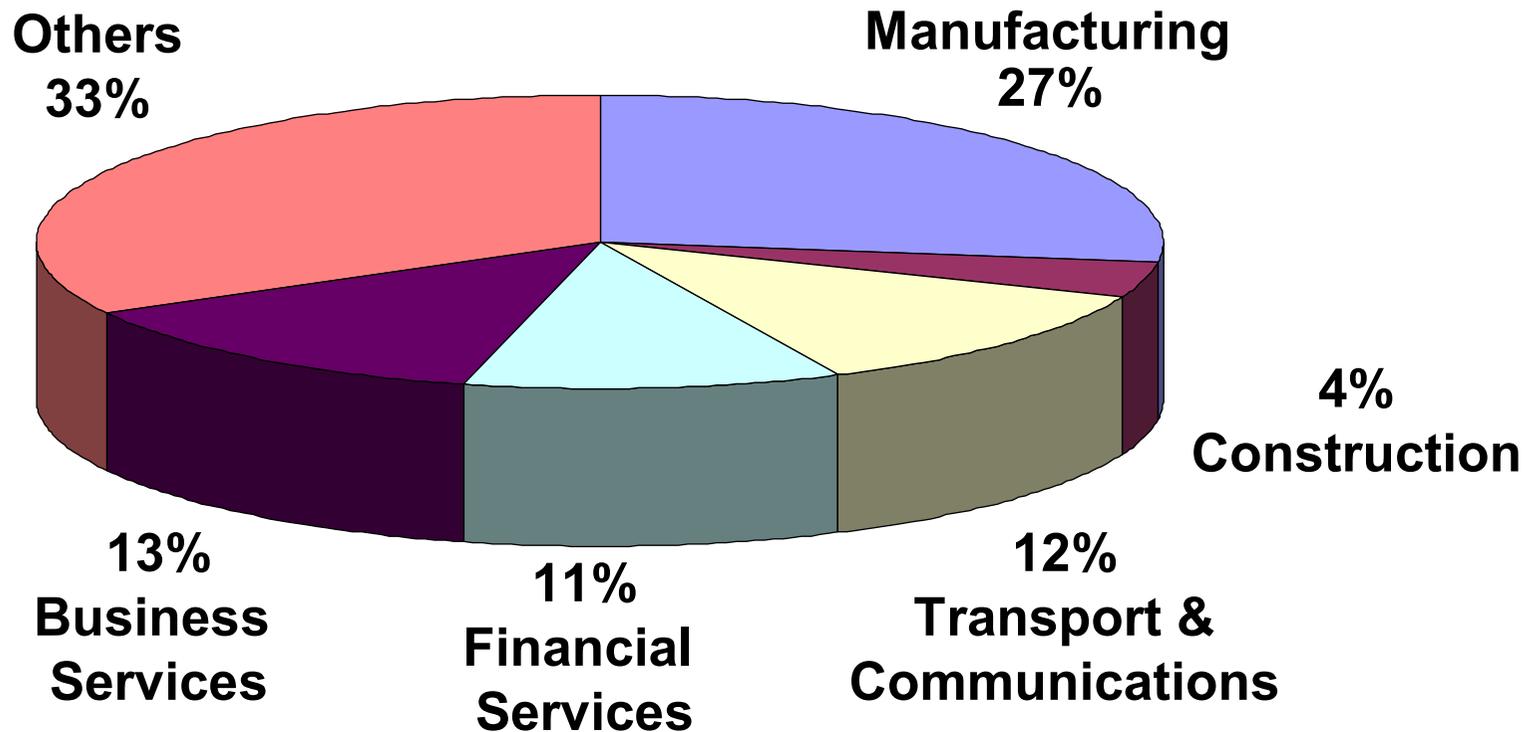


**Presentation at the
International Conference
on Science & Technology
for Sustainability 2006**

SINGAPORE
The Biopolis of Asia

Singapore's economic structure today

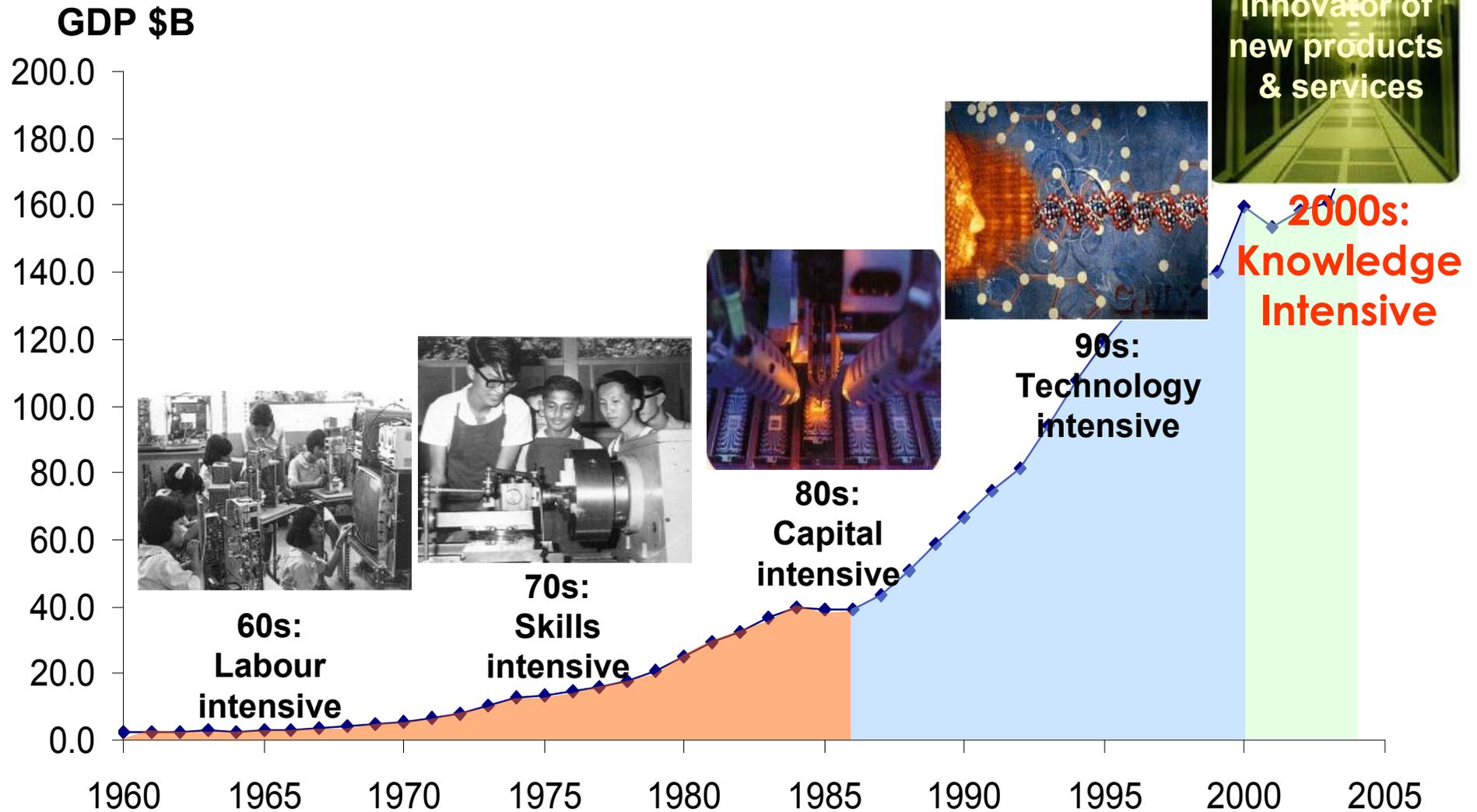
2005 GDP: S\$194 billion



- 4.24 mil population
- More than 7,000 Multinational Corporations

Singapore's industrial transformation

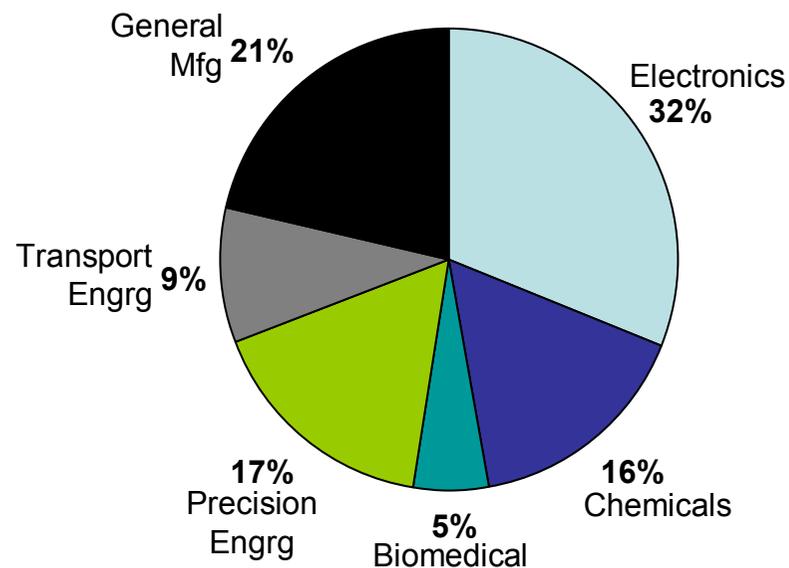
Adding knowledge and innovation as drivers for growth



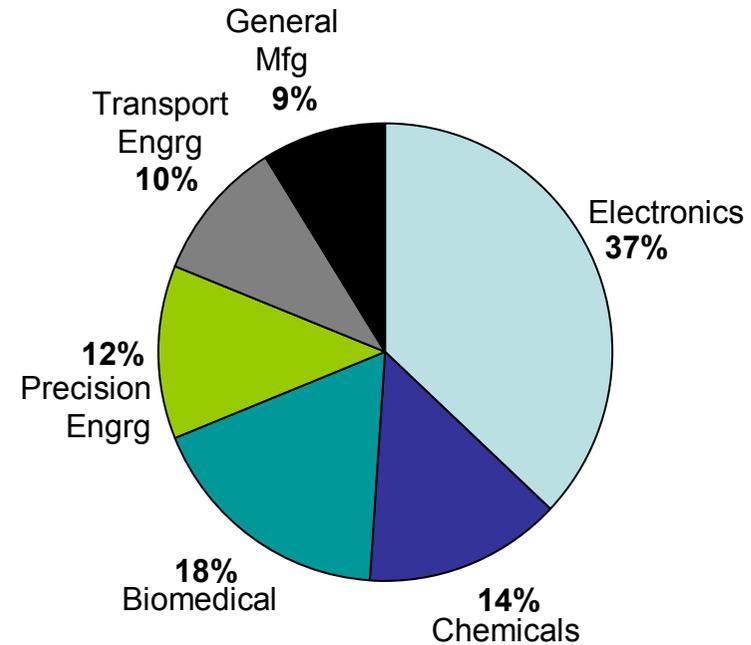
Sustainable economic growth

Through “portfolio diversification”

**1990 Manufacturing
Value-added = \$16B**



**2005 Manufacturing
Value-Added = \$50B**

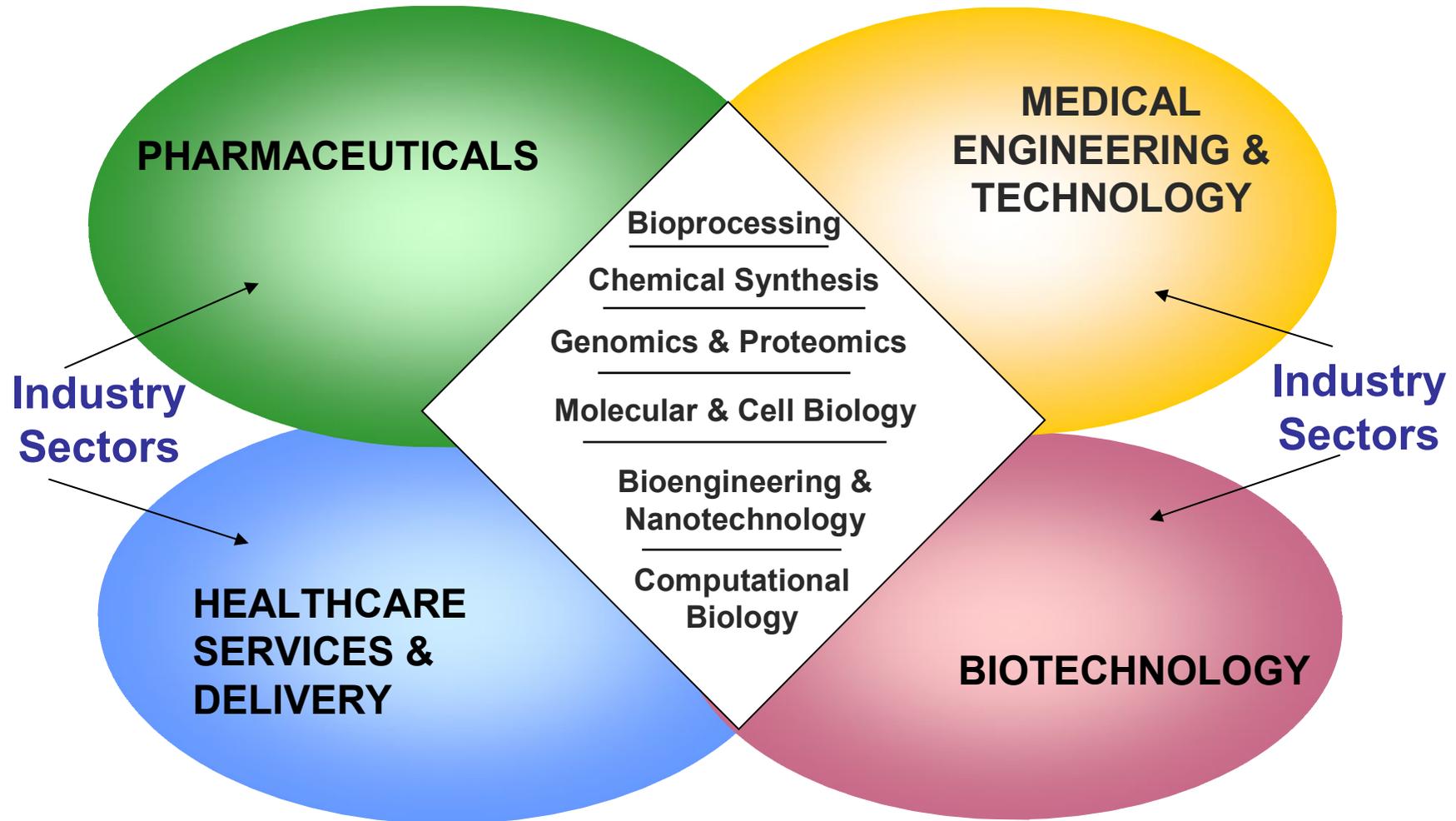


Figures updated February 2006

VA = Net operating surplus + Depreciation + Remuneration + Indirect Taxes

Developing the Biomedical Sciences sector

Focus area since year 2000



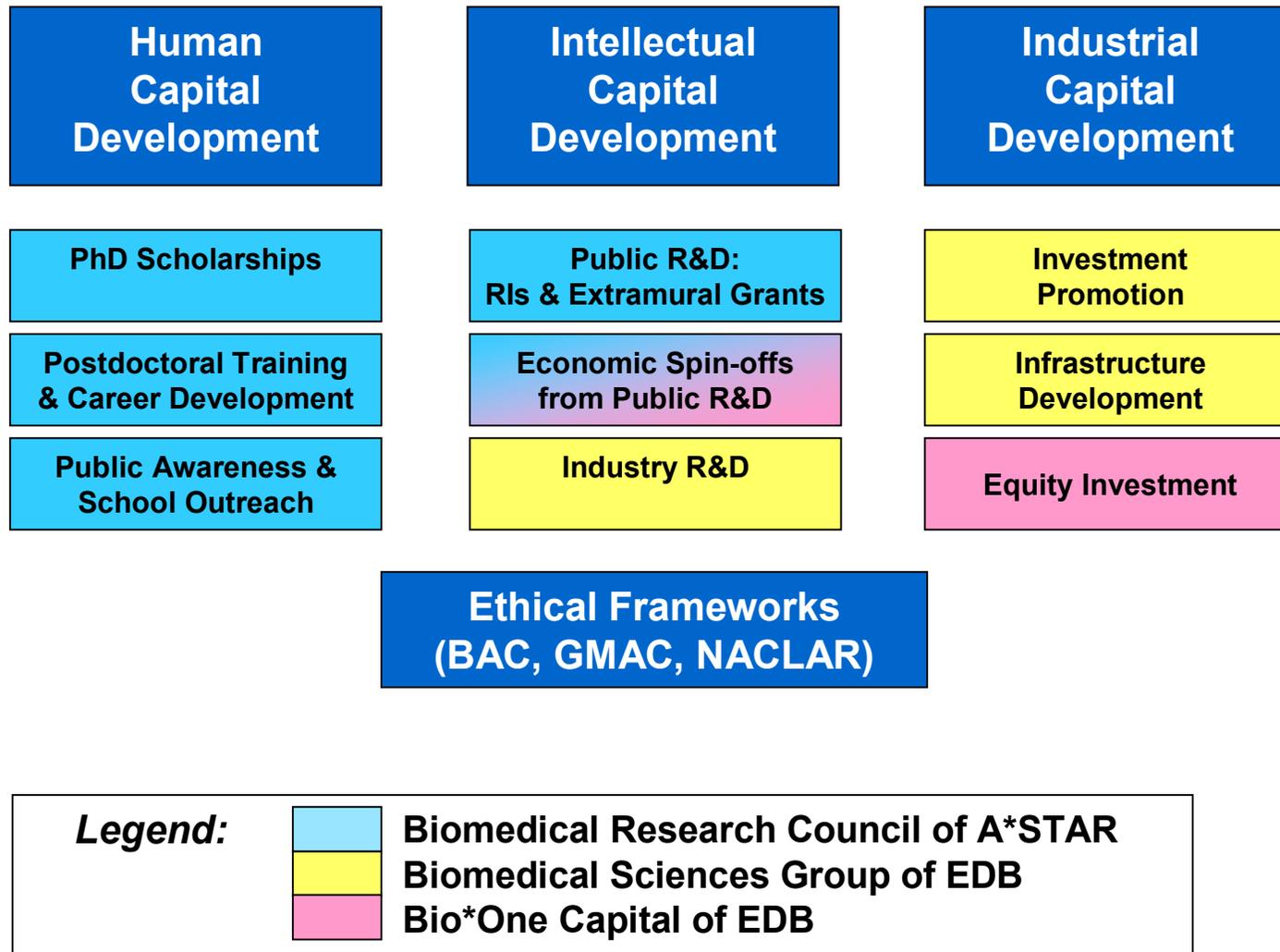
Vision

Singapore – The Biopolis of Asia

An International Biomedical Sciences Cluster Advancing Human Health
Through the Pursuit of Excellence
in Research & Development, Manufacturing, and Healthcare Delivery



An integrated approach



BMS International Advisory Council



Sir Richard Sykes (Chairman)
Imperial College (UK)



Dr John Mendelsohn (Co-Chairman)
MD Anderson (USA)



Dr David Baltimore
California Institute of Technology
(USA)



Dr Sydney Brenner
The Salk Institute
(USA)



Dr Leland Hartwell
Fred Hutchinson Cancer
Research Center (USA)



Dr Peter Gruss
Max Planck Society
(Germany)



Dr John Reed
Burnham Institute
(USA)



Dr John Bell
University of Oxford
(UK)



Dr Colin Blakemore
Medical Research Council
(UK)



Dr Philippe Kourilsky
College de France
(France)



Dr Harriet Wallberg-Henriksson
Karolinska Institutet
(Sweden)



Dr Suzanne Cory
WEHI
(Australia)



Dr William Evans
St Jude (USA)



Dr Helen Hobbs
UT Southwestern
(USA)



Dr Tadataka Yamada
Gates Foundation
(USA)



Dr Rolf Zinkernagel
University of Zurich
(Switzerland)



Sir Philip Cohen
University of Dundee
(UK)



Dr Alan Bernstein (Emeritus)
Canadian Institutes of Health
Research (Canada)



Dr Richard Lerner (Emeritus)
Scripps Research Institute
(USA)



Sir George Radda (Emeritus)
University of Oxford
(UK)



Dr Samuel Barondes (Emeritus)
University of California, San
Francisco (USA)



Dr Stanley N. Cohen (Emeritus)
Stanford University
(USA)



Dr David I. Hirsh (Emeritus)
Columbia University
(USA)



Dr Susan Lindquist (Emeritus)
Whitehead Institute of
Biomedical Research (USA)



Dr Paul A. Marks (Emeritus)
Memorial Sloan-Kettering Cancer
Center (USA)



Dr Alan Munro (Emeritus)
University of Cambridge
(UK)



Sir Keith Peters (Emeritus)
GlaxoSmithKline
(UK)



Dr Hans Wigzell (Emeritus)
Karolinska Institutet
(Sweden)



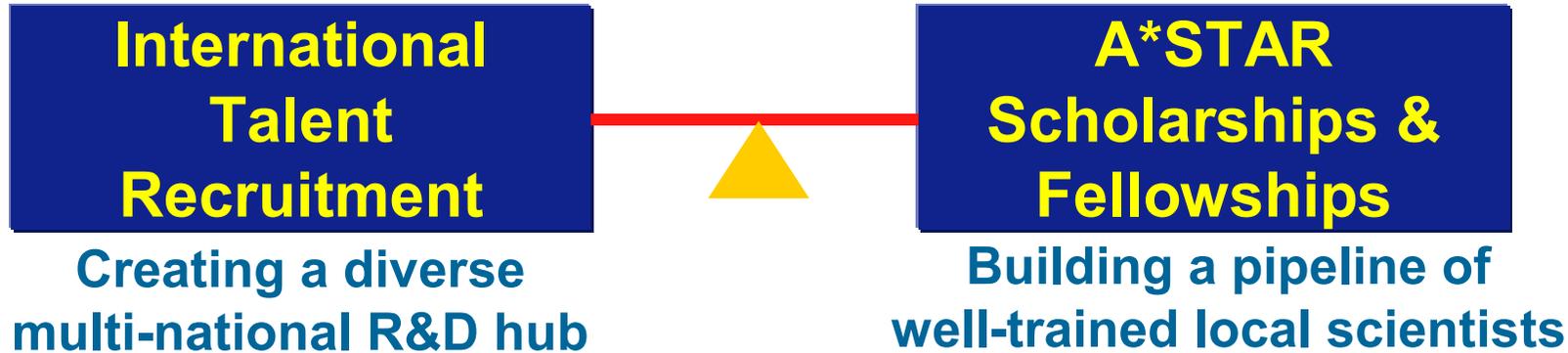
Dr Axel Ullrich (Emeritus)
Max-Planck Institute of
Biochemistry (Germany)



Dr John Shine (Emeritus)
Garvan Institute of Medical
Research (Australia)

Creating an international R&D community

Pro-Global and Pro-Local Approach



1000* scholarships & fellowships by 2010 for BSc, MSc, PhD & Post Docs

**BS-PhD
MBBS-PhD
PhD
Overseas Fellowship
Biomedical Fellowship for Doctors
Local PhD + Overseas Post-Doc**

*354 BMRC and 259 SERC scholars to date



Dr Yoshiaki Ito
Principal Investigator, IMCB
From Kyoto University



Sir David Lane, Exec Director, IMCB and
Lady Birgitte Lane, Exec Director, CMM
From Dundee University



Dr Jan-Anders Karlsson
CEO, S*Bio
From Bayer Pharma



Dr Alex Matter
Director, NITD
From Novartis



Dr Axel Ullrich
Head, SOG Lab
From Max Planck Institute



Dr Neal Copeland and Dr Nancy Jenkins
PIs, IMCB
From National Cancer Institute, USA



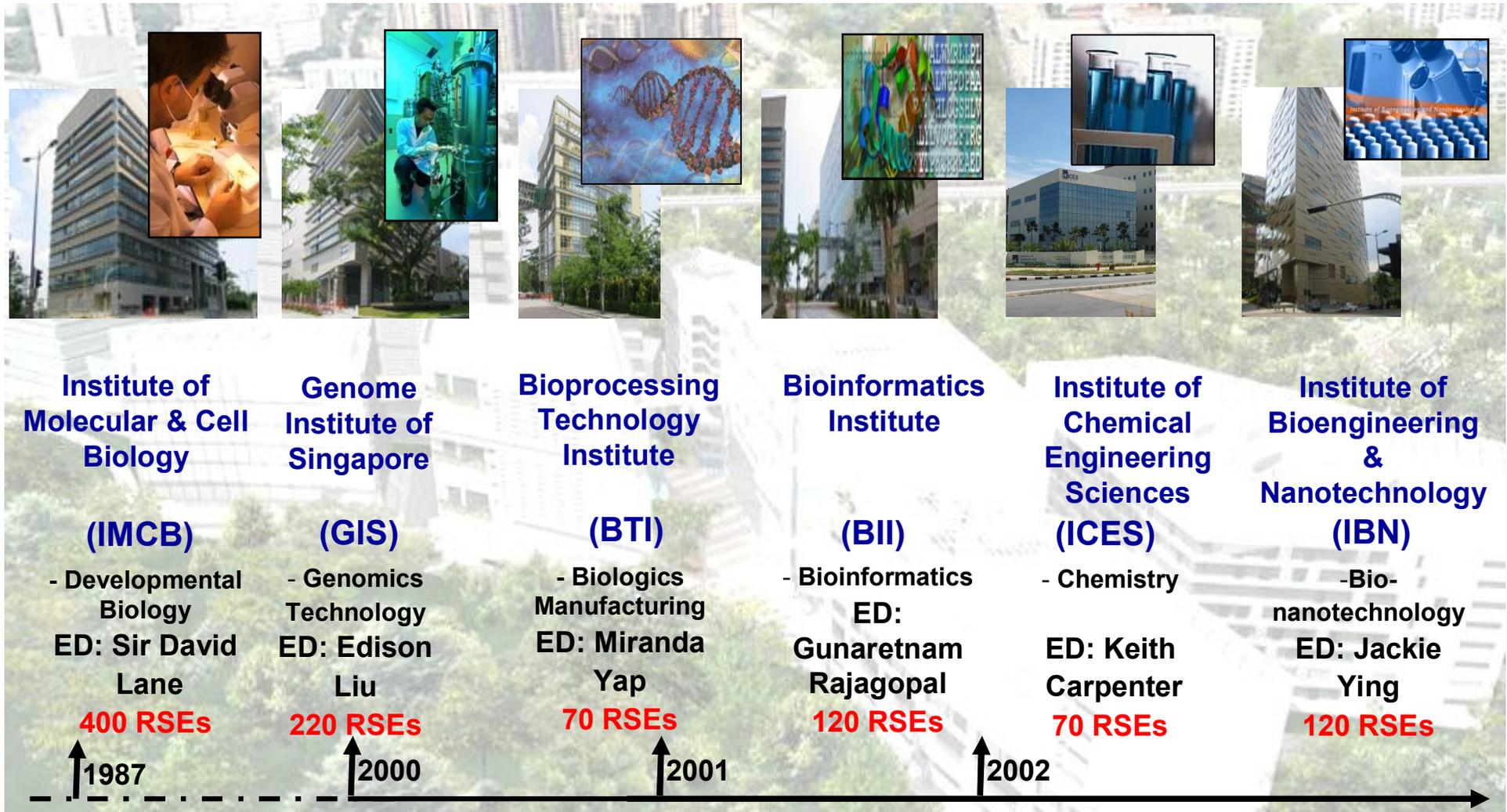
Dr Philippe Kourilsky
Chairman, SlgN
From Institut Pasteur



Dr Edward Holmes and Dr Judith Swain
Joins A*STAR in Fall 2006
From UCSD

Putting core scientific capabilities in place

Research Institutes @ Biopolis



Building the Biopolis

*For multidisciplinary research
and public-private collaborations*



Phase 2a

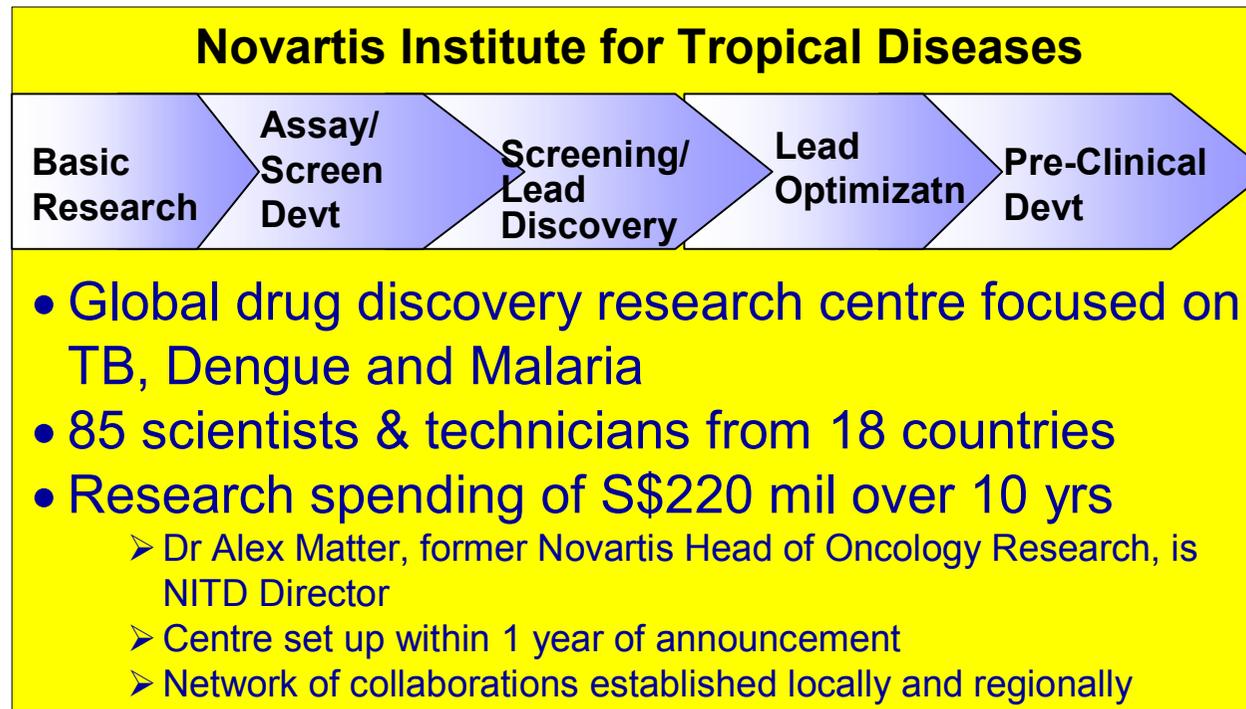
- 2 buildings for corporate labs
- Additional 30,000 sqm
- Construction began in June 05 and will be completed in end 2006

Shared Facilities

- Shared R&D equipment
- Shared utilities
- Shared animal facility

Phase 1

- 200,000 sqm
- S\$500 million invested
- Public R&D centres & corporate labs



“I would like to thank the Economic Development Board of Singapore for its outstanding cooperation and commitment to encourage Biomedical Sciences R&D in this country. Singapore is widely recognized as a regional centre of excellence where a modern scientific research centre such as this will thrive.” -- Dr Daniel Vasella, Chairman and CEO, Novartis AG

Growing base of drug discovery

Rapid growth since 2000



- 35 RSEs; 60 by 2007
- Drug discovery for neuro-degenerative diseases



- 21 RSEs
- Use *in vivo* functional genomics to predict clinical utility of novel drug targets
- Focused on CNS and metabolic diseases



- 55 RSEs
- Genomics & small molecule technologies-based drug discovery

Pharmaceuticals Research (PLR)

- 21 RSEs
- Focus on breast cancer
- Chugai-Biostar (Mitsui/CIEA) JV



- 85 RSEs
- Drug discovery for TB and Dengue



- 15 RSEs
- Drug development for infectious diseases



- 35 RSEs
- Development of hES cells for applications in Diabetes & CVS



- 15 RSEs
- R&D in stem cell expansion



- 10 RSEs
- R&D in stem cell biology, protein chemistry & markers



- 33 RSEs
- Oncology biomarkers research



- 62 RSEs
- Natural products research for drug discovery



Albany Molecular Research, Inc.[®]

- 15 RSEs; 200 by 2008
- Chemistry process development R&D



WASEDA UNIVERSITY

- 13 RSEs
- Neuroscience R&D



- 12 RSEs; 60 by 2008
- Development of vaccines for infectious diseases prevalent in Asia

...Beyond drug discovery

Medtech product development



SIEMENS

- Global Devt Centre for hearing aids



PerkinElmer
precisely.

- Devt of lab equipment / analytical instruments



- Devt of real time, high throughput reaction biochip



- Global Devt Centre for electrochemistry-based analytical instruments



The Knowledge-Object Oriented People

- Devt of data management systems used in BMS R&D

WelchAllyn

- Asian R&D Centre for diagnostic & monitoring instruments



AB Applied Biosystems

- Devt of thermal Cyclers & sequence detection systems

Fluidigm

- Devt of microfluidics biochip



MERLIN MD

- Devt of stents & delivery systems



- Unique 'Virtual Reality' & 'Real-time' medical imaging software technologies



BD

- Asian R&D Centre for needles and syringes



- Devt of diagnostic kits for Asian diseases (eg. NPC & SARS)

SIMEMS

- Devt of DNA extraction and detection systems

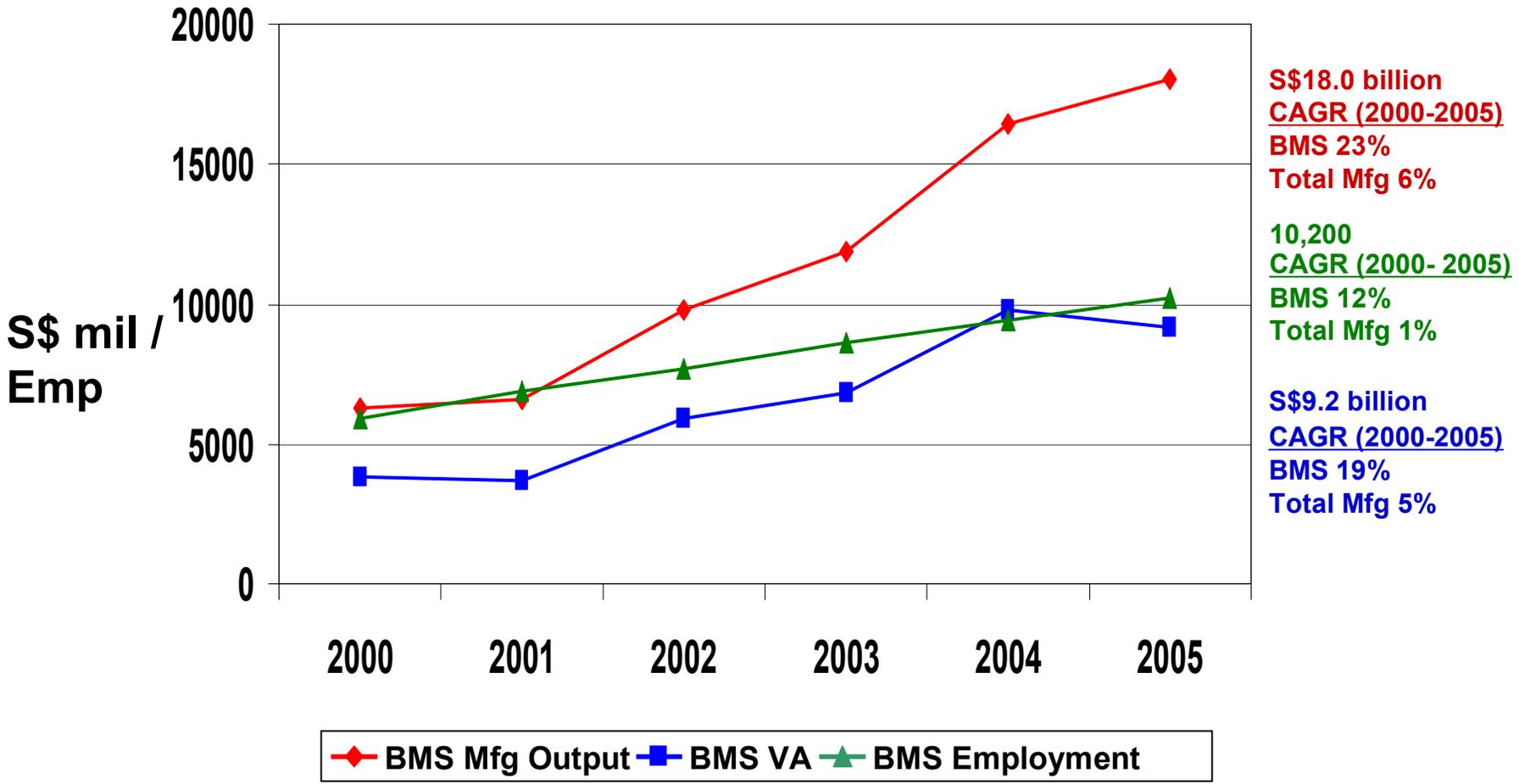
QuantaGen

- Devt of ultra-sensitive label free DNA Detection



- Devt of vision correction technology

Strong growth momentum



Nominal output data
VA = Labour Cost + Depreciation + Interest Cost + Profit before Tax + Land Cost

Going forward

Increased commitment to R&D

PM to head new research and innovation body

RIEC aims to turn Singapore into knowledge-based economy

By **NANDE KHIN**

PRIME Minister Lee Hsien Loong will personally chair the Research, Innovation and Enterprise Council (RIEC), with Deputy Prime Minister Tony Tan as deputy chairman, in a "national effort" to transform Singapore into a knowledge-based economy.

In his National Day Rally speech yesterday, Mr Lee said that RIEC will advise the government on national research, innovation and enterprise strategies as part of a bigger vision to propel Singapore beyond an "economy based on efficiency and cost effectiveness" to one that knows

from the private sector, academia and the scientific community, as well as the Cabinet.

"This has to be a national effort backed by the whole government and with the cooperation of the private sector," said Mr Lee, explaining why he would chair the RIEC himself.

He said that Dr Tan, who headed MCRD, will help him drive the R&D effort, and that Dr Tan will continue to do this after he retires as deputy prime minister at the end of the month.

Mr Lee also announced the setting up of a National Research Foundation (NRF) — chaired by Dr Tan — as recommended by MCRD. The foundation, to be set up as a new department under the Prime Minister's Office, will fund long-term research in strategic areas

recommended that a balance be struck between investigative research and mission-oriented research.

Mission-oriented research, through the Agency for Science, Technology and Research (A*Star), will get \$5.4 billion for the next five years, up from the \$4 billion it received for FY2001-2005.

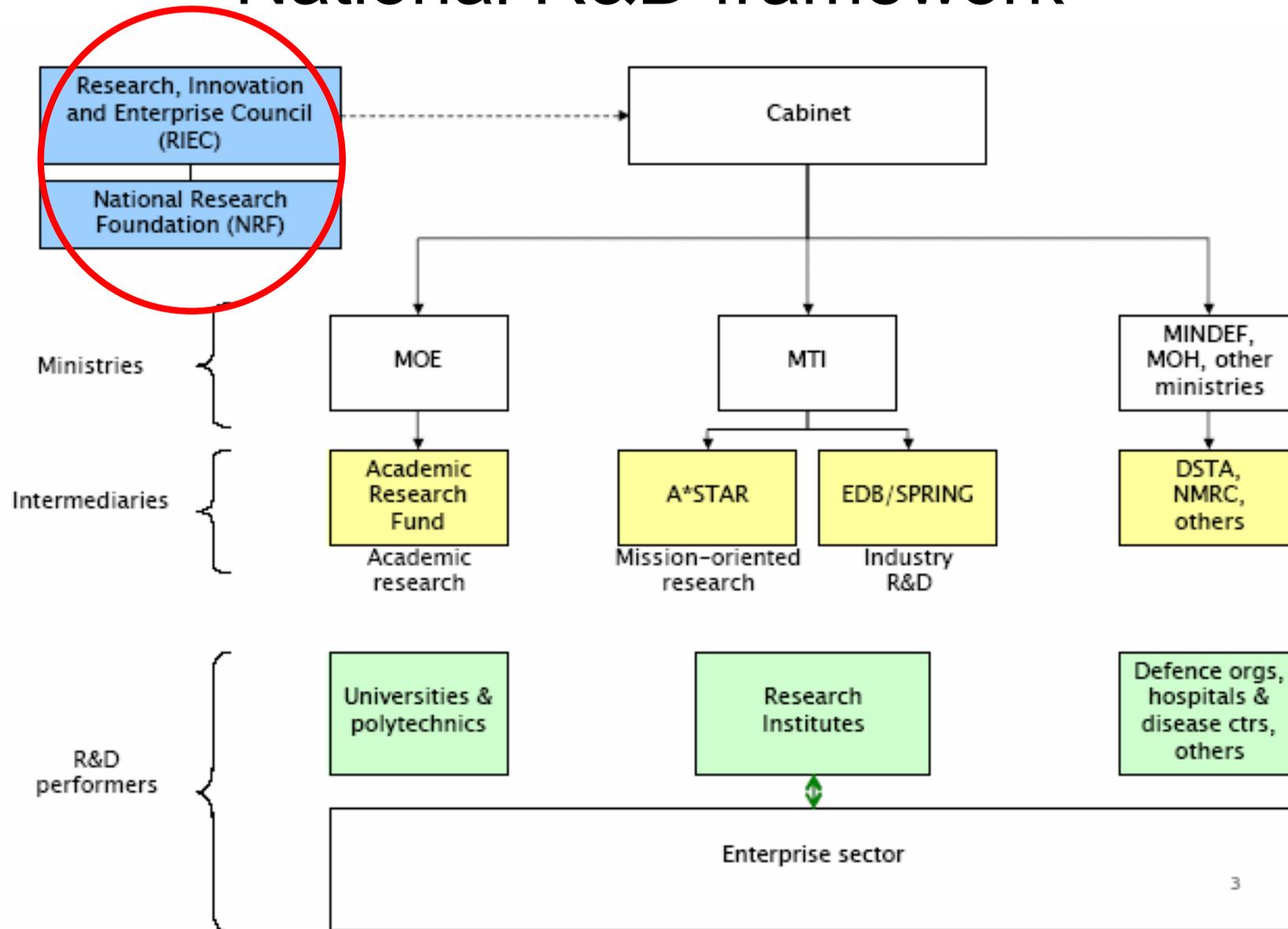
Investigative research will also get a boost. It will be overseen by the Ministry of Education, whose Academic Research Fund will be doubled to \$1.05 billion.

Mr Lee, who also touched on fostering innovation and enterprise in his speech, said that there are risks in courting R&D, innovation and enterprise to remake the economy.

"We are a small country, we can't bet on every number on the table," he said.

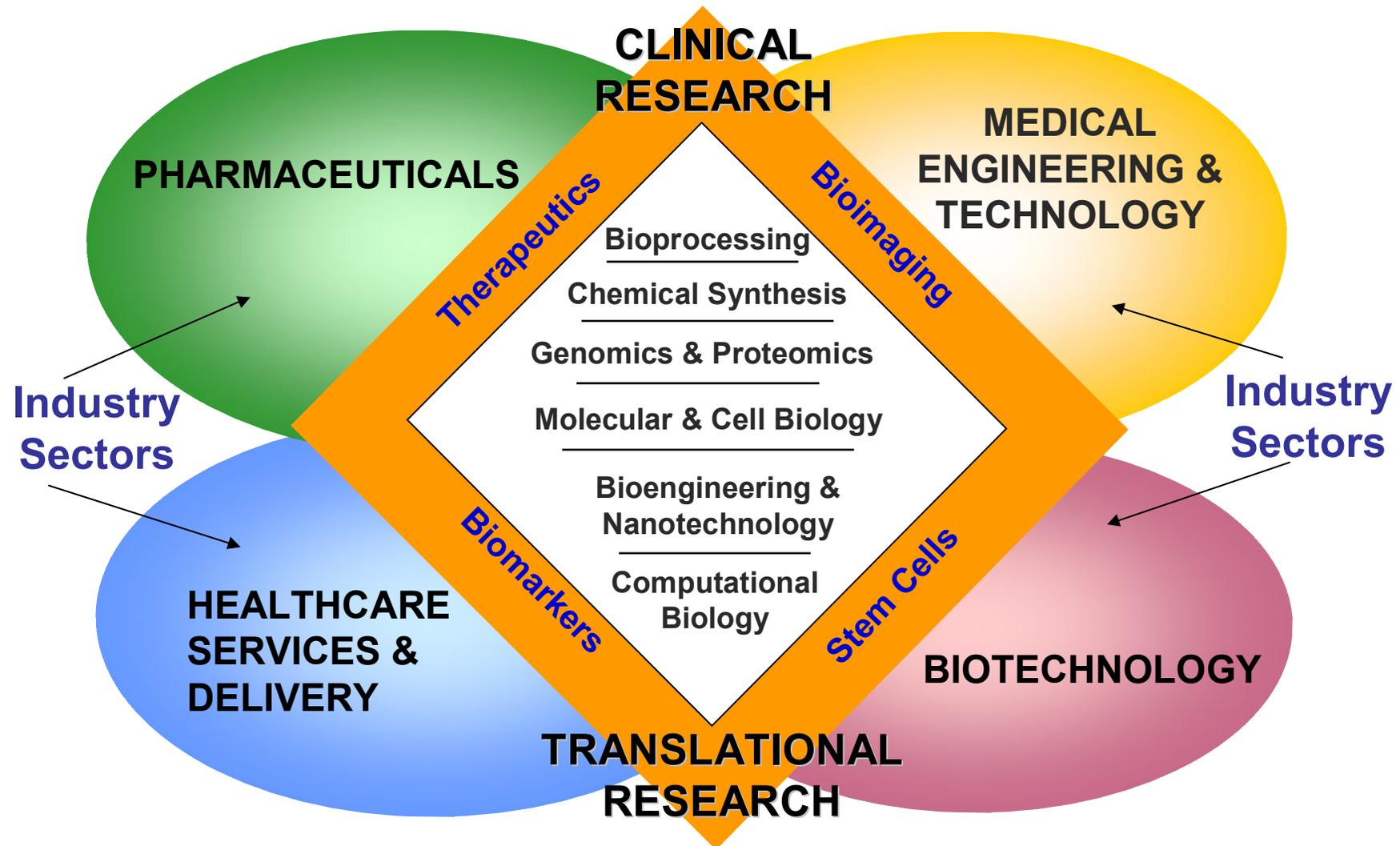
- Public sector R&D budget to increase from \$5bil in 2001-2005 to \$12 billion in 2006-2010
- R&D spending to account for 3% of GDP by 2010
- Deepen focus: Electronics, Chemicals, Engineering and Biomedical Sciences
- New growth areas to include Environmental & Water Technologies; and Interactive & Digital Media

National R&D framework



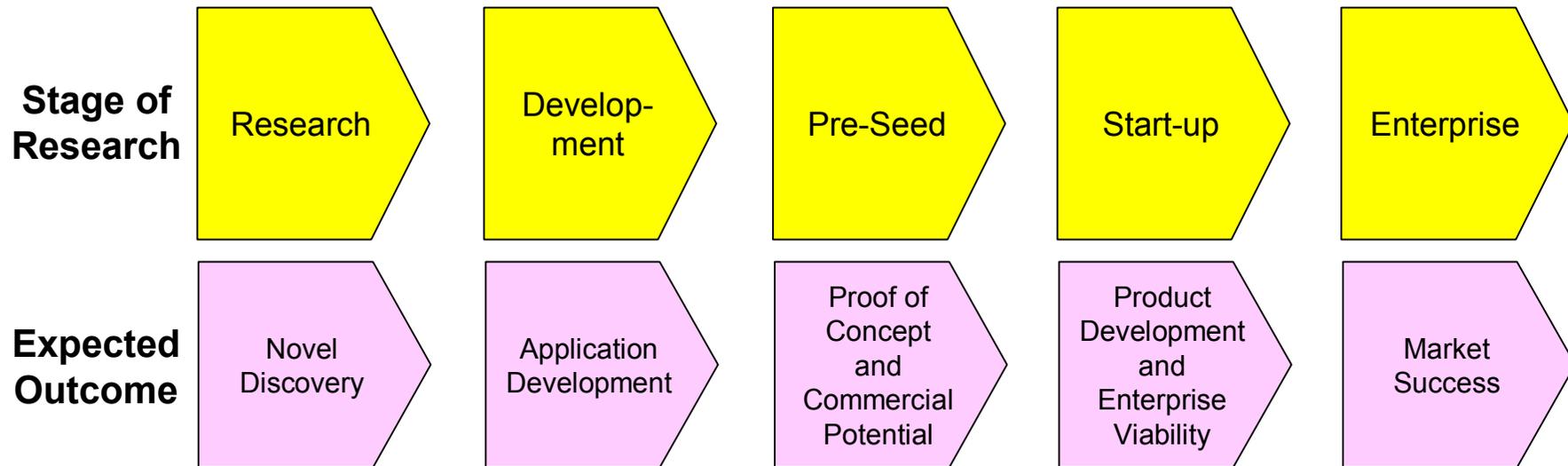
BMS Phase II: 2006-2010

From Bench to Bedside



Building Bio-Enterprises

From Bench to Industry



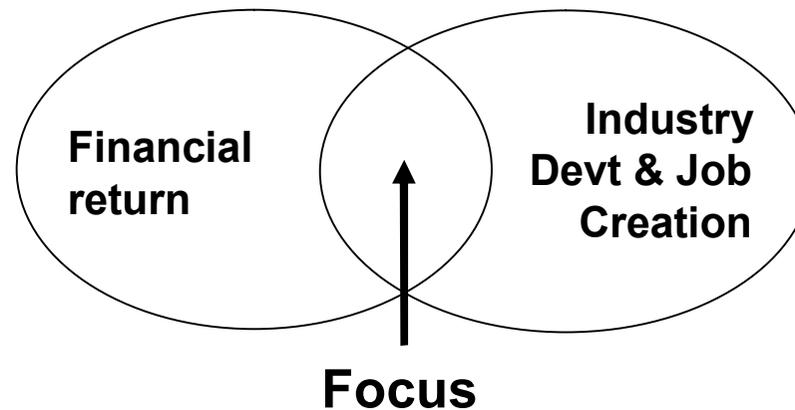
Bio*One's investment strategy

Investment Criteria

- Cutting edge technologies
- Outstanding management
- Global opportunities / Market
- Sound business models
- Singapore value – technology transfer, industry development, creation of employment & opportunities

Investment Mechanism

- Direct Equity (private usually)
- Joint Ventures
- Commercialising local technology



Bio*One's portfolio companies

Drug Discovery & Development



Biologics & Cell Therapy

Lonza

A-Bio



SINGVAX

VIACELL

PROT

Medtech Tools & Technology

Fluidigm



volume
INTERACTIONS



**Promatrix
Biosciences**

Note: Since 2000

Research Institutes for Physical Sciences



**Data
Storage
Institute
(DSI)**



**Institute for
Chemical &
Engineering
Sciences
(ICES)**



**Institute of
Micro-
electronics
(IME)**



**Singapore
Institute of
Manufacturing
Technology
(SIMTech)**



**Institute for
Infocomm
Research
(I2R)**



**Institute of
High
Performance
Computing
(IHPC)**



**Institute of
Materials
Research &
Engineering
(IMRE)**

Fusionopolis

Ready by mid 2007



Thank you

www.biomed-singapore.com

