



社團法人
國家生技醫療產業策進會
Institute for Biotechnology and Medicine Industry

2016投資台灣商機研討會-生技醫藥





錢宗良 副執行長



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亞太經合會生科創新論壇(APEC-LSIF)

研究發展督導委員會主席

經歷

行政院科技部政務次長

財團法人國家實驗研究院董事

國光生物科技股份有限公司監察人(公股代表)

行政院科技會報辦公室副執行秘書

臺灣大學醫學院副院長

生技醫藥國家型科技計畫辦公室副執行長

臺灣大學醫學院國際事務中心主任



Taiwan's Strengths, Challenges and Opportunities

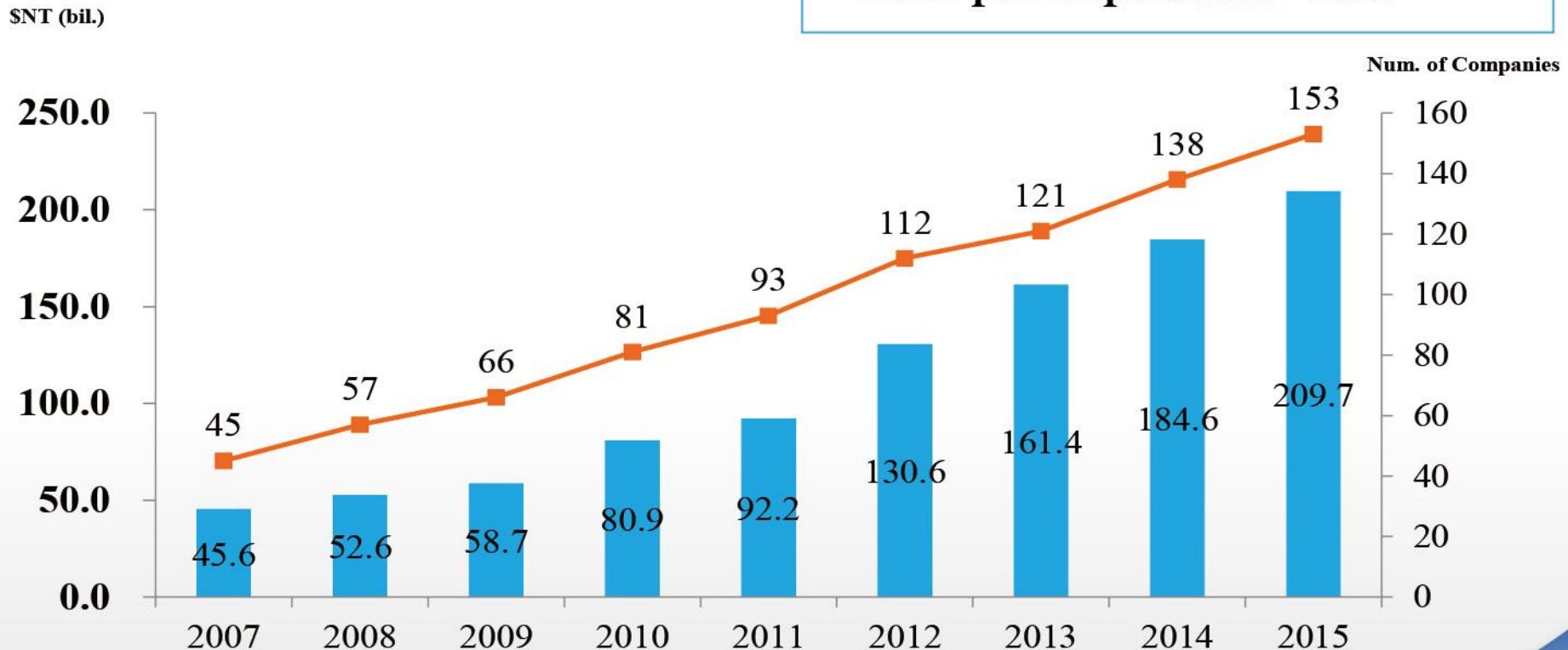


Strength of Taiwan in Biotech Development

- **Representative Population** in East Asia
- Improved Cross-Strait Relationship
- Competitive, Strong **R&D Activities** and **Manufacturing Capabilities** in Computer Sci., Electric Engineering, Biotech, Clinical Medicine, *etc.*
- **Integrated** Government-Industry-Academia-Hospital, **Transparent Regulatory Environment**
- Excellent **Health Care System**, National Health Insurance: $\geq 99\%$
- **Center of Excellence for Clinical Trials** in East Asia
R&D for Pfizer, GSK, BI, MSD, Novartis, Eli Lilly, Roche, AZ, Bayer, etc.
- **Government's Investment** and **Support**

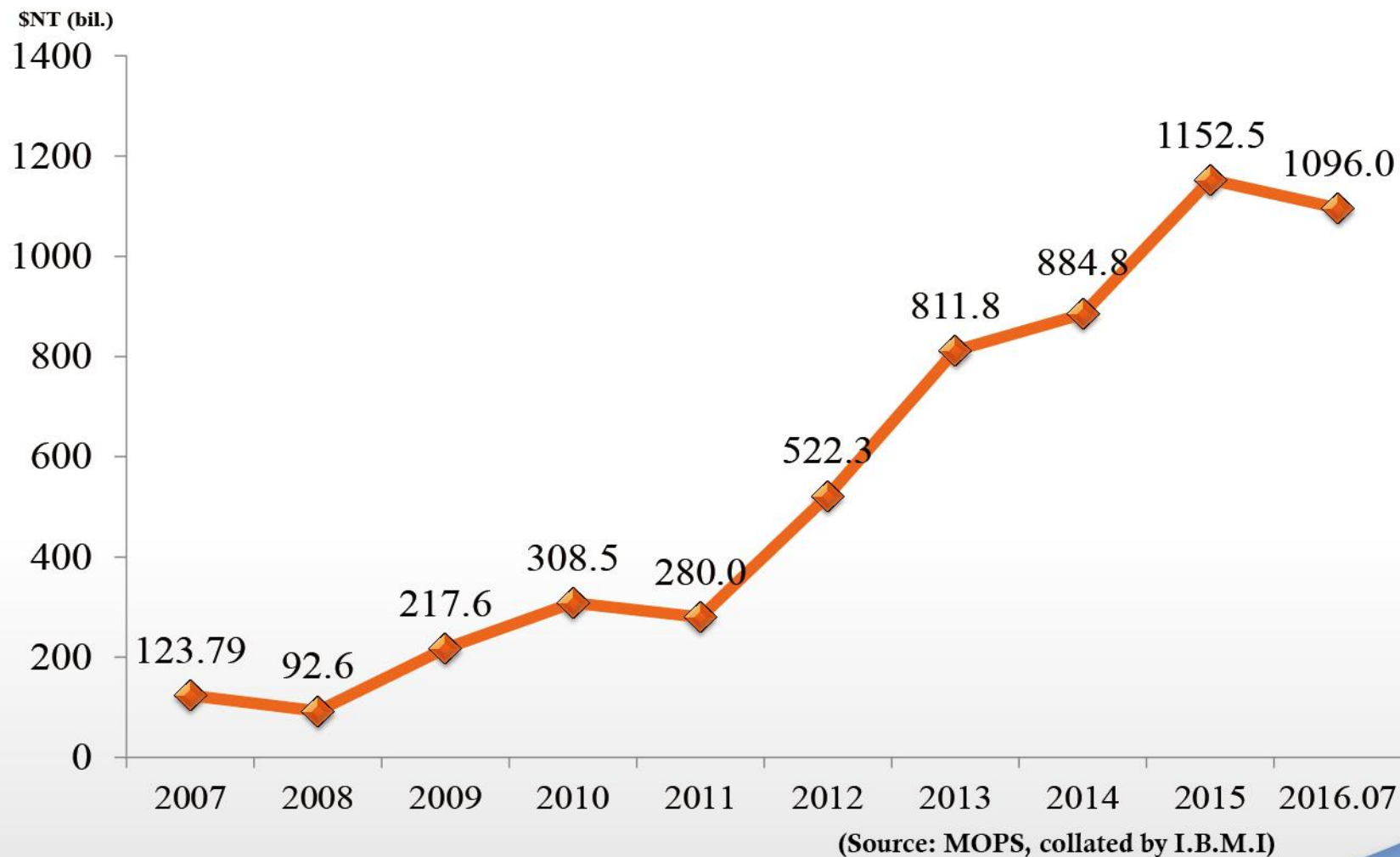
2015 Overview of Publicly Traded Companies

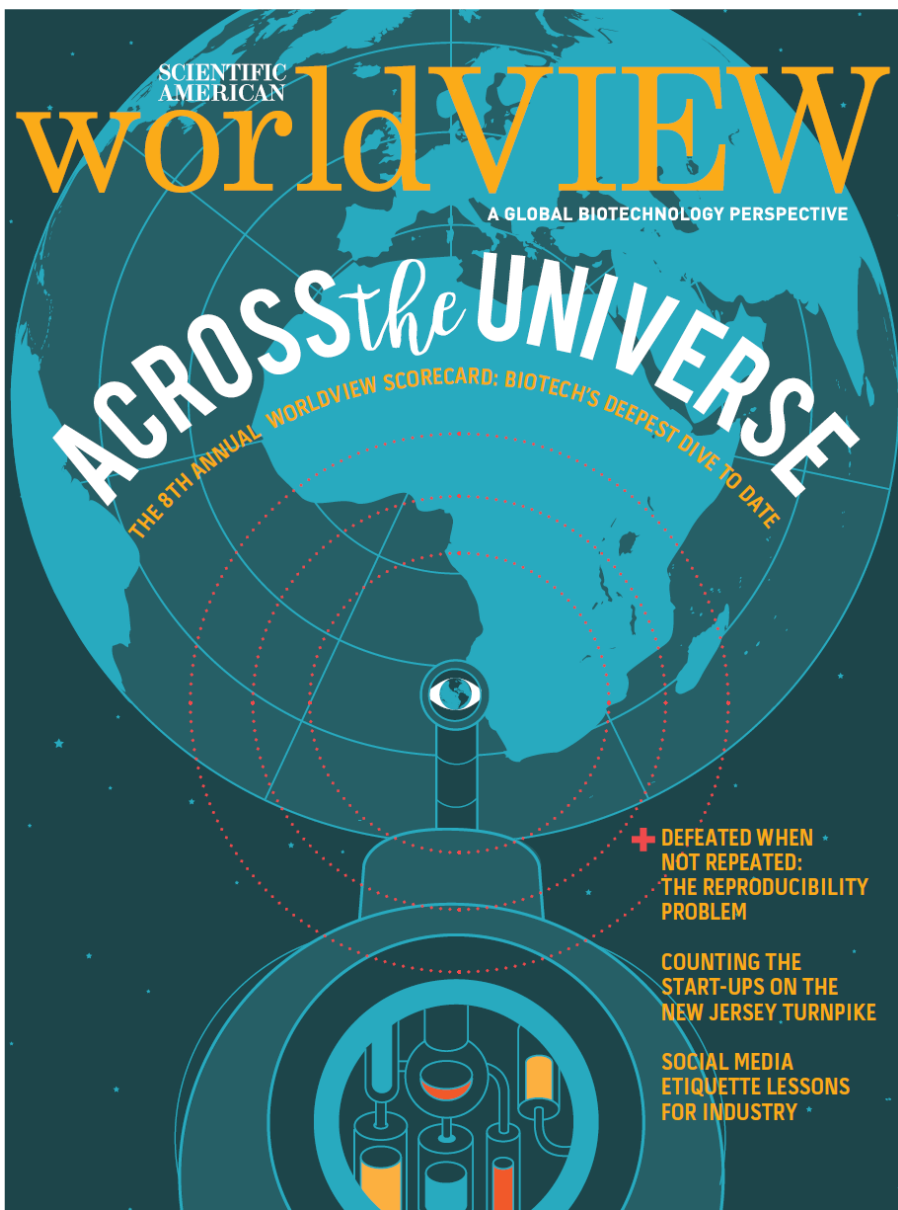
- Publicly Traded Companies **153**
- Total Revenue **209.7** NT\$bn
- Employees **54427**
- R&D Investment **17.7** NT\$bn
- Sales per Capita **3.85** NT\$m



(Source:MOPS, collated by I.B.M.I.)

Market Capitalization of Publicly Traded Companies





2016 Scientific American

WORLDVIEW SCORECARD

-  **PRODUCTIVITY**
-  **IP PROTECTION**
-  **INTENSITY**
-  **ENTERPRISE SUPPORT**
-  **EDUCATION/WORKFORCE**
-  **FOUNDATIONS**
-  **POLICY & STABILITY**



Enhanced with a new guidebook and region-specific ratings, the 2016 Scorecard ventures deeper than ever to track down the latest in biotech innovation

2016 Scientific American Worldview -A Global Biotechnology Perspective

Asian Countries' Performance

| Country | Global Ranking | Productivity | IP Protection | Intensity | Enterprise Support | Education/ Workforce | Foundations | Policy & Stability |
|------------------------|----------------|--------------|---------------|-----------|--------------------|----------------------|-------------|--------------------|
| Singapore | 2 | --- | 8.3 | 3.8 | 9.2 | 4.5 | 6.6 | 9.6 |
| Hong Kong | 11 | 0.0 | 7.1 | 1.6 | 8.6 | 1.6 | 6.7 | 9.0 |
| Japan | 15 | 0.1 | 9.2 | 0.6 | 4.5 | 3.6 | 7.9 | 8.0 |
| Taiwan (Score/Rank) | 23 | 0.0/19 | 5.8/29 | 0.1/37 | 7.0/6 | 2.6/35 | 6.9/11 | 7.2/22 |
| South Korea | 24 | --- | 5.6 | 0.6 | 4.8 | 3.9 | 8.3 | 6.3 |
| Malaysia | 27 | --- | 5.5 | 1.1 | 8.0 | 2.1 | 4.9 | 5.9 |
| China | 41 | 0.1 | 4.7 | 0.6 | 4.5 | 1.3 | 4.0 | 2.9 |
| Thailand | 45 | --- | 2.3 | 3.0 | 3.4 | 2.7 | 3.0 | 1.8 |
| India | 49 | 0.0 | 4.3 | 0.8 | 3.5 | 0.2 | 1.6 | 2.0 |

Source: 2016 Scientific American Worldview

#1 PRODUCTIVITY *Publicly traded biotechnology companies and output* **0.0**

1.1 Public company revenues (US\$mm) **0.0**

1.2 Public companies **0.1**

Taiwan Score

**GREATEST PUBLICLY
TRADED COMPANY
REVENUES:**

United States
United Kingdom
Australia

**LARGEST PUBLIC
MARKETS FOR
BIOTECHNOLOGY:**

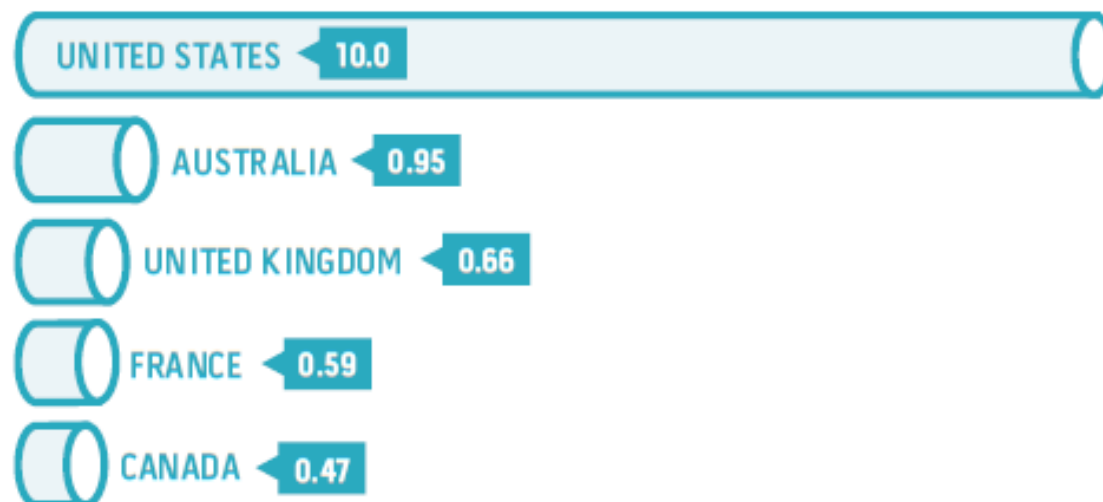
United States,
United Kingdom
Australia

**MOST GROWTH IN
BIOTECHNOLOGY
PUBLIC MARKETS:**

United States
United Kingdom

**MOST PUBLICLY
TRADED COMPANIES:**

United States
Australia
Canada/France



#2 IP PROTECTION *Quantitative and qualitative intellectual property protection*

5.8

2.1 Patent strength

4.9

2.2 Perceived IP protection

6.7

Taiwan Score

**STRONGEST MEASURED
PATENT PROTECTION:**

United States

**GREATEST PERCENTAGE
OF PATENTS IN
BIOTECHNOLOGY:**

Denmark

New Zealand

Singapore

**GREATEST PERCEIVED
PATENT STRENGTH:**

Finland,

Luxembourg

Singapore/Sweden



#3 INTENSITY *Effort in biotechnology innovation*

0.1

| | |
|-------------------------------------------------------------------|-----|
| 3.1 Public companies / million population | 0.4 |
| 3.2 Public company employees / capita | 0.0 |
| 3.3 Public company revenues / \$B GDP | 0.0 |
| 3.4 Biotech patents / total patents filed with PCT | 0.0 |
| 3.5 Value added of knowledge- and technology-intensive industries | 0.2 |
| 3.6 Business expenditures on biotechnology R&D | --- |

GREATEST PUBLICLY TRADED COMPANY MARKET CAPITALIZATION:

United States
United Kingdom
Australia

GREATEST REVENUE PER PUBLICLY TRADED COMPANY:

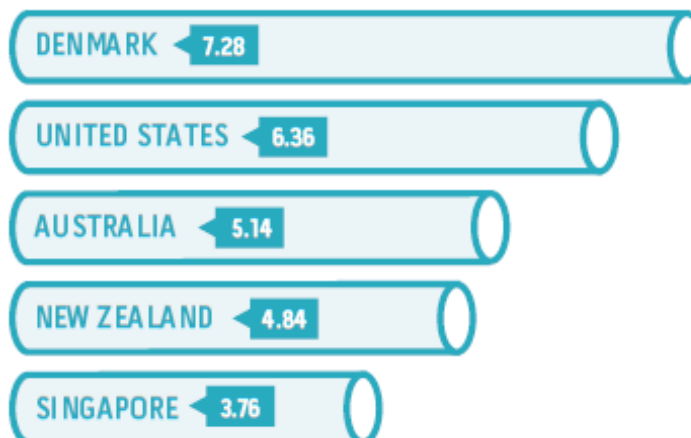
Hong Kong (*only has one company*)
United States
Denmark

GREATEST REVENUE PER PUBLICLY TRADED COMPANY EMPLOYEE:

United Kingdom
United States
Switzerland

MOST PUBLICLY TRADED COMPANY EMPLOYEES:

United States
Australia
France



#4 ENTERPRISE SUPPORT *Business environment and capital availability* **7.0**

4.1 Business friendly environment (higher = better) **7.9**

4.2 Biotech VC, 2007 (\$mm) **---**

4.3 VC availability **6.9**

4.4 Capital availability **6.2**

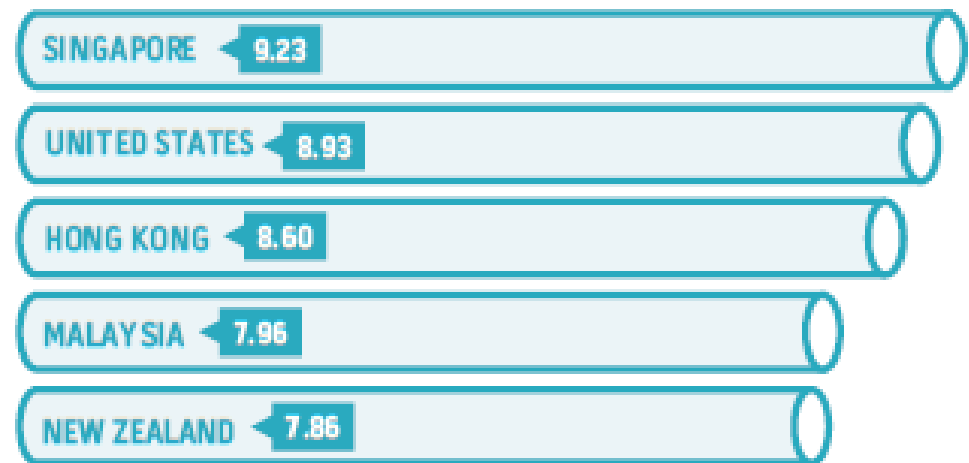
Taiwan Score

GREATEST ENTERPRISE SUPPORT:

Singapore
United States
Hong Kong

GREATEST VENTURE CAPITAL AVAILABILITY:

Qatar
Malaysia
Singapore



Enterprise Support

The only industry to benefit from specially legislated R&D investment incentives

- **Biotech and New Pharmaceutical Development Act**

Taiwan features a unique listing regime and capital market environment

- **Go Incubation Board for Startup and Acceleration Firms (GISA)**
- **Emerging Stock Board System (ESB)**
- **IPOs of Technology-Based Enterprises**
- **IPOs of Evergreen VC Firm**

Active VC funds from the government and private sector

- **National Development Fund**
- **Diamond BioFund**
- **Taiwan-Silicon Valley Technology Fund**

#5 EDUCATION/WORKFORCE *People trained in biotechnology*2.6

| | |
|--------------------------------------------------------------------------|-----|
| 5.1 Post-secondary science graduates / capita | --- |
| 5.2 Ph.D. graduates in life sciences per million population | --- |
| 5.3 R&D personnel per thousand employment | --- |
| 5.4 Talent retention (reciprocal of brain drain) | 2.6 |
| 5.5 Brain gain (share of global students studying outside their country) | --- |

MOST PH.D. GRADUATES
IN LIFE SCIENCES PER
CAPITA:
New Zealand
Canada/United Kingdom

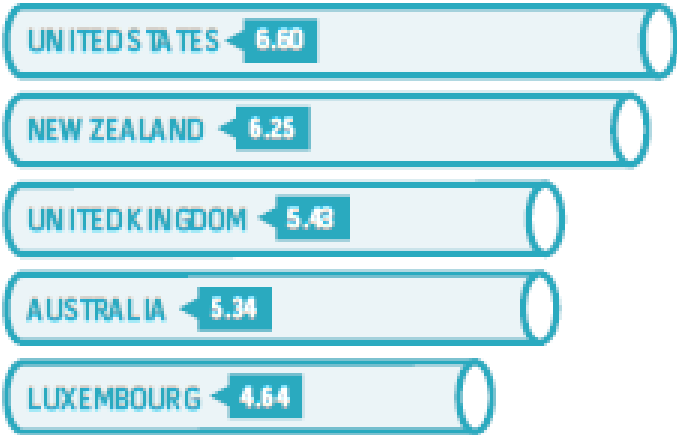
WORST BRAIN DRAIN
*(most U.S.-trained doctorate
graduates intending to stay
in the United States):*
India
China
Russia/Ukraine

BEST TALENT
RETENTION *(most U.S.-
trained doctorate graduates
intending to return home):*
Saudi Arabia
Thailand
Chile

Taiwan Score

MOST R&D
PERSONNEL PER
TOTAL EMPLOYMENT:
Israel
Denmark
Finland

BEST BRAIN GAIN *(share
of global graduate students):*
United States
United Kingdom
France



#6 FOUNDATIONS *Infrastructure and R&D drivers*

6.9

6.1 Business expenditures on R&D (% of GDP)

6.4

6.2 Gross domestic expenditure on R&D (% of GDP)

6.3 Infrastructure quality (roads, ports, electricity, etc.)

7.2

6.4 Entrepreneurship and opportunity

7.1

GREATEST BUSINESS EXPENDITURES ON R&D

(% of GDP):

Israel

South Korea

Japan

GROSS EXPENDITURES ON R&D (% of GDP):

Israel

South Korea

Finland

BEST INFRASTRUCTURE QUALITY:

Switzerland

Hong Kong/Singapore/

United Arab Emirates

STRONGEST PERCEIVED ENTREPRENEURSHIP CLIMATE:

Sweden

Denmark

Switzerland

Taiwan Score



#7 POLICY & STABILITY *Government control*

7.2

7.1 Political stability and absence of violence/terrorism

8.0

7.2 Government effectiveness

6.8

7.3 Regulatory quality

7.2

7.4 Rule of law

6.9

BEST POLITICAL STABILITY:

New Zealand
Luxembourg
Austria

GREATEST REGULATORY QUALITY:

Singapore
Hong Kong
New Zealand

Taiwan Score

GREATEST GOVERNMENT EFFECTIVENESS:

Singapore
Switzerland
Finland

BEST RULE OF LAW:

Finland
Norway
Denmark



Connecting, Syndicating and Collaborating with Taiwan

- **Leveraging Taiwan's Strengths**
- **Managing the Challenges**
- **Seeking Opportunities and Partnerships**

Managing the Challenges

**Talent
Recruitment
& Retention**

**Pricing and
Reimbursement
Obstacles**

**PCT Intellectual
Property
Application**

**Large-Scale
Manufacturing**

**Regulation
Effectiveness**

**Global
Marketing**



Seeking Opportunities and Partnerships

**World's
Leading APIs
Providers**

**Specialty
Pharmaceutical
Companies**

**Bio Design
House &
Niche Platform**

**Innovative
Medical Device
Companies**

**Trustful
CMO / CRO
Partners**

**Taiwan
Clinical Trial
Consortium**

Taiwan Clinical Trial Consortium (TCTC):

Total Solution and Early Engagement for Global Market



Lung Cancer Consortium



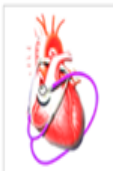
Gastrointestinal Disease And Helicobacter Consortium



Liver Net Consortium



Breast Cancer Consortium



Hypertension Associated Cardiac Disease Consortium



COPD Consortium



GYN Oncology Group



Lipid and Atherosclerosis Consortium



Fabry Disease Consortium



Oncology Phase I Consortium



Pediatric Infectious Diseases Alliance



Mental Disorders Consortium



QUINTILES



IP LAW FINNEGAN



Connecting, Syndicating and Collaborating with Taiwan

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