



Innovative Capacity-building Towards 2020 in China

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Contents

I. Introduction

II. Innovation Development & Capacity-building

III. Policies for Innovation Capacity-building

IV. Conclusion Remarks



I. Introduction

- Thanks to the policies for reform & opening, China has experienced over 20 years of high-speed economic growth and become the third largest economies.
- However, this economic growth mainly relies on lower cost of labors and increasing input instead of innovation.



I. Introduction

Understanding Development

- ❖ economic development
- ❖ economic & natural development
- ❖ economic & natural & social development
- ❖ development for people (serve the people)

Scientific Outlook for Development

--Resource Saving/Environment Friendly

Harmonious Society

--Growth of Development Cost

From resources-based dev. to innovation based development.

From reform & open to scientific dev.



I. Introduction

□ Global Issues

- financial crisis: changes in global market
- climate change: new global regulation
- short term threats? Transformation of manufacturing system
- long term opportunities? Upgrading and restructuring

□ Measures for Recovering from the Crisis:

- 10 plans for energizing industrial developments
- 4 trillion RMB investments in domestic markets
- S&T and innovation are expected to make great contribution for economic recovering from the crisis.

II. Innovation Capacity & Innovation Development

Innovative nation by 2020

What does innovative nation mean?

- Innovative nation means that innovation has become major driving forces for national development.**
- Innovative nation should have powerful national innovation capacity and high innovative development level.**

II. Innovation Capacity & Innovation Development

National Innovation Capacity is the ability of a nation to conduct scientific discovery, technological innovation and related commercialization activities.

- In a broad sense, national innovation capacity is the ability of a nation to integrate innovation resources with a view to transforming them into fortune. It is the integrative capacity that promotes economic and social development.

II. Innovation Capacity & Innovation Development

Innovative Development means a development driven by innovation, concerning the effectiveness, efficiency and efficacy of innovation activities, ranging from social, economic development to S&T and innovation as well as infrastructure development.

II. Innovation Capacity & Innovation Development

Indicator System for National Innovative Development

Index	Indicator
Industrialization Dev't Index	GDP per Capital; CO ₂ Emission/GDP; Energy Consumption/GDP
Informatization Dev't Index	Telephone/100 People; Internet Users/100 People Broadband Subscribers/100 People; PCs/100 People
Urbanization Dev't Index	Urban Population/Total Population; Value Added of Non Primary Industry/GDP Employees in Service/Total Employees
Education & Health Dev't Index	Life Expectancy at Birth; Infant Mortality Rate; Public Expenditure on Education
S&T Development Index	R&D Expenditure/Mil. People; Researchers/Mil. People S&T Articles/Mil. People; Resident Invention Patent Grants/Mil. People PCT Patents Applications/Mil. People; Revenue of Royalty and License Fees/GDP

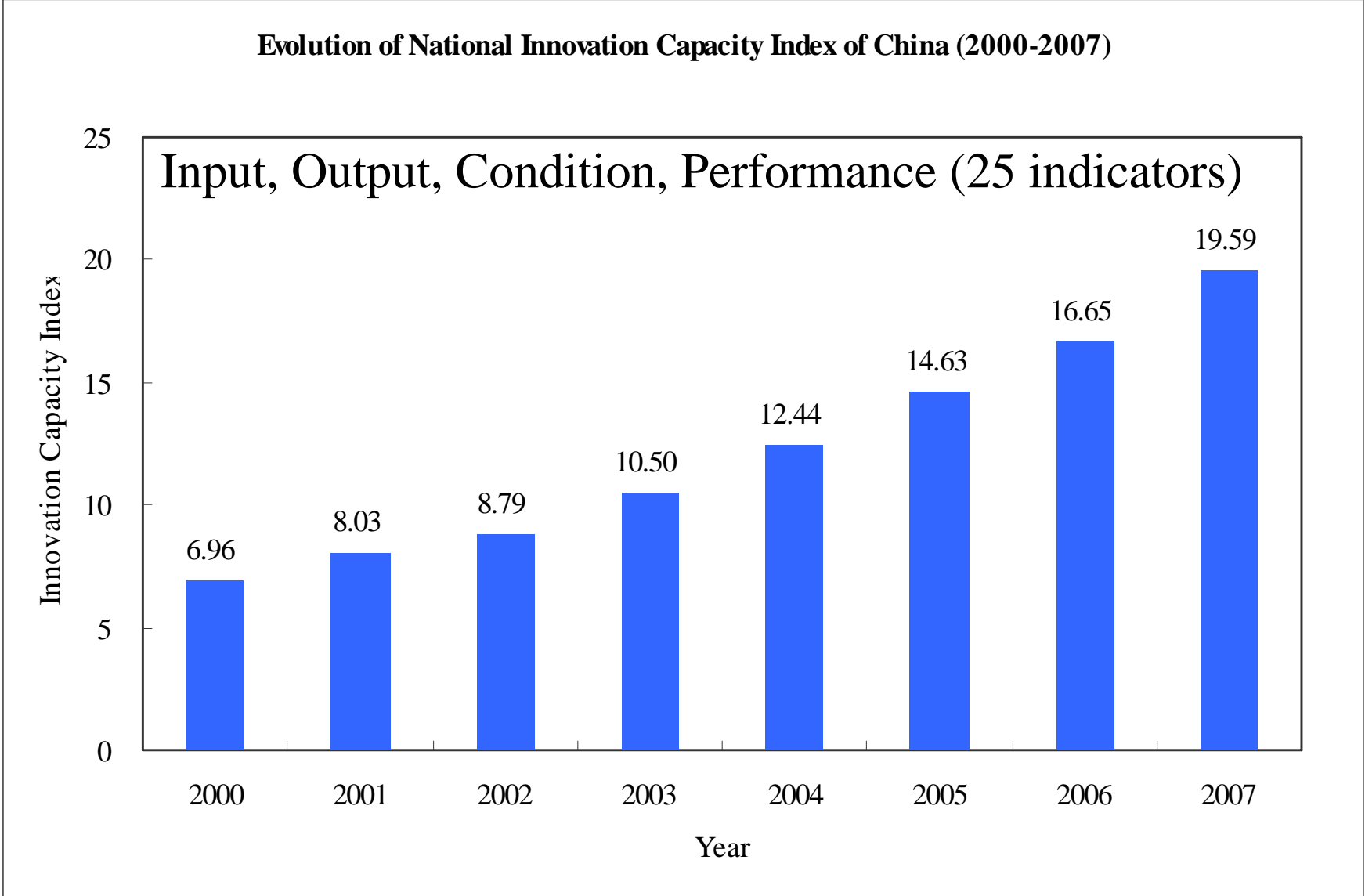
II. Innovation Capacity & Innovation Development

Indicator System for National Innovation Capacity

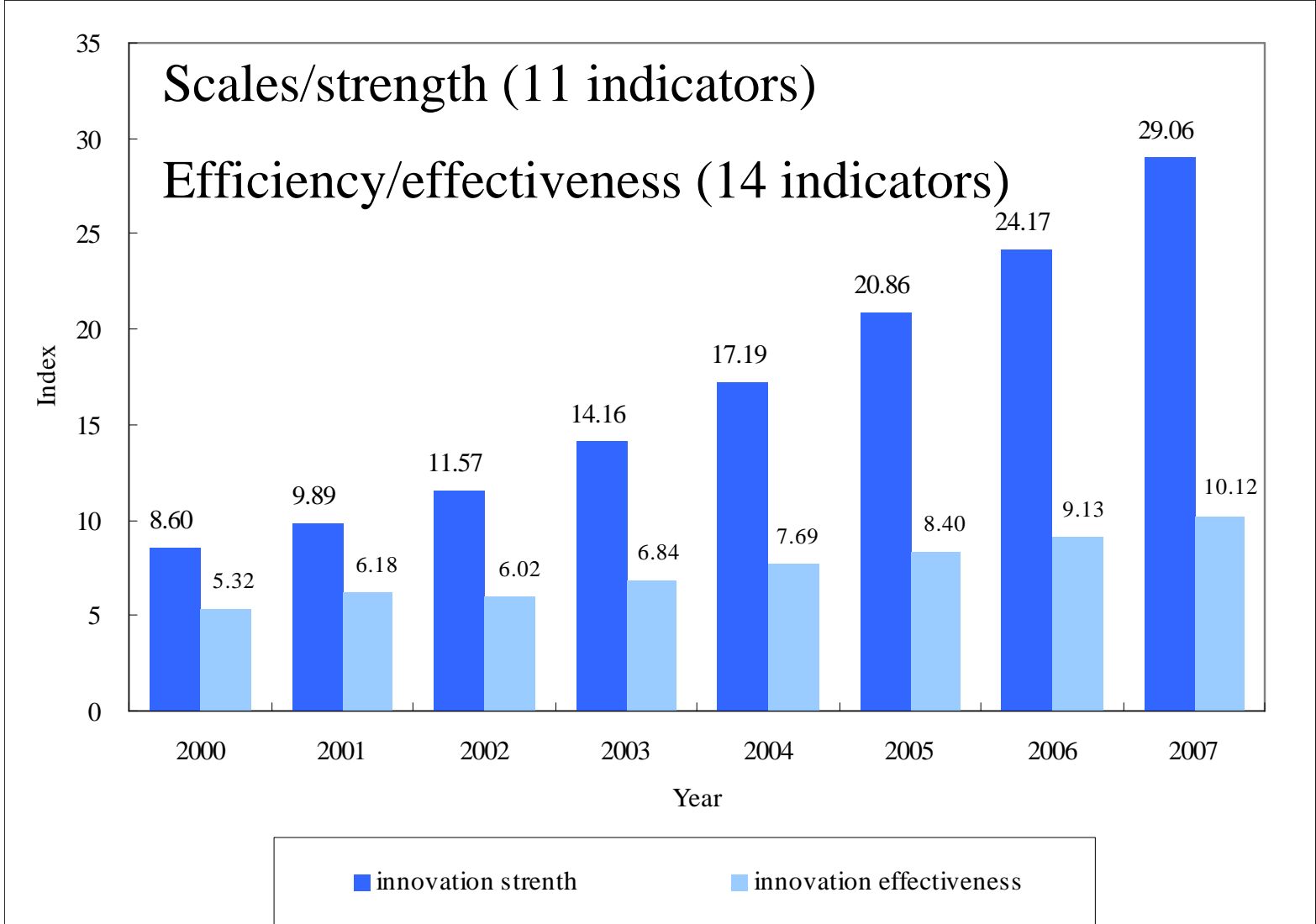
index	Sub-index	Indicator
Innovation Strength	Innovative Input Strength	R&D Expenditure; Researchers
	Innovative Output Strength	Number of S&T Articles, Number of Patents; Number of PCT Patents
	Innovative Condition Strength	Total Tele's; Internet Users; Bandwidth Subscribers; Number of PCs
	Innovative Performance Strength	Royalty and License Fees; GDP
Innovation Effectiveness	Innovative Input Effectiveness	R&D Expenditure of GDP; Researchers/Mil. Population
	Innovative Output Effectiveness	S&T Articles/Mil.R&D Personnel; Residents Patents/Mil.R&D Exp't
		PCT Patents /Mil. R&D Personnel; PCT Patents /Mil. R&D Exp't
	Innovative Condition Effectiveness	Telephone/100 People; Internet User/100 People
Broadband Subscriber/100 People; PCs/100 People		
Innovative Performance Effectiveness	Innovative Performance	The Receipt to Payments of Royalty and License Fees
	Innovative Performance Effectiveness	GDP per Capital; CO ₂ Emission/GDP; Energy Consumption/GDP

II. Innovation Capacity & Innovation Development

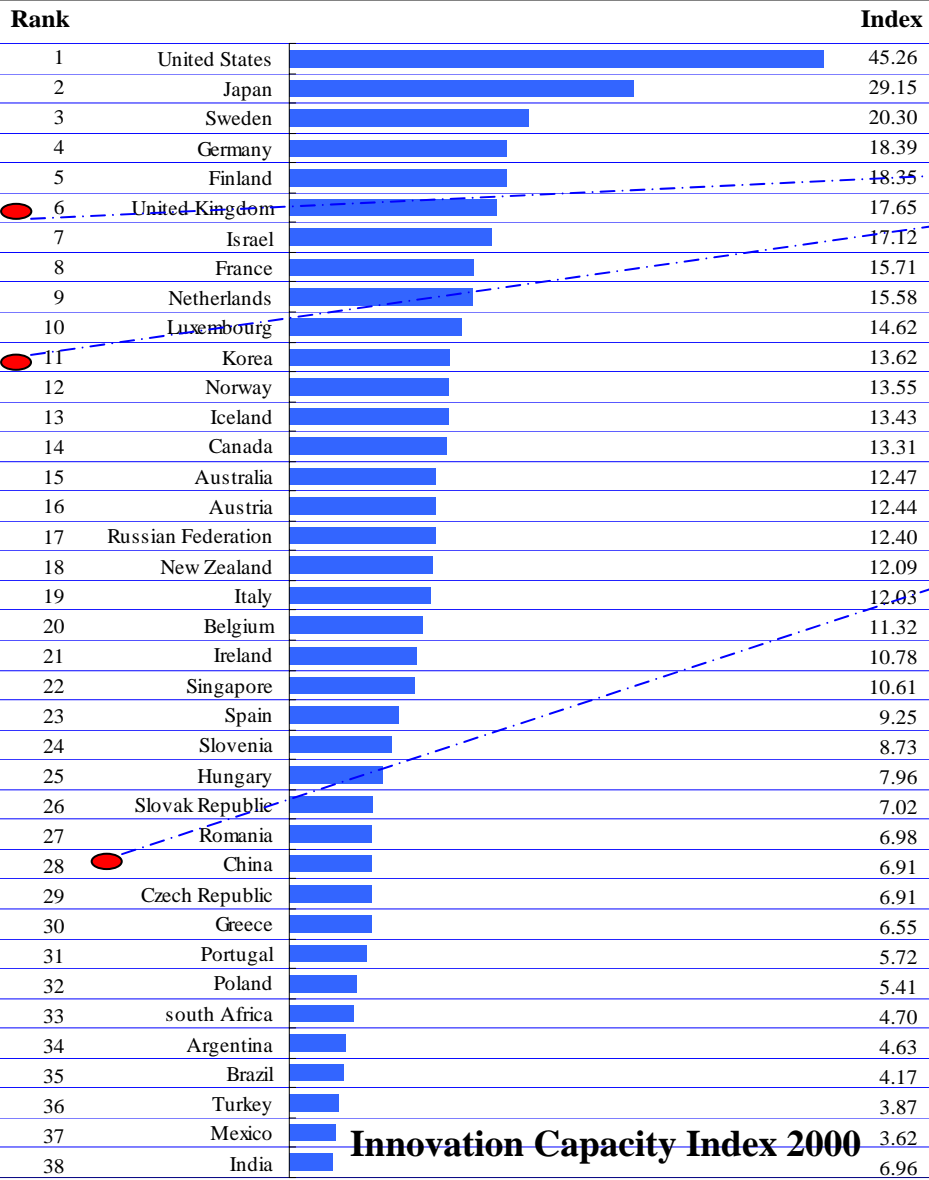
Evolution of National Innovation Capacity Index of China (2000-2007)



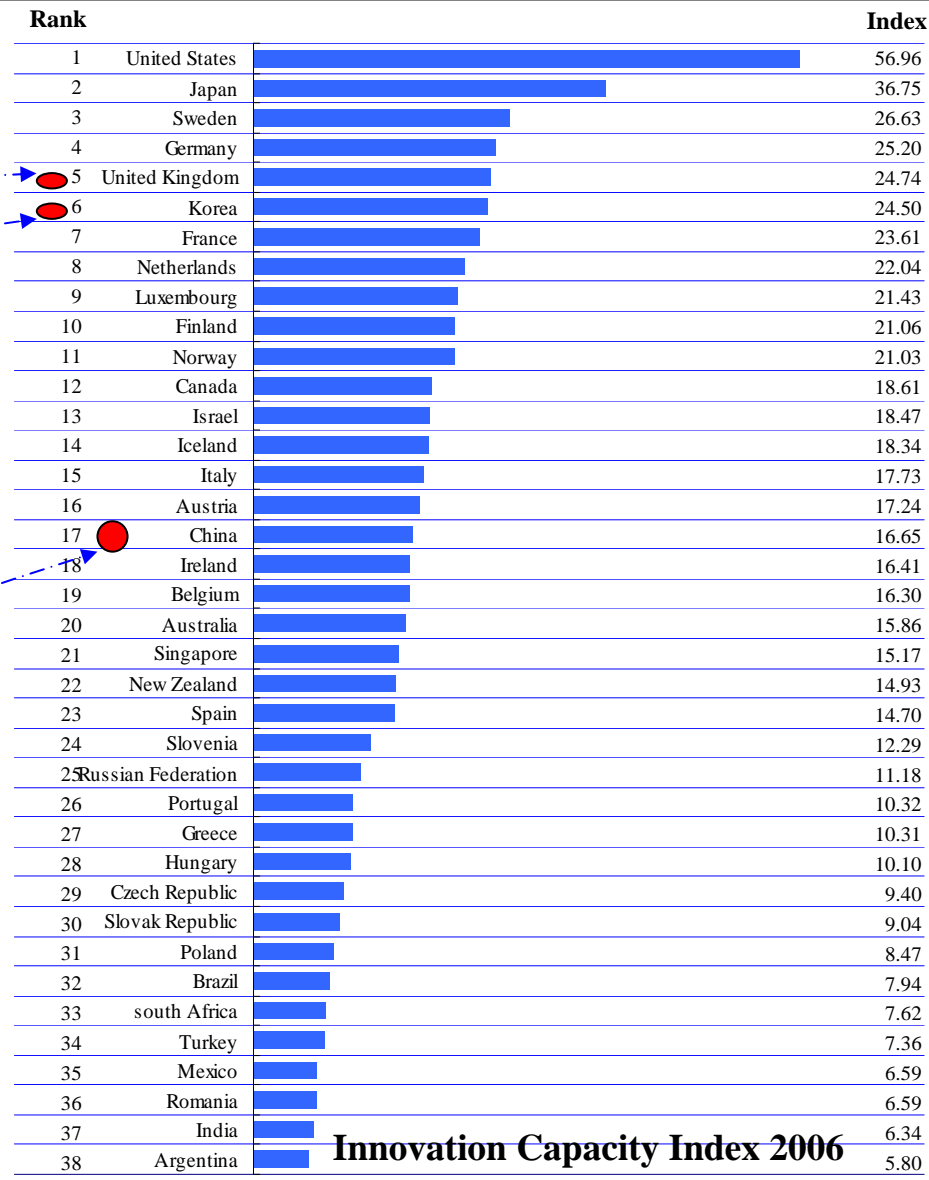
II. Innovation Capacity & Innovation Development



II. Innovation Capacity & Innovation Development

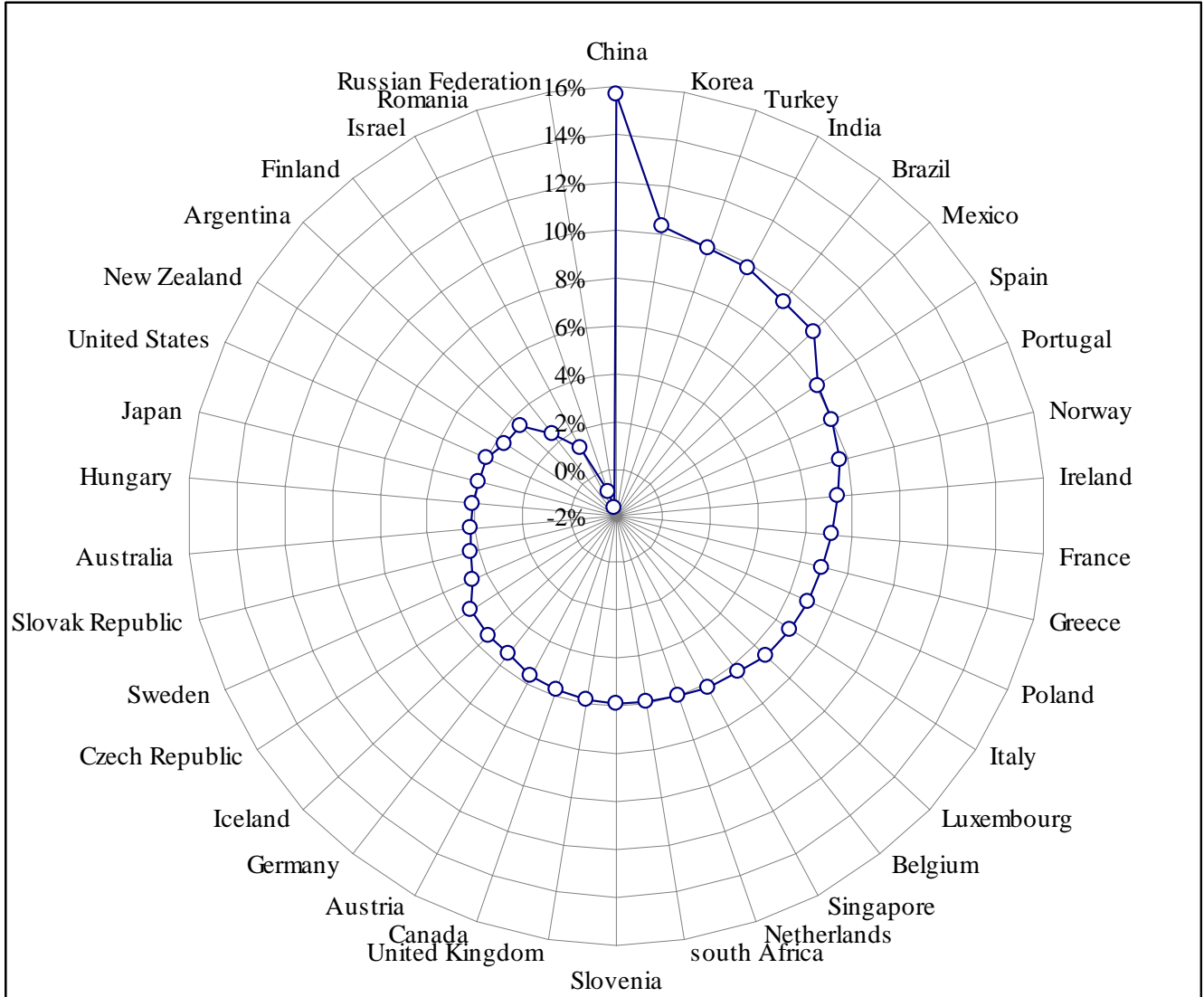


Innovation Capacity Index 2000



Innovation Capacity Index 2006

II. Innovation Capacity & Innovation Development



Average Annual Growth Rate of National Innovation Capacity Index (2000-2006)

II. Innovation Capacity & Innovation Development

Rank	Country	INCS
1	United States	57.03
2	Japan	26.39
3	Germany	10.72
4	China	8.60
5	United Kingdom	8.42
6	France	6.66
7	Russian Federation	5.56
8	Korea	4.62
9	Canada	4.02
10	Italy	3.92
11	Netherlands	2.58
12	Spain	2.41
13	Australia	2.25
14	Sweden	2.16
15	India	2.02
16	Brazil	1.93
17	Mexico	1.21
18	Finland	1.16
19	Belgium	1.14
20	Israel	1.07
21	Poland	0.99
22	Austria	0.88
23	Turkey	0.79
24	Argentina	0.72
25	Norway	0.67
26	south Africa	0.53
27	Greece	0.44
28	Ireland	0.44
29	Singapore	0.44
30	Portugal	0.39
31	New Zealand	0.38
32	Czech Republic	0.35
33	Hungary	0.33
34	Romania	0.29
35	Slovak Republic	0.15
36	Slovenia	0.11
37	Luxembourg	0.07
38	Iceland	0.02

Index of National Innovation Strength in 2000

Rank	Country	INCS
1	United States	74.79
2	Japan	34.18
3	China	24.17
4	Germany	15.44
5	United Kingdom	12.44
6	Korea	12.20
7	France	10.69
8	Russian Federation	7.65
9	Italy	6.42
10	Canada	6.20
11	India	5.62
12	Spain	4.63
13	Brazil	4.19
14	Netherlands	4.13
15	Australia	3.32
16	Sweden	3.19
17	Mexico	2.39
18	Turkey	1.91
19	Belgium	1.83
20	Poland	1.75
21	Finland	1.51
22	Austria	1.45
23	Israel	1.32
24	south Africa	1.19
25	Norway	1.15
26	Argentina	1.00
27	Singapore	0.89
28	Ireland	0.81
29	Greece	0.80
30	Czech Republic	0.72
31	Portugal	0.71
32	Hungary	0.70
33	Romania	0.65
34	New Zealand	0.58
35	Slovak Republic	0.28
36	Slovenia	0.19
37	Luxembourg	0.16
38	Iceland	0.04

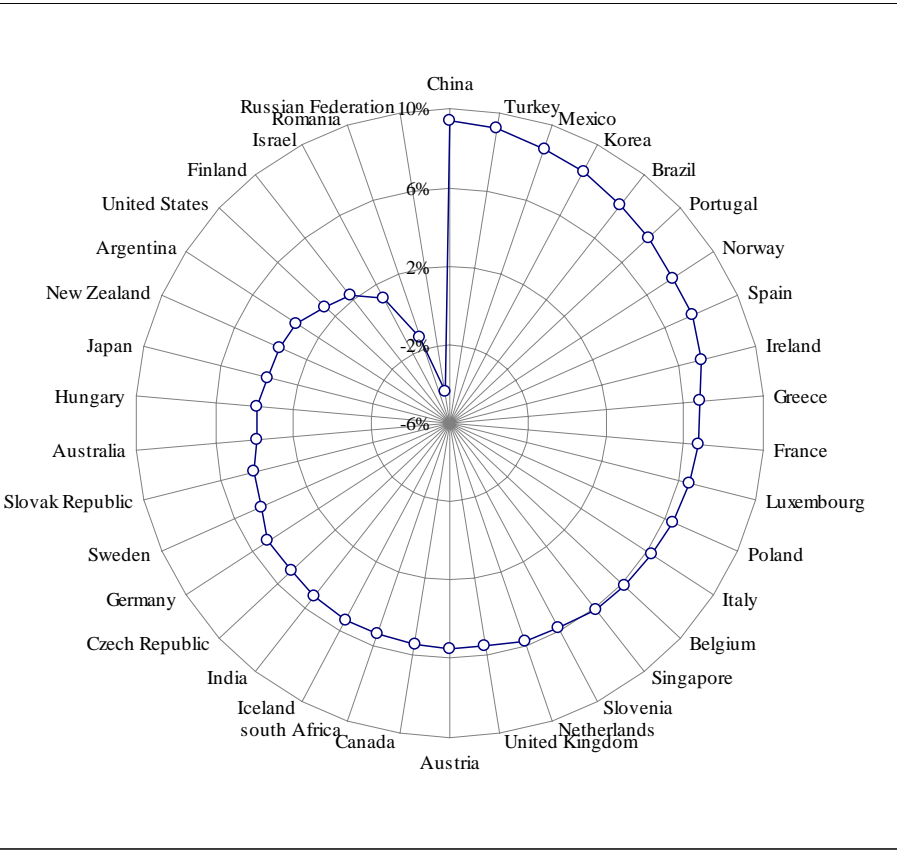
Index of National Innovation Strength in 2006

II. Innovation Capacity & Innovation Development



Average Annual Growth Rate of Index for National Innovation Strength (2000-2006) P16

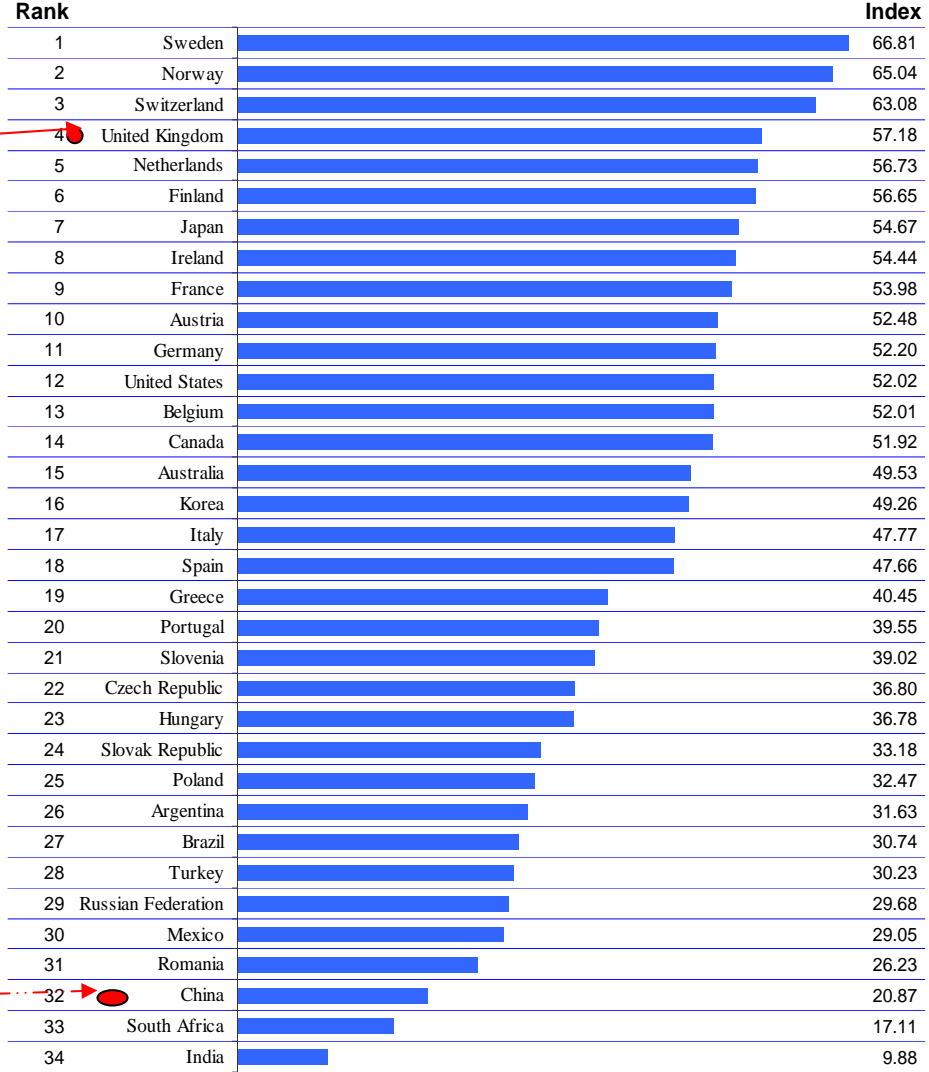
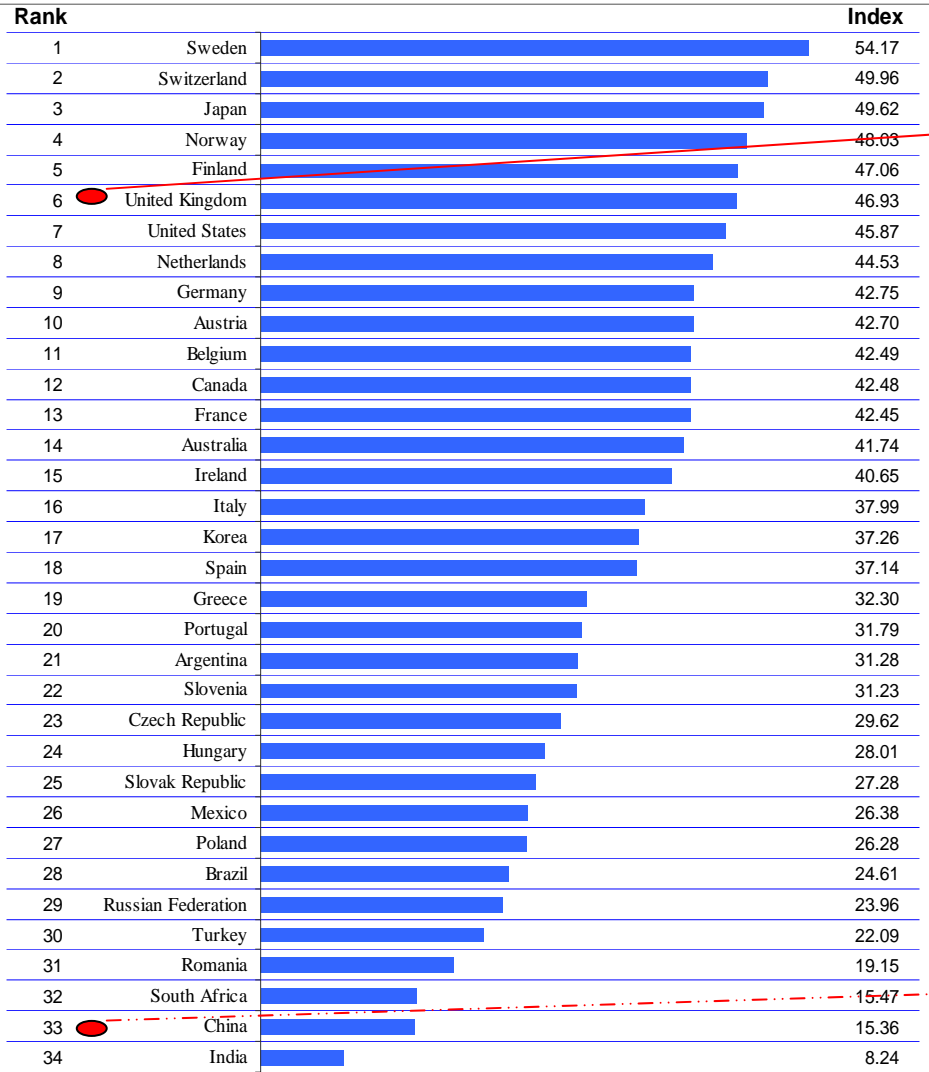
II. Innovation Capacity & Innovation Development



Rank	Country	Index
1	Sweden	50.08
2	Luxembourg	42.71
3	Norway	40.92
4	Finland	40.61
5	Netherlands	39.95
6	Japan	39.32
7	United States	39.14
8	United Kingdom	37.04
9	Korea	36.81
10	Iceland	36.64
11	France	36.53
12	Israel	35.62
13	Germany	34.96
14	Austria	33.04
15	Ireland	32.01
16	Canada	31.02
17	Belgium	30.77
18	Singapore	29.45
19	New Zealand	29.28
20	Italy	29.04
21	Australia	28.40
22	Spain	24.76
23	Slovenia	24.39
24	Portugal	19.93
25	Greece	19.83
26	Hungary	19.51
27	Czech Republic	18.08
28	Slovak Republic	17.81
29	Poland	15.18
30	Russian Federation	14.71
31	south Africa	14.06
32	Turkey	12.80
33	Romania	12.52
34	Brazil	11.69
35	Mexico	10.79
36	Argentina	10.60
37	China	9.13
38	India	7.06

Average Annual Growth Rate of Index for National Innovation Effectiveness (2000-2006) Index of National Innovation Effectiveness in 2006

II. Innovation Capacity & Innovation Development



Innovative Development Index in 2000

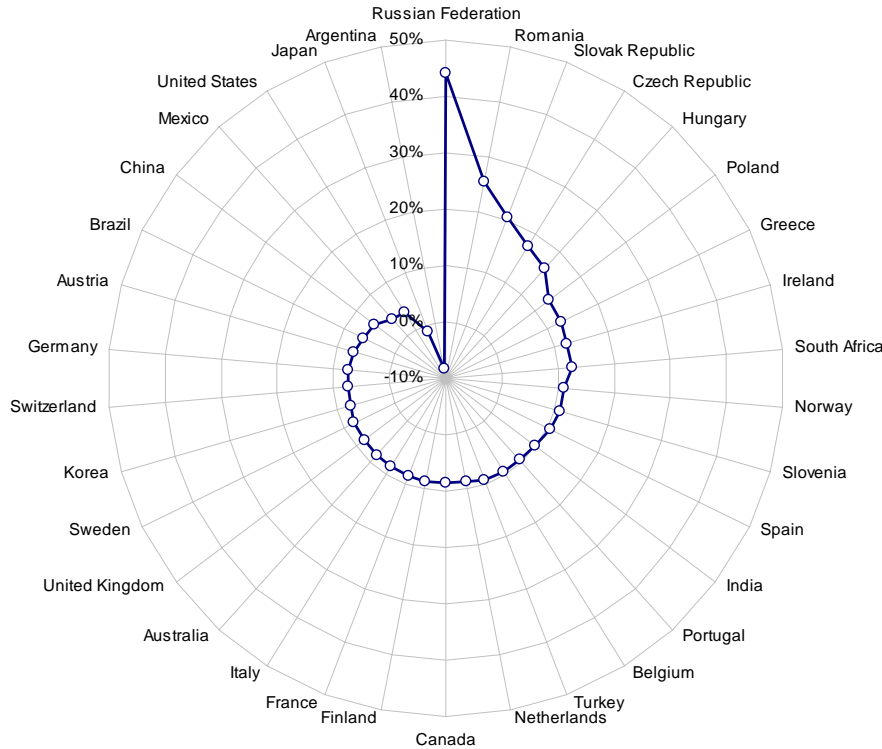
Innovative Development Index in 2006

II. Innovation Capacity & Innovation Development

GDP/Capital, CO2 Emission/GDP, Energy Consumption/GDP

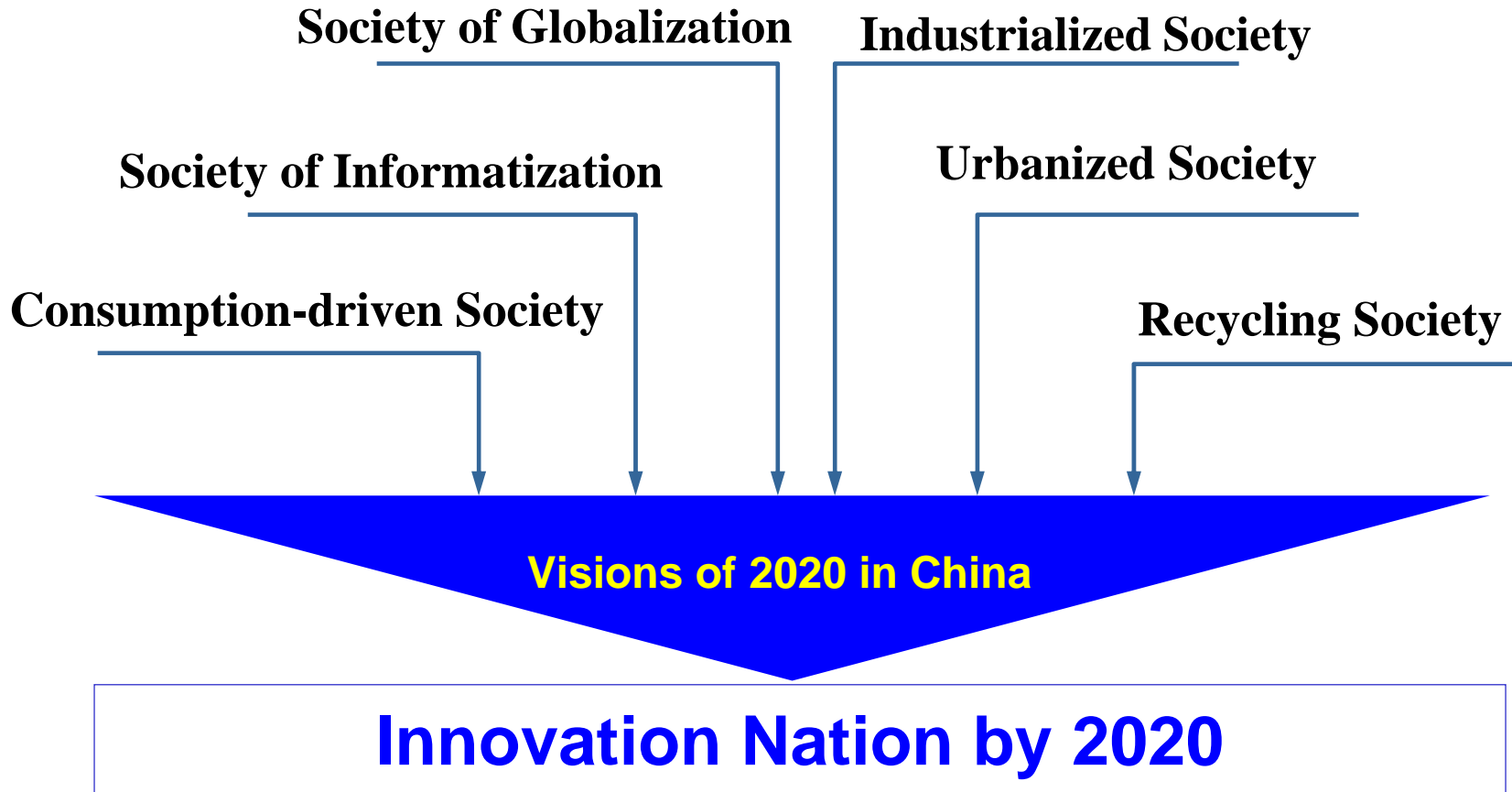


Average Annual Growth Rate of Innovative Development Index (2000-2006)



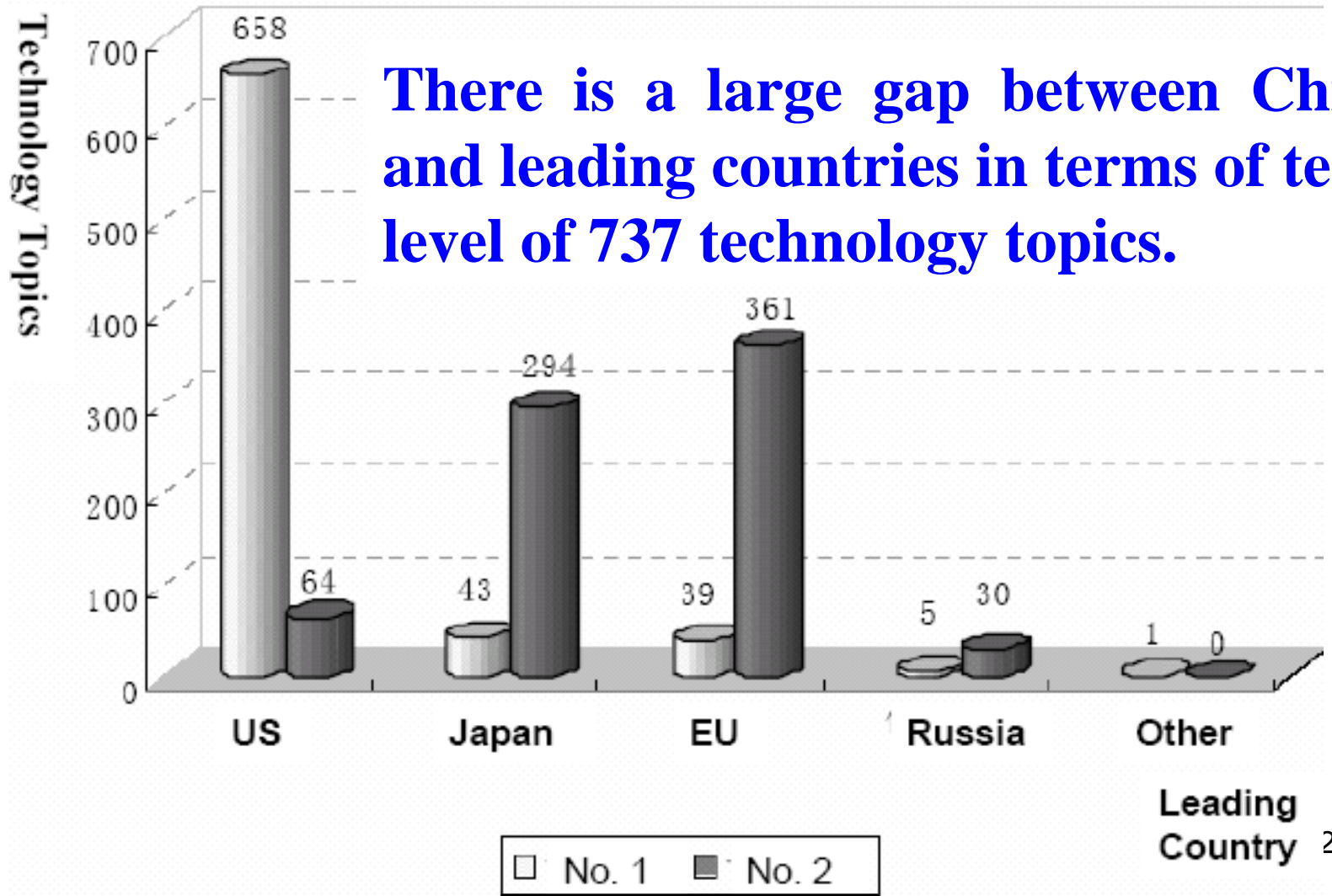
Average Annual Growth Rate of Industrialization Development Index (2000-2006) P19

III. Policies for Innovation Capacity-building



- ❑ New model of industrialization: green and efficient growth
- ❑ New model of urbanization: Integration of urbanization and Informatization
- ❑ Total population, employment and aging population.

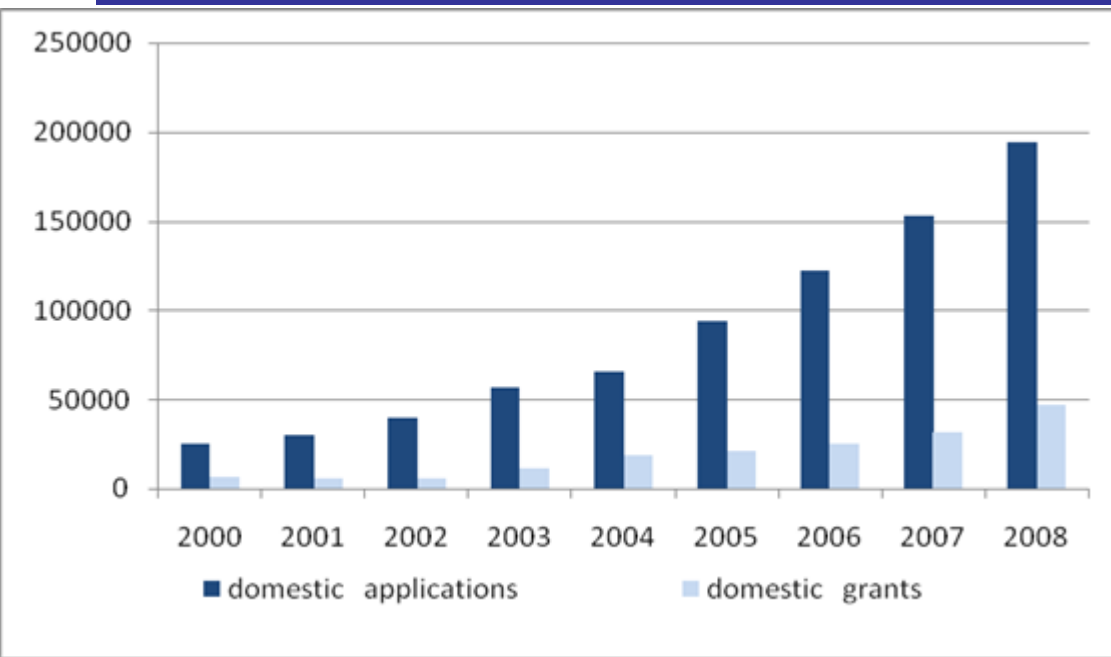
III. Policies for Innovation Capacity-building



There is a large gap between China and leading countries in terms of tech-level of 737 technology topics.

Leading Country 2

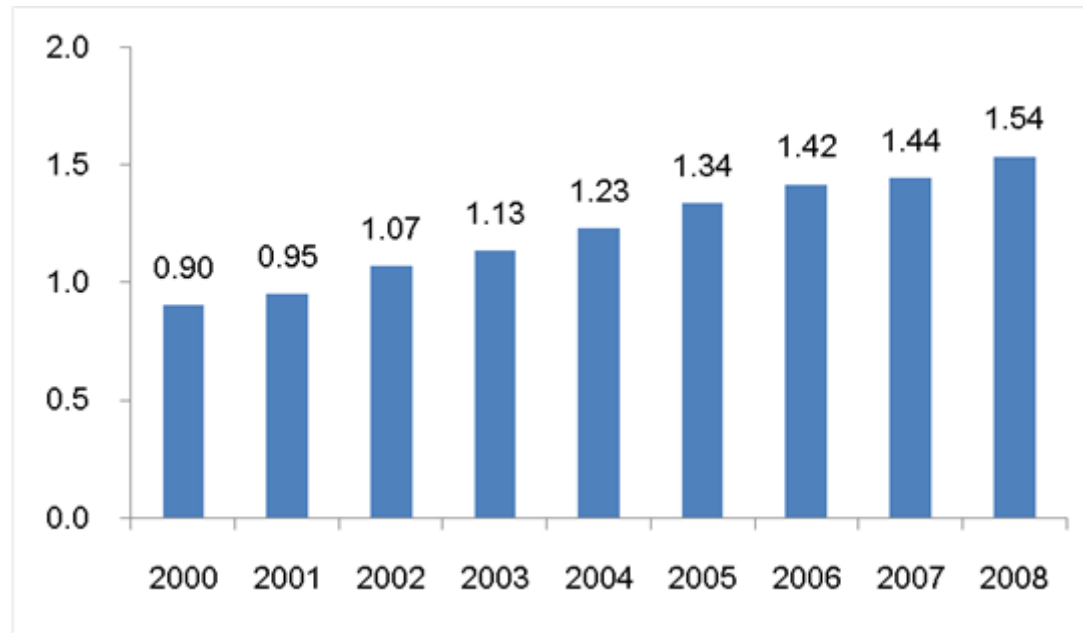
II. Innovation Capacity & Innovation Development



- The number of Chinese applications for invention patent in China increased dramatically during the period from 2000 to 2008.

The efficiency of researchers in China in terms of invention patents is lower than that in most developed countries. In 2007, the number of Chinese invention patents granted per 10^3 researchers was 22.4, much lower than that in Korea (413), in Japan (203), in Germany (46); China filed 3.8 PCT patents per 10^3 researchers, much lower than that in Germany (62.7), Japan (39.1)

II. Innovation Capacity & Innovation Development



•China has become one of the world's largest countries in terms of gross expenditure on R&D (GERD). The ratio of GERD to GDP in China has increased from 0.90% in 2000 to 1.54% in 2008, but much lower than that of developed countries such as USA(2.68%), Japan (3.44%).

III. Policies for Innovation Capacity-building

Chinese government has issued supportive policies to implement the outline of M&L term plan for national S&T development in 2006, and 76 detailed regulations and policy documents by the end of 2009. These policies have effectively promoted the capacity-building for innovation in China, which has profound impact on economic and social sustainable and green development.

III. Policies for Innovation Capacity-building

Four principles for the 12th five year plan for national social & economic development

- ❑ **Balancing all factors**
- ❑ **Innovation-driving**
- ❑ **Green Growth**
- ❑ Working & sharing together

Innovation capacity-building covers all fields of social, economic and science & technology system, focusing on following:

- innovation in strategic emerging industries and service industry
- innovation in key industries, for energy saving & emission decreasing
- innovation on **urbanization** and urban management

III. Policies for Innovation Capacity-building

Main Tasks for Innovation Capacity-building

- S&T mega-projects, knowledge & tech. innovation programs
- Development of strategic emerging industries
 - new energy/bio-tech (medicine/breeding/manufacturing)
 - information network/new materials.
 - high end manufacturing/electric cars
- Upgrading/restructuring of key industries
 - shipbuilding, automobile, steel.
- Innovation in modern service industries
- National Innovation Cities
 - integration of innovation policies

III. Policies for Innovation Capacity-building

(1) To Increase Investment in S&T&I

- To set up a diversified investment system for STI, to increase STI expenditure dramatically, and to optimize the structure of R&D expenditure so as to stimulate enterprises to investment in innovation.

(2) Tax Incentives

- To share the risk of innovation in enterprises by means of tax deduction (sharing 12.5% of enterprises' R&D expenditure).

(3) Government Procurement Policy

III. Policies for Innovation Capacity-building

(4) Innovation Based on Imported Technology

- To strengthen the management of technology import and assimilation. Key national projects should build innovation capacity based on imported advanced technology.

(5) To Create and Protect the IPRs.

Chinese government has taken many measures to create and protect intellectual property rights (IPRs) since 2006.

- To compile a list of key technologies and products for which China should hold related patents.
- To support enterprise to generate & protect IPRs, to engage in standard-making procedure at national and international level.

III. Policies for Innovation Capacity-building

(6) To Build National Infrastructure/Platform for S&T

- To construct lots of experimental bases, infrastructure and platforms, including the scientific facilities and large equipments, the platform of natural resources and scientific data, for NKLs/NEL/NERC.
- To support enterprises, especially transformed research institutes and large enterprises to establish TDCEs and NELs through cooperation with universities and research institutes.
- To establish a sharing mechanism to make the platform for STI open to all users, for instance, to evaluate the openness and effectiveness of these platforms.

III. Policies for Innovation Capacity-building

(7) To Train Qualified HR & Make them Flow to Firm

- To train talents in different level from top scientist to skilled workers, to encourage talents flow from Universities to enterprises.
- To recruit/bring up world leading scientists/experts in strategic research fields via national program for hi-level innovation talents.
--China has recruited more than 800 oversea top experts working in China via “The Recruitment Program of Global Experts”.
- To bring up scientists/engineering technologists and innovation teams in national S&T programs, and platforms on STI such as NELs/NERCs.

III. Policies for Innovation Capacity-building

(8) Financial Measures for Indigenous Innovation

Chinese government has taken a number of financial measures to support indigenous innovation since 2006:

- To give high priority in financing national megaprojects for S&T, national projects concerning the industrialization of hi-tech.
- To improve the financial services to SMEs for innovation, to improve the legal framework by making venture capitals easily invest in start-ups.
- To establish multiple capital markets to support indigenous innovation, including a stock market for technology-based SMEs, stock transactions for hi-tech enterprises and regional transaction market for property rights.

IV. Conclusion Remarks



Innovation-friendly environment is the key for developing the potential of social innovation, especially the potential of human creativity.





Thank you!

