



# **China's Innovation Policy in the Context of National Innovation System Reform**

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**August 27, 2007**

# Outline

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- I. Background
- II. The new challenges
- III. China's new innovation strategy
- VI. Innovation policies

# I. Background-Overall transition

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## Economic system:

- Central planning=>market-based;

## Industrial structure:

- Agriculture + Manufacturing=> Manufacturing + Service

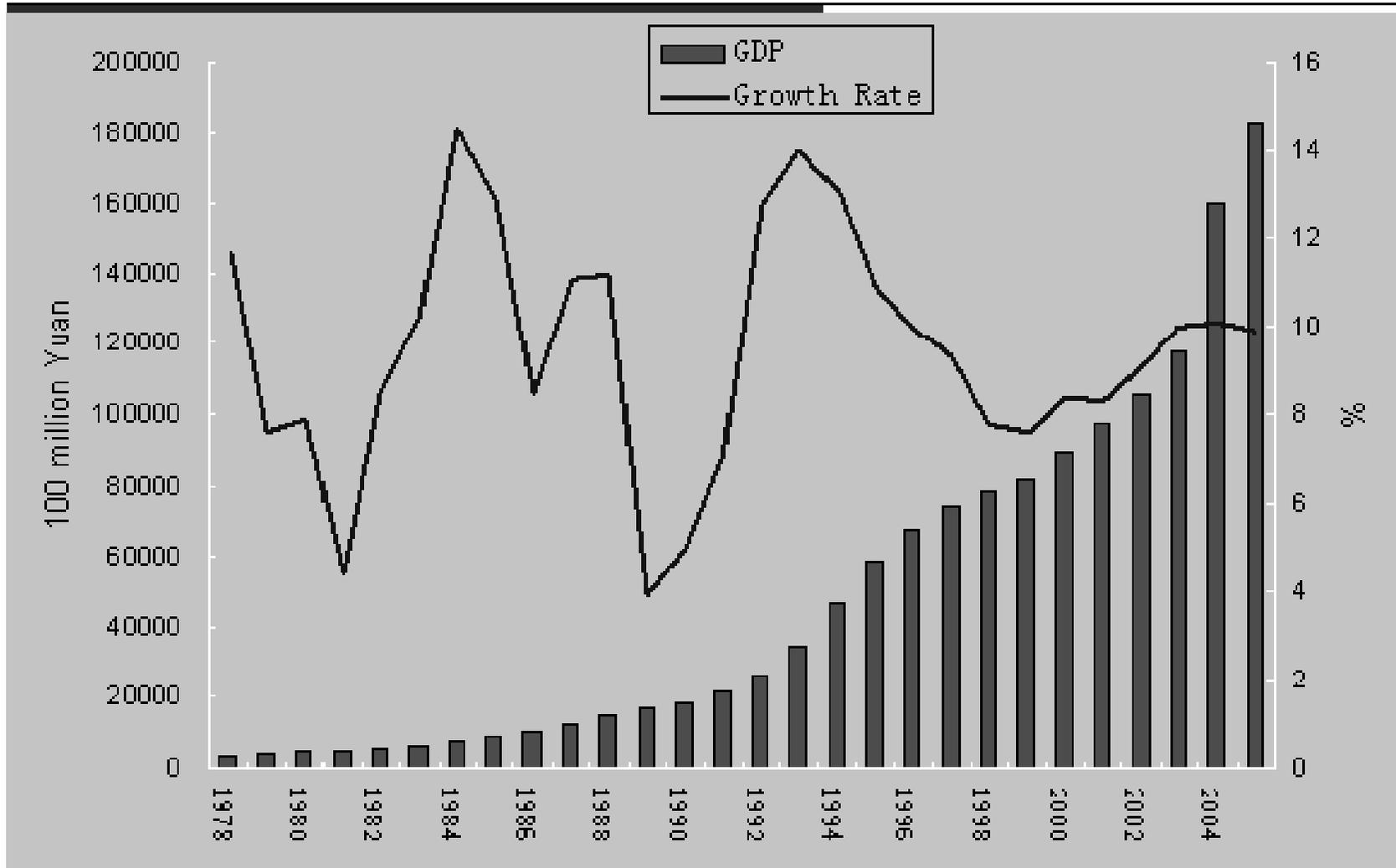
## Society:

- Rural=>Urban
- Closed=>Open

## Governance

- personal charisma and authority=>broad participation and rule of law

# Economic system



# Industrial structure

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## □ Agriculture:

■ 1980=30% => 2000=14.8% => 2006=11.8%

## □ Manufacturing:

■ 1980=49% => 2000=45.9% => 2006=48.7%

## □ Service:

■ 1980=21% => 2000=39.3% => 2006=39.5%

# Society

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## □ Rural =>Urban

- Urban population 1982=20.6% => 43.9%=2006

## □ International Linkage

- Economy: Self-reliant=>major world trading partners

- FDI> \$60 billion

- international trade as the percentage of GDP

- 1978=10% => 2005 =62%

- Overseas travel:

- 1998=8.43million => 2004=28.85 million

# Governance structure

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- Village election and township election experiments;
- Administrative and legal systems reforms;
- Broader public participation in the policy process (e.g. public hearing);
- The growth of non-governmental sector;
- Anti-corruption campaigns;
- .....

# I: Background-Innovation system reform

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- 1949-early 1980s--Establishment of a centralized system based on the Russian model:
  - Separation of functions and mission orientation;
    - human resources=>universities & technical colleges;
    - basic research=>Chinese Academy of Sciences (CAS);
    - applied research=>ministerial/provincial Research Institutes
    - development=>in house services in enterprises.
- Assessments
  - Great achievements in selected missions (e.g. in defense), weak linkage to economic development.

# S&T reform from 1980s-1990s

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- In 1985, the government issued a major document announcing the beginning of the reform on S&T system. The reform measures included:
  - Reform on research Institutions
    - Gradual funding cuts to all research institutes;
    - new R&D funding from competitive projects
    - establishment of horizontal linkages
    - new approaches to the management of research organizations
    - incentive for S&T personnel to “jump into the sea (becoming entrepreneurs)”;
  - .....

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□ Starting new S&T initiatives:

- Torch program (aimed at tech. diffusion in agriculture);
- 863 program (aimed at high-tech sectors)
- National Natural Science Foundation;
- Key bottleneck projects;

□ Creating platforms for high-tech enterprises:

- Establishing 53 new and high-tech development zones at the national level, and many more at the local level;
- Establishing over 40 economic and technical zones to attract foreign high-tech FDIs;
- Encouraging the formation of university-affiliated enterprises;
- High-tech incubators around universities (later many become university science parks).

# Innovation system reform from 1990s to 2000s

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- Knowledge Innovation Program: reforms in the Chinese Academy of Sciences (CAS):
  - Strategic planning process for CAS and for each institute in CAS;
  - Consolidation of research institutes (from a total of over 120 to about 80);
  - Establishment of innovation centers (lean and mean, with high pay and high pressure) within research institutes;
  - Attracting overseas talents;
  - .....

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□ Reforming public research institutes —  
>pushing them into the market

- By the end of 2003, 1050 research institutes were transformed into business since 1999 government reform;
- 99 others were merged into universities or transformed into NGOs.

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## Industrial R&D

- Supporting the establishment of R&D centers in major State Owned Enterprises:
  - Close to 300 centers were certified by the central government;
  - Over 2000 centers were certified by provincial governments;
- Supporting small business innovation
  - Small and Medium Enterprise innovation fund;
- Helping MNCs to establish R&D centers in China
  - Official figure show that 750 MNC R&D centers were established in Beijing, Shanghai, Guangzhou, Chengdu, etc by mid-2005.

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## Higher education system reform

### ■ Dramatic increase in university enrollment

- Gross enrollment increased from 3.7% in 1990 to 21% in 2005;
- Total college enrollment from 6.43 million in 1998 to 21 million in 2005.

### ■ Structural change by consolidation of universities

- In total, 637 universities merged to create 270 new universities;

### ■ Decentralization of the management of universities

- Universities administrated by Central Ministries reduced from 367 universities to 120 (including about 70 national universities by Ministry of Education);

### ■ Strengthening universities' R&D capability:

- 985 program and 211 program

## II. New challenges-overall

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- Regional, sectorial, and income disparities
  - Differences between coastal and interior regions
- Constraints in environment and resource;
  - Grave air and water pollutions around the country
- Constraints in regulatory regimes
  - The need to strengthen regulatory agencies
- Competitions from global markets;
  - Competitive pressures from Multinationals

## II. New challenges- within the innovation system

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- Weak industrial R&D capability;
- Knowledge production increased, but quality remains to be a problem;
- Lack of integration among different players in the system (such as Chinese Academy of Sciences, universities, and enterprises);
- The over-reliance on foreign technology in key industrial sectors (such as semiconductors, manufacturing equipment, and etc).

# III. China's new innovation strategy

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- With over 2000 experts' effort in more than two years, China drafted a median and long term S&T plan, which was published in early 2006
  - Objective-making China an innovation-based country in 2020;
    - Increasing R&D spending to 2.5 percent of GDP;
    - Increasing the contribution of S&T to the economic growth;
    - Reducing over-dependency on foreign technology;
    - Stepping up the output of publications and patents in major fields.
  - Approach-promoting indigenous innovation;
    - Importation, assimilation, and innovation;
    - Integration innovation
    - Original innovation

# Focused research areas and programs

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- Applied research based on the societal needs:
  - Energy, water resources, environmental protection, health, agriculture, manufacturing, service, and etc ;
- Mega Projects:
  - Semiconductor manufacturing, broadband wireless mobile communication, nuclear power, water pollution treatment, AIDS and Hepatitis, aircraft manufacturing, space exploration and etc.
- Frontier Technologies:
  - bio-tech, IT, new materials, new energy, space...
- Important basic research
  - In broad areas and interdisciplinary areas.

# Framework conditions

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- Institutional Reform and improving the performance of national innovation system
  - Enterprise-centered tech-innovation system
- Coordinated policy support
- Public understanding and innovative culture
- Investment and infrastructure
- Human resource development
- International cooperation

## VI. Innovation policies

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### Government investment

- Encourage multiple channels to invest in R&D
- Government budget would maintain stable growth;
- Government investment in mega-projects;

### Tax incentives

- R&D spending can be deducted from taxable income on a 150% basis, which is also transferable in five years;
- Accelerated depreciation for R&D instruments and equipment;
- High-tech companies in NHTZs can enjoy two year tax-free benefits after becoming profitable;

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## □ Financing R&D

- Public banks will support national mega-projects;
- Banks will support SME innovations;
- Policy support for venture capital markets;
- Facilitate and reduce barriers for domestic firms to set up R&D centers overseas;

## □ Importation, assimilation and innovation

- Better management of importation of technologies;
- Establishment of a preferred list of foreign technologies and limitation of importation of old and outdated technologies;
- Policy support of importation, assimilation and innovation.

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- Creation and protection of IPRs
    - Support and facilitate firms to gain IPRs in important technology areas;
    - Support Chinese firms and industrial associations to participate in international technology standard settings;
    - Improve IPR protection environment; strengthening punishment of IPR violators;
    - Improve the process for patent examination;
    - Integrate China's technology trade system with the international system;
  - S&T human resource development
  - S&T Platform
  - Overall policy coordination

# Summary-changes in the policy process

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- Policy process
  - From participation by domestic policy elite to broad participation by the general public and international experts;
- Policy orientation
  - From research institution-centered to enterprise-centered;
- Policy scope
  - From focusing mainly on research areas/programs to focusing also on framework conditions;
- Policy tools
  - From government investment/programs to other instruments such as market incentives, legislations and etc;

# Summary-policy challenges

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- ❑ How to coordinate among different government agencies in the policy process?
- ❑ How to shift policy focus from funding research programs to improving environments and infrastructures?
- ❑ How to motivate firms, universities, and research institutes and other relevant players to work together in the innovation process?
- ❑ How to coordinate (and communicate relevant messages) between domestic reform and global integration better?

# Thank you!

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2007年9月14日