China’s Innovation Policy in the Context of National Innovation System Reform

Lan Xue, Professor and Director
China Institute for S&T Policy
Tsinghua University

August 27, 2007
Outline

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

- 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

2007年9月14日
Economic system
Industrial structure

☐ 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

- 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=8.43 million => 2004=28.85 million
Governance structure

- 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;
- …..

2007年9月14日
I: Background-Innovation system reform

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.
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)”;
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

- 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;
  - .............
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.
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.
Higher education system reform

- Dramatic increase in university enrollment
  - Gross enrollment increased from 3.7% in 1990 to 21% 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

- 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

☐ 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

- 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

2007年9月14日
Focused research areas and programs

- **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

- 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

2007年9月14日
VI. Innovation policies

- 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;
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.
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

- 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

☐ 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?

2007年9月14日
Thank you!

2007年9月14日