Basic Thinking of National Medium and Long Term Development for Science and Technology of China

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1. Background of Development for S&T
2. Basic Principles of the Development for S&T
3. Prospect of the Development for S&T
China’s economy has been transforming from a phase of rapid growth to a stage of high-quality development that demands more development driven by innovation.
New round technical revolution and industry transform demonstrates new trends:

- Cross and integration among different technology
- Group breakthrough of technology: information and telecommunication, advanced materials, advanced energy, life science, etc.
- Digitization and intelligence
- Significant disruptive technology spring up
- The speed of industrialization of scientific and technological achievements accelerates
1. Background of the Development for S&T

- Mankind society is facing severe challenge of sustainable development.

Common challenge:
- Climate change
- Health
- Environment protection
- Disaster prevention
- Public safety

In the new stage, new guidelines, highlights, and policy measures of S&T should be put forward.
There is still a large gap between China and developed countries in S&T development.

- Number of R&D personnel: 1st in the world
- Number of R&D personnel per 10,000 employment is small.

Proportion of basic research in China is about 5.5% of R&D, lower than that of the developed countries such as Japan, France and the United States. It is also lower than the emerging economies such as South Korea, Russia and South Africa.
Expenditures on R&D of Enterprises are Relatively Lower.

World’s top 2500 companies ranked by their investments in R&D
——The 2018 EU Industrial R&D Investment Scoreboard

<table>
<thead>
<tr>
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<th>Number of Companies</th>
<th>R&amp;D Investment (€bn)</th>
<th>Average (€mn)</th>
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<tbody>
<tr>
<td>US</td>
<td>777</td>
<td>274.2</td>
<td>353</td>
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<tr>
<td>EU</td>
<td>578</td>
<td>200.1</td>
<td>346</td>
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<tr>
<td>China Mainland</td>
<td>438</td>
<td>71.2</td>
<td>163</td>
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<tr>
<td>Japan</td>
<td>339</td>
<td>99.9</td>
<td>295</td>
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2. Basic Principles of the Development for S&T

- Stick innovation driven
- Deepen the opening policies: Strengthen international cooperation
- Adhere to the reform direction of marketization: let market play the decisive role in allocating innovative resources, reducing or eliminating the systematic barriers, emitting reform dividends
- Stick to people oriented.
- Building good innovative ecology
Innovation driven

• New development idea: innovation, coordination, green, open, share
• Innovation is the first dynamics to lead development
• Improving innovative capacity:
  – Strength basic research, original innovation
  – Grasp key technology,
  – Build S&T infrastructure
Open innovation

- Globalization of S&T is a big trend that can not resist
- Openness is the basic policy of China
- Stick mutual benefit and win-win guideline
- Improve the level of internationalization, because our level of internationalization is relatively low
- Build innovative community
Reform of marketization

- Market plays the decisive role in the allocation of resources
- Enterprise is the subject of innovation
- Government should play better function
  - Basic research
  - Frontier research and core technology
  - Research on the important public interest
People oriented

• By people: talent is the first resource.
• For people: let innovative results serve people
• Means of inspiration and constraint both should be used
• Material inspiration and spirit inspiration both should be used
Innovative ecology

- Transform from management to governance, from management to service
- Encourage innovation
- Train the spirit of doubt
- Tolerant failure
- Inspect every people, treat every people equally
3. Prospects of the Development for S&T

- Basic Researches and Frontier Technologies
- Major Demands for Social Development
- Innovation Platforms and Infrastructures
- Coordinated Development among Regions
- International Cooperation
- Technology Transfer and Commercialization
1. Basic Researches and Frontier Technologies

- Artificial Intelligence
- Big Data
- New Materials
- Quantum information
- Intelligent Manufacturing
- Integrated Circuit
- Mobile Communication
- Aeronautics and Aerospace

- Optimize mechanism of project management
- Highlight interdisciplines and disruptive technologies
2. Major Demands for Social Development

**Life & Health**
- Brain science and brain-like artificial intelligence research
- Development of major new medicines
- Prevention and treatment of serious diseases such as cancer, angiocardioopathy and diabetes

**Food Supply**
- Characteristic improvement research of staple crops
- Innovation in seed industry

**Environmental Protection**
- Comprehensive environmental governance in Beijing-Tianjin-Hebei region
- Control and treatment of water pollution
- Participation in global climate governance

**Clean Energy**
- Clean and efficient utilization of coal
- Smart grid
- Large-scale advanced nuclear power plants with pressurized water reactors (PWR) and high-temperature gas-cooled reactors (HTGR)
3 Innovation Platforms and Infrastructures

**Major S&T Facilities**
- Shanghai Synchrotron Radiation Facility
- China Spallation Neutron Source
- BPL and BPM Time Service Systems
- Guoshoujing Telescope
- Beijing Electron Positron Collider
- Heavy Ion Research Facility in Lanzhou
- ...

**State Key Laboratories**
- Total number: 501 (175 in enterprises)
- Covering all provinces in mainland China, as well as Hong Kong and Macao

**National Technological Innovation Center**

- *Comprehensive Industrial Technology Innovation Platform*

- **Reform the system of state key laboratories**
- **Optimize distribution of innovation platforms and infrastructures**
4. Coordinated Development among Regions

Improving Regional Innovative and Coordinated Development

- Coordinated development of the Beijing-Tianjin-Hebei region
- Guangdong-Hong Kong-Macao Greater Bay Area

Innovation Demonstration Zone of National Sustainable Development Agenda

- Shenzhen
  - Innovation Leads Sustainable Development of Super-large Cities
- Taiyuan
  - Transformation and upgrading of Resource-based Cities
- Guilin
  - Sustainable Utilization of Landscape Resources

Poverty alleviation by S&T
- S&T support for Xizang, Xinjiang, Qinghai, Ningxia, Yunan, ...
- Agricultural S&T Parks
5. Technology Transfer and Commercialization

- Incubators
- Innovation Spaces
- University Science Parks
- Technology Trade Markets

Innovation funds and Venture capital

Laws and Policies

High-Tech Zones
6. International Cooperation

- Enhance cooperation with other countries in S&T
- Address global challenges together
- Open up national S&T programmes
- Participate and initiate international major science programs & projects
- Implement "the Belt and Road" Science, Technology and Innovation Action Plan

In September 2018, Mr. Wang Zhigang met with Mr. Carlos Moedas in MOST.
Thanks