China's Innovation Environment and Universities

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Summary

1. China’s Innovation Environment

2. Chinese Universities' Roles and Tasks

3. Current Innovation Status of Chinese Universities

4. Chinese Universities’ Technological Innovations

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1. China's Innovation Environment

1. Components

Innovation teams

(including communities and innovation systems) **organic**

Material foundation

(material means and support conditions) **non-organic**

Innovation environment

(policy, system, culture) **environment**

2. Functions

Guiding, supporting domestic economic and social development

A great power's responsibility, common wealth of society

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1. China's Innovation Environment

3. Characteristics

Diversity

Including communities, systems, talents, direction, institutions and cultural background

Stability

Including dynamic equilibrium on a fluid foundation

Self-regulation

Including incentive policy, strategic structure, information structure, resistance and feedback regulation

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1. China's Innovation Environment

4. Factors with an impact

Economic impact (domestic economic development, world economic development)

Cultural impact (nature, harmony)

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1. China's Innovation Environment

China' innovation communities mainly include:

- **Universities and the Chinese Academy of Sciences**
- **Business research organizations**
- **Research institutions specializing in economics**
- **Research institutions specializing in social development**
- **Multinationals' research organizations in China (e.g. IBM's China Research Lab)**
- **Public service organizations concentrating on innovation (patent, evaluation, intermediary services)**

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1. China's Innovation Environment

Establishing a national innovation system with Chinese characteristics

1. Formation of an innovation system

- **A knowledge innovation system that organically combines scientific research and higher education - foundation**
- **A technological innovation system that is business-based, market-oriented and integrates industry, academia and research - core, breakthrough point**
- **An innovation system that takes into account different regions' respective characteristics and advantages - distinct results**
- **A socialized, networked technology intermediary service system – requiring additional effort**

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1. China's Innovation Environment

Establishing a national innovation system with Chinese characteristics

2. Key elements and characteristics of an innovation system

- **Key elements include scientific innovation, technological innovation, product innovation, industry innovation, system innovation, cultivation of innovative talents, and an innovative culture**
- **Having characteristics of being networked, diverse, dynamic and open**
- **The system contains factors that include frameworks, mechanisms, management, protective systems and the overall operation**

1. China's Innovation Environment

Establishing a national innovation system with Chinese characteristics

3. Major tasks

- **Strengthening original innovation, integrated innovation and innovation on technologies introduced to the country**
- **Deepening reform of various systems; accelerating construction of the country's innovation system**
- **Creating a favorable environment; cultivating innovation talents**
- **Developing a culture of innovation; nurturing an innovative spirit in society**

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2. Role of Chinese Universities in the Innovation System and Their Tasks

In the 21st century, technological innovation has become the driving force behind a country's economic development. Countries around the world are endeavoring to raise their ability to innovate technologically, placing a high priority on cultivating talents and building an energetic innovation system.

2. Role of Chinese Universities in the Innovation System and Their Tasks

1. Source of the country's core competitiveness (engine)

Universities are involved in areas including science and technology, education, economy and society.

Universities contribute greatly to the rise and development of a great power, and are closely connected with the country's industrialization and modernization processes.

2. Role of Chinese Universities in the Innovation System and Their Tasks

2. Backbone of the country's knowledge innovation activity

(driving force)

One of the main forces for basic research and original high-tech innovations

Universities' SCI theses make up 3/4 of the country's theses

Top 50 universities' SCI theses make up 3/4 of all universities' papers

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2. Role of Chinese Universities in the Innovation System and Their Tasks

3. Place where innovative talents are cultivated

One of the principal places where first-class innovative talents are cultivated

Place where other organizations go to have the talents they need cultivated

Other institutions are located near schools of higher education with the two linked by innovative talents

2. Role of Chinese Universities in the Innovation System and Their Tasks

4. An essential force for technological innovations

New blood to help solve major economy-related technological problems, transfer technologies developed to businesses, and convert research results into practical applications

Universities' technological innovation ability and results continue to grow rapidly

Promoting cooperation between industry, academia,and research, and harnessing universities' innovation potential and using them as a guiding light, as a means of strengthening the country's innovation strategy

2. Role of Chinese Universities in the Innovation System and Their Tasks

Society's demands on technology and education

- **Increasing demand for people's innovative ability**
- **Growing demand for new knowledge and technology**
- **Demand for spending less time turning knowledge into products**
- **Demand for tighter integration of technological innovation and national needs**

2. Role of Chinese Universities in the Innovation System and Their Tasks

Technological development's demands on higher education

- Using scientific research as an important means of cultivating top-notch innovation talents, with talents cultivated having stronger innovative ability
- Providing a continuous supply of innovative results
- Providing more services to the public such as technology transfer and decision advisory services
- Promoting an innovative culture
- Developing high-standard, research-oriented universities to raise the country's core competitiveness

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3. Current Innovation Status of Chinese Universities

1. High-standard innovative talents

- **562 academicians of the Chinese Academy of Sciences and the Chinese Academy of Engineering in universities, accounting for 40% of the country's total academicians**
- **902 holders of National Science Fund for Distinguished Young Scholars scholarships in universities, making up 60% of the country's total**
- **73 outstanding national innovation communities in universities, accounting for 52% of the country's total**

Ministry of Education implements the "High-Level Innovation Talents Program"

- **Employing 1,108 Cheung Kong Scholars**
- **245 Outstanding Innovation Teams**
- **3,776 New Century Excellent Talents in University**
- **126 Discipline Innovation and Talents-introducing Bases**

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3. Current Innovation Status of Chinese Universities

2. Construction of technological innovation bases

- 3.5 National Pilot Laboratories, making up 60% of the country's total
- 140 National Key Laboratories, accounting for 63% of the country's total
- 26 National Engineering Laboratories, making up 30% of the country's total
- 110 National Engineering Research Centers, accounting for 35% of the country's total
- 7 National Center For Technology Transfer, making up 70% of the country's total
- 76 National University Science Parks that have connections to over 110 universities

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3. Current Innovation Status of Chinese Universities

3. Performing the country's innovation tasks

Basic research: In charge of about 80% of National Natural Science Foundation's General Programs, 65% of its Key Programs, and 55% of its Major Programs

Research on high technology: In charge of about 40% of High Technology Research and Development Programs

Supporting industrial development: In charge of about 30% of programs tackling key industrial problems of generic technology

Facilitating economic and social developments: The funding for converting research results into practical applications to serve businesses increases at a rate of 20% annually, with about 40% of the combined funding for universities' scientific research coming from businesses.

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3. Current Innovation Status of Chinese Universities

4. Achieving technological results

- **Patents for service inventions accounts for about 35% of the country's total**
- **Papers published in Chinese-language periodicals make up over 60% of the country's total**
- **Papers included in SCI, EI and ISTP account for over 80% of the country's total**
- **Receiving over 50% of the National Science and Technology Awards**

4. Chinese Universities' Technological Innovations

1. Respecting the development patterns

Scientific research's continuity

Technological innovation's nature of developing exponentially

Emerging industries' nature of concentration

Economic development's nature of gradient

Interactivity between science and technology and policy

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4. Chinese Universities' Technological Innovations

2. Guiding principles

Accurate positioning: Talent cultivation, scientific research and serving society

Categorized guidance: Realizing different universities' advantages and characteristics to achieve the goal of joint development

Reinforcing innovation: Boosting original innovation; providing support for core, generic technologies

Intersection and integration: Adopting a discipline combination, consolidation and integration strategy to more efficiently allocate resources

4. Chinese Universities' Technological Innovations

3. Overall objectives

Establishing a schools-of-higher-education innovation system that fits in a socialist market economy and technological development patterns; achieving major breakthroughs and developments in several key areas; markedly raising competitiveness and the quality of schools of higher education in the next five years.

- **Ability to influence the direction of future technological developments**
- **Ability to solve major problems associated with economic, social developments**
- **Ability to train outstanding innovative individuals**
- **Ability to nurture and develop an innovative culture**
- **Ability to conduct international cooperation**

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4. Chinese Universities' Technological Innovations

4. Major tasks

Promoting the building of a knowledge innovation system that revolves around key laboratories

Promoting and improving the construction of a university innovation system and cultivation of talents

Enhancing coordination, integration and organization of university scientific research work; bolstering international cooperation and exchanges in science and technology

Producing certain original innovation results in certain disciplines; solving certain major technological problems encountered in economic, social development

Strengthening the cooperative relationship between industry, academia and research; raising the percentage of technological research results that are converted into practical applications

Establishing a comprehensive, multilayered "Chinese Education IT Public Service System"

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4. Chinese Universities' Technological Innovations

Areas requiring special effort

Interdisciplinary research: **Improving the relationship between the management system, operating mechanism discipline establishment, and division of labor and coordination**

Union of scientific research and talent cultivation: **Cultivating quality talent and forming teams through advanced scientific research**

Training leaders: **Improving the systems to train, utilize and evaluate talents**

Ability to transfer technologies developed to businesses: **Improving the establishment of an incentive mechanism and the forming of intermediary service teams**

Thank you!

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Building the 21st Century:
U.S. - China Cooperation on Science, Technology, and Innovation

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