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THE CHINESE ECONOMY TODAY

THE PERSPECTIVE OF **RENOWNED CHINESE EXPERTS**

Transition from STI Policy to Innovation Policy -the Case of China

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Outline

- I. Introduction
- II. Evolution of China's STI policy
- III. New challenges
- IV. Response-recent policy development
- V. Conclusion

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I. Introduction

- In the last few years, China has been making progress in promoting innovation-driven development. However, what is the hype vs. reality? What are the roles of government policies? What are the future prospects?
- In addition, The international environment has also undergone fundamental changes;
- This presentation tries to examine this issue from the overall context of China's reform and openness, and the evolution of China's Science, Technology, and Industrial policy, and then reflect what can be learned from this process.

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II. The evolution of China's science, technology and industrial policy

- The main objective of China's STI policy over the last 40 years is to promote innovation:
  - Reforming S&T system—market-oriented reform based on incentive and institutional changes;
  - Global integration—domestic institutions trying to integrate into the global system while maintaining their unique identities.
- Four waves of major changes:
  - Mid-1980s: Incentives for public research institutes to work for economic development;
  - Late-1990s: Institutional changes and system reform;
  - 2006-2012: MLP and indigenous innovation.
  - 2013- innovation-driven development

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Features of China's STI policy process

- Complexity—"solving simultaneous equations"
  - Disparity in regions and between rural and urban areas
  - Market underdevelopment and market failure co-exist
    - Market intervention and market regulation
  - Normal growth and later-comer catch up
    - Fostering the "infant and strategic" industries
  - Indigenous capability and global integration
    - July 16, 1960, facing increasing ideological differences with China, USSR stopped cooperation in S&T and industrial development with China, breaking 600 contracts and agreements and withdrawing 1390 experts in a month.

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- Gradualism—"solving stepwise equation", or Crossing the river by feeling the stone
  - Not bounded by orthodoxy principles
    - Neither market-fundamentalism nor hard-core planning economic principles
  - Trial and error
    - Experiments in some cities or regions, learning from the experience, and then expand the policy if it works—such as 5 coastal opening up cities and high-tech development zones;
  - Sequencing reforms in various areas
    - Reform to reduce administrative approvals
    - Reform on market regulation

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Outcome of the reform—successes

- Sustained growth in total R&D investment(2016=2.11%)
- Greater role of Industrial R&D:
  - 1986=35.3%=>2001=60.4%=>2016=77.5%
- Rapid growth in R&D output (papers and patents)
- Greater participation in the global innovation system
  - Multinational R&D centers and joint publications
- Massive expansion of higher education
  - Gross enrollment rate: 1990=3.7%; 2001=10%; 2015=40%
- The emergence of globally known institutions
  - Research universities (30+ in 985 program)
  - Research institutes (CAS, NIBS, BGI, and etc)
  - Multinational companies (BAT, Huawei, Lenovo, Jili, and etc)

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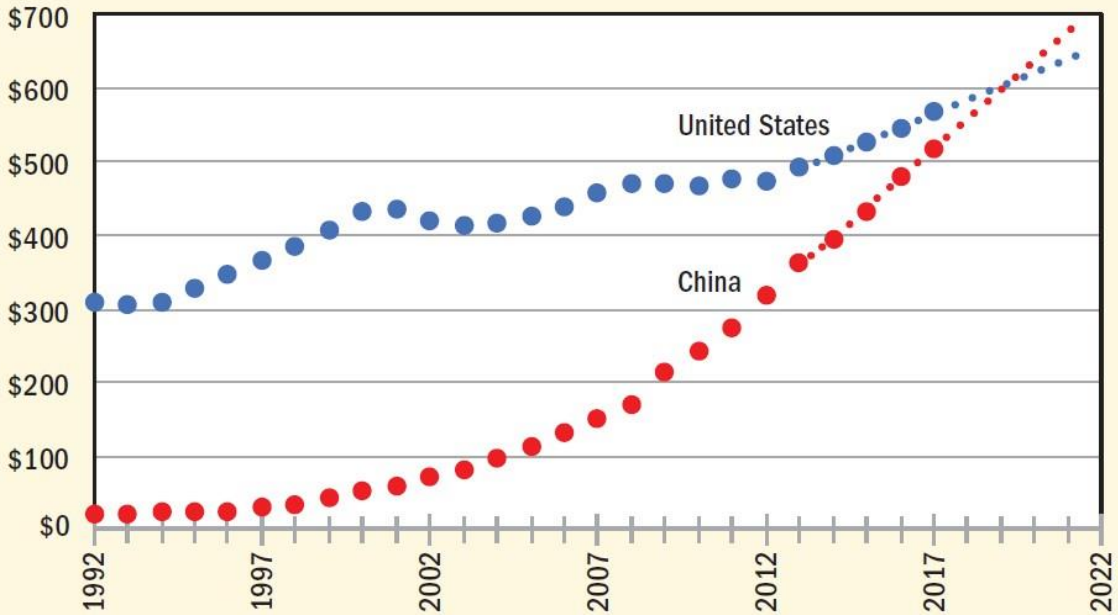
Gross Expenditures in R&D

in billions of 2019 constant PPP $US



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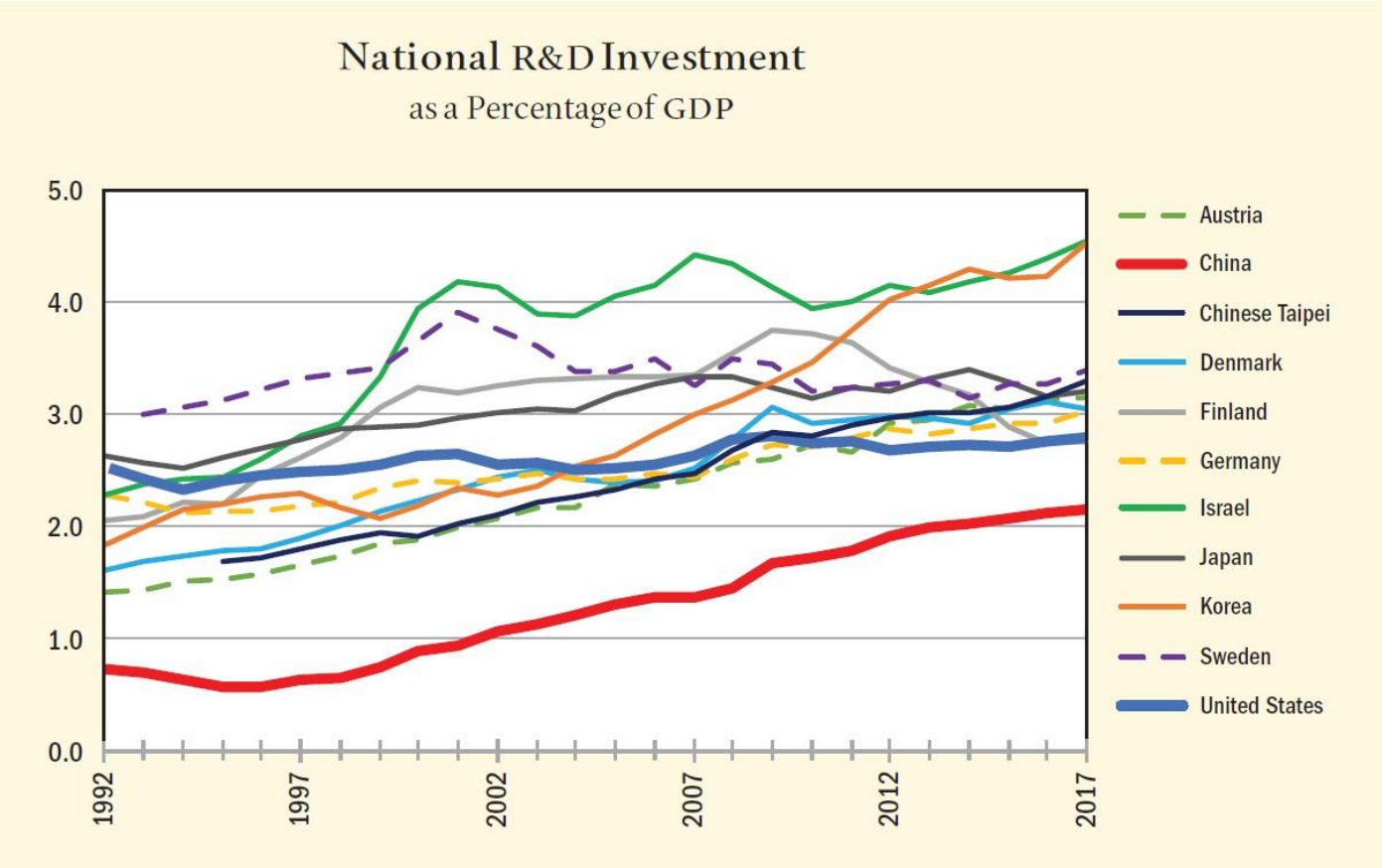
National R&D Investment
as a Percentage of GDP
5.0
4.0
3.0
2.0
1.0
0.0
1992
1997
2002
2007
2012
2017
Austria
China
Chinese Taipei
Denmark
Finland
Germany
Israel
Japan
Korea
Sweden
United States

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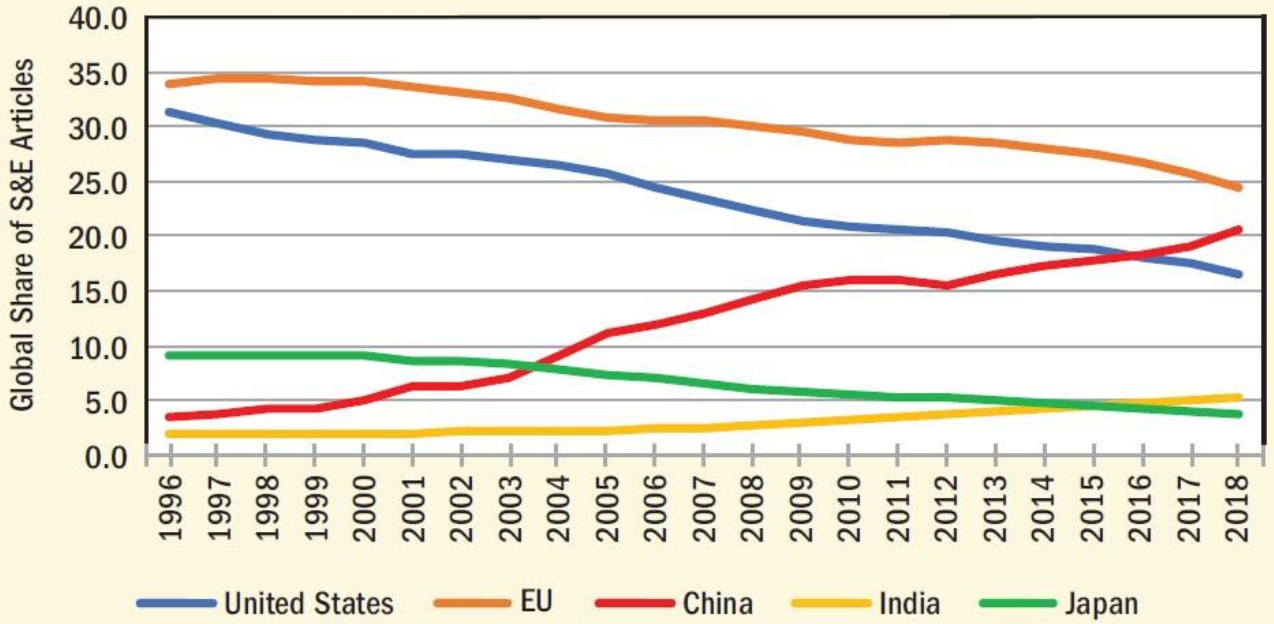
S&E Articles, by Global Share of Selected Region, Country, or Economy



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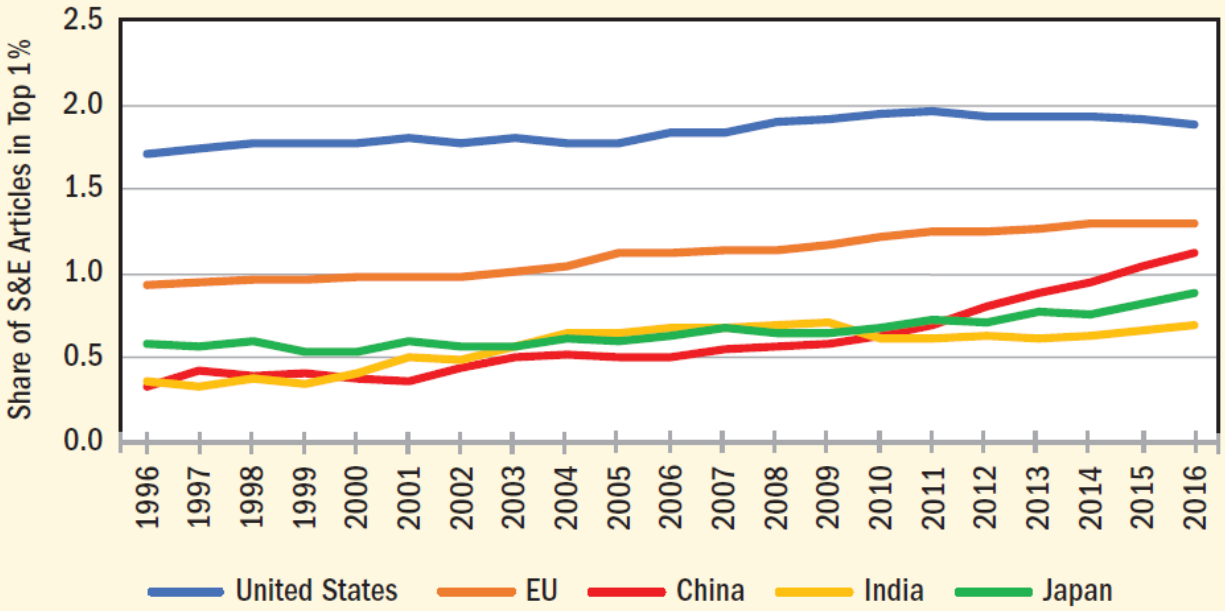
S&E Publication Output in the Top 1 Percent of Cited Publications, by Selected Country or Economy



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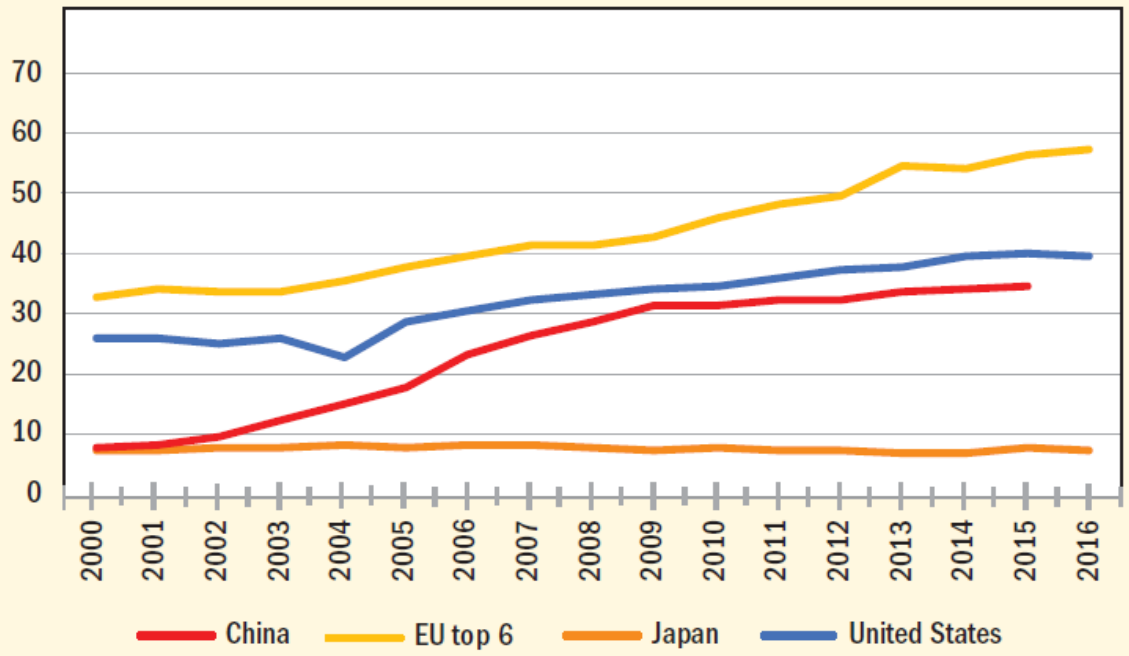
Doctoral Degrees in S&E by Awarding Country, in Thousands



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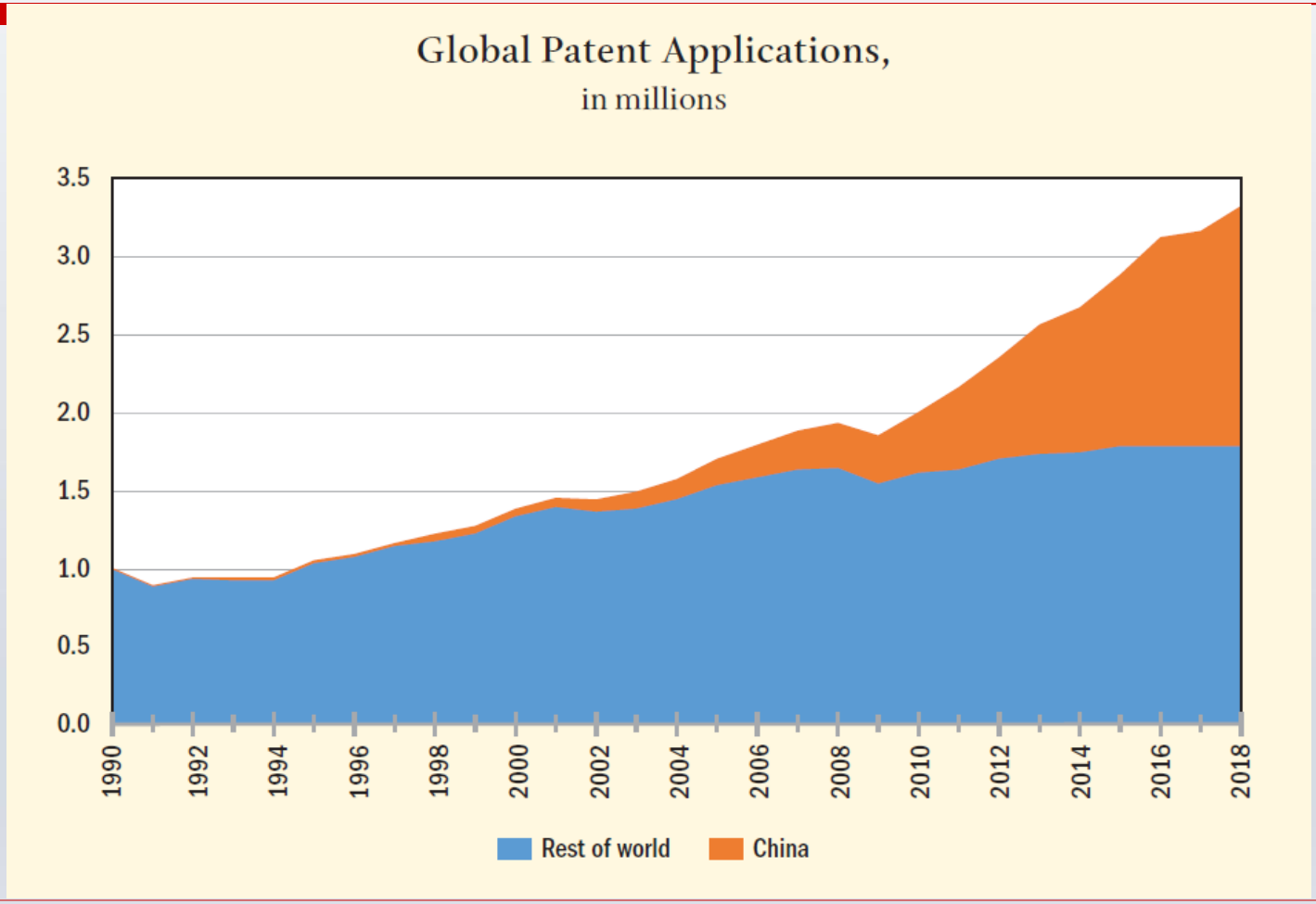
Global Patent Applications,
in millions
3.5
3.0
2.5
2.0
1.5
1.0
0.5
0.0
1990
1992
1994
1996
1998
2000
2002
2004
2006
2008
2010
2012
2014
2016
2018
Rest of world
China

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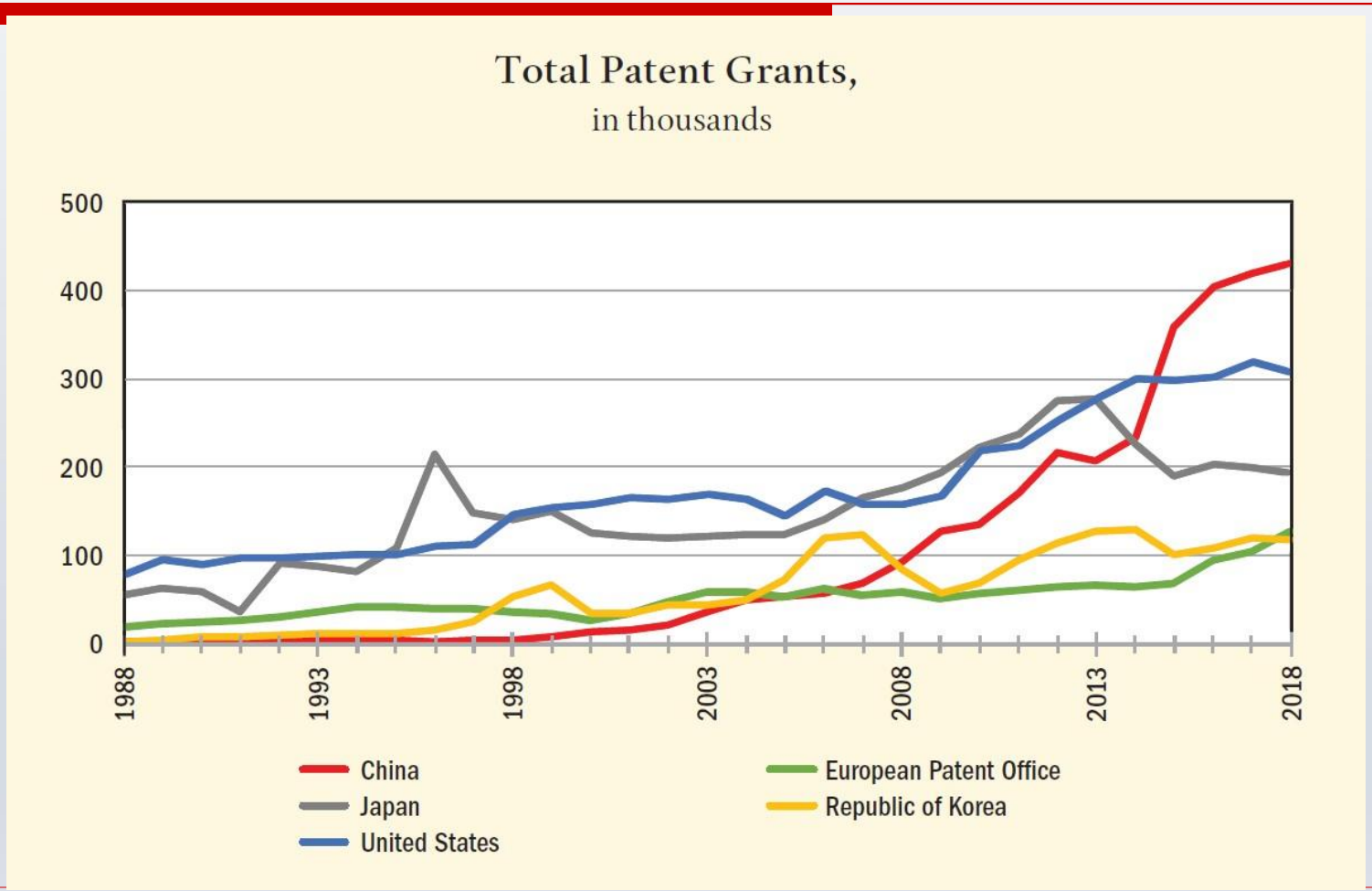
Total Patent Grants,
in thousands
500
400
300
200
100
0
1988
1993
1998
2003
2008
2013
2018
China
Japan
United States
European Patent Office
Republic of Korea

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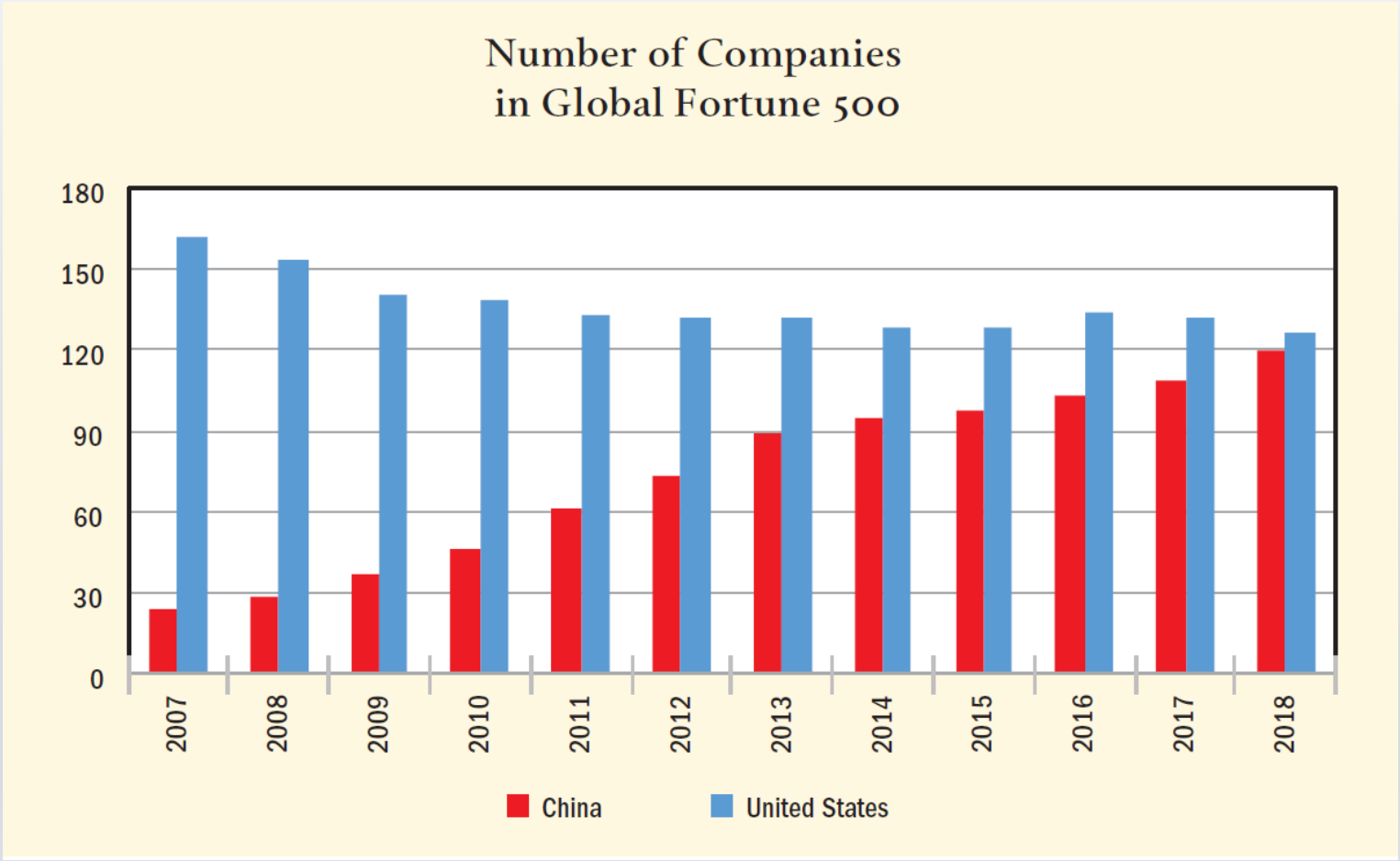
Number of Companies
in Global Fortune 500
180
150
120
90
60
30
0
2007
2008
2009
2010
2011
2012
2013
2014
2015
2016
2017
2018
China
United States

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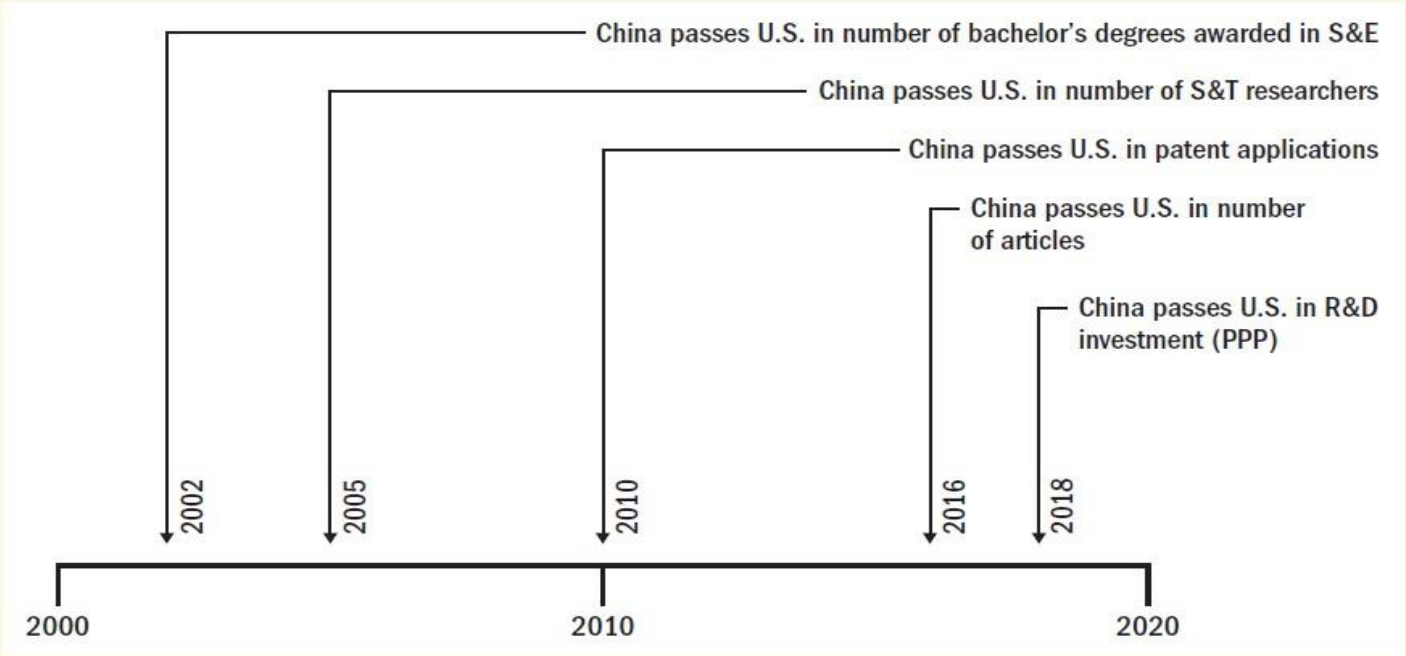
Timeline of China Surpassing the United States in Research and Development



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Outcome of the reform--regrets

- There are still innovation gaps with global leaders in critical technological areas (see data on IC trade)
- China has accumulated strong manufacturing capabilities, but not strong brands;
- The overall productivity of Chinese economy is still relatively low;
  - 1/3 work in agriculture; regional/industrial diversity;
- There are still many institutional reforms to be completed if China wants to be an innovative country：
  - E.g. How to reform the management of Public Service Units (事业单位）?

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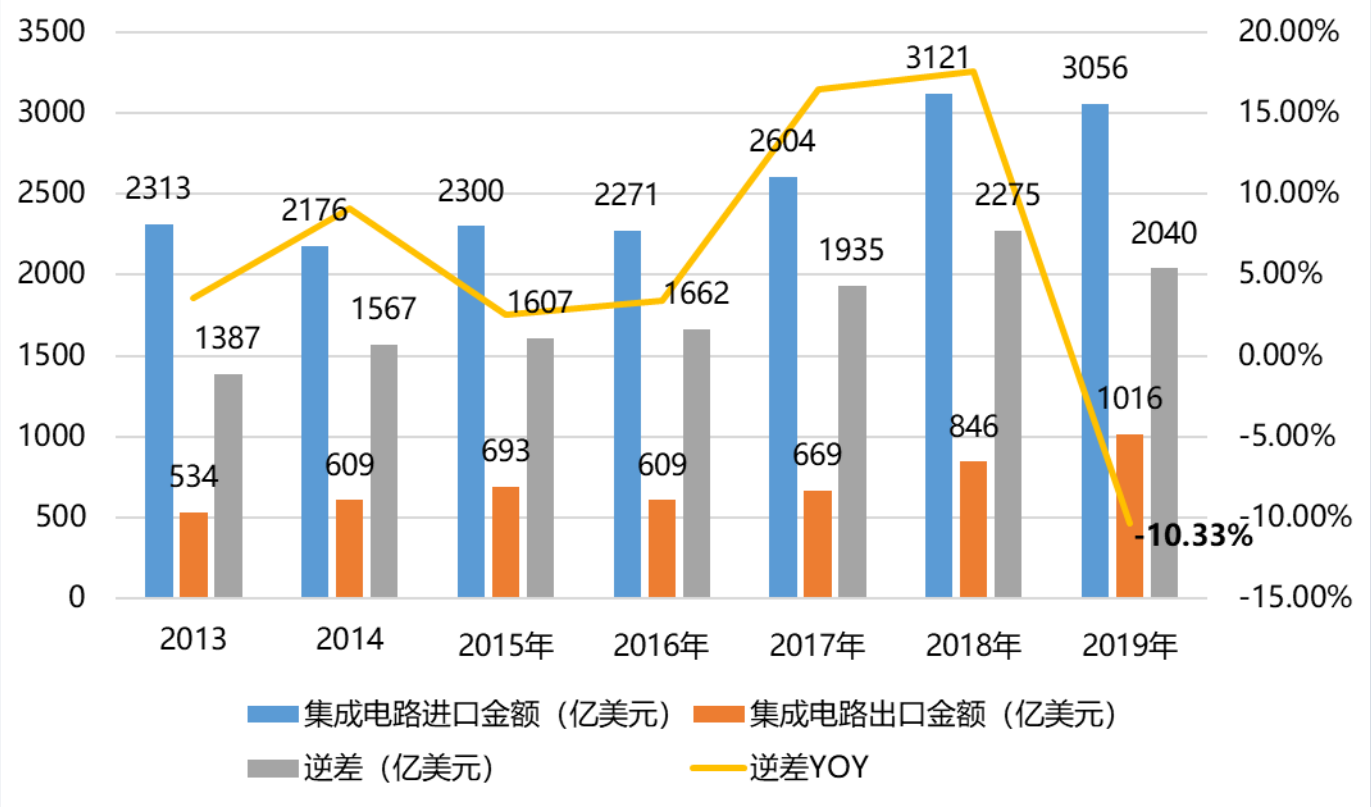
China’s trade in IC industry (in $100 million)



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III. New challenges

- Economic growth is slowing-down
- Resources and environmental constraints
- Fragmentation of social values
- Challenges in global environment
  - US-China conflict, from trade to full competition
- Challenges in overall innovation performance
  - See trade in IC sector
- Addressing system distortions
  - Salary differences in and outside public sector

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Issues related to the innovation system

- China's S&TI policy has been focused on the technology side, but how to make the transition to an innovation policy?
  - Fair competitive environment;
  - Better protection of IPR;
  - Effective and efficient regulations;
- How to cultivate an innovative culture?
  - Independent thinking in education;
  - Tolerance for failures in the market;
- How to make research better linked with the need of the industry?
  - How to foster better linkages among different players?
  - How to improve coordination among different agencies?
- How can Chinese companies better engaged with global market?
  - Restrictions on high-tech exports;
  - Investigations on investments from China.

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IV. Response-recent policy development

- Administrative reform since 2013
  - Simplifying administration and decentralization
  - Strengthening IPR protection
  - ……
- Regulation reform for R&D spending
  - In response to corruption cases
  - Cross-board tightening of regulations
- Consolidation of national R&D programs
  - In response to criticisms on “fragmentation”
  - Consolidation of all programs in 5 functional types;
  - Managed by non-governmental organizations.
- New policy infrastructure—three pillars
  - An inter-ministerial mechanism to coordinate innovation policy
  - A special committee on strategic consultation and comprehensive evaluation;
  - Independent institutions to evaluate the performance of R&D programs

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Response-the case of 14th five year plan for STI

- China's national five year plan is a visionary document based on a very elaborate process to:
  - Illustrate the strategic intention of the nation;
  - Clarify major economic and social development goals, major tasks, and initiatives;
  - provide directions and guidelines for business and government.
- It is a plan system with an overall plan, specialized sectoral plans, and provincial and municipal plans:
  - STI is one of the specialized sectoral plan.

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Outline of National 14th Five Year Plan

- Overall goal—to build innovation-based country
  - Innovation is placed at the core of the national comprehensive development plan;
  - Making self-reliance as the strategic support of national development;
  - Facing the needs from science frontier, from economic development, from national needs, and from public health needs;
  - Implementing three major strategies;
  - Improving national innovation system

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- Strengthening national S&T strategic forces;
  - How to break up US containment?
- Promoting innovative capabilities of the enterprises;
  - More incentives for basic research
- Stimulating the innovative potentials of S&T talents;
  - How to cultivate innovative culture
- Perfecting institutional mechanisms for innovation
  - Institutional reform; IP protection; Open cooperation

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V. Conclusion

- China's STI policy has been relatively successful in getting R&D institutions more productive, but innovative capabilities of Chinese firms are still lagging behind in general;
- Chinese STI policy change has been a gradual learning process full of trial and error;
- A more open international market will help China to make the transition from STI policy to innovation policy, which will bring benefits not only to the Chinese market but also to the global community;
- There is a need to re-examine some of the general framework we use to analyze industrial development, global trade, and public policy.

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Thanks !

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